# NAPA COUNTY TRANSPORTATION AND PLANNING AGENCY (NCTPA)

## AGREEMENT NO. NCTPA 14-21

THIS AGREEMENT is made and entered into as of this 1st day of December, 2014, by and between the Napa County Transportation and Planning Agency, a joint powers agency under the laws of the State of California, hereinafter referred to as "NCTPA", and **Avail Technologies, Inc.** whose mailing address is **1960 Old Gatesburg Road, Suite 200, State College, PA 16803,** hereinafter referred to as "CONTRACTOR";

## RECITALS

**WHEREAS**, NCTPA wishes to purchase and implement Computer Aided Dispatch (CAD) and Automated Vehicle Location (AVL) system for its transit operations; and

**WHEREAS**, NCTPA has authorized the NCTPA Executive Director to enter into a contract for services at its November 19, 2014 meeting; and

**WHEREAS**, CONTRACTOR is willing and has been determined to be qualified to provide such specialized services to NCTPA under the terms and conditions set forth herein;

## TERMS

**NOW, THEREFORE**, NCTPA hereby engages the services of CONTRACTOR, and CONTRACTOR agrees to serve NCTPA in accordance with the terms and conditions set forth herein:

1. **Term of the Agreement**.

(a) The term of this Agreement shall commence on the date first above written and **shall expire** on **December 31, 2017**, unless earlier terminated as provided herein, except that the obligations of the parties under "Insurance" and "Indemnification" shall continue in full force and effect after said expiration date or early termination in relation to acts or omissions occurring prior to such dates during the term of the Agreement, and the obligations of CONTRACTOR to NCTPA shall also continue after said expiration date or early termination in relation to the obligations prescribed by "Confidentiality," "Taxes," and "Access to Records/Retention)".

(b) The term of this Agreement shall be to the date shown above with an option for two (2) one (1) year terms subject to review and recommendation of NCTPA, and the satisfactory negotiation of terms.

2. **Scope of Services**. CONTRACTOR shall provide NCTPA those services set forth in CONTRACTOR's proposal (EXHIBIT A), attached hereto and incorporated by reference herein. EXHIBIT A is provided solely to describe the services to be provided. Any terms contained in EXHIBIT A that add to, vary or conflict with the terms of this Agreement are null and void.

3. **Compensation**.

(a) Rates. In consideration of CONTRACTOR's fulfillment of the promised work, NCTPA shall pay CONTRACTOR at the rate set forth in EXHIBIT B, attached hereto and incorporated by reference herein.

(b) Expenses. Unless explicitly agreed in writing, no direct expenses, including travel or other expenses, will be reimbursed by NCTPA.

(c) Maximum Amount. Notwithstanding subparagraphs (a) and (b), the maximum payments under this Agreement shall be a total of **$2,709,249.53** for equipment, software, professional services and expenses; provided however, that such amounts shall not be construed as guaranteed sums, and compensation shall be based upon services actually rendered.

4. **Method of Payment**.

(a) Invoices. All payments for compensation shall be made only upon presentation by CONTRACTOR to NCTPA of an itemized billing invoice in a form acceptable to the NCTPA Manager of Finance which indicates, at a minimum, CONTRACTOR's name, address, Social Security or Taxpayer Identification Number, itemization of the hours worked or, where compensation is on a per-task basis, a description of the tasks completed during the billing period, the person(s) actually performing the services and the position(s) held by such person(s), and the approved hourly or task rate. CONTRACTOR shall submit invoices not more often than every 30 days to NCTPA Accounts Payable who, after review and approval as to form and content, shall submit the invoice to the NCTPA Manager of Finance no later than fifteen (15) calendar days following receipt.

(b) Legal status. So that NCTPA may properly comply with its reporting obligations under federal and state laws pertaining to taxation, if CONTRACTOR is or becomes a corporation during the term of this Agreement, proof that such status is currently recognized by and complies with the laws of both the state of incorporation or organization and the State of California, if different, shall be maintained on file with the Secretary of NCTPA's Board of Directors at all times during the term of this Agreement in a form satisfactory to the NCTPA Manager of Finance. Such proof shall include, but need not be limited to, a copy of any annual or other periodic filings or registrations required by the state of origin or California, the current address for service of process on the corporation or limited liability partnership, and the name of any agent designated for service of process by CONTRACTOR within the State of California.

5. **Independent Contractor**. CONTRACTOR shall perform this Agreement as an independent contractor. CONTRACTOR and the officers, agents and employees of CONTRACTOR are not, and shall not be deemed, NCTPA employees for any purpose, including workers' compensation and employee benefits. CONTRACTOR shall, at CONTRACTOR's own risk and expense, determine the method and manner by which duties imposed on CONTRACTOR by this Agreement shall be performed; provided, however, that NCTPA may monitor the work performed by CONTRACTOR. NCTPA shall not deduct or withhold any amounts whatsoever from the compensation paid to CONTRACTOR, including, but not limited to amounts required to be withheld for state and federal taxes. As between the parties to this Agreement, CONTRACTOR shall be solely responsible for all such payments.

6. **Specific Performance**. It is agreed that CONTRACTOR, including the agents or employees of CONTRACTOR, shall be the sole providers of the services required by this Agreement. Because the services to be performed by CONTRACTOR under the terms of this Agreement are of a special, unique, unusual, extraordinary, and intellectual or time-sensitive character which gives them a peculiar value, the loss of which cannot be reasonably or adequately compensated in damages in an action of law, NCTPA, in addition to any other rights or remedies which NCTPA may possess, shall be entitled to injunctive and other equitable relief to prevent a breach of this Agreement by CONTRACTOR.

7. **Insurance**. CONTRACTOR shall obtain and maintain in full force and effect throughout the term of this Agreement, and thereafter as to matters occurring during the term of this Agreement, the following insurance coverage:

(a) Workers' Compensation insurance. CONTRACTOR will provide workers' compensation insurance as required by law during the term of this Agreement, CONTRACTOR shall provide workers' compensation insurance for the performance of any of the CONTRACTOR's duties under this Agreement; including but not limited to, coverage for workers' compensation and employer's liability and a waiver of subrogation, and shall provide NCTPA with certification of all such coverage's upon request by NCTPA's Risk Manager.

(b) Liability insurance. CONTRACTOR shall obtain and maintain in full force and effect during the term of this Agreement the following liability insurance coverage's, issued by a company licensed (admitted) to transact business in the State of California and/or having a A.M. Best rating of A VII or better:

1. General Liability. Commercial general liability [CGL] insurance coverage (personal injury and property damage) of not less than ONE MILLION DOLLARS ($1,000,000) combined single limit per occurrence, covering liability or claims for any personal injury, including death, to any person and/or damage to the property of any person arising from the acts or omissions of CONTRACTOR or any officer, agent, or employee of CONTRACTOR under this Agreement.

2. Professional Liability/Errors and Omissions. Professional liability/errors and omissions insurance for all activities of CONTRACTOR arising out of or in connection with this Agreement in an amount not less than ONE MILLION DOLLARS ($1,000,000) per claim.

3. Comprehensive Automobile Liability Insurance. Comprehensive automobile liability insurance (Bodily Injury and Property Damage) on owned, hired, leased and non-owned vehicles used in conjunction with CONTRACTOR's business of not less than ONE MILLION DOLLARS ($1,000,000) combined single limit per occurrence.

(c) Certificates. All insurance coverage's referenced in 7(b), above, shall be evidenced by one or more certificates of coverage or, with the consent of NCTPA's Risk Manager, demonstrated by other evidence of coverage acceptable to NCTPA's Risk Manager, which shall be filed by CONTRACTOR with NCTPA's Deputy Executive Director prior to commencement of performance of any of CONTRACTOR's duties; shall be kept current during the term of this Agreement; shall provide that NCTPA shall be given no less than thirty (30) days prior written notice of any non-renewal, cancellation, other termination, or material change, except that only ten (10) days prior written notice shall be required where the cause of non-renewal or cancellation is non-payment of premium; and shall provide that the inclusion of more than one insured shall not operate to impair the rights of one insured against another insured, the coverage afforded applying as though separate policies had been issued to each insured, but the inclusion of more than one insured shall not operate to increase the limits of the company's liability. For the commercial general liability insurance coverage referenced in 7(b)(1) and, where the vehicles are covered by a commercial policy rather than a personal policy, for the comprehensive automobile liability insurance coverage referenced in 7(b)(3) CONTRACTOR shall also file with the evidence of coverage an endorsement from the insurance provider naming NCTPA, its officers, employees, agents and volunteers as additional insureds and waiving subrogation, and the certificate or other evidence of coverage shall provide that if the same policy applies to activities of CONTRACTOR not covered by this Agreement then the limits in the applicable certificate relating to the additional insured coverage of NCTPA shall pertain only to liability for activities of CONTRACTOR under this Agreement, and that the insurance provided is primary coverage to NCTPA with respect to any insurance or self-insurance programs maintained by NCTPA. The additional insured endorsements for the general liability coverage shall use Insurance Services Office (ISO) Form No. CG 20 09 11 85 or CG 20 10 11 85, or equivalent, including (if used together) CG 2010 10 01 and CG 2037 10 01; but shall not use the following forms: CG 20 10 10 93 or 03 94. Upon request by NCTPA's Risk Manager, CONTRACTOR shall provide or arrange for the insurer to provide within thirty (30) days of the request, certified copies of the actual insurance policies or relevant portions thereof.

(d) Deductibles/Retentions. Any deductibles or self-insured retentions shall be declared to, and be subject to approval by, NCTPA's Risk Manager, which approval shall not be denied unless the NCTPA's Risk Manager determines that the deductibles

or self-insured retentions are unreasonably large in relation to compensation payable under this Agreement and the risks of liability associated with the activities required of CONTRACTOR by this Agreement. At the option of and upon request by NCTPA's Risk Manager if it is determined that such deductibles or retentions are unreasonably high, either the insurer shall reduce or eliminate such deductibles or self-insurance retentions as respects NCTPA, its officers, employees, agents and volunteers or CONTRACTOR shall procure a bond guaranteeing payment of losses and related investigations, claims administration and defense expenses.

8. **Hold Harmless/Defense/Indemnification**. To the fullest extent permitted by law, CONTRACTOR shall hold harmless, defend at its own expense, and indemnify NCTPA and the officers, agents, employees and volunteers of NCTPA from and against any and all liability, claims, losses, damages or expenses, including reasonable attorney's fees, for personal injury (including death) or damage to property, arising from all acts or omissions of CONTRACTOR or its officers, agents, employees, volunteers, contractors and subcontractors in rendering services under this Agreement, excluding, however, such liability, claims, losses, damages or expenses arising from the sole negligence or willful acts of NCTPA or its officers, agents, employees, volunteers, or other contractors or their subcontractors. Each party shall notify the other party immediately in writing of any claim or damage related to activities performed under this Agreement. The parties shall cooperate with each other in the investigation and disposition of any claim arising out of the activities under this Agreement.

9. **Employee Character and Fitness**. CONTRACTOR accepts responsibility for determining and approving the character and fitness of its employees (including volunteers, agents or representatives) to provide the services required of CONTRACTOR under this Agreement, including completion of a satisfactory criminal/background check and period rechecks to the extent permitted by law. Notwithstanding anything to the contrary in this Paragraph, CONTRACTOR, shall hold NCTPA and its officers, agents and employees harmless from any liability for injuries or damages resulting from a breach of this provision or CONTRACTOR's actions in this regard.

10. **Termination for Cause**. If either party shall fail to fulfill in a timely and proper manner that party's obligations under this Agreement or otherwise breach this Agreement and fail to cure such failure or breach within 20 days of receipt of written notice from the other party describing the nature of the breach, the non-defaulting party may, in addition to any other remedies it may have, terminate this Agreement by giving 10 days written notice to the defaulting party in the manner set forth in Paragraph 13 (Notices). NCTPA hereby authorizes the NCTPA Executive Director to make all decisions and take all actions required under this Paragraph to terminate the Agreement on behalf of NCTPA for cause.

11. **Termination for Convenience**. This Agreement may be terminated by NCTPA for any reason and at any time by giving no less than 30 days written notice of such termination and specifying the effective date thereof. NCTPA hereby authorizes the

NCTPA Executive Director to make all decisions and take all actions required under this Paragraph to terminate the Agreement on behalf of NCTPA.

12. **Disposition of, Title to and Payment for Work upon Expiration or Termination**.

(a) Upon expiration of this Agreement or earlier termination of Agreement, all finished or unfinished documents and other materials, if any, and all rights therein shall become, at the option of NCTPA, the property of and shall be promptly returned to NCTPA, although CONTRACTOR may retain a copy of such work for its personal records only. Unless otherwise expressly provided in this Agreement, any copyrightable or patentable work created by CONTRACTOR under this Agreement shall be deemed a "work made for hire" for purposes of copyright or patent law and only NCTPA shall be entitled to claim or apply for the copyright or patent thereof.

(b) CONTRACTOR shall be entitled to receive compensation for any satisfactory work completed prior to receipt of the notice of termination or commenced prior to receipt of the notice and completed satisfactorily prior to the effective date of the termination; except that CONTRACTOR shall not be relieved of liability to NCTPA for damages sustained by NCTPA by virtue of any breach of the Agreement by CONTRACTOR whether or not the Agreement expired or was otherwise terminated, and NCTPA may withhold any payments not yet made to CONTRACTOR for purpose of setoff until such time as the exact amount of damages due to NCTPA from CONTRACTOR is determined.

13. **No Waiver**. The waiver by either party of any breach or violation of any requirement of this Agreement shall not be deemed to be a waiver of any such breach in the future, or of the breach of any other requirement of this Agreement.

14. **Notices**. All notices required or authorized by this Agreement shall be in writing and shall be delivered in person or by deposit in the United States mail, by certified mail, postage prepaid, return receipt requested. Any mailed notice, demand, request, consent, approval or communication that either party desires to give the other party shall be addressed to the other party at the address set forth below. Either party may change its address by notifying the other party of the change of address. Any notice sent by mail in the manner prescribed by this paragraph shall be deemed to have been received on the date noted on the return receipt or five days following the date of deposit, whichever is earlier.

| NCTPA | CONTRACTOR |
|---|---|
| Kate Miller | Jeffrey Pogue |
| Executive Director | Vice President |
| 625 Burnell Street | 1960 Old Gatesburg Road, Suite 200 |
| Napa, CA 94559 | State College, PA 16803-2241 |

15. **Compliance with NCTPA Policies on Waste, Harassment, Drug/Alcohol-Free Workplace, and Computer Use**. CONTRACTOR hereby agrees to comply, and

require its employees and subcontractors to comply, with the following policies, copies of which are on file with the Board Secretary of NCTPA and incorporated by reference herein. CONTRACTOR also agrees that it shall not engage in any activities, or permit its officers, agents and employees to do so, during the performance of any of the services required under this Agreement, which would interfere with compliance or induce violation of these policies by NCTPA employees or contractors.

(a) NCTPA Policy for Maintaining a Harassment Free Work Environment effective June 18, 2008.

(b) NCTPA Drug and Alcohol Policy adopted by resolution of the Board of Directors on July 25, 2008.

(c) Napa County Information Technology Use and Security Policy adopted by resolution of the Napa County Board of Supervisors on April 17, 2001. To this end, all employees and subcontractor's of CONTRACTOR whose performance of services under this Agreement requires access to any portion of the NCTPA computer network shall sign and have on file with NCTPA prior to receiving such access the certification attached to said Policy.

(d) NCTPA System Safety Program Plan adopted by resolution of the Board of Directors on July 25, 2008.

16. **Confidentiality**. Confidential information is defined as all information disclosed to CONTRACTOR which relates to NCTPA's past, present, and future activities, as well as activities under this Agreement. CONTRACTOR shall hold all such information as CONTRACTOR may receive, if any, in trust and confidence, except with the prior written approval of NCTPA, expressed through its Executive Director. Upon cancellation or expiration of this Agreement, CONTRACTOR shall return to NCTPA all written and descriptive matter which contains any such confidential information, except that CONTRACTOR may retain for its files a copy of CONTRACTOR's work product if such product has been made available to the public by NCTPA.

17. **No Assignments or Subcontracts**.

(a) A consideration of this Agreement is the personal reputation of CONTRACTOR; therefore, CONTRACTOR shall not assign any interest in this Agreement or subcontract any of the services CONTRACTOR is to perform hereunder without the prior written consent of NCTPA, which shall not be unreasonably withheld. The inability of the assignee to provide personnel equivalent in experience, expertise, and numbers to those provided by CONTRACTOR, or to perform any of the remaining services required under this Agreement within the same time frame required of CONTRACTOR shall be deemed to be reasonable grounds for NCTPA to withhold its consent to assignment. For purposes of this subparagraph, the consent of NCTPA may be given by its Executive Director.

(b) Effect of Change in Status. If CONTRACTOR changes its status during the term of this Agreement from or to that of a corporation, limited liability partnership, limited liability company, general partnership, or sole proprietorship, such change in organizational status shall be viewed as an attempted assignment of this Agreement by CONTRACTOR. Failure of CONTRACTOR to obtain approval of such assignment under this Paragraph shall be viewed as a material breach of this Agreement.

18. **Amendment/Modification**. Except as specifically provided herein, this Agreement may be modified or amended only in writing signed by both Parties. In particular, only NCTPA, through its Board of Directors in the form of an amendment of this Agreement, may authorize extra and/or changed work beyond the scope of services prescribed by EXHIBIT A. Failure of CONTRACTOR to secure such authorization in writing in advance of performing any of the extra or changed work shall constitute a waiver of any and all rights to adjustment in the contract price or contract time and no compensation shall be paid for such extra work.

19. **Interpretation; Venue**.

(a) Interpretation. The headings used herein are for reference only. The terms of the Agreement are set out in the text under the headings. This Agreement shall be governed by the laws of the State of California without regard to the choice of law or conflicts.

(b) Venue. This Agreement is made in Napa County, California. The venue for any legal action in state court filed by either party to this Agreement for the purpose of interpreting or enforcing any provision of this Agreement shall be in the Superior Court of California, County of Napa, a unified court. The venue for any legal action in federal court filed by either party to this Agreement for the purpose of interpreting or enforcing any provision of this Agreement lying within the jurisdiction of the federal courts shall be the Northern District of California. The appropriate venue for arbitration, mediation or similar legal proceedings under this Agreement shall be Napa County, California; however, nothing in this sentence shall obligate either party to submit to mediation or arbitration any dispute arising under this Agreement.

20. **Compliance with Laws**. CONTRACTOR shall observe and comply with all currently applicable Federal, State and local laws, ordinances, and codes, including but not limited to the Federal laws contained in Attachment 1, and as amended from time to time. Such laws shall include, but not be limited to, the following, except where prohibited by law:

(a) Non-Discrimination. During the performance of this Agreement, CONTRACTOR and its subcontractor's shall not deny the benefits thereof to any person on the basis of sex, race, color, ancestry, religion or religious creed, national origin or ethnic group identification, sexual orientation, marital status, age (over 40), mental disability, physical disability or medical condition (including cancer, HIV and AIDS), nor shall they discriminate unlawfully against any employee or applicant for employment because of sex, race, color, ancestry, religion or religious creed, national origin or ethnic

group identification, sexual orientation, marital status, age (over 40), mental disability, physical disability or medical condition (including cancer, HIV and AIDS), or use of family care leave. CONTRACTOR shall ensure that the evaluation and treatment of employees and applicants for employment are free of such discrimination or harassment. In addition to the foregoing general obligations, CONTRACTOR shall comply with the provisions of the Fair Employment and Housing Act (Government Code section 12900, et seq.), the regulations promulgated there under (Title 2, California Code of Regulations, section 7285.0, et seq.), the provisions of Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (sections 11135-11139.5) and any state or local regulations adopted to implement any of the foregoing, as such statutes and regulations may be amended from time to time. To the extent this Agreement subcontracts to CONTRACTOR services or works required of NCTPA by the State of California pursuant to Agreement between NCTPA and the State, the applicable regulations of the Fair Employment and Housing Commission implementing Government Code section 12990 (a) through (f), set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations are expressly incorporated into this Agreement by reference and made a part hereof as if set forth in full, and CONTRACTOR and any of its subcontractor's shall give written notice of their obligations there under to labor organizations with which they have collective bargaining or other agreements.

(b) Documentation of Right to Work. CONTRACTOR agrees to abide by the requirements of the Immigration and Control Reform Act pertaining to assuring that all newly-hired employees of CONTRACTOR performing any services under this Agreement have a legal right to work in the United States of America, that all required documentation of such right to work is inspected, and that INS Form 1-9 (as it may be amended from time to time) is completed and on file for each employee. CONTRACTOR shall make the required documentation available upon request to NCTPA for inspection.

(c) Inclusion in Subcontracts. To the extent any of the services required of CONTRACTOR under this Agreement are subcontracted to a third party; CONTRACTOR shall include all of the provisions of this Section, and any applicable Federal provisions contained in Attachment 1 in all such subcontracts as obligations of the subcontractor.

(d) Federal Required Clauses. Notwithstanding anything to the contrary in this Agreement, pursuant to 29 C.F.R. 97.36(i), CONTRACTOR is hereby notified of, and shall comply with the requirements and regulations imposed by the Federal Transit Administration for federally funded contracts, to the extent they are applicable to the services to be provided under this Agreement, and as set forth in Attachment 1, attached hereto and incorporated herein by reference.

(e) Federal Changes. CONTRACTOR shall at all times comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Request for Proposal for Computer

Aided Dispatch (CAD) and Automated Vehicle Location (AVL) System released on May 8, 2014 and Attachment 1, and the Master Agreement between NCTPA and FTA, as they may be amended or promulgated from time to time during the term of this contract. CONTRACTOR's failure to so comply shall constitute a material breach of this contract.

(f) No Obligation by the Federal Government.

1. NCTPA and CONTRACTOR acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to the NCTPA, CONTRACTOR, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

2. CONTRACTOR agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

(g) Disadvantaged Business Enterprises.

This contract is subject to the requirements of Title 49, Code of Federal Regulations, Part 26, Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs if CONTRACTOR intends to engage any subcontractors.

(h) Incorporation of Federal Transit Administration (FTA) Terms - The preceding provisions include, in part, certain Standard Terms and Conditions required by DOT, whether or not expressly set forth in the preceding contract provisions. All relevant contractual provisions required by DOT, as set forth in FTA Circular 4220.1F shall be compiled by the parties. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. CONTRACTOR shall not perform any act, fail to perform any act, or refuse to comply with any (name of grantee) requests which would cause (name of grantee) to be in violation of the FTA terms and conditions.

21. **Taxes**. CONTRACTOR agrees to file federal and state tax returns or applicable withholding documents and to pay all applicable taxes or make all required withholdings on amounts paid pursuant to this Agreement and shall be solely liable and responsible to make such withholdings and/or pay such taxes and other obligations including, without limitation, state and federal income and FICA taxes. CONTRACTOR agrees to indemnify and hold NCTPA harmless from any liability it may incur to the United States or the State of California as a consequence of CONTRACTOR's failure to pay or withhold, when due, all such taxes and obligations. In the event that NCTPA is audited for compliance regarding any withholding or other applicable taxes or amounts,

CONTRACTOR agrees to furnish NCTPA with proof of payment of taxes or withholdings on those earnings.

22. **Access to Records/Retention**. NCTPA, any federal or state grantor agency funding all or part of the compensation payable hereunder, the State Controller, the Comptroller General of the United States, or the duly authorized representatives of any of the above, shall have access to any books, documents, papers and records of CONTRACTOR which are directly pertinent to the subject matter of this Agreement for the purpose of making audit, examination, excerpts and transcriptions. Except where longer retention is required by any federal or state law, CONTRACTOR shall maintain all required records for at least seven (7) years after NCTPA makes final payment for any other work authorized hereunder and all pending matters are closed, whichever is later.

23. **Authority to Contract**. CONTRACTOR and NCTPA each warrant hereby that they are legally permitted and otherwise have the authority to enter into and perform this Agreement.

24. **Conflict of Interest.**

(a) Covenant of No Undisclosed Conflict. The parties to the Agreement acknowledge that they are aware of the provisions of Government Code section 1090, et seq., and section 87100, et seq., relating to conflict of interest of public officers and employees. CONTRACTOR hereby covenants that it presently has no interest not disclosed to NCTPA and shall not acquire any interest, direct or indirect, which would conflict in any material manner or degree with the performance of its services or confidentiality obligation hereunder, except as such as NCTPA may consent to in writing prior to the acquisition by CONTRACTOR of such conflict. CONTRACTOR further warrants that it is unaware of any financial or economic interest of any public officer or employee of NCTPA relating to this Agreement. CONTRACTOR agrees that if such financial interest does exist at the inception of this Agreement, NCTPA may terminate this Agreement immediately upon giving written notice without further obligation by NCTPA to CONTRACTOR under this Agreement.

(c) Statements of Economic Interest. CONTRACTOR acknowledges and understands that NCTPA has developed and approved a Conflict of Interest Code as required by state law which requires CONTRACTOR to file with the Elections Division of the Napa County Assessor-Clerk Recorder “assuming office”, “annual”, and “leaving office” Statements of Economic Interest as a “consultant”, as defined in section 18701(a)(2) of Title 2 of the California Code of Regulations, unless the NCTPA Executive Director has determined in writing that CONTRACTOR, although holding a “designated” position as a consultant, has been hired to perform a range of duties so limited in scope as to not be required to fully comply with such disclosure obligation. CONTRACTOR agrees to timely comply with all filing obligations for a consultant under NCTPA’s Conflict of Interest Code unless such a determination is on file on the filing dates for each of the required Statements of Economic Interest.

25. **Non-Solicitation of Employees**. Each party agrees not to solicit for employment the employees of the other party who were directly involved in the performance of the services hereunder for the term of this Agreement and a period of six (6) months after termination of this Agreement except with the written permission of the other party, except that nothing in this Paragraph shall preclude NCTPA from publishing or otherwise distributing applications and information regarding NCTPA job openings where such publication or distribution is directed to the general public.

26. **Third Party Beneficiaries**. Nothing contained in this Agreement shall be construed to create any rights in third parties and the parties do not intend to create such rights.

27. **Attorney's Fees**. In the event that either party commences legal action of any kind or character to either enforce the provisions of this Agreement or to obtain damages for breach thereof, the prevailing party in such litigation shall be entitled to all costs and reasonable attorney's fees incurred in connection with such action.

28. **Severability**. If any provision of this Agreement, or any portion thereof, is found by any court of competent jurisdiction to be unenforceable or invalid for any reason, such provision shall be severable and shall not in any way impair the enforceability of any other provision of this Agreement.

29. **Entirety of Contract**. This Agreement constitutes the entire agreement between the parties relating to the subject of this Agreement and supersedes all previous agreements, promises, representations, understandings and negotiations, whether written or oral, among the parties with respect to the subject matter hereof.

30. **Extensions Authorized.** The Executive Director is delegated authority to execute amendments to extend the term of this Agreement, if needed from time to time.

**IN WITNESS WHEREOF**, this Agreement was executed by the parties hereto as of the date first above written.

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| "NCTPA" | "CONTRACTOR"<br>Avail Technologies, Inc. |
| By_____<br>Kate Miller, Executive Director | By_____<br>Dorsey E. Houtz, President and CEO |
| ATTEST: | |
| By_____<br>Karalyn E. Sanderlin, Board Secretary | By _____<br>G. Rick Spangler, Vice President |
| Approved as to Form: | |
| By_____<br>NCTPA Counsel | |

# ATTACHMENT 1 FEDERAL CONTRACT REQUIREMENTS

1. AMENDMENTS

Any changes in the activities to be performed under this Agreement shall be incorporated in written amendments, which shall specify the changes in work performed and any adjustments in compensation and schedule. All amendments shall be executed by the NCTPA Executive Director or a designates representative and CONTRACTOR. No claim for additional compensation or extension of time shall be recognized unless contained in a duly executed amendment.

2. TERMINATION

Contractor's failure to perform any term or condition of this Agreement as a result of conditions beyond its control such as, but not limited to, war, strikes, fires, floods, acts of God, governmental restrictions, power failures, or damage or destruction of any network facilities or servers, shall not be deemed a breach of this Agreement, and may be cause for termination of the Agreement.

3. RETENTION OF RECORDS

Contractor agrees to keep, in accordance with generally accepted accounting principles, all records pertaining to the project for audit purposes for a minimum of three (3) years following final payment to Contractor or four (4) years following the fiscal year of the last expenditure under this Agreement, whichever is longer, except in the event of litigation or settlement of claims arising from the performance of this contract, in which case Contractor agrees to maintain same until NCTPA, the FTA Administrator, the Comptroller General, or any of their duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto.

4. AUDITS

Contractor agrees to grant NCTPA or any agency that provides NCTPA with funds for the Project, including but not limited to, the U.S. Department of Transportation, FTA, the Comptroller General of the United States, the State, and their authorized representatives access to Contractor's books and records for the purpose of verifying that funds are properly accounted for and proceeds are expended in accordance with the terms of the Agreement. All documents shall be available for inspection during normal business hours at any time while the Project is underway, and for the retention period specified herein.

The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

Contractor further agrees to include in all its third-party contracts hereunder a provision to the effect that the contractor agrees that NCTPA, the U.S. Department of Transportation, FTA, the Comptroller General of the United States, the State, or any of their duly authorized representatives shall have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, during normal business hours, for the term specified above. The term "contract" as used in this clause excludes agreements not exceeding $25,000.

5. PATENT AND RIGHTS IN DATA

A. **Rights in Data** - This following requirements apply to each contract involving experimental, developmental or research work:

(1) The term "subject data" used in this clause means recorded information, whether or not copyrighted, that is delivered or specified to be delivered under the contract. The term includes graphic or pictorial delineation in media such as drawings or photographs; text in specifications or related performance or design-type documents; machine forms such as punched cards, magnetic tape, or computer memory printouts; and information retained in computer memory. Examples include, but are not limited to: computer software, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information. The term "subject data" does not include financial reports, cost analyses, and similar information incidental to contract administration.

(2) The following restrictions apply to all subject data first produced in the performance of the contract to which this Attachment has been added:

(a) Except for its own internal use, the Purchaser or Contractor may not publish or reproduce subject data in whole or in part, or in any manner or form, nor may the Purchaser or Contractor authorize others to do so, without the written consent of the Federal Government, until such time as the Federal Government may have either released or approved the release of such data to the public; this restriction on publication, however, does not apply to any contract with an academic institution.

(b) In accordance with 49 C.F.R. § 18.34 and 49 C.F.R. § 19.36, the Federal Government reserves a royalty-free, non-exclusive and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, for "Federal Government purposes," any subject data or copyright described in subsections (2)(b)1 and (2)(b)2 of this clause below. As used in the previous sentence, "for Federal Government purposes," means use only for the direct purposes of the Federal Government. Without the copyright owner's consent, the Federal Government may not extend its Federal license to any other party.

1. Any subject data developed under that contract, whether or not a copyright has been obtained; and

2. Any rights of copyright purchased by the Purchaser or Contractor using Federal assistance in whole or in part provided by FTA.

(c) When FTA awards Federal assistance for experimental, developmental, or research work, it is FTA's general intention to increase transportation knowledge available to the public, rather than to restrict the benefits resulting from the work to participants in that work. Therefore, unless FTA determines otherwise, the Purchaser and the Contractor performing experimental, developmental, or research work required by the underlying contract to which this Attachment is added agrees to permit FTA to make available to the public, either FTA's license in the copyright to any subject data developed in the course of that contract, or a copy of the subject data first produced under the contract for which a copyright has not been obtained. If the experimental, developmental, or research work, which is the subject of the underlying contract, is not completed for any reason whatsoever, all data developed under that contract shall become subject data as defined in subsection (a) of this clause and shall be delivered as the Federal Government may direct. This subsection (c) , however, does not apply to adaptations of automatic data processing equipment or programs for the Purchaser or Contractor's use whose costs are financed in whole or in part with Federal assistance provided by FTA for transportation capital projects.

(d) Unless prohibited by state law, upon request by the Federal Government, the Purchaser and the Contractor agree to indemnify, save, and hold harmless the Federal Government, its officers, agents, and employees acting within the scope of their official duties against any liability, including costs and expenses, resulting from any willful or intentional violation by the Purchaser or Contractor of proprietary rights, copyrights, or right of privacy, arising out of the publication, translation, reproduction, delivery, use, or disposition of any data furnished under that contract. Neither the Purchaser nor the Contractor shall be required to indemnify the Federal Government for any such liability arising out of the wrongful act of any employee, official, or agents of the Federal Government.

(e) Nothing contained in this clause on rights in data shall imply a license to the Federal Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Federal Government under any patent.

(f) Data developed by the Purchaser or Contractor and financed entirely without using Federal assistance provided by the Federal Government that has been incorporated into work required by the underlying contract to which this Attachment has been added is exempt from the requirements of subsections (b), (c), and (d) of this clause , provided that the Purchaser or Contractor identifies that data in writing at the time of delivery of the contract work.

(g) Unless FTA determines otherwise, the Contractor agrees to include these requirements in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance provided by FTA.

(3) Unless the Federal Government later makes a contrary determination in writing, irrespective of the Contractor's status (i.e. , a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual, etc.), the Purchaser and the Contractor agree to take the necessary actions to provide, through FTA, those rights in that invention due the Federal Government as described in U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," 37 C.F.R. Part 401.

(4) The Contractor also agrees to include these requirements in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance provided by FTA.

B. **Patent Rights** - This following requirements apply to each contract involving experimental, developmental, or research work:

(1) General - If any invention, improvement, or discovery is conceived or first actually reduced to practice in the course of or under the contract to which this Attachment has been added, and that invention, improvement, or discovery is patentable under the laws of the United States of America or any foreign country, the Purchaser and Contractor agree to take actions necessary to provide immediate notice and a detailed report to the party at a higher tier until FTA is ultimately notified.

(2) Unless the Federal Government later makes a contrary determination in writing, irrespective of the Contractor's status (a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual), the Purchaser and the Contractor agree to take the necessary actions to provide, through FTA, those rights in that invention due the Federal Government as described in U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," 37 C.F.R. Part 401.

(3) The Contractor also agrees to include the requirements of this clause in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance provided by FTA.

6. EQUAL EMPLOYMENT OPPORTUNITY/ CIVIL RIGHTS

In accordance with Title VI of the Civil Rights Act, as amended (42 U.S.C. § 2000d); Section 303 of the Age

Discrimination Act of 1975, as amended (42 U.S.C. § 6102); Section 202 of the Americans with Disabilities Act of 1990 (42 U.S.C. § 12132; and 49 U.S.C. § 5332 for federally funded projects, Contractor agrees that it will not, on the grounds of race, religious creed, color, national origin, age, physical disability, or sex, discriminate or permit discrimination against any employee or applicant for employment

7. DISADVANTAGED BUSINESS ENTERPRISES (DBE)

The requirements of 49 CFR Part 26, Regulations of the U.S. Department of Transportation, apply to this contract. It is the policy of the Napa County Transportation and Planning Agency to practice nondiscrimination based on race, color, sex, or national origin in the award or performance of this contract. All firms qualifying under this solicitation are encouraged to submit bids/proposals. Award of this contract will be conditioned upon satisfying the requirements of this bid specification. These requirements apply to all bidders/offerors, including those who qualify as a DBE. A DBE contract goal of 10 percent has been established for this contract. The bidder/offeror shall make good faith efforts, as defined in Appendix A, 49 CFR Part 26 (Attachment 1), to meet the contract goal for DBE participation in the performance of this contract.

The bidder/offeror will be required to submit the following information: (1) the names and addresses of DBE firms that will participate in the contract; (2) a description of the work that each DBE firm will perform; (3) the dollar amount of the participation of each DBE firm participating; (4) Written documentation of the bidder/offeror's commitment to use a DBE subcontractor whose participation it submits to meet the contract goal; (5) Written confirmation from the DBE that it is participating in the contract as provided in the commitment made under (4); and (6) if the contract goal is not met, evidence of good faith efforts.

The contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 15 days from the receipt of each payment the prime contract receives from NCTPA. The prime contractor agrees further to return retainage payments to each subcontractor within thirty days after the subcontractors work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the NCTPA. This clause applies to both DBE and non-DBE subcontracts.

Failure to comply with the terms of this provision may result in any or all of the following actions including but not limited to:

1. A finding of material breach of contract
2. Suspension of payment of invoices
3. Bringing to the attention of the Department of Transportation any false, fraudulent, or dishonest conduct in connection with the program, so that DOT can take the steps (e.g., referral to the Department of Justice for criminal prosecution, referral to the DOT Inspector General, action under suspension and debarment or Program Fraud and Civil Penalties result) provided in 26.109.

The obligation of the bidder/offeror is to make good faith efforts. The bidder/offeror can demonstrate that it has done so either by meeting the contract goal or documenting good faith efforts. Examples of good faith efforts are found in Appendix A to Part 26. Forms 1 and 2 should be provided as part of the solicitation documents.

8. INCORPORATION OF FEDERAL TRANSIT ADMINISTRATION (FTA) TERMS

In the event that this project is funded by FTA in whole or in part, all contractual provisions required by DOT, as set forth in FTA Circular 4220.1E are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The Contractor shall not perform any act, fail to perform any act, or refuse to comply with any NCTPA requests which would cause NCTPA to be in violation of the FTA terms and conditions.

9. ACCESS REQUIREMENTS FOR INDIVIDUALS WITH DISABILITIES (Reserved)

10. STATE ENERGY CONSERVATION PLAN

Contractor shall comply with all mandatory standards and policies relating to energy efficiency that are contained in the State energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. § 6321)

12. CLEAN AIR AND WATER POLLUTION ACTS

Contractor agrees to comply with the applicable requirements of all standards, orders, or requirements issued under the Clean Air Act (42 U.S.C. § 7401 *et seq.*), the Clean Water Act (33 U.S.C. § 1251 *et seq.*), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15). The Contractor agrees to report each violation to NCTPA and understands and agrees that NCTPA will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office. (2) The Contractor also agrees to include

these requirements in each subcontract exceeding $100,000 financed in whole or in part with Federal assistance.

13. LOBBYING

Contractor agrees to comply with the restrictions on the use of federal funds for lobbying activities set forth in 31 U.S.C. § 1352 and 49 CFR Part 20. In addition, in the event the Agreement exceeds $100,000, Contractor agrees to comply with the Byrd Anti-Lobbying Amendment, 31 U.S.C. 1352, as amended by the Lobbying Disclosure Act of 1995, P.L. 104-65 and shall file the certification required by 49 CFR Part 20, "New Restrictions on Lobbying." Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award coved by 31 U.S.C. 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-Federal funds with respect to that Federal contract, grant or award covered by 31 U.S.C. 1352. Such disclosures are forwarded from tier to tier up to the recipient. APPENDIX A, 49 CFR PART 20--CERTIFICATION REGARDING LOBBYING Certification for Contracts, Grants, Loans, and Cooperative Agreements (To be submitted with each proposal or offer exceeding $100,000).

14. INDEMNIFICATION

To the fullest extent permitted by law, Contractor shall hold harmless, defend at its own expense, and indemnify NCTPA and the officers, agents, employees and volunteers of NCTPA from any and all liability, claims, losses, damages or expenses, including reasonable attorney's fees, for personal injury (including death) or damage to property, from claims that to the extent they arise out of, pertain to, or relate to the negligent acts or omissions of Contractor or its officers, agents, employees, volunteers, contractors and subcontractors in rendering professional services under this Agreement which constitute negligence, recklessness, or willful misconduct, excluding, however, such liability, claims, losses, damages or expenses arising from the negligence or willful acts of NCTPA or its officers, agents, employees or volunteers or any third parties. Notwithstanding the foregoing, the parties agree that Contractor's obligation to defend the NCTPA is solely limited to reimbursing NCTPA for its reasonable costs for defending a claim including reasonable attorney's fee, incurred by NCTPA which are ultimately determined to be due to Contractor's negligence, recklessness or willful misconduct. Each party shall notify the other party immediately in writing of any claim or damage related to activities performed under this Agreement.

15. COMPLIANCE WITH LAWS

Contractor shall comply with any and all laws, statutes, ordinances, rules, regulations, and requirements of the federal, state or local government, and any agency thereof, including, but not limited to NCTPA, the U.S. DOT and FTA, which relate to or in any manner affect the performance of this Agreement. Those law, statutes, ordinances, rules, regulations, and procedural requirements that are imposed on NCTPA as a Recipient of federal or state funds are hereby in turn imposed on Contractor (including, but not limited to, 49 CFR Part 18, "Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments"), and are herein incorporated by this reference and made a part hereof.

20. NO GOVERNMENT OBLIGATION TO THIRD PARTIES

(a) Contractor acknowledges and agrees that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to NCTPA, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

(b) The Contractor agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

21. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS AND RELATED ACT

(a) The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § § 3801 et seq. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract or the FTA assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.

(b) The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a contract connected with a project that is financed in whole or in part with Federal assistance

originally awarded by FTA under the authority of 49 U.S.C. § 5307, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5307(n)(1) on the Contractor, to the extent the Federal Government deems appropriate. (3) The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

# EXHIBIT A

## SCOPE OF SERVICES

*(see attached)*

**II. COMPLIANCE WITH GOVERNMENT CODE SECTION 7550.** As required by Government Code section 7550, each document or report prepared by CONTRACTOR for or under the direction of NCTPA pursuant to this Agreement shall contain the numbers and dollar amounts of the Agreement and all subcontracts under the Agreement relating to the preparation of the document or written report. The Agreement and subcontract dollar amounts shall be contained in a separate section of the document or written report. If multiple documents or written reports are the subject of the Agreement or subcontracts, the disclosure section may also contain a statement indicating that the total contract amount represents compensation for multiple documents or written report.

avail TECHNOLOGIES, INC.

# SolTrans, Petaluma Transit, & Napa VINE

## Proposal for Computer Aided Dispatch (CAD) & Automated Vehicle Location (AVL) System

COPY

SUBMITTED:

JUNE 19, 2014

June 19, 2014

Mr. David Berman
Program Analyst
SolTrans
311 Sacramento Street
Vallejo, California 94590

Dear Mr. Berman,

Avail Technologies, Inc. is pleased to provide SolTrans, Petaluma Transit, and NCPTA with our proposal in response to your Request for Proposal: Computer Aided Dispatch and Automated Vehicle Location System. Avail has crafted our solution and prepared this proposal based on nearly two decades of experience designing, developing, and maintaining Intelligent Transportation Systems (ITS) for Public Transit properties throughout North America.

If you have any questions during your evaluation of our proposal, please do not hesitate to contact us:


Proposer Identification:
Avail Technologies, Inc.
1960 Old Gatesburg Rd.
Suite 200
State College, PA 16803

POC: Mark Krueger
Email: proposals@availTec.com
Phone: 814-234-3394, ext. 1062
Fax: 814-234-3393


Authority to Obligate the Company: Dorsey E. Houtz — President or Jeffrey Pogue — Treasurer

Avail Technologies, Inc. is a financially strong private corporation with no parent company, committed to supporting all of our projects.

Proposal Validity: This offer shall remain valid for a period of 90 days from June 19, 2014. Should SolTrans, Petaluma Transit, or NCPTA need additional time, please contact Avail for an offer extension.

Receipt of Addenda: Avail acknowledges receipt of addenda A through E.

As requested in the RFP, Avail has reviewed all contractual terms and conditions and is willing to enter into agreements with all three (3) agencies utilizing the standard agency agreement.

Submitting this proposal is our opportunity to demonstrate our ability to revolutionize your technology by partnering with you to help create a greater level of efficiency and reliability. We understand that all three properties aim to:

- ✓ Improve on-time performance
- ✓ Improve dispatch reliability and efficiency
- ✓ Increase ridership
- ✓ Improve scheduling and planning
- ✓ Improve data management and reporting

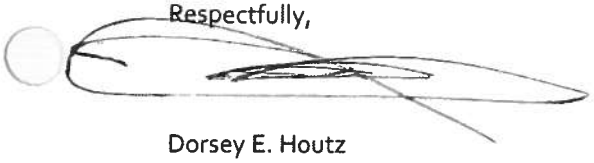
Avail will guarantee that you and the community you serve get every benefit possible from this investment by developing a long-term advanced user training program, maintaining regular customer support visits, and proactively supporting your IT staff through remote monitoring to spearhead any issues before they become a problem.

A guarantee is something of a rarity in the transit industry, but at Avail we are confident in our ability to satisfy our customers through open and honest communication and by adhering to our traditional values mindset. Our Firm Fixed Price is just that — firm and fixed. Once we agree on a contract the price won't change unless the scope changes. The long-term training program, the customer support visits, the remote monitoring of your system to keep an eye out for potential issues — it's included and all part of our pledge to you.

Avail's seasoned team of professionals lead by Mr. Milo Thomas, a certified Project Management Professional, is dedicated to providing you with a solution that in modular and easy to understand so it can be fully adopted and utilized by your agencies. Our traditional values approach combined with our progressive technologies complemented by Avail's unique and innovative processes provides a solid platform on which we can confidently base our 100% commitment to your success. This is a bold statement for any company, so we ask that you don't just take our word for it — give our customers a call. They've been in a situation just like you are now, comparing Avail with other vendors who may appear to offer a lower cost or a quicker turnaround time. Ultimately these customers chose Avail because they were looking for a vendor partner that was wholeheartedly committed to their satisfaction and success, not just selling and installing a system.

We know that procurements of this nature invite a certain level of risk to agencies that are making large investments in their future. By partnering with Avail and entrusting your project to our talented and experienced team, you're mitigating that risk and paving your road to success. We hope that the Evaluation Committee finds our proposal informative and we appreciate the opportunity to work with you as you move forward in this project.

Respectfully,



Dorsey E. Houtz
President & CEO
Avail Technologies, Inc.

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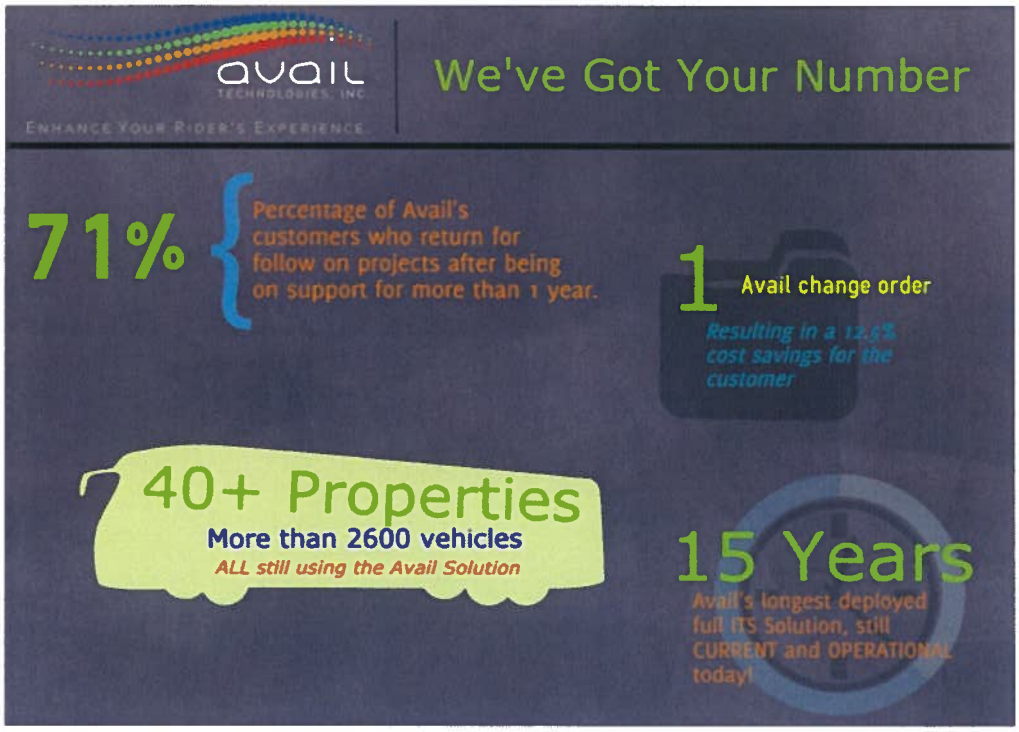
# 1 EXECUTIVE SUMMARY

At Avail, we realize that agencies within the public transit industry are facing federal funding shortfalls and that responsible stewardship of awards is more important than ever. We understand your focus on securing user-friendly automated technologically relevant solutions that support your business processes today. Our ITS System provides the high quality, expandable, backwards compatible and practical solution that your agencies need. Avail's professional, knowledgeable, and experienced staff is dedicated to forging a life-long partnership between all three agencies and Avail. Rooted in old-fashioned values with a traditional approach to doing business, the Avail team prides itself on its ability to work with our customers through open and honest communication balancing innovation and cutting-edge concepts with our customer's goals and objectives—guaranteeing your success.

Avail Technologies is the *premier integrator* of ITS technology in the mid-sized public transit industry. With a strong market already established in your local area, Avail consistently delivers reliable, secure, cost effective solutions to our customers in California and beyond. As such, Avail understands how important responsible citizenship is to your agencies and while our technology is dynamic, scalable, and infinitely expandable we believe you will be equally drawn to our commitment to serving our customers with the same reverence that you employ in your own efforts to enhance your riders' experiences.

## 1.1 RECIPE FOR SUCCESS

Thinking outside the box, at Avail we offer value, not discounts. Our goal is to continually build this value through **increased functionality**, **superior performance**, and **unparalleled service** throughout the life of your project and beyond. By design, Avail focuses on serving mid-sized transit agencies just like yours. We choose to zero-in on this niche market because we take a great deal of pride in providing **exceptional** customized service to agencies with unique needs like those of SolTrans, Petaluma, and Napa. Focusing our pursuits in this manner allows us to treat each and every customer as if they were our only customer.



## 1.2 Understanding Your Needs

Running a transit agency today is wrought with challenges. Every day you face increasing operational costs, reduced funding, and an ever changing demand for the services you provide; and that's not easy! Avail understands these challenges that your agencies face while trying to provide the best customer experience and integrated transit solutions in northern California. You have identified as many of your peers have that ITS technology can play a great role in addressing those challenges and to help each of you achieve your primary goals of improving on-time performance, improving dispatch reliability and efficiency, improving scheduling and planning, and improving data management and reporting to increase your overall ridership.

Having done this for over 20 years, Avail also understands that ITS systems are large investments and add an additional set of challenges in their own right as you attempt to deploy and adopt them into your daily operations. Sometimes the preferred concepts of agencies exceed the available budgets or staff resources; sometimes you choose a vendor that doesn't offer the level of solution or services you truly need to be successful, or simply doesn't have the experience. Avail has the solution, services, and experience you need to be successful.

In addition, Avail is experienced with multi-agency procurements involving agencies with varied operations and bus environments. Pioneer Valley Transit Authority in Massachusetts, one of Avail's customer partners, is comprised of four agencies that are each unique in their operations: SATCO with 120 fixed route buses' VATCO with 45 fixed route; University of Massachusetts with 20 fixed route shuttles and student drivers; and finally Hulmes Transportation with 135 paratransit vans operating out of 7 garages. We worked closely with each agency to ensure each got the attention they needed to be successful, while ensuring all of technologies dovetailed into a seamless solution. This project was a great success for PVTA and today we are proud to say they are a satisfied customer whose staff and riders are benefiting daily from our solution!

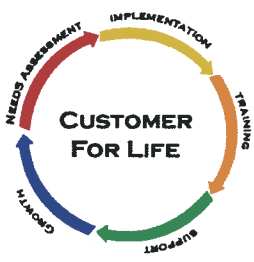
Avail's focus and dedication to agencies of your size means we have crafted our solutions to be modular in nature so they can be easily expanded to meet your available funding or as your needs grow, and we have developed our services to be truly hands-on and immersive while following a proven integration process geared around mitigating risk and making you successful. To further demonstrate this, we decided to include your risk mitigation table from your Concept of Operations document, which we thought was spot on! For each risk you identified, we wanted to provide a small snapshot of just some of the things we do to mitigate those risks:

| *No.* | *Risk Identification* | *Risk Mitigation Statement* |
|---|---|---|
| 1 | Lack of information on the varied, dissimilar bus environments available to providers prior to bid. | Avail has worked with all the major bus vendors and has OEM relationships with them as well. A list of buses and manufacturers is typically all that is required to accurately bid on a project. Once Avail has been chosen then we do a thorough bus survey of the entire fleet to determine the best solution for each vehicle type. Avail has never come back to an agency and required more money than in our initial bid once the contract has been awarded. |
| 2 | Disruption to service during bus equipment installation. | As part of our process Avail includes discussions regarding vehicle availability. There are multiple options to alleviate this risk including installing vehicles during off peak or night time, making use of spare or contingency vehicles during installation and concentrating efforts on a single vehicle at a time to ensure that your fleet is fully capable of handling peak operations. |
| 3 | The available funding is inadequate for the preferred system concept. | Avail's suite of products provides flexibility for integrating a base system which allows for basic functionality required to enhance operations, but also allows for additional functionality to be added at a later date if funding dictates. Our IVU and MDT control head along with our MyAvail Dispatch provides the foundation for which additional technologies can be added at a later date, but still provides the reporting and operational capabilities required to operate in today's transit environment. |

| No. | Risk Identification | Risk Mitigation Statement |
|---|---|---|
| 4 | Agency lacks staff resources to properly maintain the new system. | Avail provides detailed documentation for all aspects of the system including each vehicle type including a complete set of schematics for each bus type and all equipment. Avail's system is very maintenance friendly and your maintenance staff is only asked to troubleshoot or replace modular level components. As part of our process we thoroughly train all IT admin and maintenance staff to ensure they can fully maintain the system. |
| 5 | Lack of staff resources to oversee the installation of bus equipment. | Avail works with your staff before any installation occurs to ensure that complete documentation has been provided related to the installation and that locations and equipment have been approved by the agency. During installations we provide a pre/post check test as well as an installation test. Maintenance personnel are only required to perform these tests for each vehicle and need not be present during the entire installations. However, we do encourage Maintenance staff and agency personnel to be comfortable with our process and procedure and welcome them to be involved for as much of the process as they would like to, especially during the beginning period of the installation phase of the project in order to feel comfortable with our installation and process. |
| 6 | Agency lacks current knowledge of how to operate the system | Avail takes great pride in having the best training program in the industry that is very hands-on and tailored to your needs. As part of each project, training is provided at each major milestone. We work hand-in-hand with your staff to ensure they are properly trained to utilize and get the most out of the system. We don't bid a "fixed" number of hours or classes; our training is done when *you* know how to use the system. Avail provides our unique Follow on Adoption and Support Training (FAST) where we visit onsite after project completion to instruct and ensure all users understand their roles and how to utilize the system for maximum effectiveness. |
| 7 | The information to be disseminated to transit users is not accurate or useful. | Avail provides system monitoring through both on-site visits and our multi-phase testing to ensure accurate data. We will utilize built-in reporting tools to assess the accuracy of our arrival predications. We will remotely monitor the system and work with the agency to ensure the most accurate and up-to-date information is provided to your riders. |
| 8 | Provider is not familiar with the 511 system. | Avail has already performed integration with 511 in Santa Rosa and Montebello and will provide our standard interface document for review and dissemination to each agency for review. Avail provides our 511 feed at no additional cost to the agency as we believe the data belongs to the agency and not Avail. |
| 9 | System provider goes out of business, or dissolves the CAD/AVL practice. | Avail has a strong Executive Management team that manages in a fiscally responsible manner with a strong investment in R&D. We are an Employee-owned company so each employee has a vested interest in your success. We have been in business over 16 years and have successfully completed every project. Finally, our products utilize standard interfaces to the greatest extent possible and we can place all software in escrow if the agency desires. |

While not a comprehensive list, we hope this offers some insight into how Avail is focused on your success.

## 1.3 CUSTOMER FOR LIFE




As part of Avail's customer focus, we dedicate a great deal of time and effort to researching our customers and listening to what their organizational goals are. We invest this time upfront to ensure that you're getting a customized solution that is powerful, agile, and adaptable to the needs of your business today and in the future. Tying together multiple technologies into one seamless system can be a challenge. There are so many options available in the ITS for Public Transit industry, it's easy to become *overwhelmed* at the possibilities. With nearly 20 years of experience under our belt, Avail believes in partnering with our customers to navigate the integration

landscape to maximize budget and optimize success.

What this means to your agencies is that **we will never leave your side**. Our commitment to old-fashioned values guarantees we will always go the extra mile to make sure you understand how to fully incorporate the technology you're adopting. Our goal is to make you a **customer for life**, so if you have a question no matter how big or small, we'll answer it. If you have a new hire or someone on staff that needs a bit more training, we'll provide it. If you want to talk about expanding existing features and capabilities, we're here to listen and point you in the right direction. Our customers will tell you that we're not only their ITS integration vendor, but we're also trusted as an open and honest collaborator that helps pave the road to their success.

## 1.4 Partnering for the Future

At this point you may be asking yourself, "Can this technology really last us for the long haul?", "Can a company that offers such customized service really last in this industry?" In tune to your concerns, Avail utilizes a set of **Unique** and **Innovative** processes to make sure that the technology you're getting is the right amount for you *now*, and the optimal amount to bring you flexibility for the *future*. In this day and age we've all seen it, you take the time to do your research and you think you've got the best technology for your money all lined up, and the next thing you know something better hits the market. This type of situation has become so commonplace in the technology arena that a major cell phone carrier even centered an entire ad campaign on "the next best thing". At Avail we understand that your technology investment is more than just money spent on hardware and software, it's also about investing time in your staff to teach them, and investing your trust in a ***partner*** that will steer you on the road to technology adoption.

As your partner, we're focused on your long-term adoption of your technology solution. And as a privately held company that has been in business for more than 15 years we're in it for the long haul. While most of the vendors in the industry will focus primarily on installing your equipment and only completing the minimal required training, at Avail we believe that the post-installation period is just as important, if not the most important part of the project. Our unique Follow-on Adoption Support Training (F.A.S.T. ™) program is our commitment to you that we will provide advanced user training and support beyond the basic "push-the-button" instruction that others vendors provide.

What we don't expect is that you'll simply take our word for it. At this point in the process, your opinion of us is based on the information in this proposal and what you may know from seeing our marketing materials. In order to gain a better understanding of who Avail Technologies is, and what distinguishes us from other vendors who are throwing their hats in the ring, we urge you to reach out to and possibly even visit our customers in your local area. We have a strong customer presence in California, with partners in varying stages of project completion. It is our customers that can tell you the most about Avail's technology, processes, and culture.

## 1.5 Experience the Difference

You need partners that share your vision while providing the resources and support necessary to achieve that vision. While other vendors pursuing this project may quote something different, Avail has committed to dedicating the necessary project hours to not only install your solution, but to make sure that you're comfortable with it for the long haul. When reviewing proposals, we invite you to compare just how much your technology partner is willing to invest in your success.

Avail Technologies, Inc. is one of the most, if not THE most, experienced CAD/AVL Systems Integrator in North America today. We have an unmatched track record of success; as a company that believes in the strength of old-fashioned values, and we consistently put the needs of our customers above all else. Our It's Included policy is unmatched in the industry! Avail only pursues jobs where we feel we can exceed our customer's expectations to provide the *best in class* experience for which we are renowned. At the end of the day it's actions that speak louder than words; **most proven interfaces, never lost a customer, 100% Customer Satisfaction**. We invite you to learn more about our company in the next section of this proposal.

# 2 PROPOSER INFORMATION

Avail Technologies, Inc. believes that ***service is not what you do, but who you are***. It's a way of existing that you need to bring to every aspect of your business; because whatever the business, the customer comes first. In a world where "faster, better, cheaper." seems to be the motto, it's refreshing to encounter an organization that delivers unsurpassed quality without sacrificing service. At Avail we know that our technology is exceptional, but what we believe really distinguishes us is our unwavering commitment to traditional values and customer service. Think about it, what value does technology bring to your organization if you don't know how to use it to its greatest potential? From the initial proposal to the completion of the job and beyond, we always take the time to listen to your thoughts and concerns, while at the same time leveraging our experienced staff to provide you with relevant solutions to your real challenges.

## 2.1 COMPANY INFORMATION

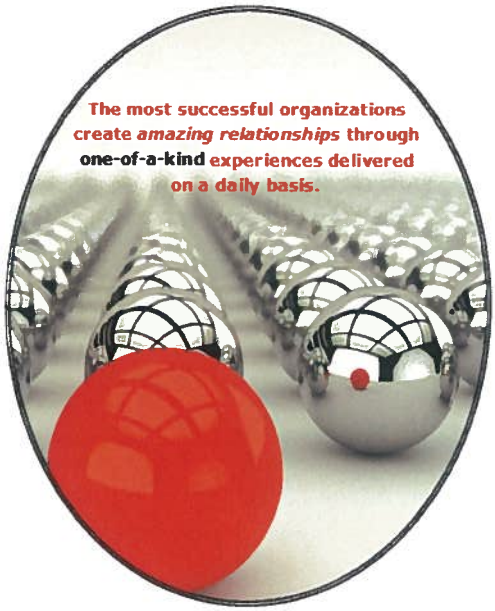
The 90s were a time where businesses, both virtual and tangible, suffered from a case of outsized ambition. In 1996, Alan Greenspan warned that markets were being driven by "irrational exuberance". Larger organizations swallowed their smaller peers, often absorbing the assets leaving both customers and employees to fall to the wayside in pursuit of a larger bottom line.

With more than 30 years in the Engineering field, and nearly a decade in the transit industry, Dorsey Houtz was painfully aware of what a merger involved. In 1999, Dorsey, working with David Matta and Michael Lynn at a Defense organization called Raytheon, realized Raytheon was on the precipice of closing a deal with Orbital. Based on his experience of navigating the waters during three previous acquisitions, Dorsey knew what was going to happen to Raytheon's customer base. He feared they were going to be alienated by this bigger conglomerate, and so it was at that point, Dorsey made the commitment to stick to his old fashioned values and rely on his entrepreneurial spirit to forge a new way of servicing the often forgotten mid-sized customer base. But he couldn't do it alone.

With a goal to *revolutionize the adoption of ITS technology by partnering with customers to achieve success*, Dorsey, David, and Michael ventured out from Raytheon and incorporated Avail Technologies on January 1, 1999. By design, Avail selectively limited its pursuits to a niche market that encompassed mid-sized transit properties. Almost immediately after its inception, Avail was approached by larger vendors who realized that it was the small and medium sized customers that really drove their success. With this in mind, the industry 'big fish' started to make offers to acquire Avail. The potential for profit was there, but remaining loyal to their customers and employees, Dorsey, David, and Michael found a way to make sure that Avail Technologies could never be bought or sold in the corporate world. Their solution focused on selling the company to the people who had a vested interest in its success—the employees. In 2009, Avail Technologies became an ESOP organization. For our customers this means that each and every person they talk to at Avail is not only an employee, but also an owner dedicated to the same traditional values that Avail was founded on.

Headquartered in State College, Pennsylvania, Avail Technologies has never been involved with litigation proceedings. With more than 15 years in operation, Avail technologies and its 60 employee owners mean business when it comes to your success. As an employee owned and operated company, for us your adoption of the Avail technology solution is *personal*.

## 2.2 QUALIFICATIONS OF THE PROPOSER




In an industry wrought with over promising and under delivering; Avail offers a refreshing dedication to get you pointed in the right direction. No project is without challenges, but what Avail pledges to all of its customers is that regardless of the obstacles we face we are the **single point of responsibility** and 100% accountable for your project.

At Avail we guarantee the successful adoption of your technology solution. **Period**.

Our experience has taught us that the dialogue that takes place among our customers is more important than any marketing we can buy. At Avail we know that nearly 70% of new business in any given industry is generated by word of mouth referrals and so we always make sure that our customers come first. We're always avail*able* to understand your challenges while helping you to understand the technology solutions being implemented. Our **"It's Included"** philosophy is supported by our:

- ✓ Strong experience level and track record in the industry
- ✓ Stable employee owned and operated US based operations
- ✓ Consistently safe, reliable, and efficient transportation technology solutions

We couldn't be more serious about our commitment to your success, and we're confident that when you contact our customers they will reinforce our dedication to completing their projects accurately and on time. At Avail Technologies we have never had a customer lose funding because of delays or failures.

We believe that experience, acquired in humility with hard work, means everything, so we've surrounded ourselves with a diverse blend of seasoned individuals to create one of the most dynamic teams in the industry. As the longest standing provider of full featured CAD/AVL systems in the U.S., we are proud to employ some of the nation's top talent. The award-winning staff at Avail has developed and deployed more proven interfaces to third party vendors than any other ITS company. In doing so, we have successfully worked with every major ITS vendor to design and develop protocols for optimal interoperability. Members of Avail's staff have authored issued U.S. patents for Traffic Light Preemption triggered via GPS (Pat# 6,064,319) and Automatic Annunciation triggered via GPS (Pat# 5,808,565).

Additionally as participating members in APTA and ITS America, Avail's team has also held key roles on various national and international committees including: The Technical Advisory Group for Intelligent Transportation Systems, The Intelligent Transportation Societies Sensory Advisory Committee, The Transit Communications Interface Profiles (TCIP) Technical Working Group for Control Centers Business Area, and The International Standards Organization (ISO) Technical Committee 204 Working Group for Public Transport and Emergency Services.

Our staff involvement with TCIP protocols has helped us to develop state-of-the-art open architecture solutions in data storage, analytics, and operation controls. Avail's exclusive ***myAvail*** suite of services provides a centralized database for system operations. Based on an open architecture structure, Avail's technologies are easy to install and integrate on communication networks. They also optimize a network and system management process, which gives you better performance and value for your investment. Ultimately the dynamic technologies that

> *I can honestly say that what impresses me most about the folks at Avail is their professionalism, experience and understanding about the diverse products they offer and interface to, as well as their pure passion for the transit industry and the work they do.*
>
> ***Phil Boyd***
> ***Transit Division Director***
> ***Gwinnett County Transit – Lawrenceville, GA***

Avail incorporates into all its projects helps make our customers' systems *competitive* while giving them *unparalleled expansion capabilities*, making Avail's ITS solution the last big investment needed as you grow your business.

Avail's award-winning staff is hands down some of the most seasoned and knowledgeable people in the ITS for public transit industry today. We have worked with virtually every software vendor, hardware vendor and bus manufacturer in the industry and we have established great relationships with every one of them. Why have we had such success with these other vendors when some of our competition seems to struggle while working with them? We think that it comes from the respect they have for our team and our capabilities. We are confident that if we make the shortlist and are invited to orals, you will experience our capability and dedication first-hand through our ability to talk to you at any level you wish and to share real world examples for any and all operational/technical concerns you may have.

For this project Avail has partnered with ESP Enterprises, a certified DBE installer and leading service provider for the installation of Transit Focused Electronics and Fare Collection Equipment, Fleetwatch, as the provider of your solar powered signs, and GTT for Traffic Signal Priority. Our proven relationship with these qualified sub-contractors has produced top notch results.

In addition to these sub-contractor relationships, Avail will staff this project with a talented team of individuals that have the transit knowledge and experience necessary to make this project a success. Key staff positions on your project are identified below:

- **Project Manager** — serves as the primary interface to your team and is responsible for all aspects of the project both onsite and at Avail, with a focus on managing project resources including subcontractors, keeping the project on schedule and within budget, and most importantly, keeping the customer satisfied. The project manager will be assigned for the duration of the project. The project manager has complete authority for decisions required within the scope of the contract.
- **Lead Systems Engineer** (aka *Central Systems Lead, Communications Systems Lead*) — responsible for the management and coordination of all aspects of integration, testing, and deployment of the system. Reporting to the Project Manager, the System Engineer leads all technical work including concept development, system requirements and design, system analysis, architecture development, transition planning, and operations. They ensure the entire solution integrates smoothly across all components. The System Engineer has a System Integration and Testing group available to them as a resource upon which they call as needed.
- **Lead Field Engineer** (aka *On-board Systems Lead, Installation and Integration Lead*) — utilizing a strong mechanical aptitude, the Lead Field Engineer is responsible for all vehicle related installation activities including: fleet surveys, creation of wiring schematics, and installation manuals, form fit, pilot installations, coordination of the fleet rollout, and management of the installation subcontractor. The Field Engineer ensures the location of all in-vehicle equipment supports ease of use and maintenance of the entire vehicle, not just the equipment itself.
- **Lead System Adoption Trainer & Customer Support Engineer** — coordinates all training tasks which include spending a great deal of time onsite to not only provide in-person classroom-style training, but to more importantly work side-by-side with property staff mentoring them on how to use this technology more effectively within their job role. Acts as a first responder to customer support concerns by prioritizing, documenting, resolving, and following-up on customer support requests. One of the most

unique aspects of Avail's approach to training and support is that we use staff from our Customer Support department to perform training in the field. So the same staff that will support you long after the project is complete, knows your staff intimately and understands your operation completely, ensuring you receive the personal level of service you need.

## 2.3 REFERENCES

While the customer matrix at the end of this section features all of Avail's customer partners we thought it would be helpful to highlight the agencies that are similar in scope and located in California. The transit properties listed below have all gone through the exact vendor selection stage in which you're currently evaluating the same mix of vendors and solutions, and they have carefully chosen Avail not only for our technical solution, but also because of our reputation in the industry as a solid customer friendly organization that goes the extra mile to ensure your success.

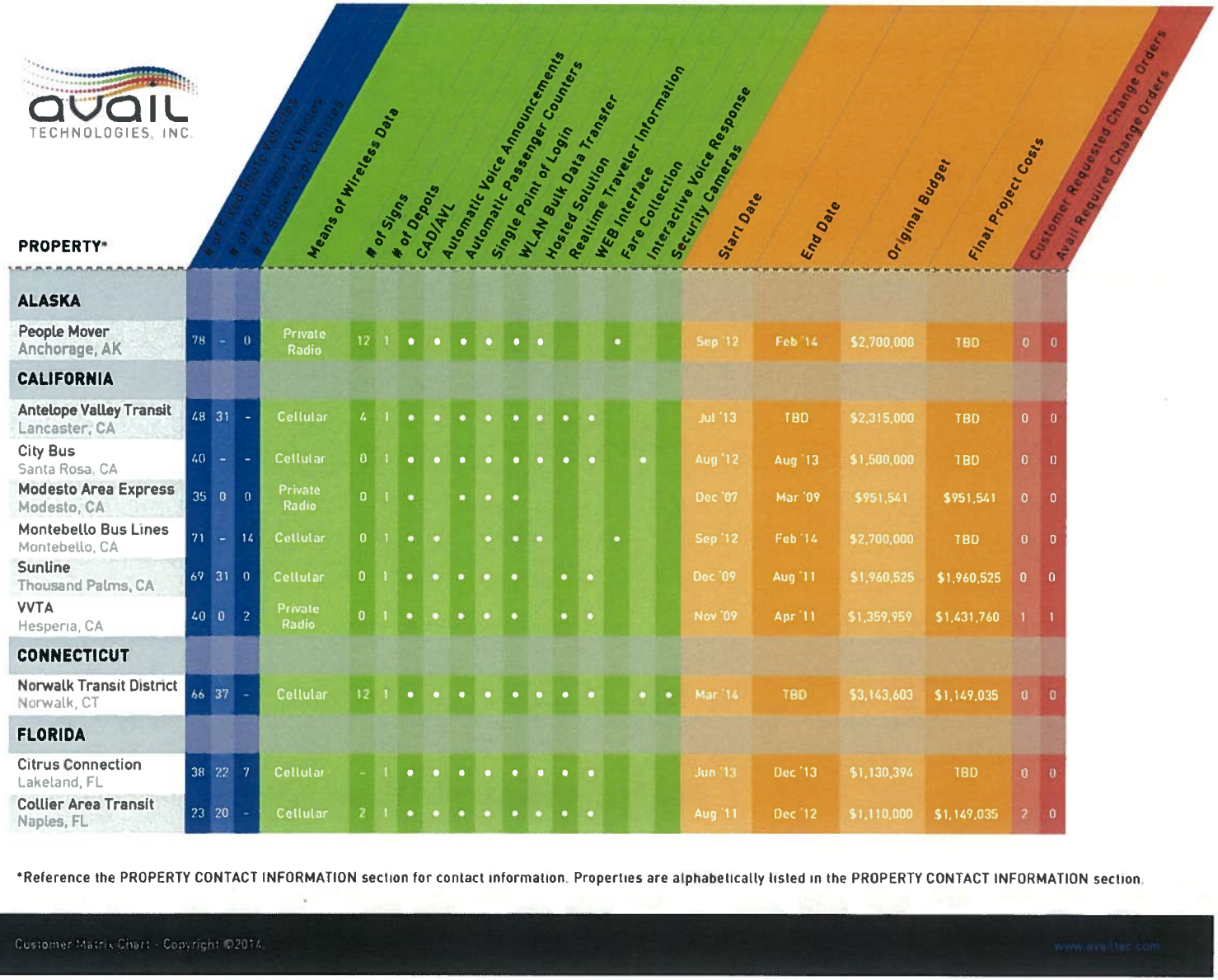
You requested we provide three (3) references, so we thought the following would be a good start for you to call:

- **Hesperia** – Longtime Avail partner with a full CAD/AVL solution that has done multiple technology deployments with Avail over the years as they have phased in technology. Kevin Kane, Executive Director – (760) 948.4330, kkane@vvta.org
- **Santa Rosa** – Deployed our full CAD/AVL solution over a year ago, now in what we call the "adoption phase" where our FAST team is ensuring they are getting the most benefit from the deployed technologies. Anita Winkler, Deputy Director of Transit, (707) 543-3330, awinkler@srcity.org
- **Modesto** — Longtime Avail partner with our CAD/AVL technology, will be purchasing 22 replacement buses over the next year with our latest technology coming pre-installed from the factory. Fred Cavanah, Transit Manager – (209) 577.5298, fcavanah@modestogov.com

In addition, we thought the following two might give some different insight to you:

- **Lancaster** - Avail's most recent customer in California, AVTA is currently in the implementation phase preparing for Pilot. Len Engle, Director of Operations, (661) 729-2229, lengle@avta.com
- **Montebello** — This partner is just finishing their full CAD/AVL solution implementation with Avail, recently completing SAT. Aurora Jackson, Executive Director – (323) 558.1625, ajackson@cityofmontebello.com

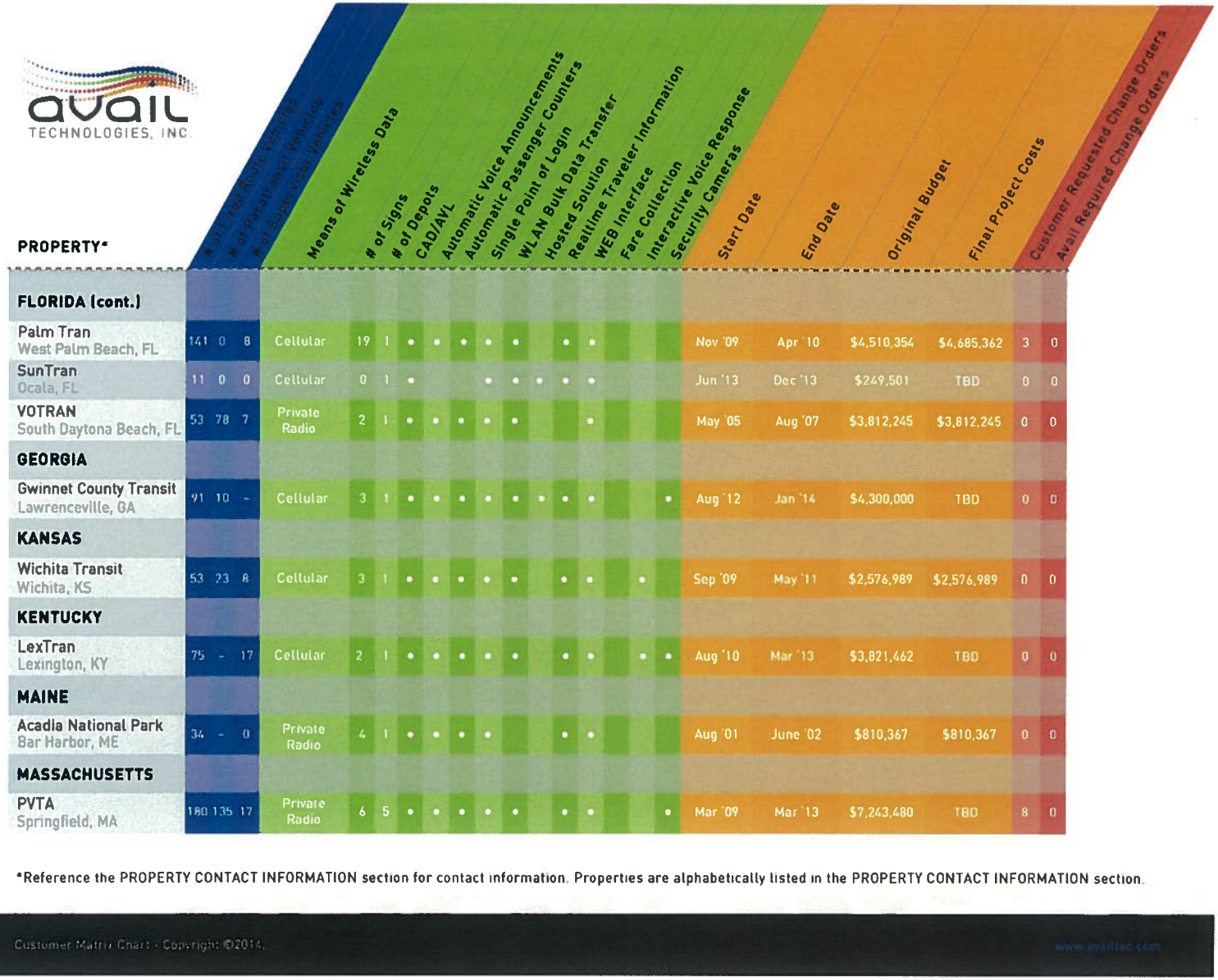
We strongly urge you to speak with any of our California customers or customers outside of the State that you share some similarities with. We are confident that these customers would be happy to host a site visit or just chat frankly and provide you with forthright and honest feedback about what it's like to work and partner with Avail.



| PROPERTY* | # of Fixed Route Vehicles | # of Paratransit Vehicles | # of Supervisor Vehicles | Means of Wireless Data | # of Signs | # of Depots | CAD/AVL | Automatic Voice Announcements | Automatic Passenger Counters | Single Point of Login | WLAN Bulk Data Transfer | Hosted Solution | Realtime Traveler Information | WEB Interface | Fare Collection | Interactive Voice Response | Security Cameras | Start Date | End Date | Original Budget | Final Project Costs | Customer Requested Change Orders | Avail Required Change Orders |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ALASKA** | | | | | | | | | | | | | | | | | | | | | | | |
| People Mover<br>Anchorage, AK | 78 | - | 0 | Private Radio | 12 | 1 | • | • | • | • | • | • | | | • | | | Sep '12 | Feb '14 | $2,700,000 | TBD | 0 | 0 |
| **CALIFORNIA** | | | | | | | | | | | | | | | | | | | | | | | |
| Antelope Valley Transit<br>Lancaster, CA | 48 | 31 | - | Cellular | 4 | 1 | • | • | • | • | • | • | • | • | | | | Jul '13 | TBD | $2,315,000 | TBD | 0 | 0 |
| City Bus<br>Santa Rosa, CA | 40 | - | - | Cellular | 0 | 1 | • | • | • | • | • | • | • | • | | • | | Aug '12 | Aug '13 | $1,500,000 | TBD | 0 | 0 |
| Modesto Area Express<br>Modesto, CA | 35 | 0 | 0 | Private Radio | 0 | 1 | • | | • | • | • | • | | | | | | Dec '07 | Mar '09 | $951,541 | $951,541 | 0 | 0 |
| Montebello Bus Lines<br>Montebello, CA | 71 | - | 14 | Cellular | 0 | 1 | • | • | | • | • | • | | | • | | | Sep '12 | Feb '14 | $2,700,000 | TBD | 0 | 0 |
| Sunline<br>Thousand Palms, CA | 69 | 31 | 0 | Cellular | 0 | 1 | • | • | • | • | • | | • | • | | | | Dec '09 | Aug '11 | $1,960,525 | $1,960,525 | 0 | 0 |
| VVTA<br>Hesperia, CA | 40 | 0 | 2 | Private Radio | 0 | 1 | • | • | • | • | • | | • | • | | | | Nov '09 | Apr '11 | $1,359,959 | $1,431,760 | 1 | 1 |
| **CONNECTICUT** | | | | | | | | | | | | | | | | | | | | | | | |
| Norwalk Transit District<br>Norwalk, CT | 66 | 37 | - | Cellular | 12 | 1 | • | • | • | • | • | • | • | • | | • | • | Mar '14 | TBD | $3,143,603 | $1,149,035 | 0 | 0 |
| **FLORIDA** | | | | | | | | | | | | | | | | | | | | | | | |
| Citrus Connection<br>Lakeland, FL | 38 | 22 | 7 | Cellular | - | 1 | • | • | • | • | • | • | • | • | | | | Jun '13 | Dec '13 | $1,130,394 | TBD | 0 | 0 |
| Collier Area Transit<br>Naples, FL | 23 | 20 | - | Cellular | 2 | 1 | • | • | • | • | • | • | • | • | | | | Aug '11 | Dec '12 | $1,110,000 | $1,149,035 | 2 | 0 |

*Reference the PROPERTY CONTACT INFORMATION section for contact information. Properties are alphabetically listed in the PROPERTY CONTACT INFORMATION section.

Customer Matrix Chart - Copyright ©2014



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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **FLORIDA (cont.)** | | | | | | | | | | | | | | | | | | | | | | | |
| Palm Tran<br>West Palm Beach, FL | 141 | 0 | 8 | Cellular | 19 | 1 | • | • | • | • | • | | | • | • | | | | Nov '09 | Apr '10 | $4,510,354 | $4,685,362 | 3 | 0 |
| SunTran<br>Ocala, FL | 11 | 0 | 0 | Cellular | 0 | 1 | • | | | • | • | • | • | • | • | | | | Jun '13 | Dec '13 | $249,501 | TBD | 0 | 0 |
| VOTRAN<br>South Daytona Beach, FL | 53 | 78 | 7 | Private Radio | 2 | 1 | • | • | • | • | • | | | | • | | | | May '05 | Aug '07 | $3,812,245 | $3,812,245 | 0 | 0 |
| **GEORGIA** | | | | | | | | | | | | | | | | | | | | | | | |
| Gwinnet County Transit<br>Lawrenceville, GA | 91 | 10 | - | Cellular | 3 | 1 | • | • | • | • | • | • | • | • | • | | | • | Aug '12 | Jan '14 | $4,300,000 | TBD | 0 | 0 |
| **KANSAS** | | | | | | | | | | | | | | | | | | | | | | | |
| Wichita Transit<br>Wichita, KS | 53 | 23 | 8 | Cellular | 3 | 1 | • | • | • | • | • | | | • | • | | • | | Sep '09 | May '11 | $2,576,989 | $2,576,989 | 0 | 0 |
| **KENTUCKY** | | | | | | | | | | | | | | | | | | | | | | | |
| LexTran<br>Lexington, KY | 75 | - | 17 | Cellular | 2 | 1 | • | • | • | • | • | | | • | • | | • | • | Aug '10 | Mar '13 | $3,821,462 | TBD | 0 | 0 |
| **MAINE** | | | | | | | | | | | | | | | | | | | | | | | |
| Acadia National Park<br>Bar Harbor, ME | 34 | - | 0 | Private Radio | 4 | 1 | • | • | • | • | | | | • | • | | | | Aug '01 | June '02 | $810,367 | $810,367 | 0 | 0 |
| **MASSACHUSETTS** | | | | | | | | | | | | | | | | | | | | | | | |
| PVTA<br>Springfield, MA | 180 | 135 | 17 | Private Radio | 6 | 5 | • | • | • | • | • | | | • | • | | | • | Mar '09 | Mar '13 | $7,243,480 | TBD | 8 | 0 |

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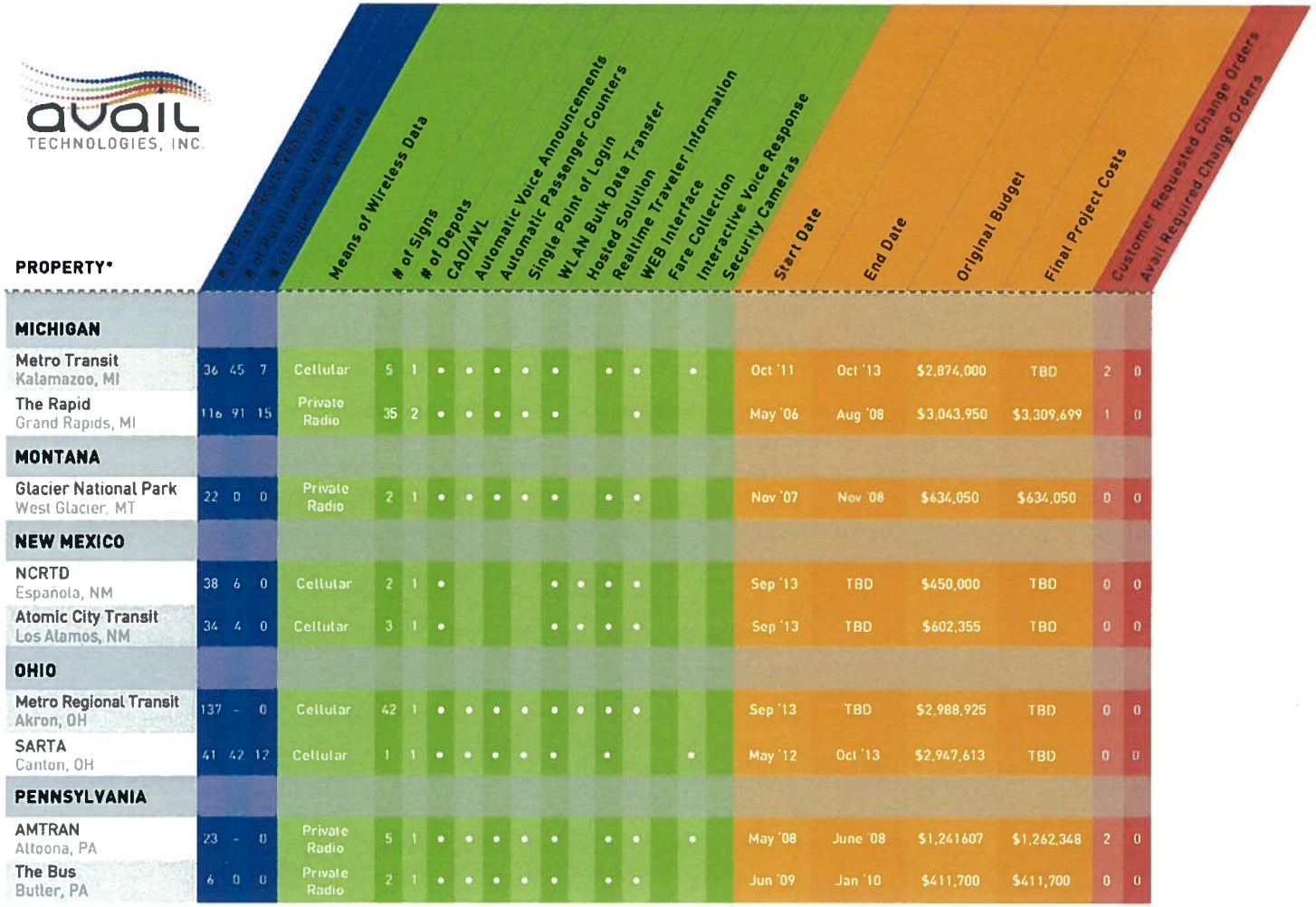
Customer Matrix Chart - Copyright ©2014



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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MICHIGAN** | | | | | | | | | | | | | | | | | | | | | | | |
| Metro Transit<br>Kalamazoo, MI | 36 | 45 | 7 | Cellular | 5 | 1 | • | • | • | • | • | | • | • | | • | | Oct '11 | Oct '13 | $2,874,000 | TBD | 2 | 0 |
| The Rapid<br>Grand Rapids, MI | 116 | 91 | 15 | Private Radio | 35 | 2 | • | • | • | • | • | | | • | | | | May '06 | Aug '08 | $3,043,950 | $3,309,699 | 1 | 0 |
| **MONTANA** | | | | | | | | | | | | | | | | | | | | | | | |
| Glacier National Park<br>West Glacier, MT | 22 | 0 | 0 | Private Radio | 2 | 1 | • | • | • | • | • | | • | • | | | | Nov '07 | Nov '08 | $634,050 | $634,050 | 0 | 0 |
| **NEW MEXICO** | | | | | | | | | | | | | | | | | | | | | | | |
| NCRTD<br>Espanola, NM | 38 | 6 | 0 | Cellular | 2 | 1 | • | | | | • | • | • | • | | | | Sep '13 | TBD | $450,000 | TBD | 0 | 0 |
| Atomic City Transit<br>Los Alamos, NM | 34 | 4 | 0 | Cellular | 3 | 1 | • | | | | • | • | • | • | | | | Sep '13 | TBD | $602,355 | TBD | 0 | 0 |
| **OHIO** | | | | | | | | | | | | | | | | | | | | | | | |
| Metro Regional Transit<br>Akron, OH | 137 | - | 0 | Cellular | 42 | 1 | • | • | • | • | • | • | • | • | | | | Sep '13 | TBD | $2,988,925 | TBD | 0 | 0 |
| SARTA<br>Canton, OH | 41 | 42 | 12 | Cellular | 1 | 1 | • | • | • | • | • | | • | | | • | | May '12 | Oct '13 | $2,947,613 | TBD | 0 | 0 |
| **PENNSYLVANIA** | | | | | | | | | | | | | | | | | | | | | | | |
| AMTRAN<br>Altoona, PA | 23 | - | 0 | Private Radio | 5 | 1 | • | • | • | • | • | | • | • | | • | | May '08 | June '08 | $1,241607 | $1,262,348 | 2 | 0 |
| The Bus<br>Butler, PA | 6 | 0 | 0 | Private Radio | 2 | 1 | • | • | • | • | • | | • | • | | | | Jun '09 | Jan '10 | $411,700 | $411,700 | 0 | 0 |

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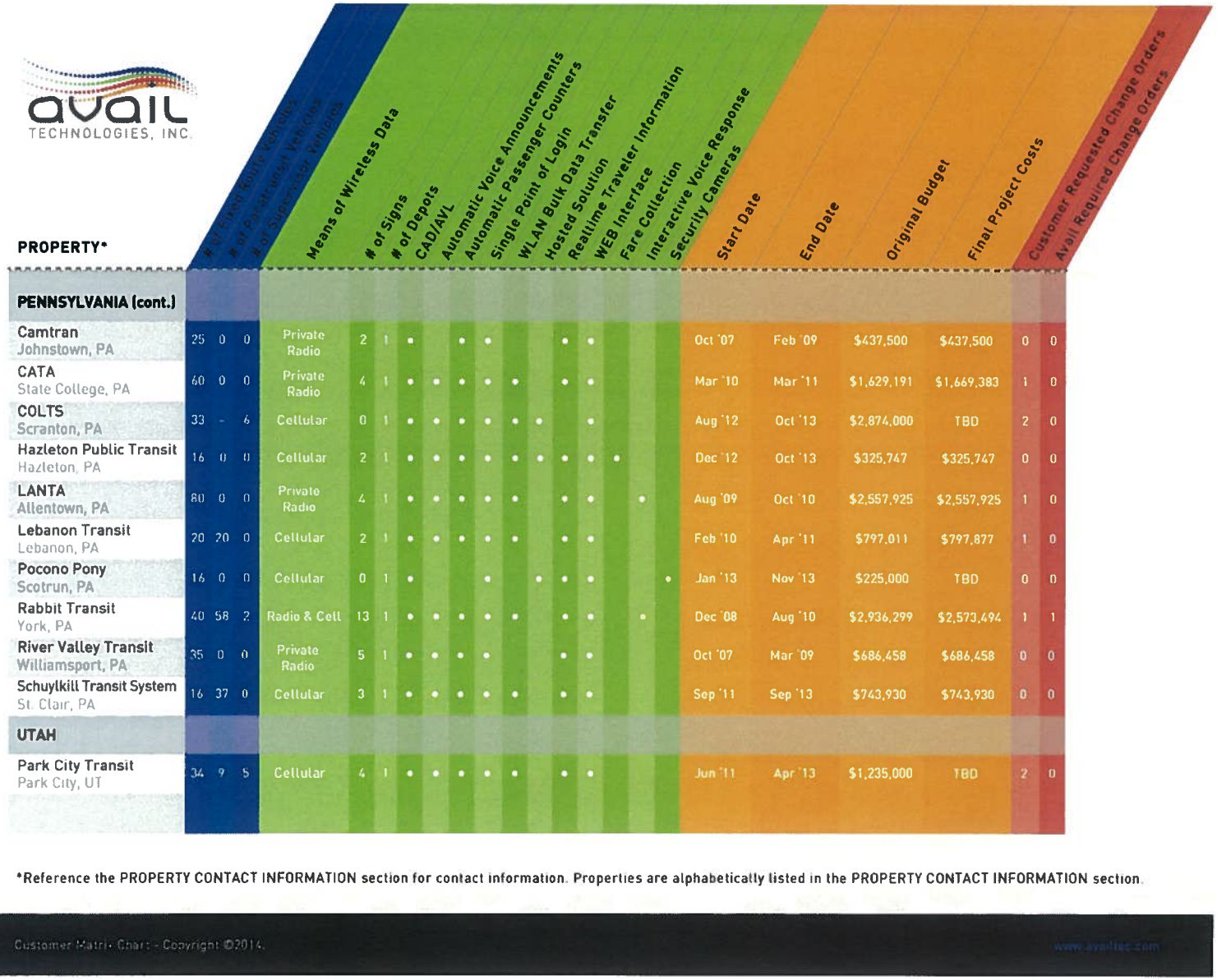
Customer Matrix Chart - Copyright ©2014



| PROPERTY* | # of Fixed Route Vehicles | # of Paratransit Vehicles | # of Supervisor Vehicles | Means of Wireless Data | # of Signs | # of Depots | CAD/AVL | Automatic Voice Announcements | Automatic Passenger Counters | Single Point of Login | WLAN Bulk Data Transfer | Hosted Solution | Realtime Traveler Information | WEB Interface | Fare Collection | Interactive Voice Response | Security Cameras | Start Date | End Date | Original Budget | Final Project Costs | Customer Requested Change Orders | Avail Required Change Orders |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PENNSYLVANIA (cont.)** | | | | | | | | | | | | | | | | | | | | | | | |
| Camtran Johnstown, PA | 25 | 0 | 0 | Private Radio | 2 | 1 | • | | • | • | | | • | • | | | | Oct '07 | Feb '09 | $437,500 | $437,500 | 0 | 0 |
| CATA State College, PA | 60 | 0 | 0 | Private Radio | 4 | 1 | • | • | • | • | • | | • | • | | | | Mar '10 | Mar '11 | $1,629,191 | $1,669,383 | 1 | 0 |
| COLTS Scranton, PA | 33 | - | 6 | Cellular | 0 | 1 | • | • | • | • | • | • | | • | | | | Aug '12 | Oct '13 | $2,874,000 | TBD | 2 | 0 |
| Hazleton Public Transit Hazleton, PA | 16 | 0 | 0 | Cellular | 2 | 1 | • | • | • | • | • | • | • | • | • | | | Dec '12 | Oct '13 | $325,747 | $325,747 | 0 | 0 |
| LANTA Allentown, PA | 80 | 0 | 0 | Private Radio | 4 | 1 | • | • | • | • | • | | • | • | | • | | Aug '09 | Oct '10 | $2,557,925 | $2,557,925 | 1 | 0 |
| Lebanon Transit Lebanon, PA | 20 | 20 | 0 | Cellular | 2 | 1 | • | • | • | • | • | | • | • | | | | Feb '10 | Apr '11 | $797,011 | $797,877 | 1 | 0 |
| Pocono Pony Scotrun, PA | 16 | 0 | 0 | Cellular | 0 | 1 | • | | | • | | • | • | • | | | • | Jan '13 | Nov '13 | $225,000 | TBD | 0 | 0 |
| Rabbit Transit York, PA | 40 | 58 | 2 | Radio & Cell | 13 | 1 | • | • | • | • | • | | • | • | | • | | Dec '08 | Aug '10 | $2,936,299 | $2,573,494 | 1 | 1 |
| River Valley Transit Williamsport, PA | 35 | 0 | 0 | Private Radio | 5 | 1 | • | • | • | • | | | • | • | | | | Oct '07 | Mar '09 | $686,458 | $686,458 | 0 | 0 |
| Schuylkill Transit System St. Clair, PA | 16 | 37 | 0 | Cellular | 3 | 1 | • | • | • | • | • | | • | • | | | | Sep '11 | Sep '13 | $743,930 | $743,930 | 0 | 0 |
| **UTAH** | | | | | | | | | | | | | | | | | | | | | | | |
| Park City Transit Park City, UT | 34 | 9 | 5 | Cellular | 4 | 1 | • | • | • | • | • | | • | • | | | | Jun '11 | Apr '13 | $1,235,000 | TBD | 2 | 0 |

*Reference the PROPERTY CONTACT INFORMATION section for contact information. Properties are alphabetically listed in the PROPERTY CONTACT INFORMATION section.

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# PROPERTY CONTACT INFORMATION

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Bar Harbor, ME
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**717-283-0445 x216**
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**707-543-3118**
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# PROPERTY CONTACT INFORMATION

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**Charles Frazier**
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# PROPERTY CONTACT INFORMATION

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# PROPERTY CONTACT INFORMATION

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# 3 PROJECT ORGANIZATION AND STAFFING

## 3.1 KEY PERSONNEL

In the RFP you specifically identify key personnel responsibilities for this project. As you can see from the organizational chart in the next section, Avail Technologies is structured a bit differently than our competitors. In line with our traditional values approach we want you to have the most direct access to decision makers within the organization, so we've streamlined our corporate structure to reflect a more closely knit organization. At Avail, positions such as On-Board Systems Lead and Installation and Integration Lead are part of our overall Field Engineering Lead role. Likewise, Central Systems Lead and Communications Systems Lead roles are the responsibility of Avail's Systems Engineering team.

Milo Thomas, the Project Manager for this joint procurement is a certified Project Management Professional. Holding a Bachelor of Science in Computer Science and Mathematics, Mr. Thomas has more than a decade of experience in a diverse set of business classes from management and leadership, engineering and consulting to education.

Sue Warner, the Systems Engineer assigned to this project has a Bachelor of Science in Computer Science and is certified in various programming disciplines. Specializing most recently in real-time passenger information solutions, Ms. Warner is considered to be an expert on Computer Aided Dispatch as well as GPS location systems and radio communications.

Your Field Engineer for this project is Bill Fate. Mr. Fate has a BS in Information Technology and having worked for Avail since 2010 has participated in more than 15 projects. Bill is our go-to guy for custom enclosures, mounting brackets, cables, and interfacing to 3$^{rd}$ party equipment.

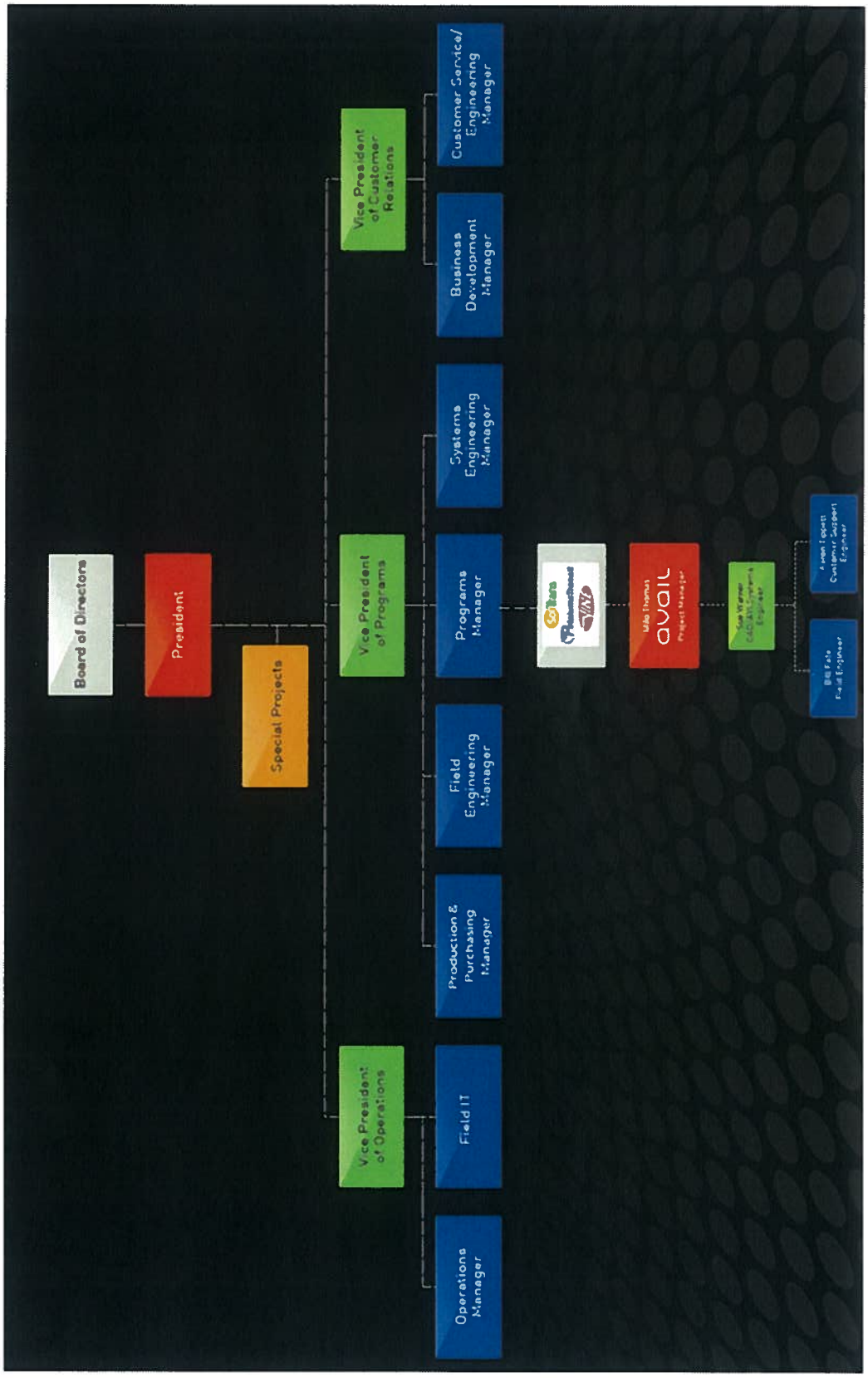
Rounding out this highly experienced team is Aaron Tippett, your assigned Customer Service Engineer. Aaron currently holds a BA in Communications, but his love of learning and teaching doesn't stop there. Pursuing a Masters in Communications Studies, Mr. Tippett designs instructional materials and documentation for our customers in a way that's both comprehensive and easy to understand.

## 3.2 ORGANIZATIONAL CHART

The Organizational Chart on the next page depicts Avail's unique corporate structure and how your project team fits into that dynamic.

# ORGANIZATIONAL CHART

avail TECHNOLOGIES, INC.



## 3.3 Availability and Location of Project Staff

> *The experience and transit knowledge of Avail's team has been unmatched. They work closely with our staff to truly understand the challenges we face on a daily basis.*
>
> *Teri Giurintano*
> *Executive Director*
> *Lebanon Transit – Lebanon, PA*

Project teams are based out of our headquarters in State College, Pennsylvania and they are accustomed to traveling throughout the nation to service the needs of our partner agencies. Our traditional values approach dictates that we treat each and every customer as if they were our only customer. To that end, while we do have projects being implemented concurrently, we carefully select project teams based on experience and their ability to dedicate adequate time to achieve the personal service levels we deem important. The team as selected for this project will spend approximately 40 to 50 percent of their time solely dedicated to the success of your solution.

Responsibilities of the Project Manager and the team are managed and balanced over the course of the project through the use of mutually agreed upon milestones and activities tracked as part of an overall project management schedule. During the entire process the Project Manager works closely with your team to make sure requirements are heard and understood. A series of customer sign-off procedures are used to keep a record of milestones achieved to your satisfaction and those that simply need a bit more work. Our unique discovery process allows the Avail team to become intimately acquainted with your internal procedures by working side by side with you in your environment. This practice early on in the project gives us a perspective that other vendors do not see and it enables us to tailor delivery of the solution in a manner that's optimized for your operations and success.

## 3.4 RESUMES (*NOT INCLUDED IN PAGE COUNT*)

This section contains the resumes of key project personnel including the Project Manager, Systems Engineer, Field Engineer, and Customer Support Engineer.

### 3.4.1 RESUME OF PROJECT MANAGER: MILO S. THOMAS

**Education**

**Bachelor of Science** — Computer Science and Mathematics — Eastern Michigan University, Ypsilanti, Michigan

**Certifications**

*Project Management Professional Certification (PMP)* — Project Management Institute, Newtown Square, Pennsylvania

**Background**

Mr. Thomas has over ten years of experience in the areas of Business Development, Product Management, Project Management, Software Engineering, Consulting, and Leadership Training in the development and delivery of software and technology solutions for businesses. This experience has translated well into the Intelligent Transit Systems (ITS) market, as Mr. Thomas brings a passion for dynamic teams, efficiency, and innovative leadership to the industry.

As a Project Manager at Avail Technologies, Mr. Thomas is responsible for working closely with Avail's customers in managing ITS projects for transit properties. This includes management of each project throughout the initial proposal, acquisition and implementation phases. Mr. Thomas is responsible for all phases of ITS technology from performing needs analysis, creating specifications, reviewing vendor proposals, recommending viable technologies based on customer needs, creating project plans, and managing the installation of the system (including subcontractors and maintaining the system).

Prior to joining Avail, Mr. Thomas was a Senior Project Manager and Consultant for ASG Software Solutions. As a Project Manager, Mr. Thomas delivered high, value-added, enterprise level technology solutions to the healthcare, manufacturing, retail, and financial industries. This also included international projects in both the private and government sectors in Europe and Latin America, which enabled Mr. Thomas to develop highly competent, cultural-intelligence skills. As a Consultant, Mr. Thomas developed and implemented Enterprise Content Management and Web Portal solutions to a diverse customer base.

While teaching in the Detroit Public School System, Mr. Thomas developed core mathematics and technology curriculums for high school students with enough potency to carry over as college credit for incoming freshman that participated in his program. The ability to teach afforded Mr. Thomas the opportunity to be responsible for all leadership and development training for Project Managers at ASG Software Solutions.

**Work Experience**

| | |
|---|---|
| 2012-Present | **Project Manager** — Avail Technologies Inc. — State College, Pennsylvania |
| 2009-2012 | **Senior Project Manager** — ASG Software Solutions — Troy, Michigan |
| 2007-2008 | **Project Manager** — ASG Software Solutions — Troy, Michigan |
| 2003-2007 | **Consultant** — ASG Software Solutions — Troy, Michigan |
| 2002-2003 | **Mathematics/Technology Teacher** — Detroit Public Schools — Detroit, Michigan |

## 3.4.2 Resume of Systems Engineer: Sue A. Warner

**Education**

**Bachelor of Science** — Computer Science —The Pennsylvania State University, University Park, Pennsylvania

**Certifications**

*Certification in Ada Programming Language, C++ Training* — The Pennsylvania State University, University Park, PA

*Object-Oriented Analysis and Design* — HRB Systems, Inc., State College, Pennsylvania

*'Introduction to Java Programming'* — Avail Technologies, facilitated by a faculty member of Juniata College

*Java for Enterprise Systems Development: Hands-On* — Learning Tree International, Reston, Virginia

*Hands-On Visual Basic .NET and C#: Building Object-Oriented Applications* — Learning Tree International, Reston, Virginia

**Background**

Ms. Warner has over twenty years of experience as a Software and Systems Engineer. She has more than twelve years of experience with Vehicle Tracking and Mobile Workforce applications, including Windows Web Services, various methods of communications, Graphical User Interface (GUI), and database maintenance and query applications. She also has extensive experience in the design and development of real-time mobile communications applications, including requirements, screen definition, and database structure definition.

As Project Engineer at Avail Technologies, Ms. Warner has contributed to several of Avail's TIS projects, including work on the new OmniPoint product components, where she has developed a module that communicates and routes messages between the in-vehicle computer (MDC) and the fixed-end processing components. She had a major role in the project for Acadia National Park, where she developed applications to geo-code announcement 'trigger boxes' and to control the Wayside Departure Signs. She led the effort to add automated headsign control to the Acadia bus fleet, working with the MDC vendor to define the control of these signs. She was part of a team to implement a new Communications module for the ATA customer, running the application on both rugged tablet PC's in the vehicles and on the fixed-end Server.

At Orbital Sciences Corporation, Ms. Warner had responsibility for the Mobile Workstation (MW) component of the ORBCAD-FS product, a Mobile Workforce Computer Aided Dispatch (CAD) system, developed in Visual C++ for applications on both the Dispatcher Workstation (Win NT) and Mobile Workstation ruggedized PC (Win 95/98). Ms. Warner served as the lead engineer on the Niagara Mohawk Power Corporation's (NMPC) ORBCAD-FS project, and prior to that, supported the rollout of the predecessor to the NT version (the OS/2 version, developed by the Alterra Systems team). Prior to her involvement with the ORBCAD product, she had contributed to several other AVL projects, developing portions of the embedded software for the in-vehicle units used in the SEPTA (Philadelphia, PA) pilot. Her experience includes the use of GPS with differential corrections, radio communications, and the display of vehicles on dispatcher's maps.

**Work Experience**

| | |
|---|---|
| Aug 2000 – Present | **Project Engineer** — Avail Technologies, Inc. — State College, Pennsylvania |
| Jan 1999 – Aug 2000 | **Senior Engineer** — Orbital Sciences Corporation — State College, Pennsylvania |
| Jan 1995 – 1999 | **Senior Engineer** — Raytheon Systems Company Transportation Management Solutions (TMS), Inc. — State College, Pennsylvania |
| May 1984 – 1995 | **Software Engineer** — Raytheon Systems Company E-Systems, HRB Systems — State College, Pennsylvania |
| Mar 1981 – 1984 | **Programmer** — Leeds & Northrup Company — North Wales, Pennsylvania |

### 3.4.3 Field Engineer Résumé of: William Fate

**Education**

**Bachelor of Science** — Information Technology (BA Minor) — University of Massachusetts, Lowell, Massachusetts

**Background**

Mr. Fate's role at Avail is Field Engineer. He is responsible for pre-installation evaluations of vehicles to determine equipment placement and wire interfaces, creating vehicle installation manuals, determining materials needed to perform vehicle installations, installing AVL systems in vehicles, providing training to contracted installers (where applicable) and providing maintenance training to designated maintenance staff after vehicle installation completion.

Mr. Fate has been with Avail since early 2010. In that time he has been involved with the integration of Automatic Vehicle Location (AVL) systems at AMTRAN in Altoona, PA, CAMTRAN in Johnstown, CATA in State College, PA, Lebanon Transit in Lebanon, PA, Rabbit Transit in York, PA, COLTS in Scranton, PA, STS in St. Clair, PA, Butler Transit Authority in Butler, PA, PVTA in Springfield, Massachusetts, Wichita Transit in Wichita, KS, PalmTran in West Palm Beach, FL, The Rapid in Grand Rapids, MI, Metro in Kalamazoo, MI, LexTran in Lexington, KY, and MAX in Modesto, CA,

Mr. Fate also designs custom enclosures, mounting brackets and cables, determines how to interface to third party equipment and troubleshoots and repairs equipment to the component level.

**Work Experience**

| | |
|---|---|
| April 2010 – Present | **Field Engineer** — Avail Technologies, Inc., State College, Pennsylvania |
| Jan 2005 – April 2010 | **Project Manager/Electro-Mechanical Engineer** — MMS Technologies, Inc., State College, Pennsylvania |
| Sept. 2000 – Nov. 2005 | **Lead Field Tech** —Telecom Design, Inc., Altoona, Pennsylvania |

## 3.4.4 Customer Support Engineer Résumé of: Aaron T. Tippett

**Education**

**Master or Arts in Communications Studies** — Business Communication (In Progress) — Edinboro University of Pennsylvania, Edinboro, Pennsylvania

**Bachelors of Arts in Communications** — Pennsylvania State University, Altoona, Pennsylvania

**Background**

Mr. Tippett has been with Avail Technologies since 2012 and has excelled as a Customer Support Engineer. His background includes a Bachelor of Arts in Communication and he is currently pursuing his Master's Degree in Communication Studies with a focus in Business Communication. As a Customer Support Engineer, Mr. Tippett provides phone support for software and hardware issues raised by our clients, formulates unique database queries to assist customer needs, investigates reported problems and outages, is responsible for testing software releases and bug fixes, coordinates and executes software upgrades to our client's systems, and performs training for end users on our system.

Mr. Tippett has extensive experience in training development and instructional design. He has developed training materials and conducted instruction courses at several transit properties. In addition, Mr. Tippett has held the role of a Customer Support Lead for properties in Ocala, FL; Los Alamos, NM; Española, NM; Altoona, PA; and Wichita, KS.

**Work Experience**

| | |
|---|---|
| 09/2012 – Present | **Customer Support Engineer** — Avail Technologies, Inc., State College, Pennsylvania |
| 03/2012 – 09/2012 | **Technical Support Analyst II** — National Electronics Warranty Corp, Altoona, Pennsylvania |
| 05/2010 – 03/2012 | **Performance Development Trainer** — National Electronics Warranty Corp, Altoona, Pennsylvania |
| 04/2009 – 05/2010 | **Customer Care Representative** — National Electronics Warranty Corp, Altoona, Pennsylvania |

# 4 MANAGEMENT PLAN

## 4.1 MANAGEMENT PLAN

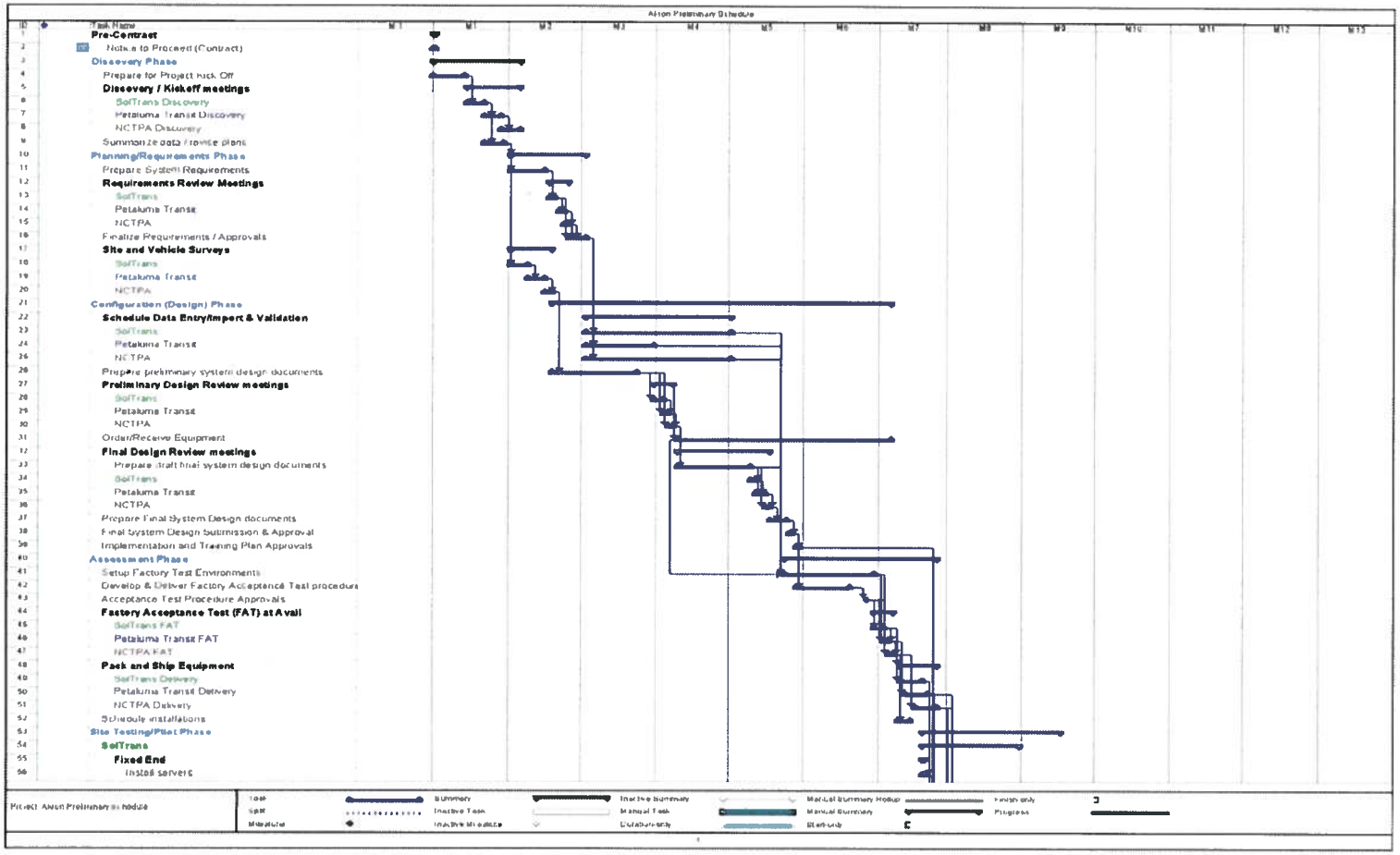
Avail Technologies is experienced with procurements of this size and complexity. We have adapted our unique and innovative project processes to accommodate multi-property projects with great success. Our customers at Pioneer Valley Transit Authority in Massachusetts and Los Alamos, New Mexico can speak to Avail's capability to manage multi-property procurements efficiently and effectively.

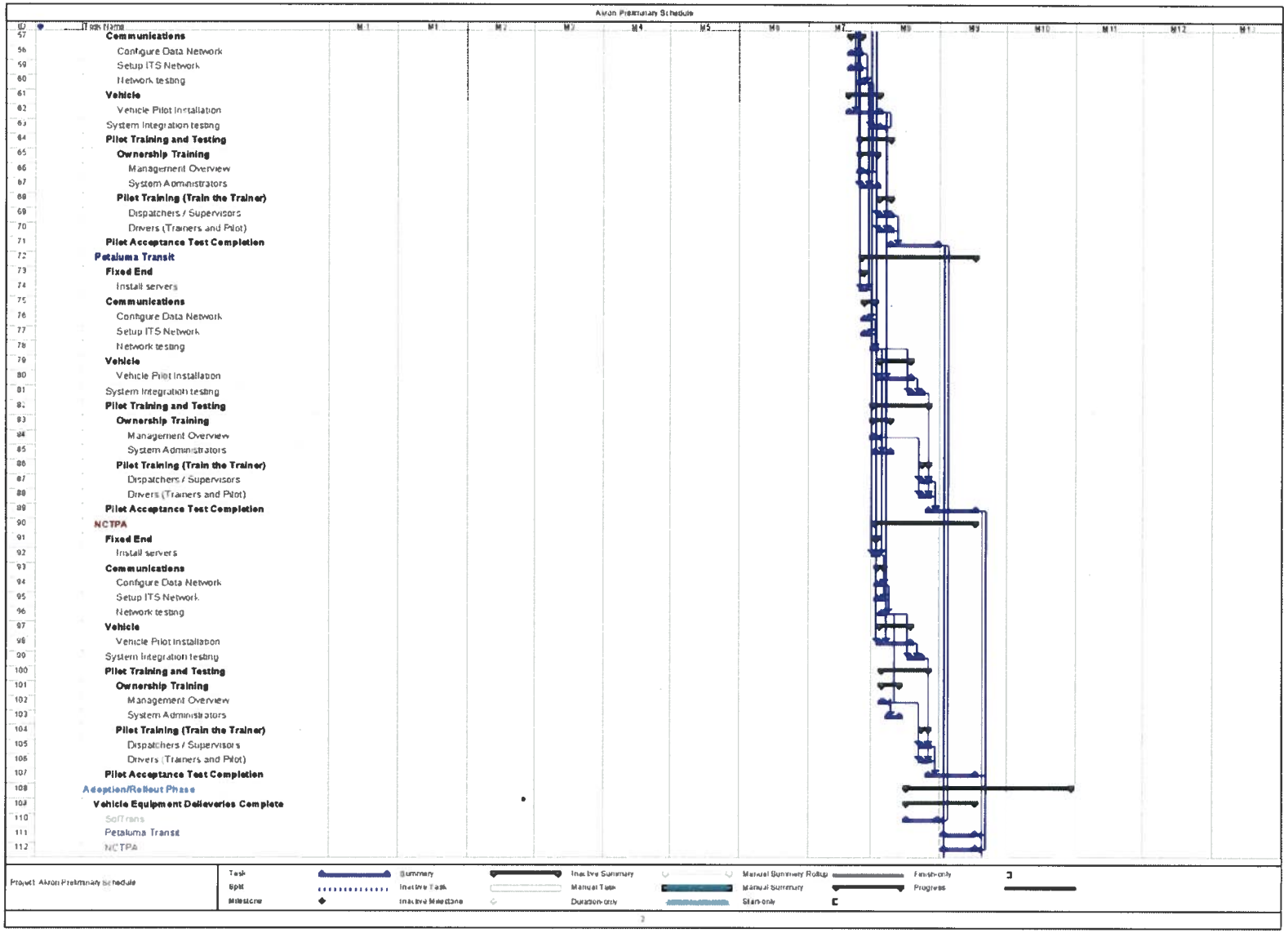
As it relates to the SolTrans, Petaluma, Napa procurement our approach would be to manage each agency as a sub-project and part of a common overall timeline. We have organized the project plan so that onsite activities are happening in the same timeframe within one master project plan. Executing reviews, meetings, installations, etc. are slated to occur with each agency but during the same time periods to maximize efficiency, minimize travel costs, and maintain parallel work flows to keep the entire project in sync.

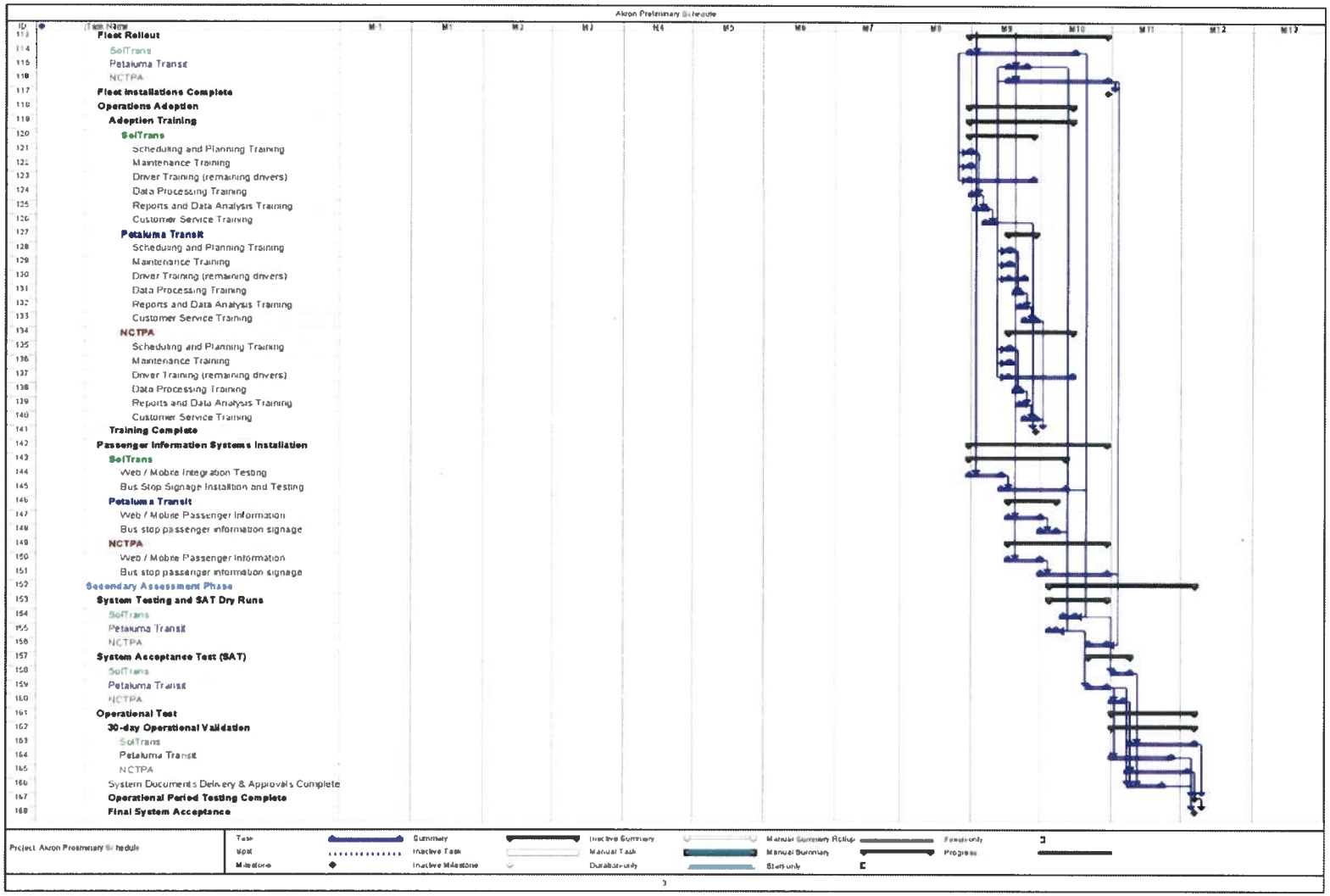
Regular project meetings as well as progress updates and reviews will be the backbone of communication throughout the entire project. Formal implementation plans, system design documents as well as installation, training, and test plans for each agency will serve as the gateways where Avail will collaborate with each agency for approval.

## 4.2 PROJECT SCHEDULE

Please find the project schedule on the following pages. The project flow follows the Implementation plan outlined in section 4.3. It is a proven approach which we have continually improved upon over the years.




Avail Preliminary Schedule
Communications
Configure Data Network
Setup ITS Network
Network testing
Vehicle
Vehicle Pilot Installation
System Integration testing
Pilot Training and Testing
Ownership Training
Management Overview
System Administrators
Pilot Training (Train the Trainer)
Dispatchers / Supervisors
Drivers (Trainers and Pilot)
Pilot Acceptance Test Completion
Petaluma Transit
Fixed End
Install servers
Communications
Configure Data Network
Setup ITS Network
Network testing
Vehicle
Vehicle Pilot Installation
System Integration testing
Pilot Training and Testing
Ownership Training
Management Overview
System Administrators
Pilot Training (Train the Trainer)
Dispatchers / Supervisors
Drivers (Trainers and Pilot)
Pilot Acceptance Test Completion
NCTPA
Fixed End
Install servers
Communications
Configure Data Network
Setup ITS Network
Network testing
Vehicle
Vehicle Pilot Installation
System Integration testing
Pilot Training and Testing
Ownership Training
Management Overview
System Administrators
Pilot Training (Train the Trainer)
Dispatchers / Supervisors
Drivers (Trainers and Pilot)
Pilot Acceptance Test Completion
Adoption/Rollout Phase
Vehicle Equipment Deliveries Complete
SolTrans
Petaluma Transit
NCTPA
Project: Avail Preliminary Schedule
Task
Split
Milestone
Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
Progress


Akron Preliminary Schedule
Fleet Rollout
SolTrans
Petaluma Transit
NCTPA
Fleet Installations Complete
Operations Adoption
Adoption Training
SolTrans
Scheduling and Planning Training
Maintenance Training
Driver Training (remaining drivers)
Data Processing Training
Reports and Data Analysis Training
Customer Service Training
Petaluma Transit
Scheduling and Planning Training
Maintenance Training
Driver Training (remaining drivers)
Data Processing Training
Reports and Data Analysis Training
Customer Service Training
NCTPA
Scheduling and Planning Training
Maintenance Training
Driver Training (remaining drivers)
Data Processing Training
Reports and Data Analysis Training
Customer Service Training
Training Complete
Passenger Information Systems Installation
SolTrans
Web / Mobile Integration Testing
Bus Stop Signage Installtion and Testing
Petaluma Transit
Web / Mobile Passenger Information
Bus stop passenger information signage
NCTPA
Web / Mobile Passenger Information
Bus stop passenger information signage
Secondary Assessment Phase
System Testing and SAT Dry Runs
SolTrans
Petaluma Transit
NCTPA
System Acceptance Test (SAT)
SolTrans
Petaluma Transit
NCTPA
Operational Test
30-day Operational Validation
SolTrans
Petaluma Transit
NCTPA
System Documents Delivery & Approvals Complete
Operational Period Testing Complete
Final System Acceptance
Project: Akron Preliminary Schedule
Task
Split
Milestone
Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary
Start-only
Progress

## 4.3 Implementation Plan

***"We're here to get you there."***

For more than 20 years Avail Technologies has been integrating ***progressive technologies*** in the transit industry. Our ***unique and innovative*** processes ensure that you're getting the most out of your technology investment. At Avail, we take ***traditional values*** seriously and we're dedicated to working hard to earn your ***trust*** and building a lifelong ***partnership***. As a partner, if you aren't comfortable using the technology solutions we've installed, then we still have work to do. Based in rural Pennsylvania, Avail is employee owned and operated, so when we talk about service and the success of our customers ***it's personal***.

Although our values may be old-fashioned, our technology is dynamic. Avail dedicates a great deal of time and resources to ***research and development*** to ensure that the technologies we bring on board are the freshest in the industry and that they are backwards-compatible, reliable, and sustainable to help drive your service into the future. The state-of-the-art intuitive reporting tools available exclusively through Avail Technologies learn from your system's past performance to help drive your operations forward effectively and efficiently.

We understand that the idea of learning the nuances of new technology can seem intimidating at first, so we've designed a one-of-a-kind comprehensive training program that focuses on the roles of your team and how they will use the technology most efficiently. By breaking the process down into role-based learning your staff can easily get used to the new technology while applying it to real-life scenarios with your Avail Project Team by their side through this entire process. As part of our traditional values pledge, your very own designated Customer Service Engineer will be available to answer any questions and address any concerns you may have during the life of the project and beyond—Yes! We provide you with access to real people at our headquarters so you can get real results.

Merging new technology with your already existing systems requires a concerted effort among hardware and software vendors. Our team of experienced and talented integrators wants to ensure that this process meshes seamlessly within the system of your current operations, so we act as the ***single point of responsibility*** on each

and every project we accept. Avail's unique on-site hands-on approach allows us incorporate all we learn about how you do business and marry that insight with our already established industry relationships to implement an efficient, safe, and reliable customized transportation solution.

With a 100% job completion record, Avail's innovative ***8 step implementation*** **process** is a key factor to making sure your project is only finished when you're ***completely satisfied*** and comfortable with your new technology. You can rely on the Avail team to always be open and honest in our communication with you, from our first handshake and our "it's included" firm-fixed pricing structure to our Follow-on Adoption Support Training (FAST), we're here to get you there.

After we receive the notice to proceed, and before our first meeting with you, the Avail team is working behind the scenes to make sure that we're doing things the right way. "Be prepared and be honest," is advice that 10 time NCAA Championship basketball coach John Wooden used to say to his players at UCLA. At Avail we believe in order to make your technology a slam dunk, Mr. Wooden's words are more than just advice; they are words to live by. Before Discovery we take the time to internally review all materials relating to your specific project with the individuals that will comprise your project team. We create an internal database to facilitate communication and we do things like develop a requirements matrix for the project so we make sure no deliverable gets missed. It's this extra bit of behind-the-scenes preparation invested up front that allows us to dedicate more time on site during the Discovery process to learn about how you do business.

## 4.3.1 Discovery

At Avail we put a great deal of effort into getting acquainted with our technology partners. After an initial kick off meeting, our professional team will work side-by-side with your stakeholders and staff to get to the crux of your technology needs. This well-informed approach is important to providing a structured solution that will grow with your operation over time. Avail's highly trained team will gain insight from riding in the passenger seat, coming in early for morning pullout, and shadowing your dispatch workers. We will observe the nuts and bolts of your day-to-day operations, while at the same time making real-time suggestions about how your organization can specifically benefit from Avail's customized ITS solutions. This hands-on approach is one of Avail's *unique* and *innovative* processes, and it allows us to not only get to know you, but also gives you the opportunity to build a professional foundation with the folks at Avail who will be working alongside you for the duration of the project. The Discovery process allows your Avail team to work with you in a candid manner to earn your trust and build a solid working relationship.

To simply hear something is automatic and instinctual in nature, but actually listening and processing meaning from words and sentences is something that you consciously decide to do. At Avail we've made the ***commitment*** to put listening first! We believe that listening is the single most important action during any process. It's through *listening* that we get to know you and your staff. It's through *listening* that we can start to gauge what role-based features your technology dashboards will require. And it's through *listening* that we really get to know not only what intimidates you about this technology, but also what excites you! As integrators of technology solutions, we are in the business of making things talk, but in order to do that effectively our experience has taught us that we must first take the time to listen.

While we are observing your operations in action and listening to how you run things, we will also work with you to coordinate a timeline for routine project activities so you can be apprised of our progress. Details such as your preference for review and approval of project components will be clearly noted and shared with decision makers to ensure that everyone is on the same route to success.

The Discovery process helps Avail to readily assess your organizational needs while at the same time allowing you to become comfortable working with our staff. This extra touch of experiencing the operations through "your eyes" gives us a perspective that our competitors can't get from some list on a piece of paper. All too often technology is perceived as emotionless and academic, at Avail we are building partnerships for the future and want you to feel like you're part of the Avail family, so we take this unparalleled approach during the Discovery process to get to know what drives you on every level.

Also during Discovery, Avail will try to answer two key questions pertaining to each of your operations, Where *are you?* and *Where do you want to be?* This integral approach is what's called a "gap analysis" and it's where Avail will sit down with the leadership in each of your organizations to talk about things like your fixed-route scheduling, current paratransit system, hardware infrastructure, ridership data, as well as maintenance. Because Avail is here to get you there, it's important that we have a clear understanding of not only your current situation, but also what you hope to achieve with this solution and in the future.

### 4.3.2 PLANNING

***Prior, Planning, Prevents, Poor, Performance***—At Avail we call this the ***5P approach*** and it's become a core part of how we do business. Our experience has taught us that the best laid plans are the most successful, and that without proper planning any solid project can be derailed. It's easy to get caught up in the excitement of new technology and the benefits it can bring to the table, but taking the time to think about the steps necessary to incorporate it efficiently into your operations is something on which Avail places a great deal of emphasis. Often our customers are eager to try out the next great thing, unaware of its full capability. Sometimes we find anticipation of new technology without proper planning can be greater than the realization of that technology. At Avail, our Planning phase develops a roadmap of the entire project so you can continue to be enthused about the great new solutions you're adopting, without being disappointed at the end.

After we've gotten to know your organizational operations and the core values that drive you forward, our technically savvy team assembles a fully operational demo system that incorporates the requirements you specified. We bring this demo to your doorstep so you can see how it will behave in a familiar setting. This onsite showcase of Avail's technology allows us to have open and frank discussions with you about what we've done well and what should be clarified and agreed upon to provide an optimal end solution for your ITS needs. What we've learned over the last 22 years is that sometimes organizations tend to overestimate just how much technology they need to incorporate to deliver safe, reliable, and comfortable transportation. During the Planning phase Avail's trained professionals will help you determine the right amount of technology by creating an efficient implementation protocol geared toward maximizing your time and money. While other vendors may choose to focus on the "sale", our customers continue to tell us that our focus on the ***best solution*** for their needs is what sets us apart from the crowd.

At the end of the Planning phase you can expect to receive a final project schedule that includes a detailed approach to your project, as well as an outline of activities your organization will need to participate in to make the implementation process run smoothly. We have found that it is most helpful for your organization to be involved in some of the validation and testing processes as Avail configures your customized solution. Partner involvement early on helps facilitate the adoption process during implementation and it also gives us the opportunity to start to train you and your staff on the new technology in a real-time environment. Through your direct involvement and feedback from your seasoned staff, we have found that your end product ITS solution will be optimized for performance specific to your unique situation.

### 4.3.3 CONFIGURATION

Now that Avail has learned what propels each of your organizations forward we can move on to the Configuration, or Design, phase of the project. In this phase, Avail constructs the system that will be the chassis

on which all other components are installed. The resulting design will be critical to the project and as such will be comprehensive including every aspect of the RFP. We will thoroughly survey your vehicles to determine optimal placement of our technology. Partnering with your key stakeholders, Avail will make sure that any equipment installations will not impair routine maintenance or interrupt operations. During our interactions with your staff we will continue to informally educate them about the new technology and how proper placement will enhance their workflow. In the event that any existing equipment needs to be relocated, our innovative tech staff will work with your leadership (or outside vendors as necessary) in each specifically affected area to ensure placement that helps make your staff comfortable with the hardware. Organizationally specific configurations will be documented by Avail and included as part of your final System and Vehicle Installation Manuals.

At the beginning of the Configuration stage Avail will meet with your team to conduct a Preliminary Design & Review, where we will make sure that your requirements are incorporated and that the design meets your agencies' expectations. At the end of the Configuration phase you can expect to be presented with Final Design Review documents which incorporate any modifications to the design of the base system. Concurrently, Avail will fulfill any outstanding equipment orders to meet your installation needs. It is during this phase that the Final Review Documents are formally accepted to make sure that your organization and Avail agree on ultimate deliverables for the project.

### 4.3.4 Assessment & Integration

During the Assessment & Integration phase you get to kick the tires on your new technology. A visit to our testing lab in State College, Pennsylvania will give each agency the opportunity to witness the series of tests that Avail performs to make sure your new system is ready for deployment. It also affords you the privilege of interacting with your new technology without the distraction of your daily work activities. This concentrated and intensive activity allows you to focus solely on the technology at hand to really see what it's made of. This process is formally called the Factory Assessment Test, or FAT, and it encompasses verifying system stability and checking route data to make sure everything is ready to roll for your upcoming on-site testing. Avail will conduct three separate FAT testing procedures (one for each agency) concurrently at our State College headquarters to ensure that each project schedule is in sync with the master schedule.

FAT testing is something that we get very excited about at Avail, because at FAT testing all of the hard work and planning that we've been collaborating on becomes a tangible reality. This is where you get to see an operating system that contains your route data and information and you get to manipulate that information to really see what your new system can do. FAT is a great opportunity to not only test your technology, but to also see how Avail itself operates on a day-to-day basis in our own environment. A formal testing of the system, FAT takes multiple days to complete and it gives both you and the Avail team one last chance before site testing to resolve any system deficiencies that might arise.

Using the information we gleaned in the Discovery phase, and having your undivided attention gives your Avail team every opportunity to incorporate training into our FAT conversations. By the time we get to Site Testing, you will already have some folks on your staff that have a working knowledge of how the new system operates because of the experience they got during the FAT process.

At the completion of FAT you formally accept in writing the results of the battery of tests run over the previous few days. Upon acceptance of the FAT testing results, the system components are shipped to your facility where they can be stored in a secure location in preparation for on-site pilot testing.

### 4.3.5 Site Testing

The Site Testing phase of the Implementation Plan is the part where you get to take this shiny new technology around the block for a test drive. Pilot vehicles are selected from your fleet and they are equipped with the previously shipped components. We work with your maintenance team to make sure that the newly installed

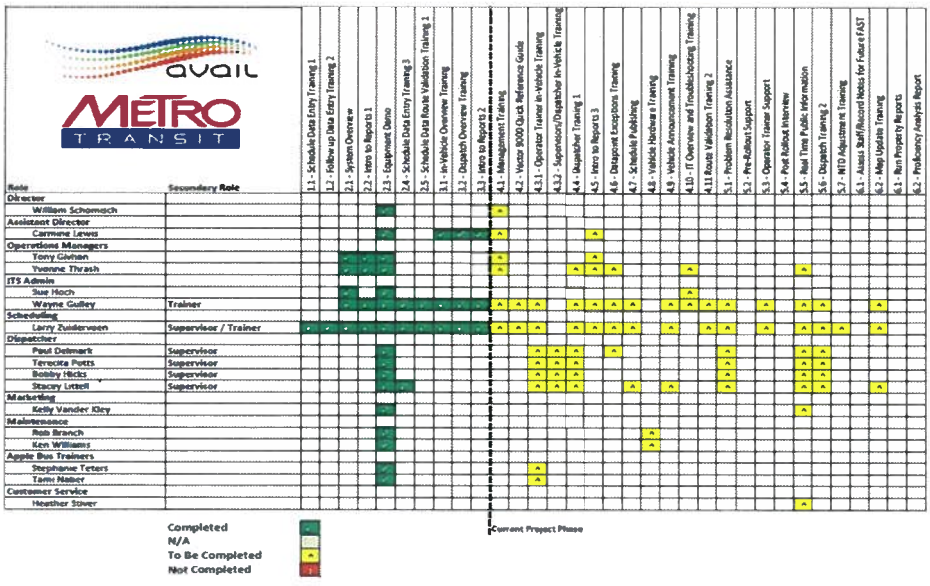
equipment meshes seamlessly with your existing hardware. Once this on-site installation process is complete the new and improved buses are ready for rollout the next morning. Your designated Customer Support Engineer and Avail team transition from the informal one-on-one training that has been taking place, and start to work directly with your dispatch group, drivers, and maintenance personnel to cultivate what they've learned about the technology so far and develop it into a structured formalized training program. It's no coincidence that this same Customer Support Engineer that is working on-site with you now, is your "inside track" contact with Avail for what we hope to be a lifelong partnership.

At the end of the Site Testing phase, your Avail team will conduct a live pilot test of the system using the selected install vehicles. As per your RFP instructions this pilot testing is scheduled to last 21 days and includes 10% of the vehicle fleet for each agency. These pilots will be separate for each agency, but will again run concurrently to remain in sync with the master schedule. Any issues that could not be detected during the FAT testing will be worked out during Site Testing and a formal test procedure will be run and accepted by your team before further vehicle installations occur.

## 4.3.6 ADOPTION

During Adoption the remainder of your fleet will be outfitted with your new technology solutions, acceptance tested, and placed into revenue service. After a 10-day burn-in test for each installed vehicle, your new ITS solution will be 100% live and operational. As the system starts to gather real time data from your buses, your Avail team will work to verify the incoming data and interoperability with your existing technologies.

As part of Avail's dedication to ***guaranteeing*** your success, your Avail team will now transition into widespread intensive training of all your staff. While Avail has been capitalizing on opportunities to train your team on the new technology throughout the entire Implementation process, their focus will now shift to making sure that your whole staff is completely comfortable with the new technology. We realize that often times, just like us, people in your organization can wear many different hats, so we've developed our unique training program around role-based learning modules. What this means for you is that we will train not only the primary person who works in a particular role, but we will also train their back-up with the same information. This gives your organization the flexibility to cover the needs of your business and it also helps to effectively develop your staff. We will take the time to teach your team how to interact with the technology in the most efficient way possible and we won't leave until we're sure they understand it. To best accomplish this training, we roll up our sleeves and work *with* your staff in the trenches so we can not only show them what the new technology can do, but so we can develop a stronger business relationship with them as a trusted mentor and guide.




During the Adoption phase Avail will work with you to develop a training matrix, similar to the one featured here, that will ensure the appropriate staff is knowledgeable about the new technologies and that they can effectively

demonstrate the skills necessary to use these tools on a day-to-day basis. This customized training is something that sets Avail apart from its competitors because we believe that your great investment in technology deserves an equally great investment from us in your people—it's important and included!

### 4.3.7 Secondary Assessment

Once all the system elements have been installed, the Secondary Assessment phase kicks off with a formal set of testing procedures called System Acceptance Testing (SAT), to make sure that your system is fully operational and running as expected. Three weeks prior to SAT testing a SAT Plan will be supplied to the agencies for approval. The SAT testing procedure is an end-to end test that will last for no less than 15 consecutive calendar days. Once that testing has been completed and witnessed by an agency representative it's time to take the training wheels off your system. We make sure that all contractual requirements have been completed to your satisfaction, that you've accepted and approved all test reports to date, that all equipment and documentation has been delivered, training has been administered and that your satisfied with the integration of all onboard systems and equipment. While most vendors would simply turn the technology over to you, your Avail team continues to monitor your system performance remotely from our State College, PA headquarters. During this operational test period Avail observes how the system functions and supports your staff as needed to further guarantee your successful 100% implementation. You can rest assured that the Avail team will not abandon you with the new technology and that we will be there to answer any questions, no matter how big or small.

### 4.3.8 Operational Improvement

The final step of our Implementation Plan is the Operational Improvement phase. At Avail this is about more than just supplying you with warranty information and rendering support when you call upon us. At Avail it's about making sure any issues you experience are resolved, but also it's about solidifying our partnership for years to come. Our highly-knowledgeable customer support staff is available 24/7 to manage any questions or issues you may have. But at Avail we take it ***one step further***. As we've demonstrated from the very beginning we are invested in making sure your staff is fully trained and comfortable with your new ITS solutions, so we've dedicated our team to provide ongoing training and support well beyond your final project completion date. From the very beginning we crafted our process to make sure that your Customer Service Engineer was on-site and involved in every aspect of your operations to make sure that they understood your processes and developed a rapport with your team.

This same Customer Service Engineer will re-visit your location at regular intervals as part of our Follow-on Adoption Support Training (FAST™). The initial FAST™ visit primarily focuses on making sure that everyone at your facility is using and integrating the new system into their day-to-day operations. Your Customer Service Engineer re-examines your customized training plan seeing if there are any additional opportunities to advance individuals or get your team acquainted with the technology. Our goal is to make sure you're using the fully deployed system to its greatest advantage and that your staff is comfortable and confident doing so. Avail is the only company that treats training as an included standard part of our service. This benefits not only the customer, but it also benefits Avail, by enabling us to tailor our training message to what the people in the trenches are actually doing with the technology.

Avail believes there's always room for improvement in everything we do and we're constantly working to make sure that ***we're better so you're better***. We seek out your feedback during training sessions, but we also regularly review our products, employees, and our overall culture as part of our Continuous Improvement Process (CIP). This objective look at who we are, what we do well, and where we can improve has helped us become a leader in the industry and has become a guide to how we approach all of our projects.

During FAST™ and as part of the CIP process, we sit down with you to take a retrospective look at what your technology goals and objectives were at the onset of this project. We talk about what drove you to adopt new technology in the first place, and we have a frank conversation about where you'd like to end up as you move

forward. This is a time to celebrate the resources and effort you have invested to make this technology roll out a success, and it's also the perfect time to see if you have additional technology needs that we can help you realize in the future. At Avail we realize that the most important communication is not our own marketing dialogue, but rather the dialogue that takes place among our customers like you.

We stand by our products and services at Avail. As your partner we base our warranty and support model on our progressive technologies, unique and innovative processes, and our traditional values and we bring that all to you in the form of value-added services at no extra charge to make sure that your operation is always running at its peak.

### 4.3.9 Pride in Craftsmanship

Recently we heard from one of our customers who told us that while they were doing site visits to see our system and those of our competitors, one thing that stood out very clearly was the quality of our installations. Not just the in-vehicle installations, but all of the products that were installed onsite. The way hardware was mounted in the buses (cleanly mounted using high quality mounts), the cable runs in the office (all the cables neatly wire tied and organized) and the sign installations were all first class.

> *"Avail's professionalism and organization have made it possible for all projects to start/end in a timely manner—and their strong management skills have made projects run smoothly. Aside from this, the quality of their products are superb, making it a privilege to install and work with their equipment."*
>
> **Steve Phelan**
> **President**
> **ESP Enterprises – DBE Installer, Arlington, TX**

Why do we go the extra mile on something that many companies take so lightly? We learned long ago that proper installation of hardware cabling is every bit as important as any other component of the system. While buses tend to look alike, we can assure you that when you start installing cables and the associated hardware components of the system, you find out very quickly that bus manufacturers often make mid-year adjustments to their chassis designs to improve the overall quality of their product. Therefore, Avail's field engineering group will perform thorough vehicle surveys on each vehicle type to ensure that nothing is overlooked during the vehicle installation process.

Avail works closely with our chosen vehicle installer ESP Services who we have successfully used many, many times over the years. Their knowledge of Avail's in-vehicle suite of products provides you with a very high quality installation. Our field engineer will provide oversight of the installations and manages the installers to ensure they maintain the quality we have come to expect from them.

### 4.3.10 Quality Control

Avail employs controls on kitting, hardware development, software development, and system problem reporting. All equipment is thoroughly inspected and, when warranted, burn-in testing is conducted by our in house staff to ensure that all equipment purchased for projects is defect free prior to installing the equipment in the field. We have also developed stringent hardware and software guidelines. Specifically, our lab technicians follow detailed assembly processes and sign off on various tests that are conducted to ensure a unit is working prior to shipping it to site. Our engineering staff documents all changes to units that are required as a result of issues identified with fielded systems. We also have stringent testing requirements for any custom software that is developed for our customers. Both developed hardware and software components utilize computer aided control mechanisms for source file schematics and code. All developed systems are tested as part of our Factory Integration process and any problems uncovered during this process are thoroughly documented in System Problem Reports. These reports identify not only the problems, but also the person who "fixed" them, so that any future questions can be answered effectively and efficiently.

Avail believes strongly in a Continuous Improvement Process (CIP) to ensure the quality of our products and processes. Avail employs a 10 person CIP leadership team tasked with continually identifying challenges within the organization that can be improved upon. It is this continual process of improvement that mirrors our approach to projects where we're always looking for ways as a team to improve upon the success of our company, products, and relationships to bring more success to our customers.

## 4.4 AGENCY PARTICIPATION

The previous sections describe the approach that Avail has used to successfully deploy our integrated systems. Our Project Management Process is naturally more detailed than we have space to provide. Below is to answer the specific question as to what participation is required from you the customer and our partner to make the project a success.

| PROJECT ACTIVITY | AGENCY PARTICIPATION |
|---|---|
| Discovery Meeting | • Ensure appropriate staff attends the meeting<br>• Review and comment on implementation plan and project schedule<br>• Provide approval for implementation plan and project schedule<br>• Provide access to facilities and staff for surveys and interviews |
| Requirements Review | • Ensure appropriate staff attends meeting<br>• Review and comment on the requirements<br>• Generate a traceability matrix with all baseline requirements and update those requirements post review<br>• Provide approval of the requirements |
| Configuration/Design Review | • Ensure the appropriate staff attends the meeting<br>• Begin entering schedule data. Avail can enter this data, but we suggest you do so that you are familiar with this process and can maintain the data moving forward.<br>• Review and comment on the proposed designs<br>• Review, understand, and provide inputs the Customer Data questionnaire<br>• Review the status of schedule data entry and agree to a completion date of at least 30 days prior to FAT<br>• Review design materials and vehicle installation manuals<br>• Provide approval of the detailed designs and installation manuals |
| Assessment/FAT | • Review and approve the Factory Acceptance Test Procedures<br>• Travel to State College, PA to witness the Factory Acceptance Test<br>• Update the requirements matrix with FAT results and get the approval from both Avail and agency project teams |
| Pilot/Secondary Assessment | • Assist with vehicle selection<br>• Provide access to pilot vehicles<br>• Work with Avail to identify trainees and schedule training classes.<br>• Ensure employee attendance at training classes<br>• Provide space and other office resources as required<br>• Provide a vehicle, driver, and resource to assist with Route Validation<br>• Assist as needed to perform schedule updates as needed per Route Validation results<br>• Provide appropriate drivers for the Pilot Test<br>• Assure that pilot vehicles are available for testing<br>• Ensure that any problems noted are reported to Avail<br>• Review and approve the Pilot Test procedure<br>• Witness the Pilot Testing, and provide final approval of the Pilot Acceptance |
| Rollout | • Provide access to vehicles according to the schedule<br>• Provide a facility for the installation of the vehicles |

| PROJECT ACTIVITY | AGENCY PARTICIPATION |
|---|---|
| | • Assist with Route Validation for the remainder of the system routes, providing vehicles, drivers, and witnesses as needed<br>• Provide feedback on any vehicle, schedule data, or system performance issues noted<br>• Work with Avail to develop a schedule for installing the vehicles<br>• Witness and sign Vehicle Acceptance Test |
| System Acceptance Test (SAT) | • Review and approve SAT Procedures<br>• Witness SAT<br>• Witness re-testing if necessary<br>• Complete the System Acceptance Checklist<br>• Accept the completion of SAT |
| 30-Day Acceptance | • Record and report any discrepancies found to Avail<br>• Accept the system once all SPR list items found during the 30 day period are resolved |

## *Your next thousand miles begin with just one step*

Our research has shown us that our customers are no longer willing to put up with shoddy products, indifferent service, and a lack of accountability and transparency. We understand that your organizations are under intense pressure to increase your relevance in the industry and minimize waste, and as your partner, Avail will be ***with you every step of the way***. Our owner operators are as much invested in you as you are in us and the Avail Team serves as the single point of responsibility for all your technology and support needs. At Avail we won't just claim that our products and support will make your life easier; we will show you. Because we have such a great rapport with our previous customers we ask you to reach out to them. Talk with them about not only our products, but also about how we managed challenges, and how our support service was better than any other in the industry. After you've spoken with them take a moment and evaluate the overall value of technology and ***service*** that Avail offers and compare it to what our competitors offer. We are confident that once you see that at Avail we are just like you, focused on providing safe, reliable, and efficient transportation solutions you'll want to partner with us for all your future technology needs.

We're different because we have a unique and innovative approach, progressive technologies, and old fashioned values. We combine all three of these attributes to bring you comprehensive technology review, seamless installation, unsurpassed training, and an unparalleled warranty and support program because it's the right thing to do and that's how we do business.

# 5 TECHNICAL APPROACH AND WORKPLAN

## 5.1 PROJECT UNDERSTANDING

Avail will deliver a **fully-compliant** solution for your agencies comprised of the most innovative and forward thinking technologies and services available in the market today. The foundation for this solution is our very own **myAvail** suite of products. **myAvail** is the culmination of everything we have learned over the past two decades of providing innovative solutions for transit. It reflects our passion for what we do, and our willingness to listen to our customers and turn their desires into products that work intuitively and powerfully.

> *With our long history of working with Avail, we have found them to be extremely progressive in their technologies and very customer oriented*
>
> **Eric Wolf**
> *Executive Director*
> *AMTRAN – Altoona, PA*

When we received your RFP and read the first paragraph of the Technical Specification, it was a breath of fresh air because you specifically called out *exactly the right items* that all too many agencies in your position take for granted—and mistakenly assume every vendor has. Unfortunately, for these agencies, their significant ITS investment born out of the promise of transforming their operational efficiency, vastly improving service, and taking customer satisfaction to new heights, resulted in failed expectations, a wasted investment, costly maintenance, and constant questioning of *why* they made the investment in the first place; all the while hoping their *next* partner would get it right. How do we know this? Because in the last year alone we have seen multiple agencies the size of yours come out with RFPs to replace their ITS systems. In every case these systems were less than 5 years old and in some cases the procurement was their 3rd attempt.

Avail's customers can tell you a much different story, a happy story that shows the promise of what ITS can do for you and instill hope that your vision can be fulfilled when you choose the right partner.

- ☑ **Open systems architecture** – Avail has designed our solution from the ground up to be non-proprietary and open-architecture, embracing applicable standards to the greatest extent possible. More importantly our staff has been active in the very groups that ***set the standards for over two decades***.
- ☑ **Data accessibility and free flow of data** – Avail's forward thinking innovation is no better illustrated than by our powerful and advanced data mining and analysis tools that provide something more important than data. ***Our tools provide answers***. And they are so easy and intuitive to use, your entire staff at all levels will be able to transform how they do their job.
- ☑ **Interfacing to other systems** – This is where Avail's traditional values come into play. How you ask? Because we believe that giving our customers options is a good thing. We don't believe every product you buy needs to come from us. We believe in playing nice with other vendors in the industry. ***We charge no license fees to interface to 3rd party products***. We have deployed interfaces with more 3rd party software and hardware than any other ITS vendor. We have more deployed working interfaces with Trapeze than any other ITS vendor.

Embracing these values and our commitment to the success of our customer-partners over the past two decades has led Avail and our staff to achieve results that speak for themselves:

- ☑ **15th year of service and still ticking** – the first system we deployed as Avail was in 1999 and today it is in its 15th year of day-in and day-out reliable operation providing valuable benefits to our customer and the riders they serve. Our focus on sustainability and backwards-compatibility means ours is the last ITS solution you will ever invest in with a total cost of ownership that is the lowest in the industry.
- ☑ **100% project success** – every project we have started we have successfully completed and most importantly we've achieved success for our customers by allowing them to accomplish every goal and objective that led them to invest in ITS in the first place. Our customers rely on our solutions every day and they are integral to how they run and manage their operations. Riders all over the country use our solutions to enhance their ride. That is our measure of success.

- ☑ Every customer we ever had is still a customer today – through our ***Progressive Technologies*** *and* ***Unique & Innovative Processes,*** we have built a standing reputation in the industry of always following through on our commitments. And it is our old-fashioned ***Traditional Values*** belief that nothing is more important than the success of our customers which motivates us to not stop until we achieve them. We live and work by a simple credo, and that is *the best thing for us as a Company is to always do what's best for our customers*. That's why after all this time and scores of systems being deployed, our proudest accomplishment is to be able to say that every customer Avail has ever had is still a customer today!

Avail is not simply building products for the next 5 years. Avail is building innovative solutions for the *next* two decades, and we are constantly looking to the future and our customers for our inspiration. Our partnerships are built with that outlook as well, and our desire is to build a long term partnership with you. We are uniquely qualified and capable to serve as your ITS technology adoption partner for many years to come. We are committed to working hand-in-hand with your staff as well as regional, State, and Federal technology stakeholders to ensure that your technology adoption plan is one that will be successful, and compatible with the continually evolving ITS standards and regional and national architectures.

The staff of Avail has been working in the trenches with, and listening to, the users of technology within transit organizations for well over two decades. We have also spent thousands and thousands of hours listening to managers and executive staff in the industry to understand their need for getting useful information out of the technologies they adopt. The results are reflected in our products and the following section provides a thorough description of our products and proposed solution.

To shed light on what has shaped the philosophy and approach behind our technologies and processes, we'd like to share with you Avail's Mission Statement and draw attention to the three highlighted words: adoption, partnering, and success.

***"To revolutionize the adoption of ITS technology by partnering with our customers to achieve success"***

What do we mean by each and why do we feel they are important?

- ☑ **Adoption** – at the end of the day, this system you are procuring is not ours, it is yours and your riders'. Our goal is to ensure your staff, at all levels within your organization, have the knowledge, understanding, and buy-in to fully embrace and leverage your system to transform how they do their job; and your riders leverage our system to transform how they interact with your service to make informed riding choices;
- ☑ **Partnering** – we are able to cultivate and foster a level of adoption within your organization by fully immersing ourselves into your operations. We get to know everyone in your organization and we learn how you do business and what your unique challenges are. At every step in the project we work hand-in-hand with you as a team and become an extension of your staff;
- ☑ **Success** – by becoming an extension of your staff and your organization and truly understanding the unique aspects and demands of your operation, we now have the knowledge to apply what we know and tailor our integration of your

technology solution and our training expertise to meet your needs and put a project plan in place that ensures together we achieve success.

And what is our definition of **Success**? That when it is all said and done, *that each of your agencies achieves the goals and objectives that led you to invest in ITS technology and partner with us in the first place*! For us, that is the only definition of success that matters, and it is the measuring stick for everything we do. But more than that, being part of helping our customers achieve this kind of success gives us a great sense of pride and satisfaction. We talk about our customers being family, and just like family we love sharing in each other's accomplishments.

As a company, Avail is blessed to have a family of customers, peers of yours, who comprise some of the leading transit agencies in the country. We are proud to say these customers have embraced, and have fully adopted our technologies and solutions into their daily operations. Using these technologies, they are able to provide the *safest, most efficient and reliable service* possible and they are rewarded with *increasing ridership*, *industry recognition*, and the *highest levels of customer satisfaction*. Ironically, at one time or another, they were all exactly where you are today. They too faced the daunting task of investing a significant amount of time and resources to select a technology vendor whom they could trust would help them achieve their goals, with a solution that would have a profound impact on their operations for the *next decade and more*.

## 5.2 Avail's Unique Approach

Thus far we have presented our Mission and what success means for us and for our customers. We have shared some examples of how our customers have been able to achieve the very same objectives that each of your agencies hopes to achieve through this project. And we stated that our experience has taught us that success requires not only great technology, but also great processes to ensure the users of that technology understand it and its use is second nature so they can truly transform how they do their job.

But we also understand that as you as read these proposals from different vendors that they all start to sound the same after a while and it is hard to truly discern one company from the another. So what we want to do here is highlight just a few of the unique things that truly set us apart.

Much of our staff has been doing systems integration for public transit for over 20 years, and our senior staff cut their teeth doing Command, Control, and Communications for the Department of Defense, so we have learned quite a lot from that experience. But we have also watched other vendors struggle and fail in this industry, and seen firsthand the things that create frustration for customers. And so we have learned from that as well, and used what we have learned to create a unique and innovative project process that is simply unmatched by any other vendor in the industry.

One example of where we feel we are different from our competitors is the vehicle installation process. We like to say you only have 1 backend, but you have many vehicles, so proper fleet installation is critical. Most likely every vendor proposing will use a 3rd party installer and some may even use the same installer as Avail! So at first glance it may seem that all things are equal.

**But here is where you need to look closer to truly appreciate how Avail is different.**

- ☑ We assign a dedicated Field Engineer to your team whose sole focus is managing fleet installs
- ☑ We contract with a DBE installer (we use ESP Services) for installs and we have a consistent trained Avail specific crew
- ☑ We will contract with your local radio shop for

installation support

- ☑ Your designated Avail FE will perform a complete vehicle survey of every unique bus and vehicle type
- ☑ Your designated Avail FE will work closely with your maintenance staff to determine all equipment placement
- ☑ Your designated Avail FE will create custom vehicle schematics and installation manuals for every unique bus type
- ☑ Your designated Avail FE will train your maintenance staff, ESP and the local radio shop on installation and troubleshooting
- ☑ Your designated Avail FE will install the pilot buses with support from ESP and the local radio shop to further train them
- ☑ Your designated Avail FE will perform the 1st article installs with ESP for each bus type for rollout
- ☑ Your designated Avail FE will train your maintenance staff on how to inspect and sign off on each install

**This approach results in numerous benefits to your agency:**

- ☑ Avail is the **single point of responsibility** for all aspects of the vehicle installation ensuring quality and a smooth rollout. We make it easy by cutting out the middle man!
- ☑ Your maintenance staff is fully trained on how to troubleshoot the vehicle equipment, ensuring that when issues do arise they are quickly resolved keeping your fleet in revenue service
- ☑ Avail will work closely with your staff to identify the right resources to ensure you have a local presence for additional support as needed.

A few more things to remember as you evaluate vendors during this process:

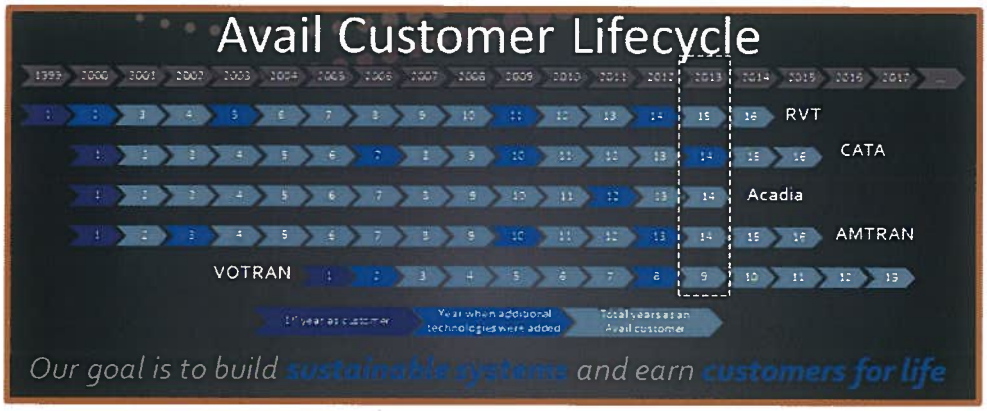
- ☑ **Once your Project Team, always your Project Team**. With Avail, the team you start the project with is the team you end with. We also enjoy the highest staff retention in the industry because our employees take pride in what they do and their ownership of the Company;
- ☑ **We provide as much training as you need – *no extra cost***. Every customer is unique and every user is too, and we all learn at a different pace. So while we follow a structured training plan, at the end of the day if someone needs more training we provide it. We want everyone to be able to fully use our technology, and you shouldn't have to pay extra for that;
- ☑ ***It's Included***. Speaking of paying extra, ***we are proposing a firm fixed price turnkey system.*** So unless you change the scope, there will be no change orders. You are hiring us because you trust us to know what it takes to deploy an ITS solution, we will not nickel and dime you to death or lowball our price to get our foot in the door only to try and recoup money later;
- ☑ **FAST™ Process**. As long as you are a customer and under support, we continue to come back to your facility and provide additional Follow-on Adoption Support and Training (FAST) to ensure you continue to maximize the use of our system and achieve measurable ROI from your ITS investment with us. This is our most revolutionary concept and has helped us and our customers achieve our greatest successes together;
- ☑ **Out of the Box Reliability**. Our solution was architected to be "off-the-shelf" yet be highly configurable to meet the unique needs of each of our customers. We leverage best-of-breed products to the greatest degree possible and all of our products are designed specifically for transit and we test to the most stringent industry standards to ensure day-in and day-out reliability;
- ☑ **Role-based interface to maximize efficiency**. All we do is transit and our full-service approach to deploying systems means we have an intimate knowledge of how you work, whatever your role may be. We have infused that knowledge and input from our customers into our products so that they enable you to work smarter not harder;
- ☑ **Focused on providing answers not just data**. We have the most comprehensive data warehouse in the industry that combines and links all of your data, and the most powerful analysis engine that continuously mines the data looking for

metrics *you* ask for so that you have the answers you need to proactively take positive action;

- ☑ **Expandability**. Avail has designed our solution from the ground up to be non-proprietary and open-architecture, embracing applicable standards to the greatest extent possible. More importantly our staff is active in the very groups that set these standards for over two decades;
- ☑ **Long Service Life**. The first system we deployed as Avail was in 1999 and today it is in its 15th year of reliable operation providing a valuable benefit daily to our customer and the riders they serve. Our focus on sustainability and backwards-compatibility means ours is the last ITS solution you will ever invest in with a **total cost of ownership that is the lowest in the industry**.

These are the kind of differentiators that we encourage you to look for in your evaluation. Our extensive experience has taught us what properties the size of yours need in the products they use and it has helped us develop a powerful yet user-friendly suite of products that truly separates Avail from our competition. Avail is not simply building products for the next 5 years. Avail is building innovative solutions for the next two decades and beyond, and we are constantly looking to the future and our customers for our inspiration. Our partnerships are built with that outlook as well, and our desire is to build a long term partnership with your agency.

As you can see by the graphic below Avail does its best to ensure backward compatibility in everything we do.



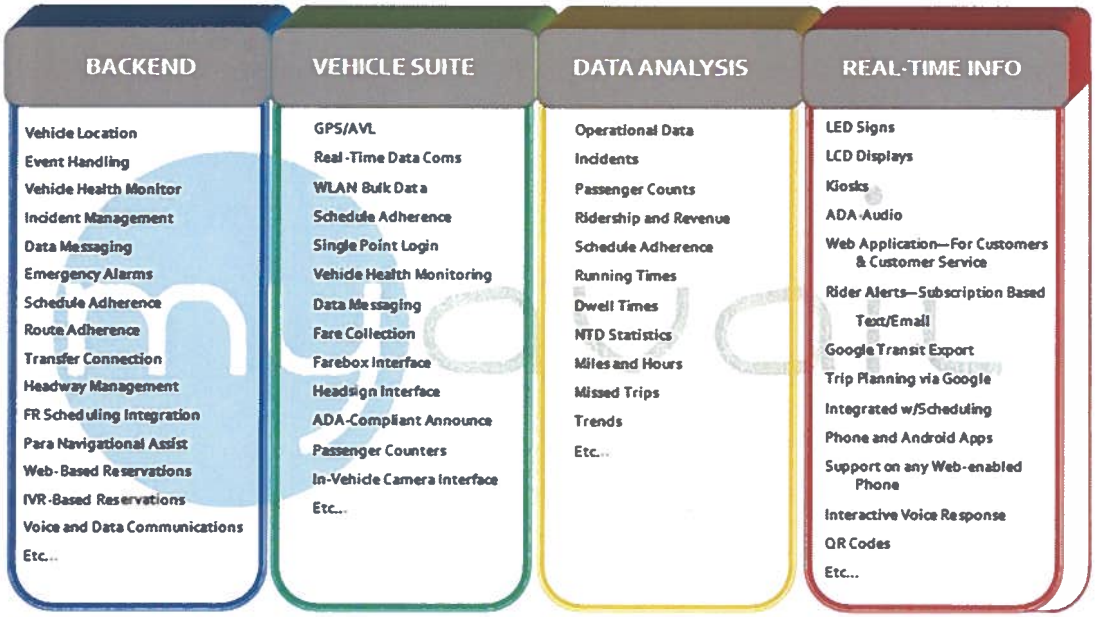

## 5.3 THE AVAIL SOLUTION

In this section we will highlight the solution and services we are proposing to meet the requirements set forth in your RFP for the procurement of a Computer Aided Dispatch and Automatic Vehicle Location System. Our goal is that when you are finished reviewing this section you will clearly understand the unique qualifications of Avail Technologies that truly set us apart as the best possible partner for Soltrans, Petaluma Transit and Napa VINE.

Avail certainly understands just how daunting the review of these proposals can be. So we do our best to keep our proposal brief, easy to read and to the point, while still providing your evaluation team with all of the details you need to understand the depth and exceptional value of Avail's offering.

We know that you are not preparing to make this significant investment in ITS technology just for the sake of procuring technology. ***You are making this investment because you believe this technology has the power to transform your operation.*** In your RFP you clearly stated your primary objective of the ITS system project is to "increase availability of transit information and dissemination; to improve overall dispatching, operational efficiency, cost effectiveness, and enhance the customer experience of its transit services."

In addition, the chart below provides a visual overview of much of the *myAvail* CAD/AVL solution to illustrate how the overall solution can evolve, which has been requested as part of your RFP. Each unit identified is a modular addition to the system allowing for increased functionality over time as your ITS needs grow.




## 5.4 Understanding You

Running a transit agency today is tough work. Every day you face increasing operational costs, reduced funding, and an ever changing demand for the services you provide; and achieving your goals is never easy!

While ITS technology is a great tool to help you achieve these goals, address your needs today and in the future, it isn't the "total solution". Addressing those needs will be accomplished by adopting an array of technological, operational and service based changes that when balanced properly, can put you on the road to success for decades to come. This is where having the right partners becomes essential.

A large portion of Avail's staff has been developing technology for public transit for more than two decades. Collectively we have spent tens of thousands of hours working hand-in-hand with you, the operators, observing daily operational challenges and the steps you take in addressing them. With that experience under our belts, we too see your vision for the future and are confident in our ability to help you achieve it.

Technology adoption isn't something that's new to any of the agencies involved in this procurement as technology adoption includes everything from phone systems and internet service, to software for maintenance, headsigns and fareboxes on the vehicles, and so much more that you have already done.

More so than any technology adoption you have done thus far, the wide array of technology that you are about to procure, if done properly will have a profound impact on just about every aspect of your operations. That's why making the right choice for a partner in this process is so vital to your long term success, and Avail Technologies is that partner!

## 5.5 The Right Solution for SolTrans, Petaluma Transit and Napa VINE

Avail has developed one of the most forward thinking and innovative fixed route CAD/AVL solutions on the market today. As the only true systems integrator in the Intelligent Transportation System for public transit market, Avail has worked and integrated with virtually every hardware and software company in the industry. In many cases Avail, as part of the project scope, has worked with existing vendors in order to provide a fully integrated suite of technologies and on other projects we have chosen to partner with the vendors we felt would best meet the needs of the customer. This is the approach we are proposing to you. If during the *Discovery phase* we uncover the need for a different type of solution we will do whatever it takes to make sure that you're comfortable and happy with your new technology immediately becomes Avail's priority once you choose us as your vendor.

## 5.6 myavail System Description and Architecture

While the Avail CAD/AVL solution being proposed not only meets and exceeds all the features, functionalities and requirements of your RFP, it is also the ***foundation*** that will serve as the "glue" to begin tying all your disparate technologies and applications together into a truly integrated solution.

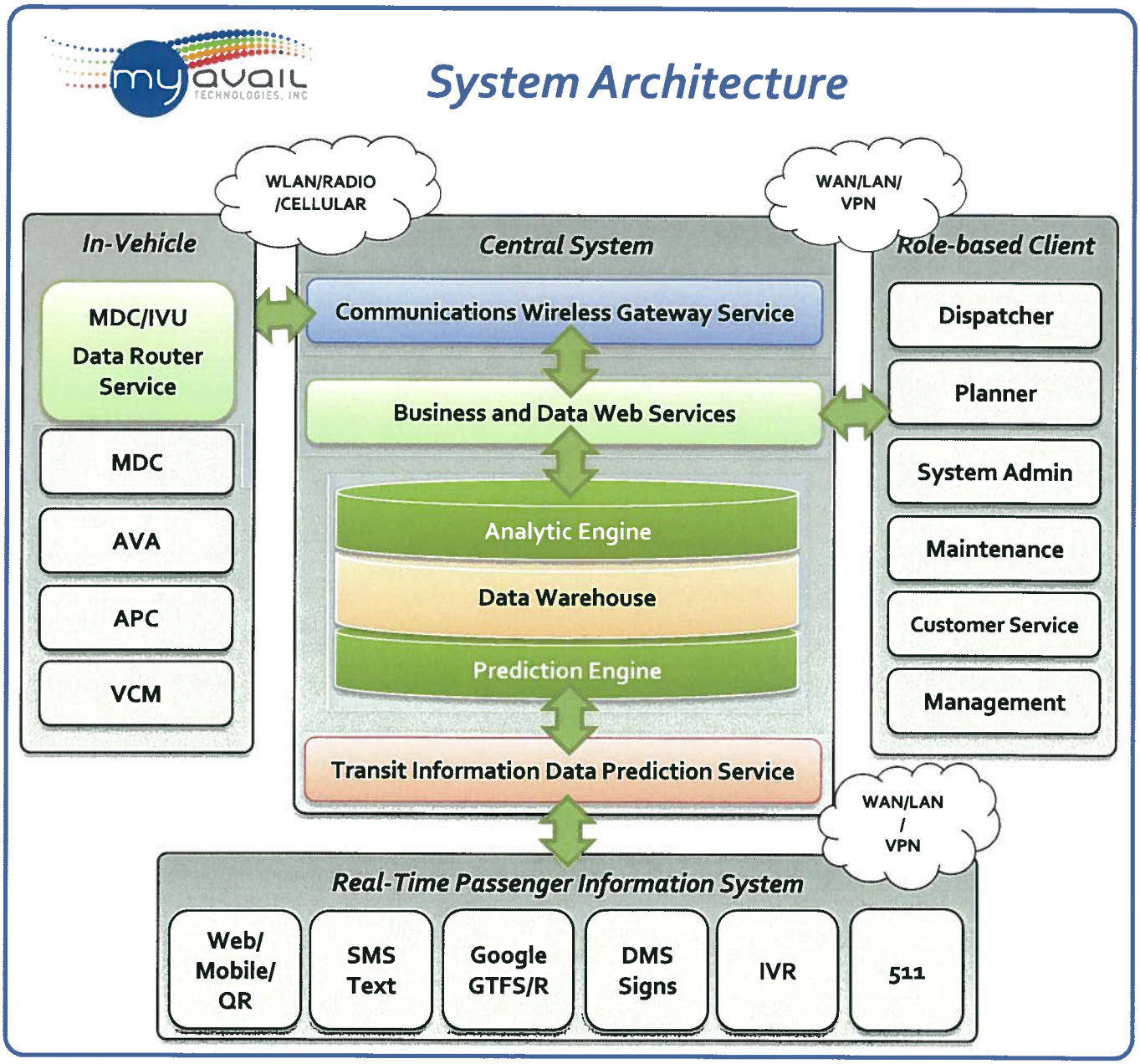



Figure 1: myAvail System Architecture

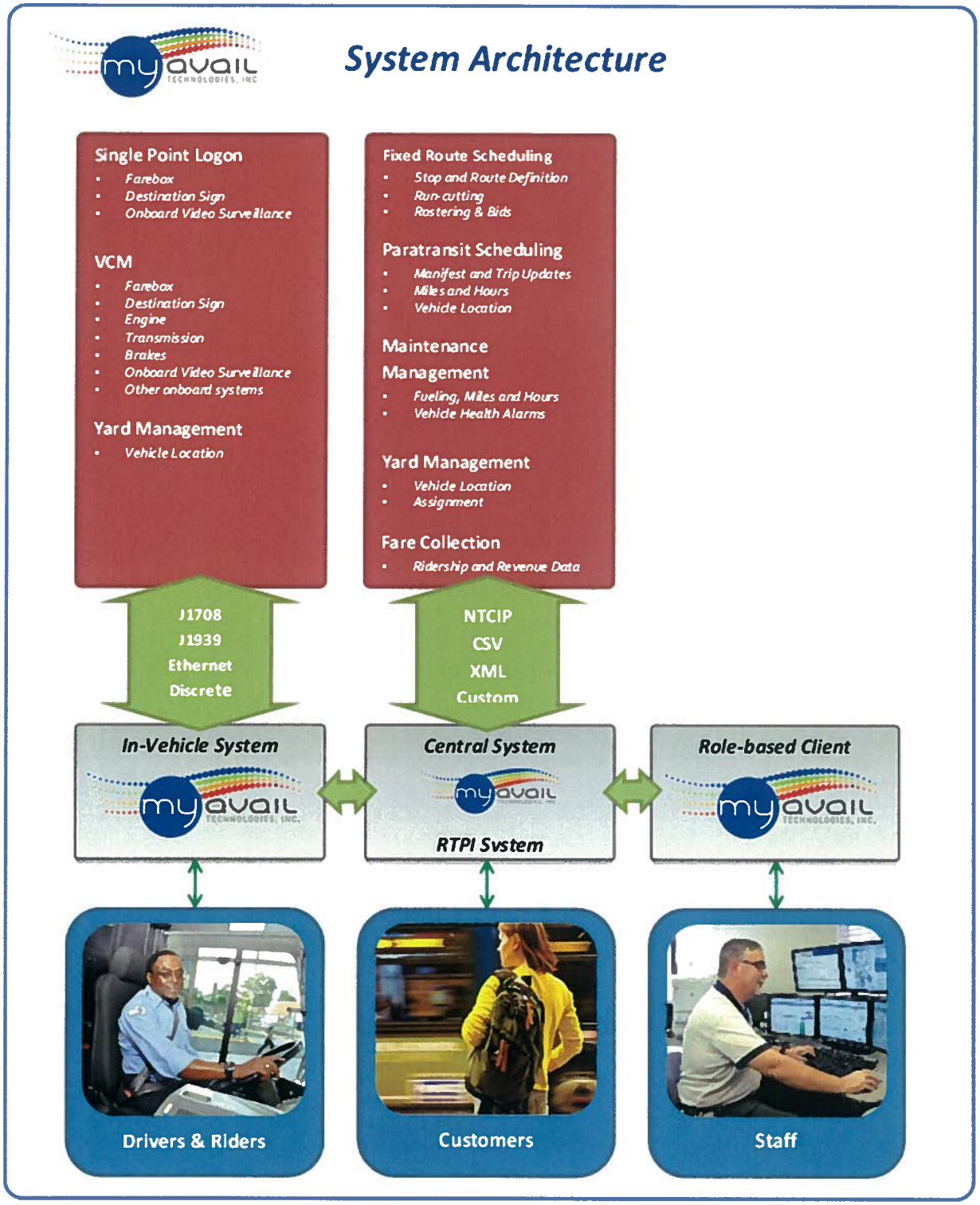
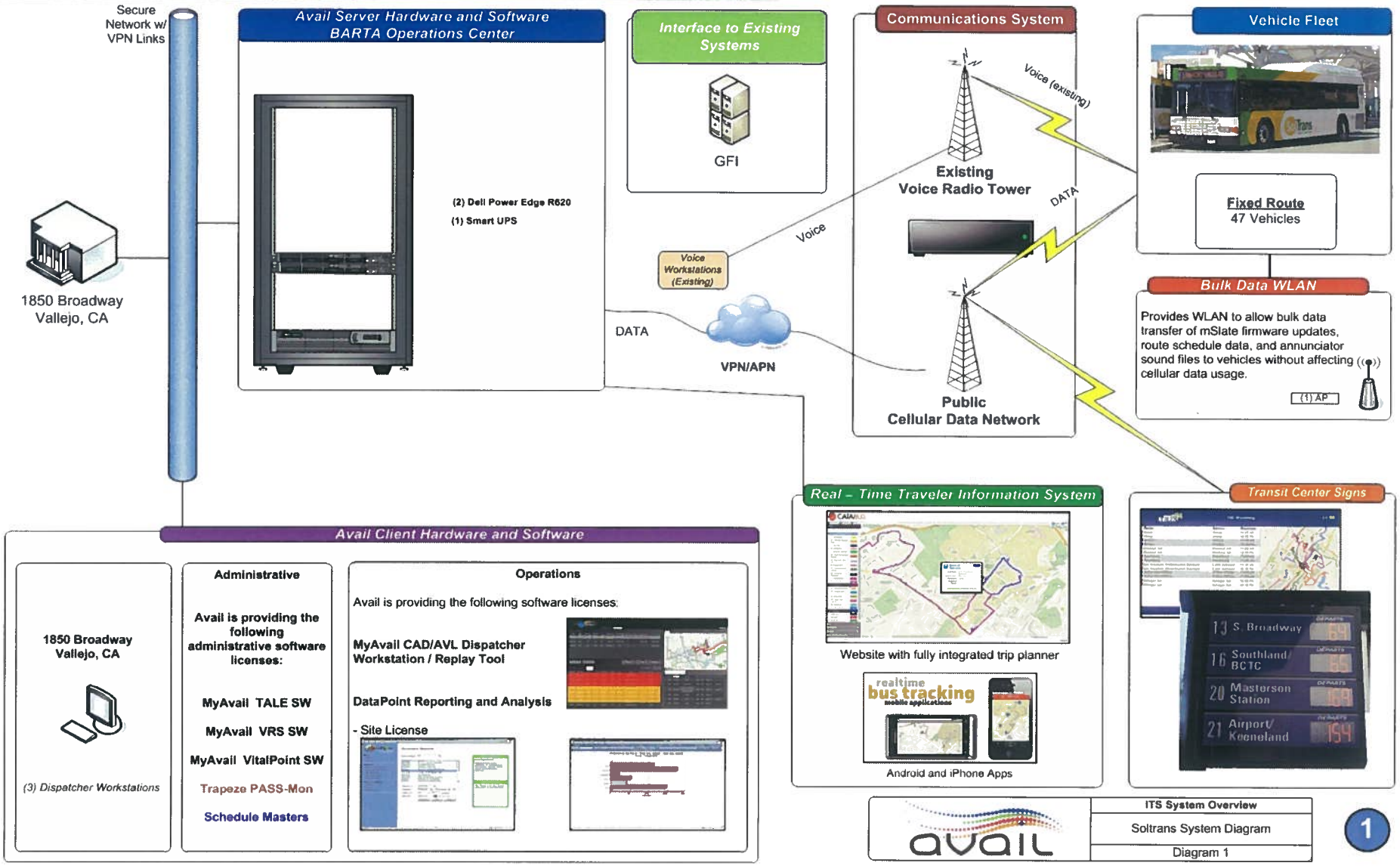
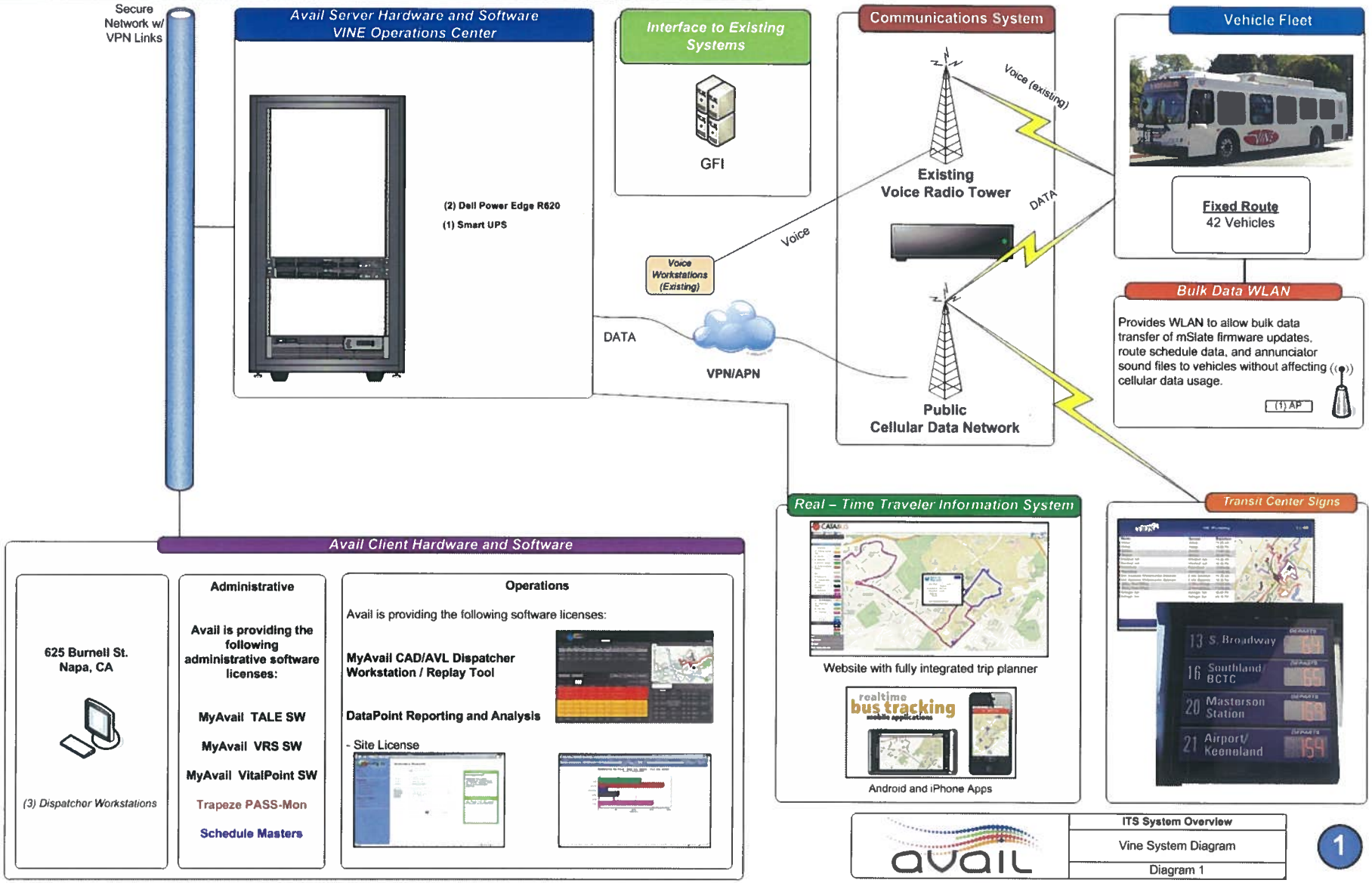



Figure 2: myAvail serving as foundation to share data and connect users and disparate systems

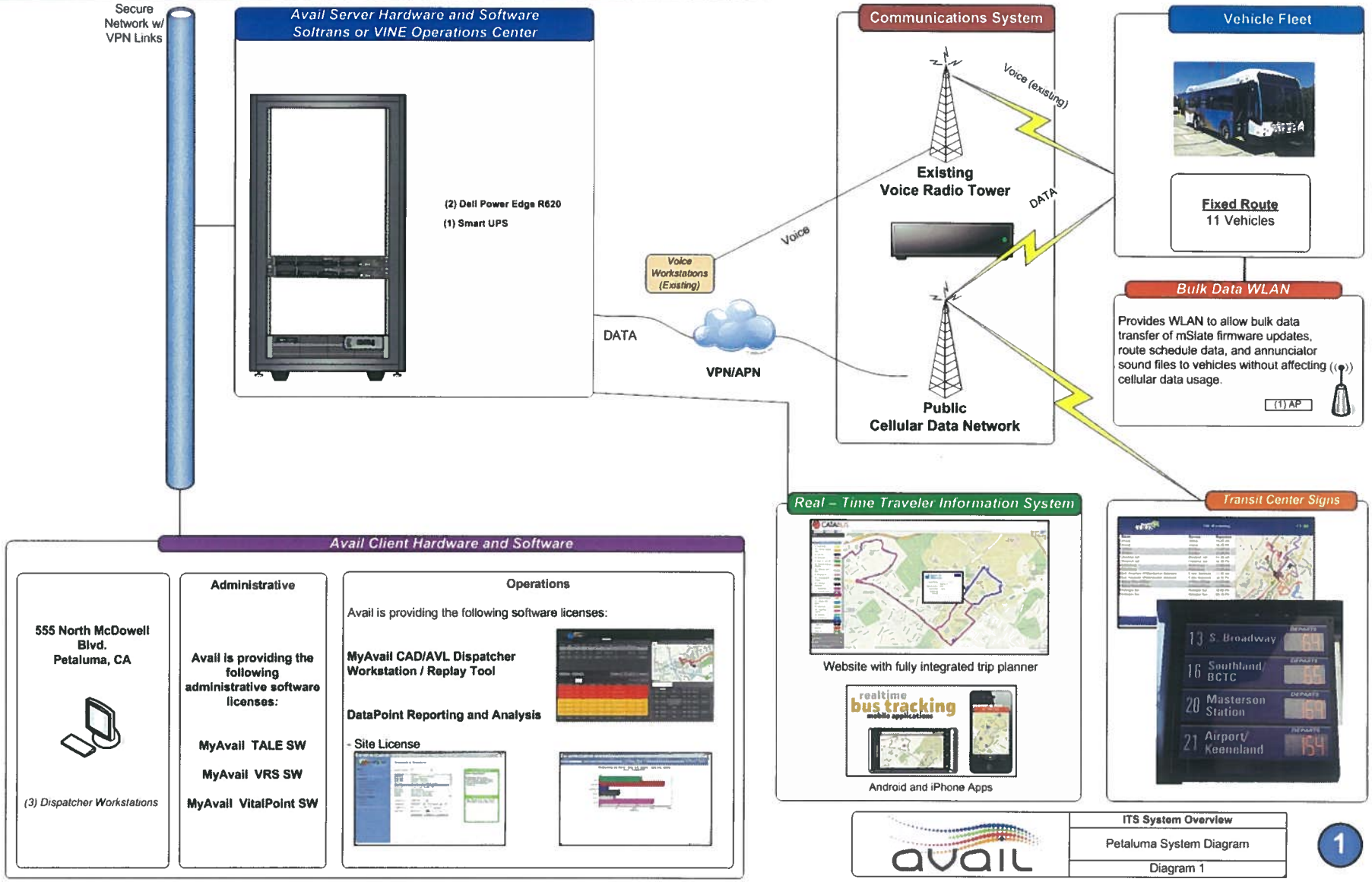
# Backend Solution



# Backend Solution



# Backend Solution



### 5.6.1 A Vision for the Future

Being in business for more than 15 years, Avail Technologies has seen the landscape of public transit change from an operationally oriented business model to something more customer centric. The use of real-time passenger information has made using transportation systems easier for riders, and technologies such as GPS and automated passenger counting help streamline administrative functions. In your RFP you requested that each vendor propose what their 10 year vision for proposed system hardware and software would look like for your agencies. We certainly know from experience that the face of public transit has no limitations as technologies continue to evolve and grow. That's why we've crafted our solution to leave the door of possibility open. What does this mean to you?

If you think about an overall transit system there are two key elements required to make it work. There is the hardware side of things that encompasses your MDTs and vehicle equipment and there's the software side that includes dispatching, locating, and reporting capabilities. At Avail we've designed our hardware to withstand the rigors of public transit. As we write this proposal, we've got customer partners that are still currently successfully using equipment as part of their daily operations that was installed more than 10 years ago. Making sure our customers get the most value for their dollar is something that Avail is very serious about, so we design each generation of hardware as a backwards-compatible component so your fleet can evolve as you continue to grow. As you migrate to next generation hardware through OEM bus buys, you will continue to build an inventory of spares that will be supported through the Avail RMA process while transitioning your newest fleet additions to the most up to date hardware products. What this means to you is that outside of regular operating and support renewal contract costs, you will not incur additional hardware costs as you update your agency's vehicles.

Our software solution is written on an open architecture platform that is easily updatable and able to interface with other programs you may currently be using. As long as you are under maintenance and warranty contract with Avail Technologies all software updates are automatically included as part of your ongoing support. As we said in our Executive Summary our goal is to make you a customer for life. Committing ourselves to your success by providing hardware and software support for the future is just one way we work to achieve that goal.

The Avail solution is made to be modular in nature and infinitely expandable. Our first loyal customer, River Valley Transit, presents the perfect case study below of how transit technology can grow over the course of a decade. While River Valley was our first customer, their service experience is typical of what Avail brings to the table for all customers. We want to partner with our customers and become just as passionate about their vision as they are. Born out of open and honest communication, it's these partnerships that pave the road to innovation.

River Valley Transit, Williamsport, PA was installed in 1999.

RVT had a specific vision in mind and an immediate need for a Traveler Information System to facilitate informing passengers of bus arrivals and departures at their newly constructed Trade and Transit Center via a public address system and LED signage at the facility. They also knew long term they wanted to phase in new technologies as funding became available. Sound familiar?

Our solution: We deployed an initial system with the capabilities they needed, and put together a technology adoption plan for them to roadmap future procurements. As funding became available, they added capabilities:

- In 2000, they added our DataPoint Reporting Software to analyze their GFI farebox data
- Starting in 2003, they started adding our AVA system via new Gillig bus buys
- In 2007, they upgraded our system to cover their entire service area and added APCs
- In 2013, they upgraded to *myAvail*, added IVR, procured additional signage and added other technologies

Today, RVT has a full suite of CAD/AVL technologies. Each new investment built on the previous one and everything is fully integrated.

Our success with RVT is a great example of just how modular our technology solutions are and how easy it is to incorporate new features as your agency and needs grow.

### 5.6.2 3rd Party Licensing Interoperability with Other Systems

We are providing a solution to facilitate your desired interoperability with other systems. We are proposing a three-fold solution of technology, services, and values: Our technology is architected to support a wide range of interface options (ODBC, XML, CVS, etc.). Our services work with you and your other vendors to ensure the resulting interfaces meet your needs. And our values are to not charge you costly interface license fees every time you want to interface with another system. Our belief is simple. If these interfaces allow you to get more use from our system then it's a win-win for everyone and that's what partnering is all about.

Avail has included the required licensing interfaces for all third party integration, including: Trapeze PASS-Mon, Schedule Masters Scheduling Software, GFI, etc.

### 5.6.3 National and Regional ITS Architectures and Standards

As a leader in the industry for over 20 years Avail and staff have coordinated, participated, and continue to support APTA, FTA, Nationally recognized standards for the ITS and Transit Industry. The proposed solution will meet the National ITS Architecture schemes as well as your Regional ITS architecture. In fact we have over 5 employees that have personally supported the design of the NTCIP standard. Avail will work with you to support any standard that makes sense and where applicable. In addition Avail will make sure that your system is built on an open architecture and one that will support future enhancement and based on backwards compatible components taking it one step further than just meeting an architecture schema.

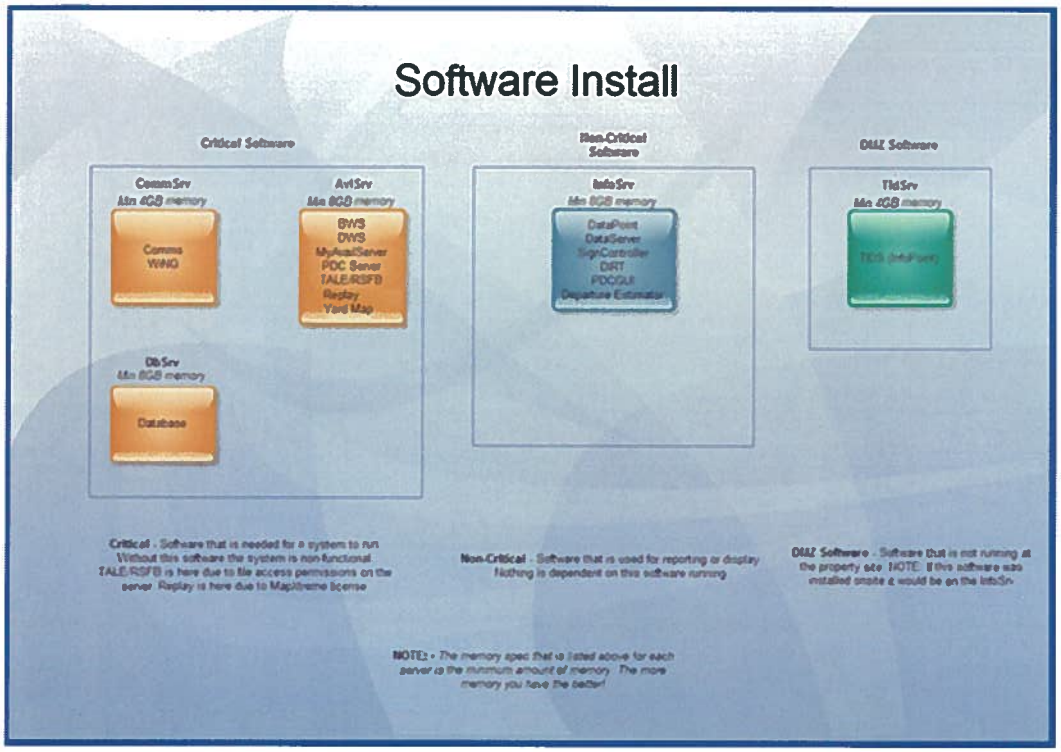
## 5.7 Computer Environment

Avail is providing a proven, robust and redundant IT solution which will be the backbone of the Intelligent Transportation System requested. Avail is proposing a solution to be hosted by the agencies.

*Our proposal includes the following IT related items:*

- ☑ Two (2) Dell PowerEdge R620 Servers
  - Dual Intel Xeon processors
  - 64 GB RAM
  - (2) 300GB 10K SAS hard drives in a RAID configuration
  - Windows Server 2012 OS (or current)
- ☑ EMC –VNXE 3150
  - Dual Storage Controllers
  - (6) 900GB Drives
- ☑ (2) Dell 6224 L3 Switches w/ Stacking module
- ☑ Microsoft SQL Server 2008R2 (or current), processor-based licensing
- ☑ Microsoft Windows Server 2012 Standard (or current)
- ☑ VSphere Essentials Plus
- ☑ One (1) WLAN access point for the yard plus one (1) spare
- ☑ Bing Map licensing for # vehicles and traffic and speed layers enabled
- ☑ APC Smart UPS X 3000VA

During our Discovery phase of the project we will work with you to evaluate your infrastructure and ensure that we have all the requirements needed to ensure the system will operate optimally. Our IT solution is a high reliability, high availability environment installed at each agencies facility.




### 5.7.1 Hosted Option

Avail does offer the option of **hosting our solution at our Data Center**. We have many customers that now desire the hosted option for the advantages hosting offers, but do not want a "lightweight" less feature-rich solution. Our solution is fully functional and there is no difference in our solution whether it is hosted by us or by you – the only difference is where the servers are. Our services include setting up the required connections with your local network and ensuring QOS (quality of service) measures are in place for optimal performance. This is an option we can discuss in more detail if you would like to consider it.

## 5.8 Central Systems

We are providing our latest **myAvail CAD/AVL Software** which looks unlike any other dispatching software on the market today. Features like our Timeline View will revolutionize how your dispatchers and supervisors manage daily operations because it will allow them to proactively take actions to prevent issues from happening. Fully customizable and scalable displays ensure we can tailor the configuration to accommodate your operational needs while promoting efficiency by providing data at a glance. Integrated Pullout Management and Yard Management modules ensure your staff can do everything they need from one convenient location.

*myAvail* offers fully customizable and scalable display architecture with revolutionary views to provide your operations staff with all of the critical data they need allowing them to proactively respond to issues *before* they impact your service

### 5.8.1 Role Based Management

Within the ***myAvail*** solution is a new concept that is also being coined by Avail within the ITS market called **Role Based Management**. This Role Based management is completely integrated into the backend software allowing views, screens, functionality, dashboards, and widgets to be associated to and customized for any individual. Why have we done this? Well as with many of our customers, employees of the Transit Agency often wear many hats within the organization. In this case one individual may have access to reporting, dispatching and planning as their unique role and have it set up specifically for them and their job function. The benefit to the individual is that they will not have to have 3 programs running. They will only need ***myAvail*** set up for their role to meet their operational need.

With a fully customizable "role-based" user interfaces, **myAvail** was designed with an understanding of transit operations to maximize your efficiency whether you are in Operations, Planning, Customer Service, or Maintenance.

### 5.8.2 Built-in Maps

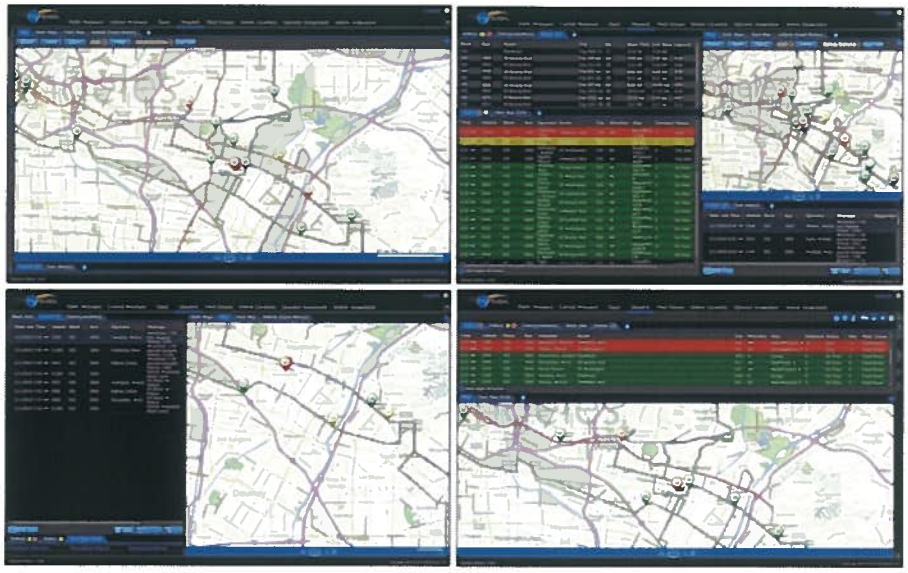
Within the ***myAvail*** Dispatch role the software utilizes the latest Bing maps and layers for the base **GIS and Mapping**. In this map view one can view the road data or satellite view and well as see present Traffic data on the map. Within the Map quadrant of the screen Avail can add addition ESRI map layers on top of the Bing map data to incorporate any additional information that you would like to add. Also viewable on the map are the route traces, and vehicles color coded with on time performance, including all of the zoom, pan and other map features. In the case a larger viewing area is desired the **myAvail** map quadrant can be expanded to the full screen or to a separate screen based on the desire of the user.

### 5.8.3 CAD/AVL

In addition the Dispatcher screen depicting Vehicle on–time reporting is provided in multiple views within the ***myAvail*** solution. This information can be seen from the map view by color or one can right click on the vehicle icon on the map to see the actual schedule adherence of the vehicle. In addition, users can see on time performance information in the status screen as well as the timeline screen. Any time a vehicle or action is clicked on within any screen quadrant all information pertaining to that vehicle or event will be brought to the user's attention.

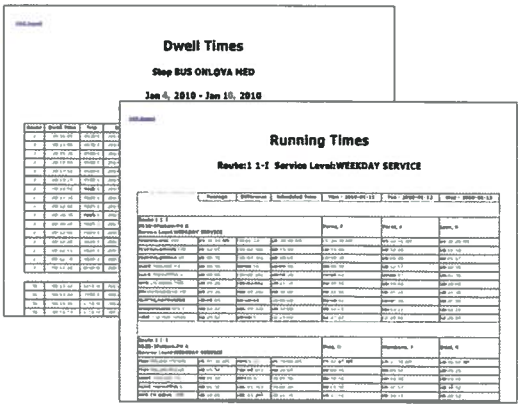
Being a dispatcher in a public transit operation is an extremely challenging and dynamic job. Dispatcher duties include:

- ☑ Making sure all pieces of work for the day are covered
- ☑ Checking in drivers
- ☑ Handling morning pullout
- ☑ Being the focal point of voice communications
- ☑ Coordinating road supervisors
- ☑ Interfacing with maintenance to handle vehicle issues
- ☑ Supporting customer service representatives
- ☑ And solving any other service based issues that arise throughout the day



Given this already demanding job, the last thing a dispatcher needs to be bothered with is scouring over data and monitoring vehicle screens, to see if there are any other items to be concerned about. Yet it's the dispatcher's job to make sure they have everything accounted for, so what's the alternative? Simple, the alternative is ***myAvail*** —Dispatch! Just like an extension of the dispatcher themselves, ***myAvail*** —Dispatch knows exactly what should happen at every moment of the day, and how one thing can affect another if it doesn't happen as planned. With this built-in knowledge and the internal data mining engine that's unique to Avail, ***myAvail*** watches the day unfold for the dispatcher, allowing them to handle the more dynamic human-to-human interfaces. Then, ***myAvail*** proactively alerts dispatch when something happens—or doesn't happen—that could cause them problems, if not addressed.

## 5.8.4 Data Warehouse and Reporting




We are providing our ***myAvail*** **Data Warehouse, Mining, Analysis, and Reporting module** which again is another example of the innovation and progressive thinking built into our products. Avail has been at the forefront in the industry for over a decade in recognizing the value and importance of the data generated by these systems. More importantly, we also understand that data is not the endgame. You want and need data so that you can make informed decisions to affect positive change within your business. **Our focus is on providing Answers, not data.** Our tools work for you to **proactively mine the data** looking for the trends and metrics you define, and then we provide various ways to view and access that data to ensure you get answers where you need them when you need them. Fully customizable dashboard views provide the data you need at a glance. OLAP charts and reports that allow you to drill-down into data quickly. Our desktop widget bar to alert you immediately to events and trends while you do other work. SMS texting of alerts when you are away from your desk but still want to stay on top of critical events. Our solution will unleash the power of this data and transform your decision making process.

### 5.8.5 REPORTING

We are providing our ***myAvail*** **Reporting and Analysis** Tool. Avail's proposed solution includes our ***myAvail*** DataPoint Software module which is available to any role within ***myAvail***. This is a powerful reporting engine and truly unique in the capabilities it provides. It is the key interface to the vast amount of data stored in our backend transit database, providing robust data analysis and reporting capabilities on this data.

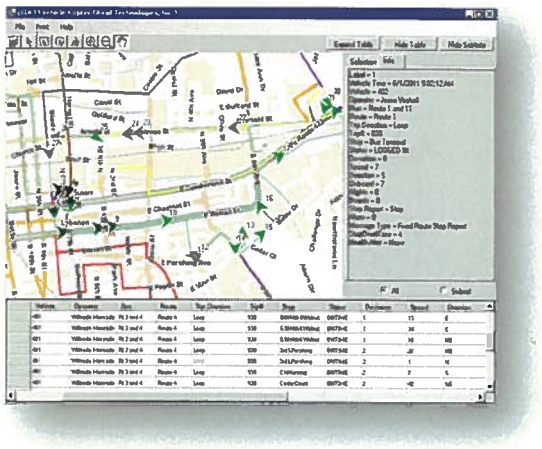
Unlike other reporting tools that are based off of Crystal Reports or some other generic reporting package, the ***myAvail*** Reporting module is a "transit-smart" product specifically engineered by Avail to quickly and easily provide access to the information Operations and Management personnel need to make informed decisions. Some of the key features of the ***myAvail*** Reporting module include:

- ☑ Analysis and reporting of schedule adherence data, farebox ridership and revenue data, Passenger count data, incident and event data, etc.
- ☑ NTD Reporting utilizing the APC count data and system miles and hours information
- ☑ Operational Summary reports including login status reports, pull in and pull out reports, schedule adherence reports, etc.
- ☑ Trend Analysis reports that mine the data searching for user defined criteria and send email alerts when matches are found

We could spend countless pages trying to explain the features of the ***myAvail*** Reporting module, but instead of trying to explain everything, these are just a few unique highlights.

### 5.8.6 GIS REPORTING TOOL

Avail is providing our **GIS Replay Tool** for Vehicle Location Data and Location Playback for post review of the vehicle information. Vehicle location is sent into the system over the public network from each vehicle based on time, distance traveled, or the occurrence of an event. This location is then plotted on a map on the ***myAvail*** workstation so the dispatchers can see where the vehicles are at all times. The location of the vehicle is determined using the Global Positioning System (GPS).



An advanced GIS location playback capability allows for the analysis and reporting of all historical AVL data reported from vehicles stored in the ***myAvail*** database. Data can be quickly and easily queried for any date/time period for any combination of routes and vehicles. Data includes vehicle, driver, route, block, run, trip, direction, stop, schedule adherence status, speed, vehicle alarms, passenger counts (ons, offs, onboard) and more.

Data is displayed on a GIS map and in a tabular format. Data can be quickly and easily resorted and filtered. Data can be exported to Excel via a menu option.

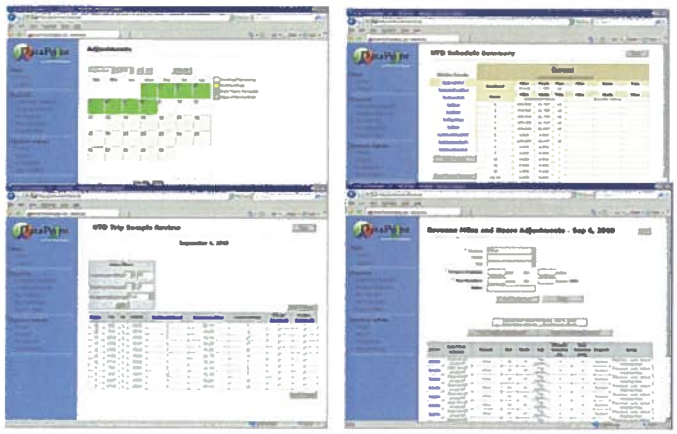
### 5.8.7 APC SOFTWARE AND NTD REPORTING TOOL

Avail has also developed a feature rich and proven NTD Reporting Tool. Another exciting feature of ***myAvail*** reporting is our robust NTD tools. Some key tools we offer include:

- ☑ An NTD calendar and to-do list to assist you in managing all of the data that feeds into the NTD reporting process, including miles, hours, APC counts, daily exceptions, etc.;
- ☑ An NTD Trip Sample review screen to allow you to manage the APC data to determine and control what data is used for NTD. From this screen, you can determine which samples you want to include in your statistics, you can identify outlying data that you want to exclude, and you can view all samples to keep an eye on the overall quality and consistency of incoming data;
- ☑ An NTD Schedule Summary review screen to allow you to manage the scheduled revenue miles and hours, and deadhead miles and hours for specific schedule periods within an NTD-reporting period to ensure base data is correct;

- ☑ An NTD Adjustments screen to allow you to manage the daily deviations and changes to the planned revenue miles and hours to ensure the reported actual miles and hours data is complete and correct

Avail provides the required NTD report and our APC's meet the required accuracy for NTD, and we go beyond that to provide our customers with the tools they need and the training necessary to understand and use those tools. The NTD tools we provide will allow you to manage your data on a daily basis and provide the audit trail for the FTA to document how you gathered that data. Our **FAST** process ensures you have the training and support necessary to understand and use these tools and together this will ensure you get certified to use APC counts in place of manually collected ride samples in the NTD report you submit to the FTA.



***Various NTD Screenshots***

## 5.9 Fixed Route Scheduling Software

We are proposing Schedule Masters TMS software to meet the fixed route scheduling component for Soltrans and Napa VINE. Schedule Masters TMS follows a table-driven relational database model. Data components, such as routes, patterns, trips, and blocks are all directly input into the system, or are generated based on input data.

TMS is unique in the field, in that the same version of the software is in use at all Schedule Masters clients' sites. Whenever modifications are made to the system, that version of TMS is made available to everyone else – all 105+ properties.

Avail has integrated with The Master Scheduler software at a number of different properties with great success and we will provide the interface to your current TMS product.

For Petaluma we are proposing Avail's DataPoint reporting software that provides basic schedule development. This product is used by many agencies across the country for their scheduling software.

## 5.10 Trapeze – PASS-MON

Trapeze is providing their standard interface for the Demand Response Scheduling System PASS. Avail and Trapeze have worked together with this interface many times. This robust interface provides a solid backbone for data messaging back and forth between the two systems providing reliable data for the demanding paratransit operation. Avail's proposed solution includes integrating our In-vehicle Mobile Data solution with your existing Trapeze PASS system.

Avail has a great deal of paratransit and demand response experience and the majority of the solutions we provide are for mixed fleet operations just like yours. Avail has deployed solutions with all of the leading paratransit software providers including RouteMatch, Trapeze, StrataGen, and TranSched. Avail has not only interfaced our system with Trapeze PASS, but we also have a

long successful history of working with Trapeze in a variety of capacities.

Avail has included in our proposal all of our services and software to integrate with your existing Trapeze PASS Paratransit system.

The bottom line is that Avail has years of experience deploying Trapeze's line of products, a proven interface with PASS MON, and a strong long-standing working relationship with Trapeze's staff to ensure you get the most out of your existing investment without feeling like you have to lock yourself in with one vendor for all your products. Avail simply gives you more options and flexibility, now and in the future.

## 5.11 Real-Time Predictive Arrival System

We are providing our ***myStop***™ **prediction engine** which combines real-time data coming in from your buses combined with your fixed route schedules and other data to make accurate predictions. It then formats those predictions into a TCIP-compliant XML data feed and Google Real-Time feed to drive our various rider portals to ensure accurate and consistent information.

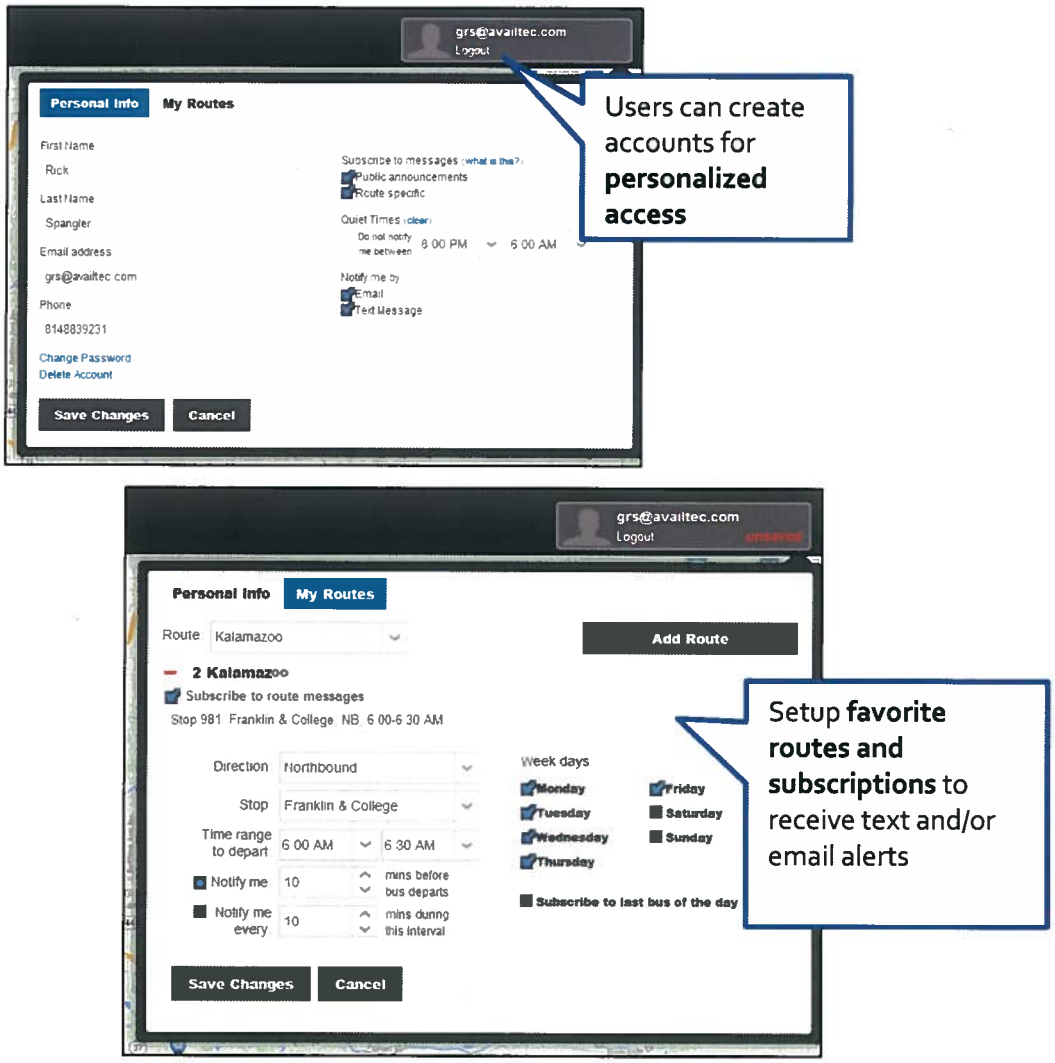
- ☑ Avail's proposed solution includes our InfoPoint module. This includes our InfoPoint Departure Estimator which is the heart of our Real-Time Passenger information suite. The heart of ***myStop***™ is our **prediction engine** which combines real-time data coming in from your buses combined with your fixed route schedules and other data to make accurate predictions. It then formats those predictions into a **TCIP-compliant XML data feed and Google Real-Time feed** to drive our various rider portals to ensure accurate and consistent information.

Recent calculations for our Project in State College PA (CATA) resulted in the following accuracies.

| Time Section | Percentage of Accuracy |
|---|---|
| Threshold + or – 1 minute<br>Arrival Less than 5 minutes | 95% |
| Threshold + or – 2 minutes<br>Arrival 5 to 10 minutes | 96% |
| Threshold + or – 1 minute<br>Arrival 10 to 20 minutes | 96% |
| Threshold + or – 1 minute<br>Arrival 20 to 30 minutes | 98% |
| **Total** | **97%** |

- ➔ We are providing our ***myStop***™ **Real-Time Passenger Information Suite** to provide the requested predictive arrival and departure information to your riders via the requested portals: Your website, web-enabled phone and mobile devices, voice phone, and wayside DMS locations

  - ☑ Web – information is accessible via a transit property's website and a customer's web-enabled cell or smart phones
  - ☑ Wayside signs – information is viewable via electronic signage located at key locations
  - ☑ Smart Phone – IPhone and Android Apps able to view Real Time Information
  - ☑ QR Codes – Ability for QR codes to access and view Real Time Information
  - ☑ Google Interface – Interface with Google Transit to provide a complete Trip Planning tool
  - ☑ Alert Subscriptions – Ability to subscribe to Real Time information alarms




## 5.11.1 Mobile Website and App

Our proposed solution includes our **Mobile Website and App** to allow your patrons to do access our Rider Portal conveniently from any smartphone, tablet, or personal communication device. Our mobile website and app includes:

- ☑ myStop app, available for free download
- ☑ Mobile website
- ☑ Text-only website (for older web-enabled phones and ADA TTD support)
- ☑ Download links for App Store and Google Play

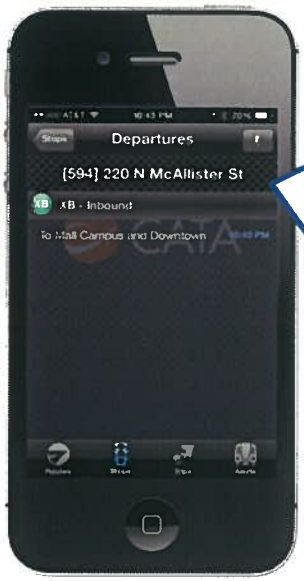
Download on the App Store

ANDROID APP ON Google play

**Mobile website and app** for iPhone, Android, and other smartphone support

**Supports all features of desktop website, plus mobile enhanced features**

**Automatically finds the Nearest Stop to you** along with the predicted arrival time for next bus on each route at that stop




**Walking directions** to get you to your stop

- ☑ We are providing our **Rider Portal** to allow your riders to do a multitude of things: They can find when their next bus is coming, check status on their bus, plan a trip, schedule an email or SMS text alert to let them know when their bus is close, get public alert messages and more! They can do this all from a website at their desk, on a tablet, or on any mobile-enabled phone. Our rider portal will be **integrated into your existing website** and seamlessly branded to fit with your web standards. Also included is an advanced subscription system allowing your riders to set personal preferences, route favorites, and subscribe to receive email and SMS text alerts. Avail includes access to an SMS short code and we also include all inbound and outbound texts at no additional cost.
- ☑ We are providing our Solar Powered **Real Time Information DMS signs** to let riders know when the next bus is coming at the installed locations.
- ☑ Avail is proposing to interface to the existing LCD displays currently in place. LCD displays offer more screen real estate to display additional info and more dynamic advertising.

We offer a wide array of Kiosk, LED and LCD options to fit any application. With full ADA compliance, we offer solutions that will satisfy all of your riders

## 5.11.2 GOOGLE GTFS AND REAL-TIME

We are providing our Google interface that supports the generation and automatic output of **GTFS and Google Real-Time** feeds. We also provide all of the services necessary to walk you through the lengthy certification process with Google to ensure a seamless go-live with Google.

You have requested 511.org integration as well. In reviewing the specifications it appears that 511.org also uses the same Google Transit feed to provide Trip planning functionality. Since this export is already a part of the Avail product that will be available to you.

There is also a real-time component to the 511.org specification. Avail has also looked at the real-time component of the 511.org and will provide the real-time interface that is required at no additional charge if awarded the contract.

Please refer Section 4 of this proposal for detailed information in regards to our documentation, testing, training, installation, and cutover plan and procedures.

# Avail Fixed Route Vehicle Diagram

**GPS Triggered Headsign Changes**

Provides **GPS based headsign** updates **including trip** and **route changes**.

**Fully Integrated Automatic Vehicle Announcements**

Provides full **ADA-compliant audio** and visual **automated next stop interior and exterior announcements** via existing bus PA System and *optional* **Interior LED sign**

**mSlate and IVU**

**mSlate Mobile Data Computer** provides main driver interface to control and monitor all onboard systems and generate AVL via internal GPS receiver

**IVU (In Vehicle Unit)** provides a ruggedized central hub to control all interfaced onboard systems via dedicated J1939/J1708/1587 processing

**Communications**

Voice Communications

Voice Radio Tower

Cellular Data Communications

Public Cellular Data Network

**Automatic Passenger Counting**

Provides **stop-level boarding, alighting, and onboard counts in real-time** to the central System

47 Fixed Route Buses

**Inputs/Vehicle health Monitoring (expansion option)**

- 12 Volt Battery
- Chassis Ground
- Ignition
- Stop Request
- Lift Request
- Front Door Open
- Wheelchair Lift
- Odometer
- Additional Discrete

WLAN Bulk Data

**Soltrans Facility**

802.11 WiFi

1850 Broadway
Vallejo, CA

**Farebox Control**

**Single point of logon** to existing **farebox**

**Single Point of Logon**

**Provides a single point of login to:**

- **Automatic Next Stop Annunciation**
- **Automatic Passenger Counters**
- **Farebox**
- **Headsigns**
- **TSP (option)**

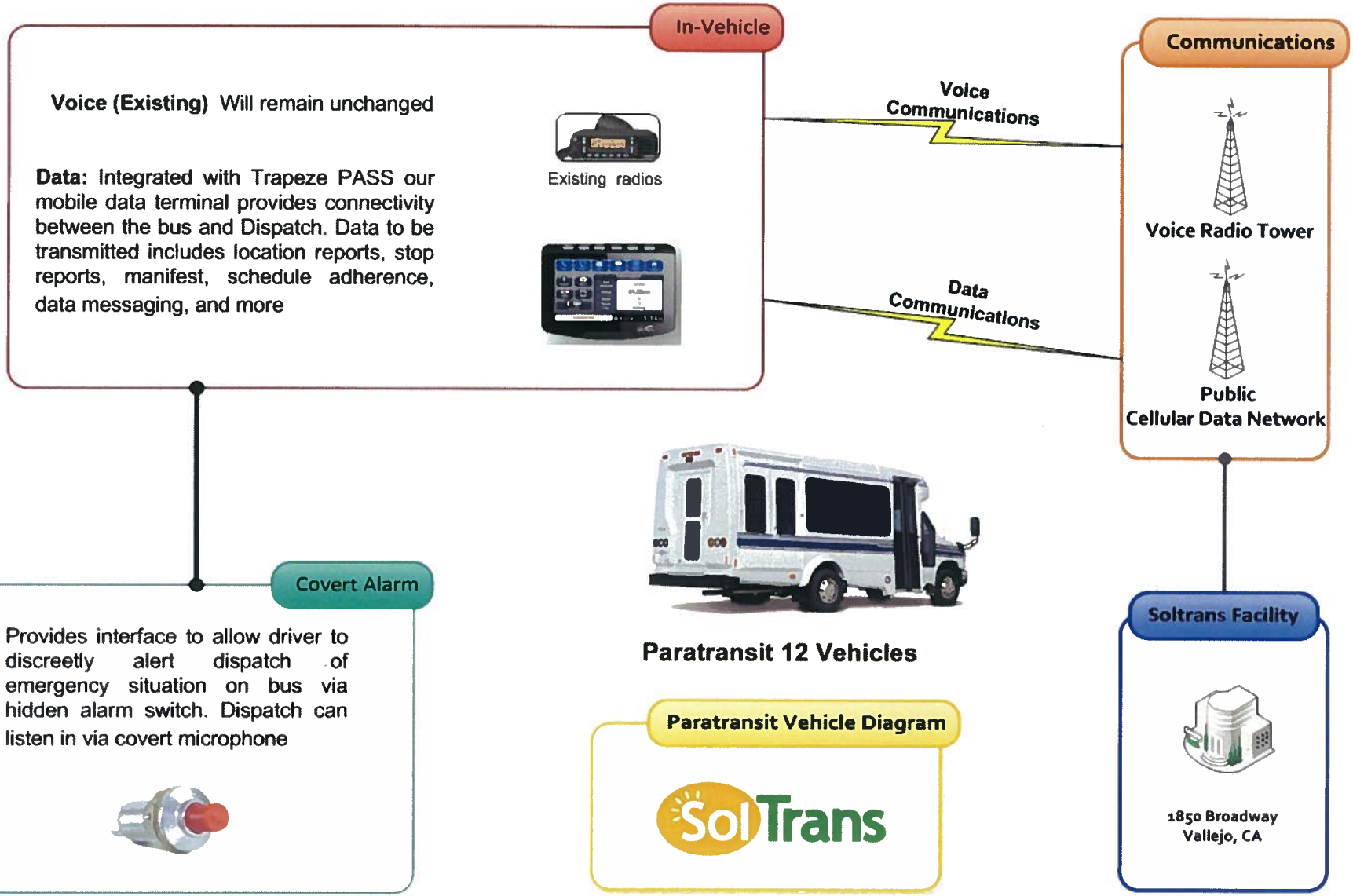
Destination Signage System

**Silent Alarm**

Provides interface to allow drivers to **discreetly alert dispatch of emergency situation** on bus via hidden alarm switch. Dispatch can listen in via covert microphone

Fixed Route Vehicle Diagram

SolTrans


In-Vehicle
Voice (Existing) Will remain unchanged
Data: Integrated with Trapeze PASS our mobile data terminal provides connectivity between the bus and Dispatch. Data to be transmitted includes location reports, stop reports, manifest, schedule adherence, data messaging, and more
Existing radios
Voice Communications
Data Communications
Communications
Voice Radio Tower
Public Cellular Data Network
Covert Alarm
Provides interface to allow driver to discreetly alert dispatch of emergency situation on bus via hidden alarm switch. Dispatch can listen in via covert microphone
Paratransit 12 Vehicles
Paratransit Vehicle Diagram
SolTrans
Soltrans Facility
1850 Broadway
Vallejo, CA

# Avail Fixed Route Vehicle Diagram

**GPS Triggered Headsign Changes**

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**Communications**

Voice Communications

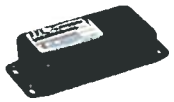
Voice Radio Tower

Cellular Data Communications

Public Cellular Data Network

**Automatic Passenger Counting**

Provides **stop-level boarding, alighting, and onboard counts in real-time** to the central System



11 Fixed Route Buses

**Inputs/Vehicle health Monitoring (expansion option)**

- 12 Volt Battery
- Chassis Ground
- Ignition
- Stop Request
- Lift Request
- Front Door Open
- Wheelchair Lift
- Odometer
- Additional Discrete

WLAN Built Data

**Soltrans Facility**

802.11 W/FI

Located at Soltrans or The VINE

**Single Point of Logon**

**Provides a single point of login to:**

- **Automatic Next Stop Annunciation**
- **Automatic Passenger Counters**
- **Farebox**
- **Headsigns**
- **TSP (option)**

Destination Signage System

**Silent Alarm**

Provides interface to allow drivers to **discreetly alert dispatch of emergency situation** on bus via hidden alarm switch. Dispatch can listen in via covert microphone

Fixed Route Vehicle Diagram

PetalumaTransit

# Avail Fixed Route Vehicle Diagram

**GPS Triggered Headsign Changes**

Provides **GPS based headsign** updates **including trip** and **route changes**.

**Fully Integrated Automatic Vehicle Announcements**

Provides full **ADA-compliant audio** and visual **automated next stop interior and exterior announcements** via existing bus PA System and *optional* **Interior LED sign**

**mSlate and IVU**

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**IVU (In Vehicle Unit)** provides a ruggedized central hub to control all interfaced onboard systems via dedicated J1939/J1708/1587 processing

**Communications**

Voice Communications

Voice Radio Tower

Cellular Data Communications

Public Cellular Data Network

**Automatic Passenger Counting**

Provides **stop-level boarding, alighting, and onboard counts in real-time** to the central System

42 Fixed Route Buses

**Inputs/Vehicle health Monitoring (expansion option)**

- 12 Volt Battery
- Chassis Ground
- Ignition
- Stop Request
- Lift Request
- Front Door Open
- Wheelchair Lift
- Odometer
- Additional Discrete

WLAN Bulk Data

**Soltrans Facility**

802.11 WiFi

625 Burnell St.
Napa, CA

**Farebox Control**

Single point of logon to existing farebox

**Single Point of Logon**

**Provides a single point of login to:**

- **Automatic Next Stop Annunciation**
- **Automatic Passenger Counters**
- **Farebox**
- **Headsigns**
- **TSP (option)**

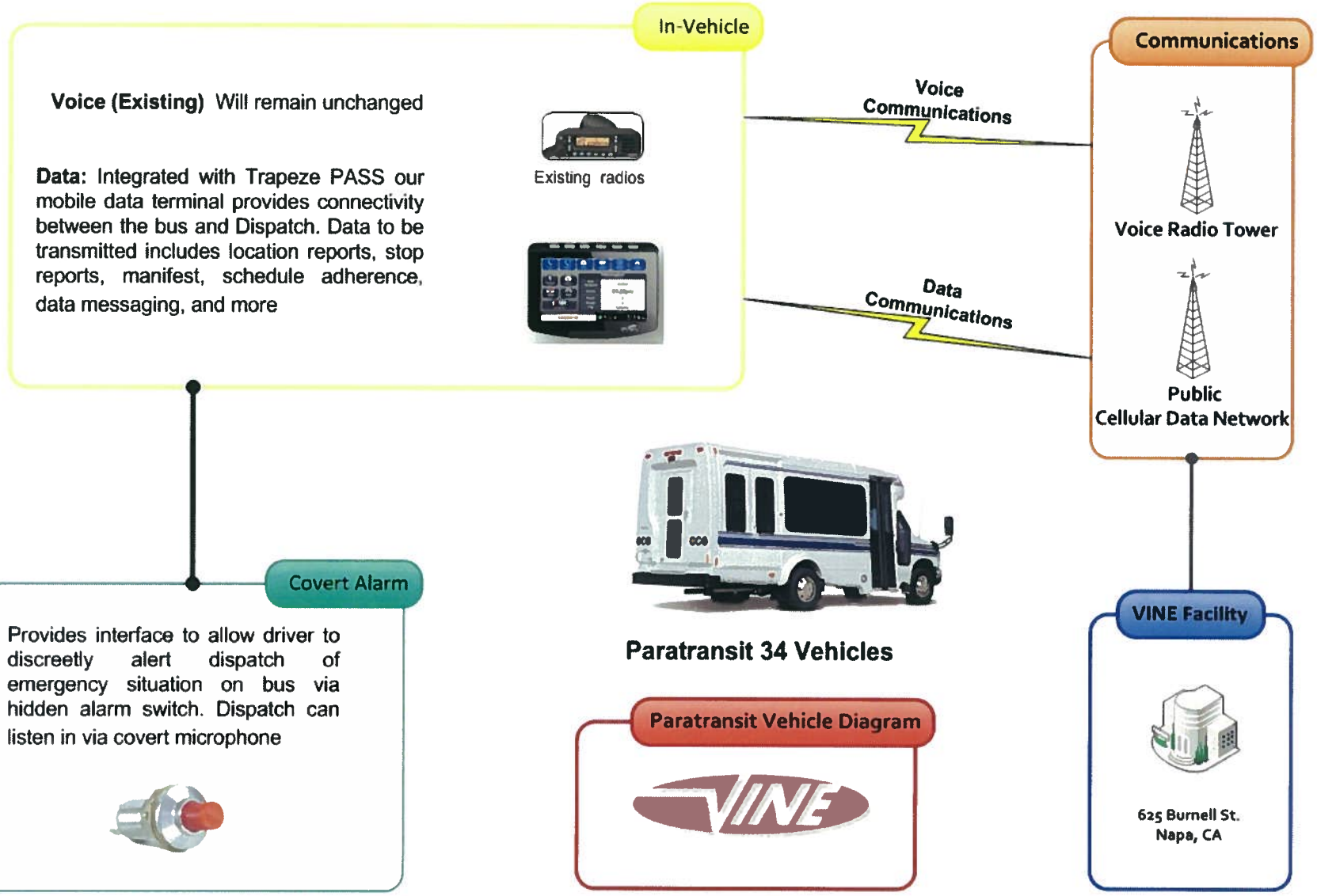
Destination Signage System

**Silent Alarm**

Provides interface to allow drivers to **discreetly alert dispatch of emergency situation** on bus via hidden alarm switch. Dispatch can listen in via covert microphone

**Fixed Route Vehicle Diagram**

VINE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Existing radios
Voice Communications
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Communications
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Public Cellular Data Network
Covert Alarm
Provides interface to allow driver to discreetly alert dispatch of emergency situation on bus via hidden alarm switch. Dispatch can listen in via covert microphone
Paratransit 34 Vehicles
Paratransit Vehicle Diagram
VINE Facility
625 Burnell St.
Napa, CA

## 5.12 ONBOARD SYSTEMS

Avail is providing our fully integrated **myAvail In-Vehicle Suite** which again is another example of the innovation and progressive thinking built into our products. Avail has spent the past two decades designing and developing robust and forward thinking vehicle solution for transit so we understand the unique demands of this environment. Avail's current offering is the result of that experience and leverages best-of-breed products wherever possible with our own custom developed hardware and software where needed to tie everything together. Our seamlessly integrated solution balances being innovative, feature rich and very powerful, with being extremely easy to use and maintain through reliable and robust operations.

### 5.12.1 IN-VEHICLE LOGIC UNIT AND DATA ROUTER (INCLUDED)

We are providing our **In-Vehicle Logic Unit and Data Router** as the backbone for the vehicle area network (VAN). Buses are becoming like rolling data probes, able to generate a wealth of data about the health of the bus, the onboard systems, your service, and your riders. Data seen as vital today was unheard of even just a few years ago, and this trend for more data will continue forward into the future. Collecting, disseminating, storing, and transmitting that data in real-time requires power, speed, and transit intelligence. Our latest generation in-vehicle data router is overflowing with out-of-the-box thinking to meet those needs head on. It is the most powerful, rugged, expandable, and interface-friendly in-vehicle device on the market today with the ability to update software configurations wirelessly.

### 5.12.2 MOBILE DATA COMPUTER (INCLUDED)

Our proposed solution includes our **myAvail Mobile Data Computer** as the single driver interface. Our MDC was designed to be set-it-and-forget it. Providing an easy to use device like our MDT allows operators to focus on driving the bus and attending to passenger comfort and safety.

**Once the driver logs in the MDC takes over:**

- ☑ Does a pre-trip check of any connected systems (e.g. ASA, APC, Etc.) to ensure proper communication
- ☑ Automatically loads the appropriate run/block information based on the driver login
- ☑ Automatically tracks the vehicles progress via built-in GPS and monitors route and schedule adherence
- ☑ Provides the driver with easy-to-read prompts to notify them of important information and keep them on track
- ☑ Download manifest for paratransit drivers
  Eliminating paper manifest

**Our MDT includes:**

- ☑ High quality, ruggedized transit-specific design environmentally tested to SAE and MIL specs
- ☑ Built-in Cellular world data modem certified on AT&T, Verizon, and Sprint data networks
- ☑ Built-in 802.11 WLAN for wireless download and upload of data within the yard
- ☑ Configurable to blank the screen when the vehicle is moving for driver safety
- ☑ Text messaging interface to receive text messages from dispatch and to send canned messages
- ☑ Schedule adherence monitoring and driver prompts to keep driver informed and on schedule
- ☑ Route adherence monitoring
- ☑ Speed monitoring
- ☑ Optional fare tracking interface to allow drivers to track fares, bikes, wheelchairs, etc.

**Benefits:**

- ☑ Single point of log on

- ☑ Intuitive and easy to use
- ☑ Improved schedule adherence
- ☑ Reduced voice communications traffic

### 5.12.3 GFI AND HEADSIGN INTERFACE (INCLUDED)

We are providing a **single-point of login to your GFI Fareboxes and Destination Signs.** Again this is a very standard capability for us and we can point to the numerous deployments we have done with each going back many, many years. This will be a feature your drivers really love because it further cuts down on distractions so they can focus on driving, and you will love it because it improves your data collection and service: Just imagine *no more buses logged into the wrong route!*

We have included the fees from GFI for their backend license fee and per vehicle charge for the J1708 interface that is applicable to all ITS vendors. *We encourage you to inquire with all vendors whether or not these costs were included in their proposal.*

### 5.12.4 AUTOMATED VEHICLE ANNOUNCEMENT SYSTEM (INCLUDED)

We are providing our **fully ADA-compliant AVA solution** to make the automated next stop announcement on the bus. We integrate with the PA system on the bus to make audio announcements for the visually impaired. We include a full-color full-matrix LED sign to display text for the hearing impaired. Announcements are made in both English and Spanish. Our solution is seamlessly integrated with our MDT and IVU for fully automated operation. **Our staff actually holds the patent for the first GPS-triggered next stop announcement system.**

Some of the key features of our system:

- ☑ Ability to handle interlining between routes, and runs/blocks where drivers switch between multiple routes – the system automatically handles all of that switching, all the driver has to do is login once
- ☑ Ability to handle off-route, missed stops, and short-turns – our system never makes a false announcement in those situations and as soon as the bus is back on track announcements automatically resume at the right spot
- ☑ Ability to announce stops only in certain directions or to make the next stop announcement at a certain distance before the stop – the system has advanced configuration settings to fine tune announcements to handle any and every situation

As you will read below, the foundation of our ASA system is our In-Vehicle Logic Unit (IVLU) and Data Router. When you buy our ASA system you are not just getting an Announcement box, you are getting the most advanced and future-proof IVLU on the market that will not only meet your needs today, but provide a powerful foundation for future expansion.

Avail has spent the past two decades designing and developing robust and forward thinking vehicle solutions for public transit, so we understand the unique demands of this environment. When designing our solutions we take into account the harsh environment that is public transit and with that we have designed a solution that will last for years.

Our system fully meets and exceeds your requirements. Our solution includes:

- ☑ Automatic GPS-triggering of pre-recorded stop announcements
- ☑ Fully ADA-compliant (audible)
- ☑ Interior announcement of next stop, exterior announcement of route number and name
- ☑ Ambient noise sensors to adjust volume
- ☑ Pre-recorded safety announcements for the driver to initiate at their discretion
- ☑ Ability to make other announcements based on location or time, such as major intersections, key transfer points, promotional information, and public service information
- ☑ Integration with existing interior and exterior speakers and microphone
- ☑ Professional recording of the requested number of announcements
- ☑ Option for internal LED display for ADA-compliant

visual information with audio announcement

- ☑ Option for multi-lingual support (e.g. Spanish)
- ☑ Voice Recording Studio (VRS) software to add or modify announcements whenever necessary
- ☑ Wireless download of new or updated announcement files

*(Note: Based on information currently available, Avail has quoted new interior signs for all buses. We would like to further investigate the existing signs to better understand the existing technology.)*

## 5.12.5 Traffic Signal Priority (Included Petaluma)

We are providing our **Traffic Signal Priority** through a proven integration with GTT's TSP emitter solution. One of Avail's staff, Andy Kissel, actually co-authored a U.S. Patent for the first traffic signal priority solution triggered by GPS so our knowledge is vast. Avail will leverage our existing relationship with GTT and knowledge gained on other projects providing TSP to meet NTD's needs.

## 5.12.6 Automatic Passenger Counter System (Included)

We are providing our **NTD-certified APC solution** to automatically count your passengers as they get on and off the bus. Our discrete over-head sensors are unique in that they are virtually **maintenance-free** as they continuously self-calibrate. Our solution is seamlessly integrated with our MDT and IVU for fully automated operation. Counts are transmitted over the primary data network in real-time to the central system to give dispatchers continuous feedback on bus loads to allow them to proactively anticipate and prevent any over-capacity issues before they happen.

## 5.12.7 Supervisor Vehicle Equipment (Included)

We are proposing laptops to meet the **Supervisor** requirements as well as provide additional functionality and features to road supervisors. Avail's mobile supervisor solution is our fully featured ***myAvail*** Dispatch Workstation running on a laptop. The workstation will be connected to the main backend central software server via a Cellular Wireless card. Our solution supports all functions and features a dispatcher in the command center would have available to them based on user rights. This is a robust solution that meets the requirements set forth in your RFP. In addition Avail will include a ruggedized GPS-based cellular modem that will report Vehicle location of the supervisor vehicles.

## 5.12.8 Mobile Access Router (Included)

Avail is proposing the Proxicast mobile router. Proxicast's LAN-Cell 3 Mobile 3G/4G Router offers fast, reliable and secure remote wireless Internet access on any 3G/4G (LTE, HSPA+) wireless data network worldwide.

The LAN-Cell 3 is a ***commercial-grade*** mobile 3G/4G cellular router with ***enterprise-class*** routing and security features that allows multiple PC's, laptops, webcams, controllers, PLCs, and other Ethernet-based devices to simultaneously share a single cellular data account for primary or backup connectivity.

## 5.12.9 Vehicle Component Monitoring (Optional)

We can provide our Component Monitoring Solution. Through J1708/J1939, Discrete, or RS232 interface connections diagnostics of

the bus can be achieved over the VAN of the bus. These interfaces can provide vehicle diagnostics including the following to be reported on the MDT as well as to maintenance when particular thresholds are breached. Based on the policy of your operations the driver will be notified and able to call the problem in or the alarm will come into dispatch as an alert and the dispatcher will be able to get the necessary individuals involved. Additionally, if the maintenance department is equipped with the ***myAvail*** workstation these alerts can be directed to the maintenance department directly. As long as the connected device can generate an alarm, we can monitor it and report it back to the central software and reported on.

For example:

- Check Engine Light
- Engine Coolant Temperature
- Low Engine Oil Pressure
- Transmission Oil Temperature
- Low Transmission Oil Level
- Low Turbo Boost Pressure

Additionally, the maintenance department can be equipped with the ***myAvail*** workstation and these alerts can be directed to the maintenance department directly. As long as the connected device can generate an alarm, we can monitor it and report it back to the central software and reported on. Some examples of the M.I.D. and P.I.D. items that are able to be monitored area identified in the tables to the below. During Discovery we will sit down with your maintenance department to discover what alarms you would like to have set, the parameters in which to collect data and where this data will be sent.

| EXAMPLES | M.I.D. | P.I.D. |
|---|---|---|
| Total Engine Idle Hours | 128 | 235 |
| Total Idle Fuel Used | 128 | 236 |
| Engine Oil Level | 128 | 98 |
| Engine Fuel Level | 128 | 96 |
| Transmission Oil Level | 130 | 124 |
| Average Fuel Economy | 128 | 185 |
| Total Fuel Used | 128 | 250 |

| EXAMPLES | M.I.D. | P.I.D. |
|---|---|---|
| Engine Oil Pressure | 128 | 236 |
| Engine Oil Temp | 128 | 175 |
| Engine Oil Filter Differential Pressure | 128 | 99 |
| Engine Coolant Temp | 128 | 235 |
| Transmission Oil Temp | 130 | 177 |
| Transmission Oil Pressure | 130 | 127 |
| Transmission Filter Differential Pressure | 130 | 126 |
| Engine Air Filter Differential Pressure | 128 | 107 |

## 5.13 Expectation of Agencies

Agency participation is highlighted in our Management Plan outlined in section 4 of this proposal.

## 5.14 Documentation, Testing, Training, Installation, and Integration

Please refer Section 4 of this proposal for detailed information in regards to our documentation, testing, training, installation, and cutover plan and procedures.

## 5.15 Communications Integration

***Avail's staff has been designing, developing, and deploying voice and data communications infrastructures for over 20 years.*** During those years, our staff has seen everything and worked with nearly every conceivable type of communications system available in the market today! We've witnessed the progression from the earliest packet-switched public cellular networks to the latest 4G-LTE networks; from the earliest low-band two-way private radio systems to the latest IP-based digital radio systems; we've worked with every major cellular carrier from companies that no longer exist (Cingular, Cellular One, etc.) to today's leaders such as AT&T, **Verizon**, and Sprint; we've worked with every leading radio equipment provider from small two-way radio firms such as ICOM and Vertex up to full blown telecommunications solutions providers such as **Motorola**, Harris, Ericson, MACOM and more.

Why do we mention this to you? Simply so that you can be confident in Avail's capabilities to not only deploy a solution that meets your needs today, but that we are a partner that can help you roadmap a solution that will meet your needs for many years to come. *Please refer to the customer matrix to see how we have met the communications needs of our customers.*

### 5.15.1 Data Communications

The communications infrastructure is the most important element of any CAD/AVL system. Avail says this because you can collect data in the vehicle all day long, and you can have the best possible software applications on the back end to use that data, but if you can't connect the two together - they provide you very little, if any, benefit at all.

Soltrans and The VINE have requested a cellular data solution for this project and we feel that this is a very good decision. Over the last few years we have definitely seen a shift away from private radio and towards public cellular as cellular data costs have continued to get lower and lower while coverage continues to improve. Utilizing a cellular data network will provide you with the full capabilities of our system. Based on our experience, AT&T and Verizon are the carriers of choice with equal performance between the two and regardless, Avail can work with all of the major cell carriers.

- ☑ We are providing an **802.11 WLAN** solution at the garage for wireless communications between the central system and buses at the garage. This is the primary interface for the upload of bulk data to the vehicle such as fixed route schedule data, new announcement files, firmware updates for onboard equipment, etc. to reduce the load on the primary data communication system.
- ☑ We are providing a **Cellular Data** modem for wireless communications between the central system and vehicles out on the road. We support all leading public cellular network carriers and have numerous deployments with Verizon, AT&T, and Sprint. All data generated by our system is transmitted in real-time over this interface including AVL data, VIM and VCM data, and APC data. We utilize efficient protocols and data compression to maximize data bandwidth and minimize recurring cellular data charges.

  *Petaluma Transit* has requested the use of the City's existing two-way radio system for data communications. Avail Technologies has contacted the individual responsible/most knowledgeable about the system and we have determined that the system is viable for data communications. Through our conversations with the radio specialist we have determined that this type of data communications would require the purchase of an additional radio for each vehicle. While we understand the desire to utilize this system it appears to be much more cost advantageous to utilize cellular. Please refer to our communications section to better understand our capabilities.

  *(See table below)*

| Estimated Two-Way Data vs. Cellular Data Costs Comparison | | | |
|---|---|---|---|
| **Capital Costs** | **Qty** | **City of Petaluma** | **Cellular Data** |
| Motorola XPR 4350 Radios (11=FR, 4=Sup, 2 Spares) | 17 | $11,900 | |
| Motorola XPR 4350 Spare Radio | 1 | $700 | |
| MTR 3000 Data Base Station | 1 | $3,000 | |
| Avail Radio Base Controller | 1 | $13,500 | |
| Cellular Modems (included) | Lot | | $0 |
| Monthly Cellular Charges (Annual charge for 17 devices) | 12 months | | $3,060 |
| **TOTAL Capital Cost** | | $29,100 | N/C |
| Lease line to tower (per month *12 months) | 12 months | $3,600 | $3,060 |
| **Total Cost of Ownership for 5 years** | | $47,100 | $15,300 |

## 5.16 Conclusion

In conclusion, Avail is proposing an innovative and forward thinking solution that is fielded and proven. Our solution is helping transit agencies across the country transform how they manage daily operations, many who are operating in a similar environment to you. Avail's solution will not only meet all of your needs today but also provides a future proof design approach that ensures it will meet your needs well into the future. Our hope now is that we have an opportunity to present our solution and staff to the evaluation committee. Avail believes that after you see what we have to offer and you meet our staff in person you will see firsthand the unique advantages our company can bring to your agency and the community that you serve.

# COMPLIANCE MATRIX

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 1 | **Central Systems** | | | | |
| 1.1 | CAD/AVL System Software - The proposed CAD/AVL System Software shall have been deployed (installed and operational) in at least three (3) similar transit agencies in the United States for a period of not less than three (3) years. | M | Y | | |
| 1.1.1 | Real-Time Graphical Displays - System shall include a real-time graphical display for user and dispatch use. | M | Y | | |
| 1.1.1.a | Import and display of standard format vector, image, and point-based map layers. | M | Y | | |
| 1.1.1.b | Map layer feature labels provided based upon zoom level or with hover-over by a pointing device. | M | Y | | |
| 1.1.1.c | Continuous refreshed real-time updates of vehicle location and status. | M | Y | | |
| 1.1.1.d | Definition of multiple map views and ability to save them at the user level. | M | Y | | |
| 1.1.1.e | Definition of shared views for use by any dispatcher to be saved in their default set of views. | M | Y | | MyAvail is designed to be role based and customized to each role within the organization. As a result the administrator can define the screens and roles accessible by the user. A user can define a map view for easy retrival. |
| 1.1.1.f | Zoom, move, center, and fit to window independent within each map view. | M | Y | | |
| 1.1.1.g | Filtered map views based upon parameters such as vehicles by route, login status, fleet, and mechanical status. | M | Y | | Filtered map views based upon parameters such as vehicles by route, login status, and fleet |
| 1.1.1.h | Map layer that includes current route traces for each fixed route selected by the operator. | M | Y | | |
| 1.1.1.i | Options to display different vehicle icon labels per technical requirements. | M | Y | | |
| 1.1.1.j | Vehicle icons that are configurable and contain context sensitive information. | M | Y | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.1.1.k** | Query tools to locate vehicle and routes based upon vehicle, route, or intersection variables. | **M** | Y | | Query tools to locate vehicle and routes based upon vehicle or route |
| **1.1.1.l** | Capability to establish voice/data communication by individual vehicle or by banding a group of vehicles together. | **M** | Y | | |
| **1.1.1.m** | Access to a distance measuring tool. | **M** | Y | | Available in Avail's TALE and Replay modules. |
| **1.1.1.n** | Print capabilities of any customized map view. | **M** | Y | | Available in Replay |
| **1.1.1.o** | Automated focus and continuous vehicle tracking during Emergency Alarm condition. | **M** | Y | | |
| **1.1.2** | Route Playback | | **Y** | | |
| **1.1.2.a** | Historical event display shall play back all pertinent historical messages, per technical requirements. | **M** | Y | | |
| **1.1.2.b** | Playback of these events shall include the ability to perform the following functions: | **M** | Y | | |
| **1.1.2.b.1** | The display shall be by a sequence of events on a geographic map. | **M** | Y | | |
| **1.1.2.b.2** | Allow selection by vehicle(s), driver(s), route(s), fleet(s), or run(s) for specific time frames through a query action window. | **M** | Y | | Allow selection by vehicle(s), driver(s), route(s), or run(s) for specific time frames through a query action window. |
| **1.1.2.b.3** | Configurable speed of replay for moving forward and backward through events. | **M** | Y | | User defines window for replay. All data is displayed in both a tabular form as well as a map view and does not require operator to watch a dynamic view. The user can step indidually through the data using arrow keys. |
| **1.1.2.b.4** | Graphical representation of event data on a common CAD/AVL map. | **M** | Y | | |
| **1.1.2.b.5** | Selectable display of map layers including but not limited to stops, streets, routes, points of interest, and geographical attributes. | **M** | Y | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.1.2.b.6** | Text display of attributes of each vehicle event message including messages related to other onboard systems including transit priority requests, farebox alarms, and passenger counts. | **M** | Y | | |
| **1.1.2.b.7** | Step forward, step backward and pause the historical display of events. | **M** | Y | | |
| **1.1.2.b.8** | Zoom, move, center, and fit to window views within the map window. | **M** | Y | | |
| **1.1.2.b.9** | Measuring distance tool. | **M** | Y | | |
| **1.1.2.b.10** | Vehicle label by number, adherence, route, driver, run, and block. | **M** | Y | | |
| **1.1.2.b.11** | Vehicle icons that are configurable and display adherence, login status, transfer status, and maintenance status. | **M** | Y | | |
| **1.1.2.b.12** | Locate vehicles, routes, intersections or objects. | **M** | Y | | |
| **1.1.2.b.13** | Display route traces. | **M** | Y | | |
| **1.1.2.b.14** | Date and time messages are logged. | **M** | Y | | |
| **1.1.2.b.15** | Print the historical display. | **M** | Y | | |
| **1.1.3** | Schedule Adherence | | Y | | |
| **1.1.3.a** | System shall monitor adherence by comparing current location versus the published schedule for all vehicles. | **M** | Y | | |
| **1.1.3.b** | Schedule adherence data shall be stored and include parameters for analysis as specified in the technical requirements. | **M** | Y | | |
| **1.1.3.c** | Both the time of arrival and departure at all scheduled timepoints shall be accurately recorded and stored. | **M** | Y | | |
| **1.1.3.d** | The Agency shall be responsible for providing the schedule data used by the Contractor provided scheduling software interface to the CAD/AVL system. The Agency shall perform any stop and route geo-surveys required using Contractor supplied tools. The Contractor shall provide adequate training prior to the start of this activity in accordance with the project schedule. | **M** | Y | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.1.3.e** | Real-time (predictive to the next time point) schedule adherence shall be displayed for dispatchers and made available to customer information applications. | **M** | Y | | |
| **1.1.3.f** | System shall identify vehicles predicted to be running early or late by predefined time parameters and shall report on both graphical and tabular displays. | **M** | Y | | |
| **1.1.3.g** | Schedule adherence parameters shall be able to be set differently by route with separate early and late user supplied values. | **M** | N | | Schedule adherence parameters shall be able to be set globally with separate early and late user supplied values. |
| **1.1.3.h** | Schedule adherence display will be shown to the Operator regardless of dispatcher selectable parameters. | **M** | Y | | |
| **1.1.3.i** | Schedule adherence from the vehicle shall be calculated, transmitted, and stored regardless of the onboard display setting. | **M** | Y | | |
| **1.1.4** | Route Adherence | | | | |
| **1.1.4.a** | Provide off-route status to the Bus Operator and transmit a notification to be displayed at the dispatch workstation. | **M** | Y | | Provide off-route status to the Dispatcher and transmit a notification to be displayed to the Operator. |
| **1.1.4.b** | The off-route notification displays shall display next stop when vehicle is off-route. | **M** | Y | | Drivers will see next scheduled timepoint on their MDT. |
| **1.1.4.c** | The off-route distance value shall be a user definable parameter. | **M** | Y | | |
| **1.1.4.d** | System shall identify off-route distance from assigned route or deviation from corridor of travel. | **M** | Y | | Off route is shown as a vehicle status with deviation viewable via the GIS map |
| **1.2** | CAD/AVL System Hardware | | | | |
| **1.2.1** | Contractor shall provide a turnkey, central system including all necessary hardware – see technical requirements. | **M** | Y | | |
| **1.2.2** | Contractor shall supply all hardware required for networking and communications for the system – see technical requirements. | **M** | Y | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 1.2.3 | The CAD/AVL system shall also consist of a backup or mirrored server that will take over operations should the main server fail. The mirrored server shall enable failover operations to be carried out in a seamless manner requiring minimal manual intervention. | M | Y | | |
| 1.2.4 | CAD/AVL Servers | | | | |
| 1.2.4.a | The Contractor shall submit a complete list of required IT equipment for the CAD/AVL System at the System Design Review stage. These requirements and specifications may be refined and finalized as part of System Design Review. The minimum computer server requirements are identified in the technical requirements. | M | Y | | |
| 1.2.5 | CAD/AVL Workstations | | | | |
| 1.2.5.a | All workstations shall use Dynamic Host Configuration Protocol (DHCP) for IP address assignment, unless otherwise approved by the Agency. | M | Y | | |
| 1.2.5.b | The Contractor shall provide and implement hardware for the Agency with capacity adequate to support the Agency's applications and other Contractor applications involved in the solution, maps, data, and associated files required for operation, with 100% expansion capacity of the specified hardware. | M | Y | | |
| 1.2.5.c | New workstations shall meet or exceed each Agency's current standard workstation specifications. | M | Y | | |
| 2 | System Data Communications | | | | |
| 2.1 | Set up radio/cellular data gateway to allow incoming and outgoing messages between the system and MDT's to be transmitted using the Agency-specific radio/cellular data communications system. | M | Y | | |
| 2.2 | The system shall allow data packets to be sent over the network from the vehicles to the central system and from the central system to the vehicles anywhere where there is a private radio system or cellular signal present. | M | Y | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **2.2.1** | Vehicle location shall be received by the Central CAD/AVL system at least once every 20 seconds (polling rate) for display and storage purposes and every 5 seconds during an Emergency Alarm situation. | | Y | | |
| **2.3** | The contractor is responsible for arranging appropriate communication protocols with the Agency-preferred cellular providers. The cellular provider to be used for SolTrans is Sprint. | **M** | Y | | |
| **2.4** | Wireless Local Area Network (WLAN) | | | | |
| **2.4.1** | Complete or bi-directional bulk data transfer software is provided for transfer of data between vehicles on mobile data system and the central system. | **M** | Y | | |
| **2.4.2** | The bulk data transfer system shall be capable, at minimum, of the following tasks: | **M** | Y | | |
| **2.4.2.a** | Downloading software updates/patches and configuration data for onboard devices. | **M** | Y | | |
| **2.4.2.b** | Downloading all updated schedule and trigger zone locations data required for operation of the VLU firmware. | **M** | Y | | |
| **2.4.2.c** | Uploading vehicle components monitoring configuration data. | **M** | Y | | |
| **2.4.2.d** | Downloading updated trigger zones locations and announcement sign messages for automated annunciation systems on-board announcements. | **M** | Y | | |
| **2.4.2.e** | Uploading revenue transactions data from fareboxes. | **M** | Y | | |
| **2.4.2.f** | Allowing for the uploading of other on-board logged data when received. | **M** | Y | | |
| **2.4.2.g** | The software shall be configurable to determine frequency and types of data transfers. | **M** | Y | | |
| **2.4.2.h** | Automated system bulk transfers shall occur and be validated automatically – see technical requirements for specifics. | **M** | Y | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **2.4.2.i** | Once communications is established with the VLU, the bulk data transfer system shall automatically determine which required file transfers remain to be completed and initiate them. | **M** | Y | | |
| **2.4.2.j** | A validation process shall ensure multiple attempts are made to complete all required file transfers until the file transfer is successfully completed. | **M** | Y | | |
| **2.4.2.k** | The system shall be able to complete a file transfer using a sequence of ad-hoc partial file transfers while the VLU is temporarily connected with the mobile data communications system. | **M** | Y | | |
| **2.4.2.l** | WLAN Access Points | | | | |
| **2.4.2.l.1** | The Contractor shall provide a WLAN controller. The WLAN controller and wireless APs shall support the functions outlined in the technical requirements | **M** | Y | | |
| **2.4.2.l.2** | The contractor shall provide wireless Access Point coverage at each Agency's bus maintenance facilities to enable WLAN connectivity for data exchange between the VLU and central system via a Bulk Data Transfer. | **M** | Y | | |
| **2.4.2.l.3** | The WLAN coverage area available for bulk data transfer at each Bus Maintenance Facility shall include the area where the vehicles are to be parked. | **M** | Y | | |
| **2.4.2.l.4** | The Contractor shall review the plans for the Bus Maintenance Facility and design the optimal locations for the APs including the orientation of antennas to satisfy all bulk data transfer requirements. | **M** | Y | | |
| **2.4.2.l.5** | The VLU shall authenticate and connect automatically when vehicles enter Wi-Fi zone. | **M** | Y | | |
| **2.4.2.l.6** | WLAN equipment shall be outdoor-rated. See technical requirements for specific code requirements. | **M** | Y | | |
| **2.4.2.l.7** | Lightning arrestors shall be installed to vendor specifications on all exterior APs. | **M** | Y | | |
| **2.4.2.l.8** | The WLAN equipment shall be IEEE 802.11i compliant or be Wi-Fi Protected Access 2 (WPA2) certified by the Wi-Fi Alliance with AES encryption. | **M** | Y | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **2.4.2.l.9** | Each single AP shall have a minimum 2x3, Dual Frequency, MIMO configuration. | **M** | Y | | |
| **2.4.2.l.10** | The APs shall support 5.0 GHz frequencies. The APs shall be capable of supporting multiple SSID's and assign separate SSID's to separate VLANs. | **M** | Y | | |
| **2.4.2.l.11** | The APs shall be able to support WMM (Wi-Fi multimedia). | **M** | Y | | |
| **2.4.2.l.12** | Installation shall be coordinated with Agency project manager with Agency clearance. | **M** | Y | | |
| **2.4.2.m** | Antennas | | | | |
| **2.4.2.m.1** | Antenna(s) shall be installed for cell data, GPS and WLAN. The antenna(s) shall support the ranges identified in the technical requirements | **M** | Y | | |
| **2.5** | **Remote and Mobile Access to Central Software** | | | | |
| **2.5.1** | Road Supervisors shall be capable of having remote access to the central CAD/AVL system through a mobile workstation (laptop). Relevant real-time information shall be gathered and transmitted to the mobile workstation through the CAD/AVL cellular data network. The mobile station shall be provided with a cellular data card. | **M** | Y | | |
| **2.5.2** | Provide map-based GUI for remote/mobile access per the technical requirements. | **M** | Y | | |
| **2.5.3** | The GUI shall be browser-based, or employ an application installed on the local workstation. | **M** | Y | | |
| **2.5.4** | The GUI shall be the same as the one used by Dispatchers, but with the ability to limit functionality as defined below. | **M** | Y | | |
| **2.5.5** | To reduce the amount of cellular data used, the GUI shall be configurable to only show selected vehicles. | **M** | Y | | |
| **2.5.6** | Vehicles shall be selectable by ID, pre-defined groups, routes, and pre-defined geographic distance. | **M** | Y | | Vehicles shall be selectable by ID, pre-defined groups (fleet groups) and routes |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **2.5.7** | The laptops shall support text messaging to the dispatchers. The Contractor shall provide recommended laptop specifications and the Agency's will provide the hardware. | **M** | Y | | Supported by off the shelf third party applications. |
| **2.5.8** | The laptops shall have access to the internet, Microsoft Outlook, and Agency software applications. | **M** | Y | | |
| **2.5.9** | The laptops shall allow the road personnel to monitor and respond to incidents including covert alarms and file incident reports. | **M** | Y | | |
| **2.5.10** | The Contractor shall provide sufficient documentation and instructions for installing software such that Agency staff can perform the installation in the event of a laptop replacement or upgrade. | **M** | Y | | |
| **3** | On-board Equipment and Systems | | | | |
| **3.1** | All on-board equipment shall be new and designed for use in the transit industry rated to applicable industrial and vehicle standards. See technical requirements. | **M** | Y | | |
| **3.2** | Equipment shall be the latest model in current production, as offered to commercial trade, and shall conform to transit industry requirements. | **M** | Y | | |
| **3.3** | The contractor shall represent that all equipment offered under these specifications is new. | **M** | Y | | |
| **3.4** | Contractor shall demonstrate that all equipment has been installed and operational for at least three other CAD/AVL systems for a period of not less than three (3) years. | **M** | Y | | |
| **3.5** | All equipment shall be constructed in accordance with best commercial practice, with such practices described in the associated design documentation. At a minimum, the design and installation construction shall provide for: | **M** | Y | | |
| **3.5.1** | Reliable and stable operation; | **M** | Y | | |
| **3.5.2** | Minimum maintenance and alignment procedures, with a minimum of special tools; | **M** | Y | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.5.3 | Minimum number and variety of assemblies and spare parts; | M | Y | | |
| 3.5.4 | Maximum attention to human factors, engineering, and ergonomic design; and | M | Y | | |
| 3.5.5 | Simplified design and rapid fault isolation to reduce the requirement for maintenance personnel. | M | Y | | |
| 3.5.6 | All parts shall be made of corrosive resistant material. | M | Y | | |
| 3.5.7 | All parts shall be constructed with materials and quality suited to the intended use and shall use modular design wherever feasible | M | Y | | |
| 3.5.8 | Functionally identical modules and assemblies shall be interchangeable per the technical requirements. | M | Y | | |
| 3.5.9 | Functionally non-identical modules shall not be and shall not appear to be interchangeable. | M | Y | | |
| 3.5.10 | All modules and assemblies shall be connected using standardized durable, positive-locking, and indexed quick disconnect fasteners. | M | Y | | |
| 3.5.11 | Equipment, assemblies, and components shall be identified by a permanently affixed part number and/or serial number. | M | Y | | |
| 3.5.12 | Features identifying software module version within that device shall be provided on each device. | M | Y | | |
| 3.5.13 | All equipment shall provide a usable life of not less than 15 years. | M | Y | | Avail currently has customers with systems that are over 15 years old still operating original equipment. However, we can't guarantee a usable life of 15 years. Avail has developed our entire suite of products to meet and exceed industry standards (7) years and we do our best to ensure a product life span well beyond (7) years. |
| 3.5.14 | Onboard equipment shall utilize most current microprocessor technology. | M | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.5.15** | Compatibility between current and future on-board equipment systems shall be maintained, including due to chip end-of-life issues. | **M** | Y | | |
| **3.5.16** | All on-board equipment shall have a minimum 40,000 hours Mean Time Between Failures (MTBF). | **M** | N | | The Equipment is designed for mobile environments and Transit. The VLU will meet this requirment, however Avail does not have calculated values for the rest of the equipment. The equipment is designed for its intended use. See requirement 3.6.3 for the design standards. |
| **3.5.17** | Internal (to the onboard equipment) batteries shall not be used to maintain parameter information in onboard equipment when it is in its powered down state. See technical requirements for real-time clock exception. | **M** | Y | | |
| **3.5.18** | The system shall check the battery state and create a warning message if the battery needs to be replaced. Onboard equipment shall be capable of being disassembled to fit through a coach door that is a minimum of 24 inches wide by 60 inches tall. | **M** | Y | | |
| **3.5.19** | Onboard equipment, including all exterior connectors and exposed ports, shall be rated for International Electrotechnical Commission (IEC) standard 60529, IP 54 for interior equipment, IP 65 for exterior equipment and designed for use in an industrial and mobile environment subjected to dirt, water, oil, and cleaning solvents. | **M** | Y | | |
| **3.5.20** | If existing vehicle wiring, switches, or contact points are used, testing shall occur to certify that the wiring, switches, or contact points are in an acceptable state and suitable for reuse. | **M** | Y | | |
| **3.5.21** | Data transferred from a device shall not be purged or written over until a successful transfer is confirmed. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.5.22** | In the event the transfer is not successful and the system is unable to re-attempt a transfer, it shall revert to the previous version of the data automatically and without corruption. Any data transfer failure shall be logged, alerted, and recorded. | **M** | Y | | |
| **3.5.23** | Devices shall include functionality to extract data directly from the device using a laptop computer in the event of a transfer failure (for any reason). Tools and processes shall be provided. | **M** | Y | | |
| **3.5.24** | Equipment shall be properly grounded, with onboard equipment connected as directly as possible to the chassis ground. | **M** | Y | | |
| **3.5.25** | Onboard equipment shall operate from the vehicle electrical system, between 9 and 35 volts. | **M** | Y | | |
| **3.5.26** | Onboard equipment shall be securely mounted in the interior of the vehicle, clear of obstructions and interference-generating devices. | **M** | Y | | |
| **3.5.27** | Customer-facing equipment shall meet or exceed all ADA requirements per technical requirements. | **M** | Y | | |
| **3.5.28** | Installations shall be performed at specific times as approved by the Agency. | **M** | Y | | |
| **3.5.29** | The agencies reserve the right to allow less of its vehicle fleet to be out of service if necessary in order to avoid disruption to revenue service in conjunction with maintenance requirements. | **M** | Y | | |
| **3.5.30** | The Contractor shall ensure that all vehicles made available for overnight installation work are ready for revenue service by the start of the next service day. | **M** | Y | | |
| **3.6** | **Vehicle Logic Unit (VLU)** | | | | |
| **3.6.1** | The CAD/AVL system shall include a VLU on each vehicle to serve as a central processing unit, memory, data storage, and vehicle software. | **M** | Y | | |
| **3.6.2** | VLU shall interface with vehicle's on-board equipment and support communications via a mobile wireless communications network with the central servers. | **M** | Y | | |

| SolTrans Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.6.3 | The VLU shall meet environmental and vibration standards (MIL-STD-810D, NEMA-4) as well as appropriate electromagnetic immunity standards (SAE 1455 and ESD J1112/13) and protect against surge, and reverse polarity. | M | N | | Avail equipment is tested and designed to meet the conditions encounted in transit vehicles and is deployed in properties from Maine to Florida to California and Alsska. Specifically the equipment is designed and tested to meet SAE-J1211-"SAE Recommended Environmental Practices for Electronic Equipment Design", MIL-STD-810F – "DOD Environmental Engineering Considerations and Laboratory Tests", SAE-J1455 –"Joint SAE/TMC Recommended Environmental Practices for Electronic Equipment Design (Heavy-Duty Trucks)". In addition digital inputs and outputs are optically isolated and protested against EMI and ESD. The MDT is a sealed unit and all other equipment is either sealed or installed in teh vehicles radio cabinet and protected against direct expsure to water and other containments. Detailed environmental specifications and test results can be provided upon request. - |
| 3.6.4 | The VLU shall be of proven design (at least three other similar transit agency deployments for at least three years) and easy to install and replace. | M | Y | | |
| 3.6.5 | The VLU shall be capable of multiple radio control, real time updates and messaging to and from the vehicle. | M | Y | | |
| 3.6.6 | The VLU shall meet communication requirements for leased cellular communications, meshed wireless networks, private radio, as well as interfaces for current and future onboard equipment. | M | Y | | The MDC and VLU are capable of all of these data communications interfaces. Avail is proposing a cellular data solution. |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.7** | Overall system interfaces shall include RS232, RS485 with busy line, TTL, SAE J1708, SAE J1939, USB, Ethernet, TCP/IP, discrete inputs and outputs, odometer, spare I/O pins, audio inputs and outputs, and full IDE capability for PC-type devices. | **M** | Y | | |
| **3.6.8** | Capability for automatic vehicle monitoring via J1708/1939 provided by the vehicle shall be included. | **M** | Y | | |
| **3.6.9** | Indication shall be provided for quick inspection of operation to indicate radio keyed, wireless network operating, software operational, proper voltage range, and ignition on. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.10** | Data storage capacity shall also be sufficient to store at least five operating days worth of passenger counts and all event messages in the case where data communications are disrupted. | **M** | Y | | All passenger counts are sent in real-time and are not accumulated and delivered in bulk at the end of the day as some APC systems operate. In the event that the real-time data communications is down for an extended period of time, the MDC will store and forward stop data and APC counts in non-volatile memory until; 1) the real-time data communications system is restored, 2) the vehicle returns back to the garage and is in WIFI range. In both cases all store and forward messages will then be delivered.<br><br>In order for the vehicle to "login" the next day, the real-time or WIFI communications data systems must be up and operational. So, in essence, you can never store more than one day's worth of store and forward messages.<br><br>If the vehicle has store and forward messages that are undelivered, and the vehicle is in long term maintenance, the stop reports and APC data will be maintained for up to 30 days.<br><br>Even though the specific requirment specifies that 5 days worth of APC data needs to be stored, we can actually never actually get to storing more than one days worth.<br><br>Because of this, Avail believes we fully meet |
| **3.6.11** | The VLU shall support functionality of the following data sets, and must have sufficient non-volatile memory to simultaneously store at least the following: | **M** | Y | | The VLU/MDT shall support functionality of the following data sets, and must have sufficient non-volatile memory to simultaneously store at least the following: |

| SolTrans Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.11.a** | Entire set of current schedule data, including school, non-school, and Holiday schedule platforms; | **M** | Y | | |
| **3.6.11.b** | Twenty (20) weeks of incremental schedule changes, for current schedule; | **M** | Y | | |
| **3.6.11.c** | Entire set of future schedule data (i.e., next run-board); | **M** | Y | | |
| **3.6.11.d** | Entire set of required AVA announcements; | **M** | Y | | |
| **3.6.11.e** | Fifty-two (52) weeks of incremental AVA announcements, for current schedule; | **M** | Y | | |
| **3.6.11.f** | Five (5) days of Automatic Passenger Count (APC) data records; | **M** | Y | | The VLU sends APC data in real-time or via the wireless in the event the data can not be sent in real-time. If the data can not be sent via realtime or throught the WLAN then it will be stored in the MDT. |
| **3.6.11.g** | Destination sign errors; | **M** | Y | | |
| **3.6.11.h** | Current configuration data; | **M** | Y | | |
| **3.6.11.i** | Future configuration data; | **M** | Y | | |
| **3.6.11.j** | Current firmware; | **M** | Y | | |
| **3.6.11.k** | Future firmware; | **M** | Y | | |
| **3.6.11.l** | Any other data recording needs identified in this RFP; | **M** | Y | | |
| **3.6.11.m** | 100% memory spare storage for growth, summing above requirements. | **M** | Y | | |
| **3.6.12** | CAD/AVL system configuration settings related specifically to the vehicle shall be stored in the vehicle's configuration module. See technical requirements for functionality. | **M** | Y | | |
| **3.6.13** | Each VLU shall have a unique IP address for purposes of participating in the wireless network and for remote monitoring. | **M** | Y | | |
| **3.6.14** | VLU shall be compatible with all on-board equipment options. | **M** | Y | | |
| **3.6.15** | The VLU shall integrate seamlessly with the Mobile Access Router (MAR), including the VLU providing a feed of GPS data to the MAR. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.16** | The VLU shall act as the central processor, data storage, and device manager for all onboard devices integrated under this Contract. | **M** | Y | | |
| **3.6.17** | The contractor shall coordinate with the agencies the final location of VLU installation on each different vehicle type and configuration, subject to approval from the agencies. | **M** | Y | | |
| **3.6.18** | The VLU shall include at minimum the following ports and interfaces: | **M** | Y | | |
| **3.6.18.a** | Two (2) opto-isolated SAE J1708: one (1) for transit devices, and one (1) for drivetrain; | **M** | Y | | The invehicle solution can be configured to have two SAE J1708 interfaces, (1) for transit devices, and (1) for drivertrain, However, since most vehicles are now equipped with J1939 interfaces to accomodate vehicle health monitoring from the engine, trans, etc., Avail does not belive a 2nd J1708 interface is required. The proposed configuration also includes (2) J1939 interfaces and (1) CAN interface. A second J1708 interface can be added, but is not included as the default configuration. The J1708 Specification does not specify a opto isolated input. We comply with SAE J1708. |
| **3.6.18.b** | Opto-isolated SAE J1939 for drivetrain; | **M** | Y | | |
| **3.6.18.c** | Ethernet; | **M** | Y | | |
| **3.6.18.d** | Universal Serial Bus (USB); | **M** | Y | | |
| **3.6.18.e** | RS-232 as an additional option to SAE J1708 for communication with the destination signs; and | **M** | Y | | |
| **3.6.18.f** | Other ports and interfaces as required for specific device-to-device communications. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.19** | The VLU shall manage power to listed onboard devices as follows: | **M** | Y | | |
| **3.6.19.a** | The VLU shall have a configurable parameter of 0 to 180 minutes that controls the power down of the VLU, MDT, and MAR after the vehicle master ignition switch is turned to "off". | **M** | Y | | |
| **3.6.19.b** | The VLU shall inform all managed devices to initiate a graceful power-down themselves and the MDT (including if necessary automatically logging off the VLU) between 0 to 30 minutes before power-down is activated and shall inform the MAR to do so. | **M** | Y | | |
| **3.6.19.c** | Upon reaching the power-down threshold, the VLU shall remove power from all connected devices, and itself. | **M** | Y | | |
| **3.6.19.d** | Upon the vehicle master ignition switch being turned to anything other than "off", the vehicle shall apply or maintain power to all connected devices, and also reset the timer unless ignition sense is again active. | **M** | Y | | |
| **3.6.19.e** | If the vehicle operator has not logged off, the system shall automatically log off, prior to power down activation. | **M** | Y | | If the vehicle operator is not logged off, the system shall automatically log off the operator when the ignition switch is turned off. |
| **3.6.20** | The VLU shall process AVL data and correlate it with operator ID, date, time (both 24 hour system clock and 36 hour service day clock), run, block, route, trip, and location. | **M** | Y | | |
| **3.6.21** | The VLU shall manage all communications processes and devices on the vehicle, and shall store any accumulated data and logs. | **M** | Y | | |
| **3.6.22** | The VLU shall reconcile any discrepancies between all the different sensors and position inputs it uses for AVL purposes – see technical requirements. | **M** | Y | | The In-Vehicle Solution software and algorithms do utilize velocity and other filter parameters to determine the validity of GPS to account for wander and gross multipath artifacts. |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.23** | The VLU shall process and manage the transmission of data to/from the central system as follows: | **M** | Y | | |
| **3.6.23.a** | Routine data including: schedule adherence, vehicle location data, passenger count, peak passenger load, messaging and communications requests, and event information on an event or periodic basis, via the data communications system. | **M** | Y | | |
| **3.6.23.b** | Priority data including priority messages, and alarms on an immediate basis, via the data communications system. | **M** | Y | | |
| **3.6.23.c** | Onboard equipment configuration data updates, non-critical logged or accumulated data, and other "batch" data, via the WLAN. | **M** | Y | | |
| **3.6.24** | The VLU shall be responsible for initiating and verifying the successful completion of data transfers, and shall not delete data until a successful transfer has been completed and confirmed. | **M** | Y | | |
| **3.6.25** | In the event of an uncompleted file transfer, the VLU shall reinitiate the file transfer in accordance with the technical requirements. | **M** | Y | | |
| **3.6.26** | The VLU shall manage the downloading of new configuration data that may include schedule updates, AVA announcement updates, firmware/configuration updates, as follows: | **M** | Y | | |
| **3.6.26.a** | The VLU shall maintain current and one set of future configuration data that will automatically become the current configuration data once the defined activation date has arrived. | **M** | Y | | |
| **3.6.26.b** | The VLU shall periodically check for configuration updates whenever it is within WLAN coverage. | **M** | Y | | |
| **3.6.26.c** | If a configuration data update is available, the VLU shall manage the download process and update other onboard equipment (the VLU shall provide a message on the MDT that a download and update is occurring so that the operator is aware). | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.26.d** | The VLU shall automatically install updated firmware or configuration data it has received into the VLU, the destination sign and the AVA system. | **M** | Y | | The VLU shall automatically install updated firmware or configuration data it has received into the VLU, and the AVA system. |
| **3.6.26.e** | To minimize potential impacts on pull-out, the VLU shall include functionality to download only the schedule information on startup. Functionality shall be provided to manage the download of more voluminous data (such as a firmware or configuration update) so that it is only downloaded and installed on shutdown or during non-operating hours. | **M** | Y | | Avail's in-vehicle download and software update is managed such that there is no impact to pull-out or any other operations while in service. |
| **3.6.26.f** | If the VLU is unable to complete the download of configuration data via the WLAN, it shall continue using the previous configuration data. | **M** | Y | | |
| **3.6.27** | The VLU must monitor and log, tagged with time and location, the following existing discrete external circuits: | **M** | Y | | While Avail feels we fully meet the following requirements we would like to better understand how this data will be used by operations. Avail's in vehicle solution has the ability to monitor and log the discretes and signals listed below, but may not tie into a couple of them as the default configuration. Most of the logging is performed as a debug log, whose data can be offloaded wirelessly.<br><br>In addition, if the vehicle's multiplex system monitors these discretes and has J1939 gateway module installed and configured to provide these discretes as a J1939 messages, then the in-vehicle solution can log these discretes as J1939 messages. |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.27.a** | Front door and Rear door, open and close; | **M** | Y | | |
| **3.6.27.b** | Kneel, and return from kneel (raise); | **M** | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| **3.6.27.c** | Lift or Ramp deploy, and return from deploy (stow); | **M** | Y | | |
| **3.6.27.d** | "Stop Requested" activation; | **M** | Y | | |
| **3.6.27.e** | Headlight activation and deactivation; | **M** | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| **3.6.27.f** | Turn Signals, activation and deactivation; | **M** | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| **3.6.27.g** | Hazard Lights, activation and deactivation; | **M** | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| **3.6.27.h** | Master-Run switch, change in status (Off, Day-Run, Night-Run, Park); | **M** | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| **3.6.27.i** | Ignition, activation and deactivation; | **M** | Y | | |
| **3.6.27.k** | Covert Alarm switch activation; | **M** | Y | | |
| **3.6.27.l** | Selected dashboard light activations for vehicle maintenance monitoring (e.g. oil pressure, check engine light, tire pressure); | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.27.m** | Motion start; | **M** | Y | | This may not necessisarily be a discrete input, but would be deteremined through other means. |
| **3.6.27.n** | Not in motion/idle. | **M** | Y | | This may not necessisarily be a discrete input, but would be deteremined through other means. |
| **3.6.28** | The VLU shall include functionality and external interfaces to provide location, time, and/or triggering messages to other on-vehicle systems. | **M** | Y | | The In-Vehicle solution is capable of providing these types of messages to external devices through any future developed data interfaces, with 3rd party devices. However, at this time, not knowing any specifics about what these 3rd party devices are, and what the devolopment, and integration effort would be to create these interfaces with these devices, any development and integration effort is not part of the scope of this project.<br><br>That said, the in-vehicle solution will send location, time, and other predefined trigger messages on the J1708/1587 interface currently. |
| **3.6.29** | The VLU shall include functionality to re-transmit data in the event of an unsuccessful transmission. | **M** | Y | | |
| **3.6.30** | The VLU shall run diagnostics and report any problems with onboard components (including the VLU itself, MDT, voice radio, AVL components, and destination sign). | **M** | Y | | |
| **3.6.31** | The VLU shall automatically recognize any system process failure or lock-up, log the problem and attempt a restart. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.6.32 | If restart of the process fails, notification shall be sent to the operator via the MDT and logged the event in the VLU data for upload at the end of the day. | M | Y | | Even though process/services may be attempted to be restarted, an automatic "reboot" of the in-vehicle system may be required to resolve. |
| 3.6.33 | The VLU shall support remote diagnostics that allow central system access to check operations and functionality of the VLU. See technical requirements. | M | Y | | |
| 3.6.34 | In addition to providing routine position updates, the VLU shall record date, time and location when the following events occur: | M | Y | | |
| 3.6.24.a | Arrival into and departure from agency configurable geographic areas that define the stops, timepoints, and pull-out/pull-in locations (for these events the current schedule adherence shall also be recorded); | M | Y | | Whether private data radio modems or cellular data, the inbound messaging content is optimized to be very small and efficient, to get the most effeciency and incur the least cost (cellular). The Entry and Exit of defined geo shapes are combined into a single message reflecting the entry and exit information. Avail believes that we meet the intent of this requirement. |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.24.b** | Every activation and deactivation of each monitored onboard circuit, including: Door open/close, Kneel/Raise, Lift/Ramp deploy/stow, Stop-Requested light, Turn Signals; | **M** | Y | | Avail's in vehicle solution has the ability to monitor and log the discretes and signals listed below, but may not tie into a couple of them as the default configuration. Most of the logging is performed as a debug log, whose data can be offloaded wirelessly.<br><br>In addition, if the vehicle's multiplex system monitors these discretes and has J1939 gateway module installed and configured to provide these discretes as a J1939 messages, then the in-vehicle solution can log these discretes as J1939 messages.<br><br>In short, the Avail In-Vehicle solution is more than capable to monitor and log all of the interfaces listed below, as long as there is a J1939 message or tie-in to the IOControls output module to connect to. |
| **3.6.24.c** | First stop/timepoint of the first trip; and | **M** | Y | | |
| **3.6.24.d** | Every toggling of operational conditions, including: operator key- press on MDT, off-route and return-to-route, early/late schedule adherence and return-to-on-time status, operator over-ride of destination sign. | **M** | Y | | Conditions such as schedule adherence, offroute, manual mode, etc are logged at the CAD. Operator key presses can be logged in the vehicle but are not sent to the CAD. "operator over-ride of the destination sign" is not sent to the CAD. |
| **3.6.35** | The VLU shall monitor diagnostic information for the Transit J1708, and log the following statistics upon every change in logon status or ignition status: | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.35.a** | By Module Identification (MID): Time of last good received packet, Total good received packets, Total good transmitted packets. | **M** | Y | | J1708 logging of information is available when the debug logging mode is enabled. Debug data can then be offloaded wirelessly. |
| **3.6.35.b** | Total bad (collision/checksum) packets received. | **M** | N | | Because of the robustness of the interface and protocol (collision detection, retries, priority management, etc), and Avail's implementation of application level retries, and monitoring, Avail does not believe there is any need to capture this information. |
| **3.6.25.c** | Total bad (collision/checksum) packets transmitted. | **M** | N | | Because of the robustness of the interface and protocol (collision detection, retries, priority management, etc), and Avail's implementation of application level retries, and monitoring, Avail does not believe there is any need to capture this information. |
| **3.6.36** | The VLU shall monitor diagnostic information for connected onboard systems, and log the following statistics upon every change in logon status or ignition status: | **M** | Y | | |
| **3.6.36.a** | Data Communication Statistics (Total: Polls, Transmits, Re-Transmits, Receives, Errors, Fallback, etc); | **M** | Y | | |
| **3.6.36.b** | Navigation Quality (Time, Duration, Good GPS Navigation, Good Alternate Navigation, Poor Navigation, etc); | **M** | Y | | The in-vehicle system monitors many aspects of the GPS component internally and logs low level details as debug messages which can be offloaded wirelessly. |
| **3.6.36.c** | All current VLU configuration data; | **M** | Y | | |
| **3.6.36.d** | Odometer Statistics, since previous record (total traveled distance, current calibration factor); and | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.36.e** | WLAN Statistics, since previous record (VLU awake time, WLAN coverage time, data packets sent, data packets received, file transmissions/receptions attempted per file, file transmissions/receptions completed per file). | **M** | N | | Low level WLAN coverage statistics are not available to the IVU, however file download, information is collected via the PDC server for bulk file downloads and uploads, along with connection times and information |
| **3.6.36.f** | All received text messages that were displayed to an operator | **M** | Y | | This data is collected by the CAD System and includes receipt and acknowledgement, Yes and No responses. |
| **3.6.36.g** | All instances of lost data communications coverage exceeding 15 seconds once back in communications for more than ten (10) seconds. | **M** | Y | | This type of data is available in debug mode, and can be offloaded wirelessly. |
| **3.6.37** | The VLU schedule data shall include agency configurable geographic areas (i.e., trigger boxes), and will initiate special VLU functions. | **M** | Y | | |
| **3.6.37.a** | Examples include: Change external destination sign; Initiate Transit Signal Priority (TSP) status change (enable/disable/activate/deactivate); Initiate AVA announcements and/or "clears"; Indicate locations where GPS is known to be degraded. | **M** | Y | | |
| **3.6.37.b** | The system shall enable the agency to maintain the trigger boxes within the scheduling database, independently without need for any software changes. | **M** | Y | | |
| **3.6.37.c** | The system shall support the creation, deletion, and relocation of trigger boxes and the designation or adjustment of the VLU action to be taken upon entering or exiting the trigger box. | **M** | Y | | |
| **3.6.38** | The VLU shall use AVL data to determine schedule adherence in real-time on the vehicle, without the need for central computation and communications. | **M** | Y | | |
| **3.6.39** | The VLU shall be fully operational within 90 seconds of power restoration for warm starts, and 150 seconds for cold starts under the full range of ambient conditions. | **M** | **Y** | | |

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| **3.6.40** | Logged data shall be stored in non-volatile memory, and shall not become corrupted due to any power condition, including: spike, drop, or loss. | **M** | **Y** | | |
| **3.7** | Mobile Data Terminal | | | | |
| **3.7.1** | The MDT shall be a rugged computing device designed for operation in a transit environment and shall function as the interface between the operator and all onboard components. | **M** | Y | | |
| **3.7.2** | MDT data storage shall be solid state. | **M** | Y | | |
| **3.7.3** | MDT shall have a color liquid crystal display (LCD) touch-screen. | **M** | Y | | |
| **3.7.4** | MDT shall be operable while wearing gloves. | **M** | Y | | Avail's MDT touch screen utilizes the same technology as todays smartphones and tablets. |
| **3.7.5** | MDT shall be readable by operators wearing polarized lenses. | **M** | Y | | |
| **3.7.6** | The MDT shall be legible for the color blind. | **M** | Y | | |
| **3.7.7** | MDT shall be readable in direct sunlight and must offer low-glare setting for night operation. | **M** | Y | | |
| **3.7.8** | MDT touch-screen shall have a video graphics array (VGA) resolution of at least 640 x 480 pixels. | **M** | Y | | |
| **3.7.9** | MDT shall display vehicle status including data transmission, pending messages, and communication mode. | **M** | Y | | |
| **3.7.10** | MDT shall be capable of providing aural tones to indicate incoming messages to operators while keeping operator attention on the road. | **M** | Y | | The MDT provides Aural tones for multiple events including invalid logon, data messages, or other events requiring operator attention. In addition the MDT provides detailed information and/or screens for the functions below. Not all of these include nor would it make sense to provide an aural tone. |
| **3.7.10.a** | Logon | **M** | Y | | |
| **3.7.10.b** | Emergency Alarm | **M** | Y | | |

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| **3.7.10.c** | Data Messaging | **M** | Y | | |
| **3.7.10.d** | Transfer Notification | **M** | Y | | |
| **3.7.10.e** | Schedule Adherence | **M** | Y | | |
| **3.7.10.f** | Headsigns | **M** | Y | | |
| **3.7.10.g** | Fare Collection | **M** | Y | | |
| **3.7.10.h** | Passenger Count | **M** | Y | | |
| **3.7.10.i** | Maintenance | **M** | Y | | |
| **3.7.10.j** | Stop Announcement | **M** | Y | | |
| **3.7.10.k** | Trip/Schedule | **M** | Y | | |
| **3.7.10.l** | Route | **M** | Y | | |
| **3.7.10.m** | Direction | **M** | Y | | |
| **3.7.11** | When the power is turned on, the MDT software shall automatically perform a power-on self-test, followed by configuring and initializing the MDT to the user-specified default values. | **M** | Y | | |
| **3.7.12** | The MDT shall be self-restarting and shall not become unresponsive and require manual restarts to continue operations. The MDT shutdown process will be controlled by the MDT software and shall only be possible when the ignition is in the off position. | **M** | Y | | |
| **3.7.13** | A user specified shutdown delay shall be provided to continue operations and to initiate the shutdown procedure that shall automatically close all files, save values, and send a shutdown message to be recorded in the CAD/AVL system. | **M** | Y | | |
| **3.7.14** | An on-board covert microphone shall be included for communication between dispatcher and operator – refer to technical requirements for location requirements. | **M** | Y | | Covert microphone is only available to monitor activity on the bus during an emergency event. |
| **3.7.15** | Wheelchairs lifts and ramps shall be monitored and data shall be recorded for each cycle. | **M** | Y | | |
| **3.7.16** | MDT shall display warning to operator and dispatcher workstation and shall transmit to central system if wheelchair lift was not cycled prior to leaving garage. All messages and warning shall be stored. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.7.17** | MDT shall display a warning if logon has not occurred following vehicle movement of predefined distance per technical requirements. Warning shall be transmitted to CAD/AVL system for storage and display at dispatcher station. | **M** | Y | | |
| **3.7.18** | A logon process shall be provided for maintenance purposes to enable a vehicle to be moved through-out a facility for servicing and maintenance purposes without triggering alarms. | **M** | Y | | |
| **3.7.19** | MDTs shall be capable of remote log-on/log-off via the data communications connection. | **M** | Y | | |
| **3.7.20** | MDT shall have the "safe driving" mode enabled when the vehicle is moving above a configurable speed limit. | **M** | Y | | |
| **3.7.21** | The safe driving mode shall allow the agency to stop vehicle operators from interacting with MDTs when driving, the MDT shall allow enabling of the following screen configurations under safe driving mode: | **M** | Y | | |
| **3.7.21.a** | Blank display on the screen; | **M** | Y | | |
| **3.7.21.b** | Disabled MDT buttons to stop vehicle operators from performing any actions on the screen; and | **M** | Y | | |
| **3.7.21.c** | Display of information relevant to vehicle operators when of high priority (e.g., route and schedule adherence status, missed messages or calls from dispatchers). | **M** | Y | | |
| **3.7.22** | Dispatch shall have the ability to remotely change the configurations for the safe driving mode. | **M** | Y | | The safe driving configuration paramenters are configurable at the backend and will be downloaded at logon. The parameters could be changed by a dispatcher but it is not a dispatch function nor recommended. |
| **3.7.23** | Dispatch shall be able to change the safe driving mode configurations by vehicle operator login. For example, the safe driving mode could be disabled for maintenance or training purposes. | **M** | N | | Safe Driving mode is configurable by vehicle type. |

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| **3.7.24** | The MDT shall allow two way text messaging between the transit vehicles and dispatch using a set of predefined messages, or free form text messaging. | **M** | Y | | |
| **3.7.25** | The MDT shall support the display of text messages longer than can fit on one line of the display. A minimum of 40 canned messages shall be supported. | **M** | Y | | |
| **3.7.26** | The MDT shall store multiple messages received from dispatch and indicate those text messages that are unread. | **M** | Y | | |
| **3.8** | Mobile Access Router (MAR) | **M** | | | |
| **3.8.1** | Shall support both wireless and wired switched Ethernet Local Area Network (LAN) functionality, as well as multiple wireless Wide Area Network (WAN) links and a gateway. | **M** | Y | | |
| **3.8.2** | MAR shall be a separate device from the VLU and MDT. | **M** | Y | | |
| **3.8.3** | MAR shall be equipped with a minimum of 1 GB of internal data storage capacity. | **M** | N | | |
| **3.8.4** | MAR shall include a minimum of two (2) USB 2.0 connections through which USB enabled devices such as a portable computer or solid state memory can be connected. | **M** | N | | The proposed Avail Technologies solution includes 1-USB port. |
| **3.8.5** | MAR shall include a minimum of eight (8) switched Ethernet ports. | **M** | N | | The proposed Avail Technologies solution includes 4- LAN ports port |
| **3.8.6** | The wireless data communications device shall be easily replaceable to accommodate potential future adaptation to different wireless WAN link services. | **M** | Y | | |
| **3.8.7** | MAR shall incorporate a LAN Ethernet multiport switch capability to interconnect CAD/AVL onboard system components and existing onboard Ethernet enabled equipment. | **M** | Y | | |
| **3.8.8** | MAR shall support the following wireless data services: | **M** | Y | | |
| **3.8.8.a** | 3G and 4G WAN, including LTE | **M** | Y | | |
| **3.8.8.b** | 802.11n Wi-Fi WLAN | **M** | Y | | |

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| 3.8.8.c | Act as a WLAN access point capable of enabling LAN access from public WLAN client devices within the bus interior, supporting the 802.11n WLAN standard and on a separate subnet firewalled from the onboard Ethernet switched LAN. | M | Y | | |
| 3.8.9 | The MAR shall be integrated with onboard CAD/AVL components and other existing onboard Ethernet enabled systems per technical requirements. | M | Y | | |
| 3.8.10 | The MAR and all WLAN communications shall support Wi-Fi Protected Access 2 (WPA2) security and communications protocols, or alternate approved through the design review process. | M | Y | | |
| 3.9 | **Global Positioning System (GPS)** | | | | |
| 3.9.1 | AVL module shall provide a derived location using an onboard GPS receiver and other location determination devices (gyroscope, odometer, etc.) per technical requirements. | M | Y | | |
| 3.9.2 | Vehicle location shall be determined by a navigation algorithm – refer to technical requirements. | M | N | | |
| 3.9.3 | Other location determination devices other than GPS shall automatically calibrate and require no operator or maintenance personnel intervention for daily usage. | M | N | | |
| 3.9.4 | Proper operation of the onboard systems relying on location reporting shall not be interrupted for vehicles leaving from an enclosed storage area. | M | Y | | |
| 3.9.5 | The GPS antenna shall be a low-profile unit housed in a rugged and weather tight enclosure. The GPS antenna shall be securely mounted and sealed on the exterior of the vehicle, clear of obstructions, and clear of interference from other generating devices or 91 Radio Frequency interference. | M | Y | | |
| 3.9.6 | The GPS system shall provide a spare NMEA-based GPS output. | M | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.9.7 | GPS system shall meet cold and warm acquisition and current position update times per technical requirements. The GPS system shall include multi-path rejection capabilities to help eliminate inaccurate signals caused by reflections off of buildings or other structures. | M | Y | | |
| 3.9.8 | Vehicle location shall be transmitted at least once every 20 seconds (polling rate) to the central CAD/AVL system for display and storage purposes and every 5 seconds during an Emergency Alarm situation. | M | Y | | |
| 3.9.9 | The AVL shall at all times provide current position information to the VLU per technical requirements. | M | Y | | |
| 3.9.10 | GPS delay time from location acquisition to formatting for transmission shall not exceed one (1) second. | M | Y | | |
| 3.9.11 | The GPS system shall store the most recent location to provide as the "last known good" location in the event that location reporting is interrupted. | M | Y | | |
| 3.9.12 | Location messages transmitted to dispatch shall indicate messages status as current or "last known verified". | M | Y | | |
| 3.1 | **Automatic Passenger Counters** | | | | |
| 3.10.1 | The APC system shall be integrated with the AVL system to provide the Agency with time, location, and on-off counts. | M | Y | | |
| 3.10.2 | The APC system shall include an option to integrate the electronic farebox to provide the Agency with fare collection information. | M | Y | | |
| 3.10.3 | The APC shall be designed to operate in accordance with these specifications for ambient temperatures from -20 °F to 140°F. | M | Y | | |
| 3.10.4 | Equipment shall withstand without damage being stored for extended periods in ambient temperatures from -40°F (-40°C) to 158°F (+70°C). | M | Y | | |
| 3.10.5 | The APC system devices shall be designed to withstand the vibration and shock forces associated with transit vehicles. | M | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.10.6** | The APC system device shall be sealed against dust and water intrusion, certified in compliance with or exceeding the NEMA4x or IP65 standard. Equipment shall be tested and proven capable of withstanding power transients, electromagnetic interference and radio frequency interference without degradation at levels encountered in typical transit operations. | **M** | Y | | |
| **3.10.7** | Power and communications lines and the chassis the units shall be tested and proven resistant to electrostatic discharges from personnel in accordance with accepted industry procedures for testing computer equipment. | **M** | Y | | |
| **3.10.8** | The APC system shall be capable of being locally configured using a laptop computer, portable programming device or wireless device. | **M** | Y | | |
| **3.10.9** | The chosen method may also be used for performing routine diagnostic maintenance. | **M** | Y | | |
| **3.10.10** | Each component/module/subsystem distinctly defined in the proposed APC system shall be replaceable as a discrete unit, identified by a unique serial number or other contractor proposed method. | **M** | Y | | |
| **3.10.11** | The APC system shall be interfaced with a wheelchair lift sensor and bike rack sensor in order to record the number of wheelchair lift and bike rack operational cycles at each stop. | **M** | Y | | The Avail Technologies solution allows drivers to track wheelchairs and bikes via the mobile data terminal. |
| **3.10.12** | APC shall record the door opening, the number of boarding and alighting passengers for each doorway and the number of wheelchair lift or bicycle rack activations, and door closing at each stop. Refer to technical requirements for methods. | **M** | Y | | The Avail Technologies solution allows drivers to track wheelchairs and bikes via the mobile data terminal. |
| **3.10.13** | Each data record shall either be in real time, or by post processing match the APC system data to the stop identification, trip number, route pattern, vehicle ID, time and date recorded in the central database. | **M** | Y | | |
| **3.10.14** | APC system shall accommodate at least 72 hours of APC data. | **M** | Y | | Avail provides this information in real-time |

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| **3.10.15** | APC data stored on board shall use non-volatile storage so that a power supply is not required to retain the data. | **M** | Y | | |
| **3.10.16** | Utility software shall be provided, for use on a laptop computer connected via a suitable (serial or Ethernet connection) to either the APC system, vehicle logic unit which supports calibration of the doorway sensors and review of stored data records. | **M** | Y | | |
| **3.10.17** | APC data shall be uploaded as initiated by central system via the WLAN bulk data transfer system. | **M** | Y | | |
| **3.10.18** | The APC subsystem shall not erase or allow the overwriting of data records until confirmation is received from the central system that the data records were successfully received. | **M** | Y | | |
| **3.10.19** | Equipment shall conform to the Federal Communication Commission (FCC) Part 15 Class A limits for conducted and radiated emissions of electromagnetic interference and radio frequency interference. | **M** | Y | | |
| **3.10.20** | Equipment shall withstand shock and vibration forces typical to transit operations. | **M** | Y | | |
| **3.11** | Emergency Alarms | | | | |
| **3.11.1** | When a covert alarm signal is received from a vehicle, the CAD/AVL software shall display the event in the performance queue to all dispatchers with configurable visual alerting methods. | **M** | Y | | Avail Technologies utilizes both visual and audible notification of emergency alarms |
| **3.11.2** | The CAD/AVL software shall provide a configurable audible and visual alert to all dispatchers, road supervisors, and others using the CAD/AVL software. | **M** | Y | | |
| **3.11.3** | The CAD/AVL software shall notify the dispatcher in the performance queue that a silent alarm message has been received using an Agency-approved visual notification method. | **M** | Y | | Avail Technologies utilizes both visual and audible notification of emergency alarms |
| **3.11.4** | Once a dispatcher selects the covert alarm event, this shall be so indicated to that dispatcher and all others. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.11.5** | When acknowledging an alarm the CAD/AVL software shall zoom and center the map display on the alarming vehicle and locate the nearest road supervisor vehicle when selected by a dispatcher. The scale for the zoom shall be configurable by the Agency. | **M** | N | | Avail automatically centers the vehicle sending an alarm on the map and can identify supervisors by the vehicle icon. Dispatchers will locate the nearest supervisor via the map. |
| **3.11.6** | The CAD/AVL software shall allow dispatchers to downgrade emergency alarms to a lower message priority, or upgrade lower priority messages to an emergency alarm. The CAD system shall log all alarm status changes (create, upgrade, downgrade, and cancel). | **M** | Y | | The system adminstrator or other authorized user defines the priorities for messages and actions associated with events. All actions taken by the dispatcher are logged and can be reviewed in the event log. |
| **3.11.7** | Activation of an emergency message shall place the vehicle in a priority status for frequency of location and message updates which will result in vehicle location and status updates at a rate that is configurable by the Agency. | **M** | Y | | |
| **3.12** | Automatic Vehicle Announcements (AVA) | | | | |
| **3.12.1** | The AVL central software shall be used to generate and manage next stop, customer, and other announcements, manage device configurations, generate reports, and manage device fault reporting and logs. | **M** | Y | | |
| **3.12.2** | The AVA central software shall meet or exceed requirements of the United States Access Board. | **M** | Y | | |
| **3.12.3** | The AVA central software shall include functionality to import route and stop data from an external system via Agency file(s) per technical requirements. | **M** | Y | | |
| **3.12.4** | The AVA central software shall include the capability to announce all or only selected stops per technical requirements. | **M** | Y | | |
| **3.12.5** | Location based stop announcement triggers shall be configurable by the Agency for any stop announcement. | **M** | Y | | |
| **3.12.6** | Stops to be announced shall be set through system configuration data managed by the Agency. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.12.7** | The AVA central software shall include the ability to customize announcements per technical requirements (i.e. add, link, etc.). | **M** | Y | | |
| **3.12.8** | Content of the AVA announcements shall be configurable and shall include the minimum messages types: | **M** | Y | | |
| **3.12.8.a** | Cross-street only | **M** | Y | | |
| **3.12.8.b** | Current street and cross-street | **M** | Y | | |
| **3.12.8.c** | Landmark | **M** | Y | | |
| **3.12.8.d** | Transfer opportunities | **M** | Y | | |
| **3.12.8.e** | Bus Stop Name | **M** | Y | | |
| **3.12.8.f** | Service announcements | **M** | Y | | |
| **3.12.9** | The AVA central software shall include the ability for the Agency to independently configure audio and text messages associated with a specific stop. | **M** | Y | | |
| **3.12.10** | The AVA central software shall include the ability to append a standard message header to all messages per technical requirements. Different headers shall be available for different types of announcements. The AVA central software shall support English at a minimum plus any other languages as required by the Agency. | **M** | Y | | |
| **3.12.11** | The AVA central software shall enable creating audio messages using both text-to-speech synthesized and recorded voice. Voice files shall be MP3 or WAV format as required by technical requirements. | **M** | Y | | |
| **3.12.12** | The AVA central software shall be able to create composite announcements that combine synthesized and recorded announcement segments. | **M** | Y | | |
| **3.12.13** | The AVA central software speech engine shall be a modular component that allows the Agency to independently replace it at a later date without other system changes. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.12.14** | The AVA central software shall be configurable by the Agency so that external announcements may be set for activation on any route. External announcements shall include at minimum: | **M** | Y | | |
| **3.12.14.a** | Route number. | **M** | Y | | |
| **3.12.14.b** | Route name. | **M** | Y | | |
| **3.12.14.c** | Destination. | **M** | Y | | |
| **3.12.14.d** | Direction. | **M** | Y | | |
| **3.12.14.e** | Branch. | **M** | Y | | |
| **3.12.14.f** | Route Type. | **M** | Y | | |
| **3.12.15** | The AVA central software shall be configurable so that external announcements can be made less frequently, only at specified stops or not at all. | **M** | Y | | The system allows external announcement volume to be controlled by time of day. In additional the announcments can be configured to play by trip but not a specific stop. |
| **3.12.16** | The AVA central software shall allow specific volume levels to be configured for individual stops, times of day and/or sections of routes. | **M** | Y | | The system allows external announcement volume to be controlled by time of day. In additional the announcments can be configured to play by trip. |
| **3.12.17** | The AVA central software shall be able to configure external announcements to repeat without operator interaction at any or all stops at a time interval configurable by the Agency. | **M** | Y | | |
| **3.12.18** | The database of announcement messages shall associate stops with message data for each trip pattern. | **M** | Y | | |
| **3.12.19** | The AVA central software shall enable incremental updates of onboard message data on an as-needed basis. | **M** | Y | | |
| **3.12.20** | The user interface for entry/deletion/modification of messages shall be easy to use, and shall associate all messages with a trip pattern. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.12.21** | The system shall accept the addition, deletion, or movement (from one trip pattern to another) of stop association data. | **M** | Y | | |
| **3.12.22** | The database shall support direct SQL interfaces. | **M** | Y | | |
| **3.12.23** | Each message shall have a unique identifier, defined by the Agency. | **M** | Y | | |
| **3.12.24** | The AVA central software shall include look-up tables to associate messages entered through the workstation with the message identifier. | **M** | Y | | |
| **3.12.25** | Creation or deletion of a message shall not change the identifiers of the other messages. | **M** | Y | | |
| **3.12.26** | Provisions shall be included to rebuild the message database and identifiers on a periodic basis. (e.g., after there have been a significant number of message additions and deletions). | **M** | Y | | |
| **3.12.27** | The AVA central software shall provide means to record and generate announcement audio and to define message-stop associations. | **M** | Y | | |
| **3.12.28** | The AVA central software shall be installed on a desktop PC or server supplied by the Agency, accessible by multiple clients or workstations if on a server, and configured with required hardware and operating system software. | **M** | Y | | |
| **3.12.29** | Internal single line LED headsigns shall be provided. | | Y | | |
| **3.13** | Single Point Log-On | | | | |
| **3.13.1** | Vehicle logic unit should allow for single point of logon for all onboard equipment including electronic fareboxes, headsigns, APC system, the AVA system, and other integrated devices. | **M** | Y | | |
| **3.13.2** | The single point logon shall log onto the other on-board equipment or override the current logon to those other devices. | **M** | Y | | |
| **3.13.3** | The central system should recognize that the vehicle is ready to commence its assigned work, has started work and completed work for the day. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.14** | Not Used | | | | |
| **3.14.1** | Not Used | | | | |
| **3.14.2** | Not Used | | | | |
| **3.14.3** | Not Used | | | | |
| **3.14.4** | Not Used | | | | |
| **3.15** | Destination Headsigns Interface | | | | |
| **3.15.1** | Existing destination signs shall interface with the VLU, which shall automatically provide sign codes for every route and direction change during revenue service. | **M** | Y | | |
| **3.15.2** | Firmware updates needed to the destination headsigns and any subcontracting for support services needed from the destination headsign vendor shall occur during interfacing of this system. | **M** | Y | | |
| **3.15.3** | The MDT shall be capable of changing the destination headsign and providing codes for the operator to manually determine the selection of destinations and to manually input codes when the CAD/AVL system is down. | **M** | Y | | |
| **3.16** | Connection Protection | | | | |
| **3.16.1** | The Contractor shall provide an option for the CAD/AVL system to provide and operate in conjunction with the Mobile Data Terminal software to provide Transfer Connection Protection (TCP). | **M** | Y | | |
| **3.16.2** | TCP shall be triggered when an incoming fixed route operator makes a transfer for a specific outgoing route, which the vehicle operator enters via the Mobile Data Terminal. | **M** | Y | | |
| **3.16.3** | The system shall, without any need for dispatcher intervention, hold the outgoing vehicle to allow the connection, if it would not need to be held more than a configurable time based on the estimated arrival time of the incoming vehicle. | **M** | Y | | |
| **3.16.4** | The system shall notify the outgoing vehicle via the Mobile Data Terminal if it is to hold, until what time and for what route. | **M** | Y | | |

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| **3.16.5** | The dispatcher shall be able to review current pending transfers, including the incoming and outgoing vehicles involved, and the time the incoming vehicle is expected to arrive at the transfer. | **M** | N | | Dispatcher is notified in the event of a transfer in jeapordy |
| **3.16.6** | The dispatcher shall have the ability to intervene and override as necessary in the operation of transfers. | **M** | Y | | |
| **3.17** | Video System Interface | | | | |
| **3.17.1** | The VLU shall be interfaced with the existing video system (REI HD800 DVR) including the digital video recorders (DVR) on-board. The Contractor shall be entirely responsible for developing and integrating this interface. | **M** | Y | | The VLU integration will include discrete monitoring of Alarm and DVR status. |
| **3.17.2** | The VLU to DVR interface shall be accessible using the MDT | **M** | Y | | MDT will receive message packets from the VLU that contain the interpreted discrete DVR and Alarm status transitions. |
| **3.17.3** | VLU shall be able to store alarms that are received from the DVR. | **M** | Y | | VLU logs and forwards all discrete alarm transitions. |
| **3.17.4** | The VLU shall send an update message to the MDT when there is an alarm received from the DVR. | **M** | Y | | |
| **3.17.5** | The VLU shall provide a discrete signal to the DVR when an emergency alarm is generated by the operator. | **M** | Y | | Alarm generated by the operator will be received by the DVR and the VLU through the wiring harness. |
| **3.17.6** | The CAD/AVL software shall support the ability to tag an incident record with an index or link to specific video frame(s)/snippets in the future. | **M** | Y | | Incident records are tagged with date of the event and included in the Incident Report. |
| **3.17.7** | The VLU shall send alert to dispatch and maintenance if the DVR is not functioning properly. | **M** | Y | | |
| **3.18** | Farebox Interface | | | | |
| **3.18.1** | The VLU shall be interfaced with the existing GenFare Fareboxes. | **M** | Y | | |
| **3.18.2** | Interface completion shall include any firmware updates needed to the fareboxes and any subcontracting for support services needed from the farebox vendor. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.18.3 | The VLU to farebox interface shall support farebox logon using the MDT. | M | Y | | |
| 3.18.4 | MDT logon shall logon to the farebox or override the current logon on the farebox. | M | Y | | |
| 3.18.5 | The VLU shall send an update message to the farebox when there is a change to the block, route, trip, operator, or fareset. | M | Y | | |
| 3.18.6 | VLU shall send the current location upon request message from the farebox. | M | Y | | Location is sent to the farebox at a stop. It is not sent upon a request. |
| 3.18.7 | VLU shall be able to store farebox alarms received from the farebox. | M | Y | | |
| 3.18.8 | Data records transmitted from the farebox to the CAD/AVL system shall use synchronous time and location stamping to support central system reporting functions that combine farebox data with data from other systems (e.g. CAD/AVL, APC) – for example, fares collected by stop location. | M | Y | | |
| 3.2 | Transit Automatic Vehicle Monitoring | | | | |
| 3.20.1 | Automatic Vehicle Monitoring (AVM) System shall be included as an option. | O | Y | | |
| 3.20.2 | Automatic Vehicle Monitoring (AVM) shall collect data on revenue-vehicle drive-train performance, CAD/AVL subsystem health warnings, pre run checklist completion, and discrete alarms in order to identify problems, improve maintenance, and reduce vehicle breakdowns. | O | Y | | |
| 3.20.3 | AVM data triggered by operating conditions beyond pre-defined threshold shall be reported in real-time to the CAD/AVL system and stored for reporting purposes. | O | Y | | |
| 3.20.4 | Standard AVM reports and user query tools shall be supplied for easy access to the stored data. | O | Y | | |
| 3.20.5 | AVM drive-train data and mechanical alarms shall be collected from the installed Engine Control Module provided by the vehicle's manufacturer and/or the installed Multiplexer I/O system. | O | Y | | |

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| **3.20.6** | Alarms shall be transmitted over the CAD/AVL cellular for real-time display to maintenance users. | **O** | Y | | |
| **3.20.7** | The AVM data messages and alarms shall be stored for analysis and interface to the Agency's Vehicle Maintenance System. | **O** | Y | | |
| **3.20.8** | Up to twelve (12) user defined discrete inputs shall be provided to monitor mechanical alarms. | **O** | Y | | |
| **3.20.9** | System shall monitor the Emergency Alarm, low oil pressure, hot engine, and low air pressure. | **O** | Y | | |
| **3.20.10** | System shall allow user/Agency to define and connect unused discrete inputs for future requirements. | **O** | Y | | |
| **4** | Dispatch and Data Reporting | | | | |
| **4.1** | Text Messaging | | | | |
| **4.1.1** | Messages shall be capable of being grouped into categories for quick selection. | **M** | Y | | |
| **4.1.2** | Canned message categories and message text shall be user definable. | **M** | Y | | |
| **4.1.3** | The operator and dispatcher shall be able to reply to a message in the queue in either a canned response or free-form text message. | **M** | Y | | The operator and dispatcher shall be able to reply to a message in the queue in a canned response |
| **4.1.4** | A text message shall support an acknowledgement message back to dispatch once the driver has viewed a message flagged by dispatch as requiring acknowledgement. | **M** | Y | | |
| **4.1.5** | Text messages shall be either deleted or saved by the Operator after viewing. Storage for saved text messages shall handle a minimum of eight messages. | **M** | Y | | |
| **4.2** | Automated Recording and Archiving | | | | |
| **4.2.1** | The CAD/AVL system shall store the position and tracking of the transit vehicles in some form of database. | **M** | Y | | |
| **4.2.2** | Database shall include ability to query the data with different parameters for performance and safety improvements. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 4.2.3 | Data shall be stored in a database for planning and evaluation purposes. The specific requirements shall be decided by the Agency and should include an assessment of the following: | M | Y | | |
| 4.2.3.a | Length of time AVL data is to be stored | M | Y | | |
| 4.2.3.b | The sampling rate AVL data is to be stored (i.e. at every minute, at every stop). | M | Y | | |
| 4.3 | Real-time, Reporting, and Archival Data | | | | |
| 4.3.1 | System shall provide the Agency the right to access, use, and distribute data to create interfaces to the CAD/AVL system, export data to other agencies and third party licensed systems, generate reports, and for other Agency purposes. | M | Y | | |
| 4.3.2 | Access to real-time operating data shall not be affected by the Agencies reporting and data access by user groups other than dispatchers and supervisors. | M | Y | | |
| 4.3.3 | Proper safeguards shall also be enabled to ensure dispatcher and supervisors cannot overload the primary database server with faulty or ill-designed queries. | M | Y | | |
| 4.3.4 | If required, a secondary database server that takes the processing load off of the primary real time database shall be provided for the purpose of data retrieval for reporting and data analysis. | M | Y | | |
| 4.3.5 | Enough online data storage shall be provided to keep at least three (3) years of historical data. | M | Y | | |
| 4.3.6 | Applications and tools shall be provided for historical data access. | M | Y | | |
| 4.3.7 | Provisions shall be provided to save data and database schema more than three years old to long term storage media such as magnetic tape, CD, DVD, etc. and delete the archived data from the main or secondary database(s). | M | Y | | |
| 4.3.8 | Provisions shall be provided to restore data by copying archived data from long term storage to either a stand-alone database machine or onto the current database(s). | M | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 4.3.9 | Archiving data shall be possible by either a graphical user interface or via the command line for automating tasks. | M | Y | | |
| 4.4 | Daily Schedules | | | | |
| 4.4.1 | The CAD/AVL system shall automatically load the daily schedule of blocks, runs, driver/operator assignments, and vehicle assignments. | M | Y | | |
| 4.4.2 | The CAD/AVL system shall support an overlap of daily schedules for service that continues past midnight. | M | Y | | |
| 4.4.3 | The CAD/AVL system shall support multiple service types to accommodate service variations at the route and trip level per technical requirements. | M | Y | | |
| 4.4.4 | Each schedule day shall permit assignment of multiple service types. | M | N | | The system can support multiple service types but only one service type is allowed be day. |
| 4.5 | Incident Reports | | | | |
| 4.5.1 | The CAD/AVL system shall provide an integrated Incident Reporting subsystem per technical requirements. | M | Y | | |
| 4.5.2 | Incident types and the association of data messages to incident types shall be user definable. | M | Y | | |
| 4.5.3 | A form creation editor shall be provided that provides the CAD/AVL System Administrator the capability to create property-specific customized incident forms that are accessible to dispatchers and other users of the CAD/AVL system. | M | N | | We support one incident form but it can be property specific. |
| 4.5.4 | Forms shall be created and associated with incident types. | M | N | | Avail's form includes all field necessary for each incident type. |
| 4.5.5 | Every new Incident Report shall be uniquely identified and the associated Incident Report form displayed for completion. | M | Y | | |
| 4.5.6 | Incident forms shall include data fields supported and auto-populated by the CAD/AVL system as well as user defined fields per the technical requirements. | M | Y | | |

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| 4.5.7 | User definable fields shall be implemented such that custom fields do not inhibit upgrades to software. | M | Y | | |
| 4.5.8 | Incident forms shall include a combination of automatically filled in data fields and manually entered data fields. Upon creation of an incident report all known CAD/AVL data shall be "pre-populated" or automatically entered into the configured incident form fields. | M | Y | | |
| 4.5.9 | An open Incident Report Queue shall be provided for each dispatcher logged into the CAD/AVL system along with information about dispatcher responsibility. All Incident Reports must be closed or responsibility transferred prior to the dispatcher logging off. | M | Y | | The event queue shows the dispatcher who is responsible for the incident. In the event the dispatcher logs off the incident returns to the queue and is shown as open and available for another dispatcher. |
| 4.5.10 | The current date, time, and user ID shall be stamped to indicate information that is added to an Incident Report after the original owner of the Incident Form has closed the incident. | M | Y | | |
| 4.5.11 | Incident Reports shall provide the following capabilities: | M | | | |
| 4.5.11.a | Incident Forms shall have the option to be required for specific incident types. | M | Y | | |
| 4.5.11.b | If a message requiring an Incident Form is deleted the CAD/AVL system shall generate the form and mark it as CAD/AVL generated. | M | N | | An incident can not be deleted without filling out the incident or logging the event. A dispatcher can logoff and the incident will remain open and available to other dispatchers. |
| 4.5.11.c | Incident Reports shall provide access to a spell checker. | M | Y | | |
| 4.5.11.d | Incident Reports shall be capable of being forwarded to individuals or groups of individual electronically. | M | Y | | |
| 4.5.11.e | Incident reports shall have the capability to be displayed online for at least twelve months for any new, open, or closed Incident Report. | M | Y | | |

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| **4.5.11.f** | Incident Reports shall be able to be queried based upon CAD/AVL variables such as open/closed status, date range, incident type, dispatcher ID, Operator ID, Route, or vehicle ID. | **M** | Y | | |
| **4.5.11.g** | Mechanical, breakdown, and vehicle switch out Incident Reports shall provide an interface to the Maintenance system to document the incident for maintenance action. | **M** | N | | |
| **5** | Scheduling System | | | | |
| **5.1** | The Contractor shall convert the existing route and stop databases from each of the agencies to import that data in the proposed schedule software database. | **M** | Y | | |
| **5.2** | The scheduling system shall also have the ability to import stop data from an external system in excel or comma separated value (CSV) file format | **M** | Y | | |
| **5.3** | The scheduling system or CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) using a GTFS feed. | **M** | Y | | |
| **5.4** | The system shall have the capability to create and define an unlimited number of bus stops and nodes. | **M** | Y | | |
| **5.5** | The system shall be able to create new routes and update exiting routes. | **M** | Y | | |
| **5.6** | The system shall be able to create new patterns and update existing patterns, including time points and stops. | **M** | Y | | |
| **5.7** | The system shall permit the user to define bus stops using a variety of methods, as identified in the technical requirements. | **M** | Y | | |
| **5.8** | The system shall be capable of allowing stops to be properly positioned at intersections. | **M** | Y | | |
| **5.9** | The system shall be capable of allowing the user to assign stop amenities (e.g., bench, shelter, etc.) to each stop and other supplemental data. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **5.1** | The system shall allow any number of trip patterns to be defined as distinct bus stop sequences, as identified in the technical requirements. | **M** | Y | | |
| **5.11** | The system shall be capable of displaying all trip patterns, or fixed portions of flexible trip patterns, on a map for visual display. | **M** | Y | | |
| **5.12** | The system shall be capable of calculating distances for deadhead route segments, entire trip patterns, and selected trip pattern segments defined by the user. | **M** | Y | | |
| **5.13** | The system shall allow the definition of average running speeds, for various days and time periods, for deadhead segments and between designated pairs of stops along each trip pattern. | **M** | Y | | |
| **5.14** | The system shall be able to generate a list of turning movements for an entire trip pattern. | **M** | Y | | |
| **5.15** | The system shall allow routes to be defined as a sequence of trips using selected trip patterns during defined time periods. | **M** | Y | | |
| **5.16** | System Viewing | | | | |
| **5.16.1** | The system shall allow the viewing of pattern statistics, as identified in the technical requirements. | **M** | Y | | |
| **5.16.2** | View a pattern's route adherence along a route or corridor. | **M** | Y | | |
| **5.17** | Creation of Timetables | | **Y** | | |
| **5.17.1** | The system shall be capable of rotating the extra board automatically. | **M** | Y | | |
| **5.17.2** | The system shall be capable of calculating the running time between any pair of timepoints on any trip pattern, taking into account running speeds. The system shall also allow running times to be manually input if needed, such as for deviated/flexible route segments. | **M** | Y | | |
| **5.17.3** | The system shall be capable of automatic or manual trip building for each route, using the designated sequence of trip patterns, per the technical requirements. | **M** | Y | | |

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| 5.17.4 | The system shall permit users to automatically or manually assign trip numbers. | M | Y | | |
| 5.17.5 | The system shall allow for modifying built trips, based on modifying a single trip pattern, all trips in a single direction or a combination of the above. | M | Y | | |
| 5.17.6 | The system shall permit authorized users to assign specific vehicle types to trips. | M | Y | | |
| 5.17.7 | The system shall be capable of computing deadhead time, including the effect of varying running speed in various time periods. | M | Y | | |
| 5.17.8 | The system shall provide summary data on trips and running times, per the technical requirements. | M | Y | | |
| 5.18 | Vehicle Assignment | | | | |
| 5.18.1 | The system shall be capable of either automatic or manual vehicle block development based on user-defined variables, per the technical requirements. | M | Y | | |
| 5.18.2 | The system shall allow users to automatically or manually assign block numbers. | M | Y | | |
| 5.18.3 | The system shall be capable of developing potential interline relationships for the entire service or based on the user selecting specific routes or trips. | M | Y | | |
| 5.19 | Runcutting | | | | |
| 5.19.1 | The system shall be capable of cutting single-piece or multi-piece work assignment runs, per the technical requirements. | M | Y | | |
| 5.19.2 | The system shall allow users to automatically or manually assign run numbers. | M | Y | | |
| 5.19.3 | The system shall generate runs that incorporate all applicable agency labor agreement provisions. | M | Y | | |
| 5.19.4 | The system shall generate runs that incorporate agency management rules. | M | Y | | |
| 5.19.5 | The system shall provide a notification flag when a manual or automatically generated runcut violates a management rule or labor agreement provision. | M | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 5.19.6 | The system shall allow for the development of alternative runcut scenarios, per the technical requirements. | M | Y | | |
| 5.19.7 | The system shall allow the shifting of trip relief times (stated in block tables) to optimize runcuts. | M | Y | | |
| 5.19.8 | The system shall allow the user to specify compressed work weeks (e.g., 4 day work weeks, 10 hour days). | M | Y | | |
| 5.19.9 | The system shall permit the agency to manually cut some or all of the blocks. | M | Y | | |
| 5.2 | Rostering and Bid Management | | | | |
| 5.20.1 | The system shall support both roster and cafeteria style bids. | M | Y | | |
| 5.20.2 | The system shall be able to create and maintain rosters including the extra board. | M | Y | | |
| 5.20.3 | The system shall be capable of building bid rosters automatically. | M | Y | | |
| 5.20.4 | The system shall permit users to automatically or manually assign roster numbers. | M | Y | | |
| 5.20.5 | The system shall have the capability to take into account special service in effect for selected dates (e.g., holidays). | M | Y | | |
| 5.20.6 | The system shall allow agency staff to establish rules on which rostering suggested by the system will be based. | M | Y | | |
| 5.20.7 | The system shall have the capability to create separate rosters for various groups of vehicle operators (e.g., part-time rosters). | M | Y | | |
| 5.20.8 | The system shall have the capability to validate the transitions between rosters for two consecutive bid periods. | M | Y | | |
| 5.20.9 | The system shall have the capability to automatically generate one roster at a time or all rosters. | M | Y | | |
| 5.20.10 | The system shall allow agency staff to access human resources information that has been imported into the system for any bus driver (optional). | M | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **5.20.11** | The system shall validate driver choices to determine whether each driver meets minimum rest time requirements between runs. | **M** | Y | | |
| **5.20.12** | The system shall validate driver choices to determine whether each driver meets requirements for minimum/maximum assigned work load. | **M** | Y | | |
| **5.20.13** | The system shall be able to associate a driver to a specific roster or rosters. | **M** | Y | | |
| **5.20.14** | The system shall generate work on a nightly basis from the schedule's bids. | **M** | Y | | |
| **5.20.15** | The nightly generation shall generate work a user-defined number of days into the future. | **M** | Y | | |
| **5.20.16** | Extra board items shall be included. | **M** | Y | | |
| **5.20.17** | Report Generation errors or rule violations that occur during schedule generation shall be identified. | **M** | Y | | |
| **5.21** | Schedule Validation | | | | |
| **5.21.1** | Schedule Validation must allow the user to review different aspects of the schedule and validate the schedule against a set of rules. | **M** | Y | | |
| **5.21.2** | All additions, omissions, time modifications, conflicts and errors shall be propagated through the rest of the schedule and be validated against a set of rules developed by the agency. | **M** | Y | | |
| **5.21.3** | Conflicts or errors associated with the changes must be highlighted in the application and noted to the agency. | **M** | Y | | |
| **6** | Data Management | | | | |
| **6.1** | The CAD/AVL system should include data management software to manage the entry, and manipulation of data and automate reporting for performance monitoring. | **M** | Y | | |
| **6.2** | The data management system should integrate with the scheduling software and facilitate easy National Transit Database (NTD) reporting. | **M** | Y | | |
| **6.3** | The system shall be capable of establishing automatic daily, weekly, monthly, quarterly routines to produce and email standard PDF reports to defined user groups. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **6.4** | Standard reports shall be developed through the design review process, and shall include at minimum: | **M** | | | |
| **6.4.1** | Schedule Adherence (by stop or timepoint) | **M** | Y | | |
| **6.4.2** | Passenger Loadings and Alightings (by stop and capacity) | **M** | Y | | Capicity is not included in report |
| **6.4.3** | Daily Revenue | **M** | Y | | |
| **6.4.4** | Missed Trips | **M** | Y | | |
| **6.4.5** | Stop Time Analysis | **M** | Y | | |
| **6.4.6** | Farebox vs. APC validation | **M** | **Y** | | |
| **6.4.7** | Layover/Recovery | **M** | Y | | |
| **6.4.8** | In-service hours | **M** | Y | | |
| **6.4.9** | Actual hour and actual miles | **M** | Y | | |
| **6.4.10** | Route deviation | **M** | Y | | Available in Replay |
| **6.4.11** | Travel time and average speeds | **M** | Y | | Running Times Report |
| **6.4.12** | Driver Log ins (by bus and route) | **M** | Y | | Avail reports log ins by bus. |
| **6.4.13** | Origin and Destination Information | **M** | Y | | |
| **6.4.14** | Dashboard | **M** | Y | | |
| **6.4.15** | Wheelchair Lift Use (by stop) | **M** | Y | | |
| **6.4.16** | Bike Rack Use (by stop) | **M** | Y | | |
| **6.4.17** | Luggage Bay Use (by stop) | **M** | N | | Further Definition Required. |
| **6.4.18** | Incidents | **M** | Y | | |
| **6.4.19** | Bus Change-off | **M** | Y | | Log on/logoff report |
| **6.4.20** | Collisions | **M** | Y | | Incident reports |
| **6.4.21** | General Delay | **M** | Y | | Running Times Report |
| **6.4.22** | Trip Delays | **M** | Y | | Running Times Report |
| **6.4.23** | Trip Cancellation | **M** | Y | | Missed Trips Report |
| **6.4.24** | Equipment Issues | **M** | Y | | |
| **6.4.25** | Vehicle Locations | **M** | Y | | |
| **6.4.26** | Vehicle Speeds | **M** | Y | | |
| **6.4.27** | Vehicle Performance | **M** | Y | | |
| **6.4.28** | Communications Status | **M** | Y | | |
| **6.4.29** | Emergency Alarm | **M** | Y | | |
| **6.4.30** | Driver Incident (incapacitated, sick, performance) | **M** | Y | | |

| SolTrans Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **6.4.31** | System Diagnostics | **M** | Y | | |
| **6.4.32** | Maintenance | **M** | Y | | |
| **6.4.33** | On Peak Loading by Route, Trip and Stop | **M** | Y | | |
| **6.5** | All reports shall have the capability to export information into a common analysis and text editing office software such as Microsoft Excel and Word. | **M** | Y | | |
| **7** | Real Time Passenger Information | | | | |
| **7.1** | The system shall generate real-time arrival/departure predictions for all vehicles that are integrated in the proposed CAD/AVL system. | **M** | Y | | |
| **7.2** | The real-time arrival predictions shall report predicted arrival times based on actual arrivals and not based on scheduled arrivals. | **M** | Y | | |
| **7.3** | The CAD/AVL system shall be able to interface with field equipment including passenger information displays, agency websites and mobile applications to provide and display real-time arrival/departure data for fixed-route and demand-response vehicles. | **M** | Y | | Demand response information would need to be provided by Paratransit software |
| **7.4** | The data required to be provided to the field equipment, agency websites and mobile applications includes current bus schedules, bus schedule adherence status, and estimated (predicted) arrival/departure times of transit vehicles at designated bus stops and transit centers. | **M** | Y | | |
| **7.5** | The real-time arrival predictions shall meet or exceed the following performance criteria: | **M** | Y | | |
| **7.5.1** | For predictions between one and ten minutes, the prediction accuracy shall be three minutes or less for 90% of the generated predictions. | **M** | Y | | |
| **7.5.2** | For predictions between 11 and 25 minutes, the prediction accuracy shall be four minutes or less for 85% of the generated predictions. | **M** | Y | | |
| **7.5.3** | For predictions more than 25 minutes, the prediction accuracy shall be six minutes or less for 85% of the generated predictions. | **M** | Y | | |

| SolTrans Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **8** | Passenger Information Displays | | | | |
| **8.1** | The Contractor shall provide passenger information signs that display, at the stop level, the estimated count-down arrival time and/or departure time of the next buses at the stop within a defined time interval. | **M** | Y | | |
| **8.2** | Both scheduled and dynamic text message capabilities shall be provided to either individual or groups of signs. | **M** | Y | | |
| **8.3** | A user interface shall provide easy setup, configuration, diagnostic, and messaging status at all sign locations. | **M** | Y | | |
| **8.4** | The displays shall be able to display multiple routes, CAD/AVL system time, ad hoc messages, and scheduled messages. | **M** | Y | | |
| **8.5** | Physical design of the sign shall be modular for easy maintenance, vandal resistant, and suitable for an outdoor environment. | **M** | Y | | |
| **8.6** | Solar power, high brightness LED displays, and multi-line displays shall be available where required by operational needs. | **M** | Y | | |
| **8.7** | The final location of the Contractor supplied bus stop and shelter passenger information displays shall be determined prior to the final design approval. | **M** | Y | | |
| **8.8** | Assistance shall be provided to the Agency in acquiring necessary permits. | **M** | Y | | |
| **8.9** | Outdated information for a transit vehicle on the display shall be cleared within a maximum of fifteen (15) seconds of the transit vehicle departing the stop or station. | **M** | Y | | |
| **8.1** | Proposers shall indicate what means (wired or wireless) shall or can be used to connect to the passenger information displays. | **M** | Y | | |
| **9** | Mobile Applications (Apps) | | | | |
| **9.1** | The CAD/AVL system shall generate and disseminate real-time transit traveler information to the regional 511 system, agency-owned infrastructure, and web/mobile services. | **M** | Y | | |

| SolTrans Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **9.2** | The system shall update real-time arrival predictions and generate service alerts to mobile applications based upon real time service adjustments and measures implemented by the agency dispatchers including: | **M** | Y | | |
| **9.2.1** | Cancelled Service; | **M** | Y | | |
| **9.2.2** | Detours (planned or ad hoc); | **M** | Y | | |
| **9.2.3** | Drop off only; | **M** | Y | | |
| **9.2.4** | Additional of supplemental service ('trippers') in addition to scheduled trips. | **M** | Y | | |
| **9.3** | It is desired that the Contractor develop a mobile app to allow transit riders to communicate with Dispatch or other Operations staff to report suspicious activity, crime, or quality of life problems at a transit station or on a bus. | **O** | Y | | Avail will utilize the "feedback" feature of our mobile app to provide this capability |
| **10** | 511 Integration | | | | |
| **10.1** | The CAD/AVL system shall support the exchange of data with the Bay Area's regional 511 traveler information system operated by the Metropolitan Transportation Commission (MTC). | **M** | Y | | |
| **10.2** | Data exchange with 511 shall consist of the following: | **M** | Y | | |
| **10.2.1** | Export of static configuration data. | **M** | Y | | |
| **10.2.2** | Export of real-time arrival information. | **M** | Y | | |
| **10.2.3** | Export of CAD/AVL system status information to 511. | **M** | Y | | Avail would like to learn more about this requirement to clarify "system status" information |
| **10.2.4** | The latest requirements and specifications for the 511 integration shall be gathered from the Metropolitan Transportation Commission (MTC). | **M** | Y | | |
| **10.3** | The CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) and other types of static and real-time information using GTFS. | **M** | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 1 | Central Systems | | | | |
| 1.1 | CAD/AVL System Software - The proposed CAD/AVL System Software shall have been deployed (installed and operational) in at least three (3) similar transit agencies in the United States for a period of not less than three (3) years. | M | Y | | |
| 1.1.1 | Real-Time Graphical Displays - System shall include a real-time graphical display for user and dispatch use. | M | Y | | |
| 1.1.1.a | Import and display of standard format vector, image, and point-based map layers. | M | Y | | |
| 1.1.1.b | Map layer feature labels provided based upon zoom level or with hover-over by a pointing device. | M | Y | | |
| 1.1.1.c | Continuous refreshed real-time updates of vehicle location and status. | M | Y | | |
| 1.1.1.d | Definition of multiple map views and ability to save them at the user level. | M | Y | | |
| 1.1.1.e | Definition of shared views for use by any dispatcher to be saved in their default set of views. | M | Y | | MyAvail is designed to be role based and customized to each role within the organization. As a result the administrator can define the screens and roles accessible by the user. A user can define a map view for easy retrival. |
| 1.1.1.f | Zoom, move, center, and fit to window independent within each map view. | M | Y | | |
| 1.1.1.g | Filtered map views based upon parameters such as vehicles by route, login status, fleet, and mechanical status. | M | Y | | Filtered map views based upon parameters such as vehicles by route, login status, and fleet |
| 1.1.1.h | Map layer that includes current route traces for each fixed route selected by the operator. | M | Y | | |
| 1.1.1.i | Options to display different vehicle icon labels per technical requirements. | M | Y | | |
| 1.1.1.j | Vehicle icons that are configurable and contain context sensitive information. | M | Y | | |
| 1.1.1.k | Query tools to locate vehicle and routes based upon vehicle, route, or intersection variables. | M | Y | | Query tools to locate vehicle and routes based upon vehicle or route |
| 1.1.1.l | Capability to establish voice/data communication by individual vehicle or by banding a group of vehicles together. | M | Y | | |
| 1.1.1.m | Access to a distance measuring tool. | M | Y | | Available in Avail's TALE and Replay modules. |
| 1.1.1.n | Print capabilities of any customized map view. | M | Y | | Available in Replay |
| 1.1.1.o | Automated focus and continuous vehicle tracking during Emergency Alarm condition. | M | Y | | |
| 1.1.2 | Route Playback | | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 1.1.2.a | Historical event display shall play back all pertinent historical messages, per technical requirements. | M | Y | | |
| 1.1.2.b | Playback of these events shall include the ability to perform the following functions: | M | Y | | |
| 1.1.2.b.1 | The display shall be by a sequence of events on a geographic map. | | Y | | |
| 1.1.2.b.2 | Allow selection by vehicle(s), driver(s), route(s), fleet(s), or run(s) for specific time frames through a query action window. | M | Y | | Allow selection by vehicle(s), driver(s), route(s), or run(s) for specific time frames through a query action window. |
| 1.1.2.b.3 | Configurable speed of replay for moving forward and backward through events. | M | Y | | User defines window for replay. All data is displayed in both a tabular form as well as a map view and does not require operator to watch a dynamic view. The user can step indidually through the data using arrow keys. |
| 1.1.2.b.4 | Graphical representation of event data on a common CAD/AVL map. | M | Y | | |
| 1.1.2.b.5 | Selectable display of map layers including but not limited to stops, streets, routes, points of interest, and geographical attributes. | M | Y | | |
| 1.1.2.b.6 | Text display of attributes of each vehicle event message including messages related to other onboard systems including transit priority requests, farebox alarms, and passenger counts. | M | Y | | |
| 1.1.2.b.7 | Step forward, step backward and pause the historical display of events. | M | Y | | |
| 1.1.2.b.8 | Zoom, move, center, and fit to window views within the map window. | M | Y | | |
| 1.1.2.b.9 | Measuring distance tool. | M | Y | | |
| 1.1.2.b.10 | Vehicle label by number, adherence, route, driver, run, and block. | M | Y | | |
| 1.1.2.b.11 | Vehicle icons that are configurable and display adherence, login status, transfer status, and maintenance status. | M | Y | | |
| 1.1.2.b.12 | Locate vehicles, routes, intersections or objects. | M | Y | | |
| 1.1.2.b.13 | Display route traces. | M | Y | | |
| 1.1.2.b.14 | Date and time messages are logged. | M | Y | | |
| 1.1.2.b.15 | Print the historical display. | M | Y | | |
| 1.1.3 | Schedule Adherence | | Y | | |
| 1.1.3.a | System shall monitor adherence by comparing current location versus the published schedule for all vehicles. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 1.1.3.b | Schedule adherence data shall be stored and include parameters for analysis as specified in the technical requirements. | M | Y | | |
| 1.1.3.c | Both the time of arrival and departure at all scheduled timepoints shall be accurately recorded and stored. | M | Y | | |
| 1.1.3.d | The Agency shall be responsible for providing the schedule data used by the Contractor provided scheduling software interface to the CAD/AVL system. The Agency shall perform any stop and route geo-surveys required using Contractor supplied tools. The Contractor shall provide adequate training prior to the start of this activity in accordance with the project schedule. | M | Y | | |
| 1.1.3.e | Real-time (predictive to the next time point, which shall include all stops) schedule adherence shall be displayed for dispatchers and made available to customer information applications. | M | Y | | |
| 1.1.3.f | System shall identify vehicles predicted to be running early or late by predefined time parameters and shall report on both graphical and tabular displays. | M | Y | | |
| 1.1.3.g | Schedule adherence parameters shall be able to be set differently by route with separate early and late user supplied values. | M | N | | Schedule adherence parameters shall be able to be set globally with separate early and late user supplied values. |
| 1.1.3.h | Schedule adherence display will be shown to the Operator regardless of dispatcher selectable parameters. | M | Y | | |
| 1.1.3.i | Schedule adherence from the vehicle shall be calculated, transmitted, and stored regardless of the onboard display setting. | M | Y | | |
| 1.1.4 | Route Adherence | | | | |
| 1.1.4.a | Provide off-route status to the Operator and transmit a notification to be displayed at the dispatch workstation. | M | Y | | Provide off-route status to the Dispatcher and transmit a notification to be displayed to the Operator. |
| 1.1.4.b | The off-route notification displays shall display next stop when vehicle is off-route. | M | Y | | Drivers will see next scheduled timepoint on their MDT. |
| 1.1.4.c | The off-route distance value shall be a user definable parameter. | M | Y | | |
| 1.1.4.d | System shall identify off-route distance from assigned route or deviation from corridor of travel. | M | Y | | Off route is shown as a vehicle status with deviation viewable via the GIS map |
| 1.2 | CAD/AVL System Hardware | | | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 1.2.1 | Contractor shall provide a turnkey, central system including all necessary hardware – see technical requirements. | M | Y | | |
| 1.2.2 | Contractor shall supply all hardware required for networking and communications for the system – see technical requirements. | M | Y | | |
| 1.2.3 | The CAD/AVL system shall also consist of a backup or mirrored server that will take over operations should the main server fail. The mirrored server shall enable failover operations to be carried out in a seamless manner requiring minimal manual intervention. | M | Y | | |
| 1.2.4 | CAD/AVL Servers | | | | |
| 1.2.4.a | The Contractor shall submit a complete list of required IT equipment for the CAD/AVL System at the System Design Review stage. These requirements and specifications may be refined and finalized as part of System Design Review. The minimum computer server requirements are identified in the technical requirements. | M | Y | | |
| 1.2.5 | CAD/AVL Workstations | | | | |
| 1.2.5.a | All workstations shall use Dynamic Host Configuration Protocol (DHCP) for IP address assignment, unless otherwise approved by the Agency. | M | Y | | |
| 1.2.5.b | The Contractor shall provide and implement hardware for the Agency with capacity adequate to support the Agency's applications and other Contractor applications involved in the solution, maps, data, and associated files required for operation, with 100% expansion capacity of the specified hardware. | M | Y | | |
| 1.2.5.c | New workstations shall meet or exceed each Agency's current standard workstation specifications. | M | Y | | |
| 1.2.5.d | Workstations for Petaluma Transit shall be Dell Optiplex 7010, Intel i7, 6GB RAM, 1TB hard drive or approved equivalent. | | Y | | |
| 2 | System Data Communications | Avail | | | |
| 2.1 | Set up radio/cellular data gateway to allow incoming and outgoing messages between the system and MDT's to be transmitted using the Agency-specific radio/cellular data communications system. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 2.2 | The system shall allow data packets to be sent over the network from the vehicles to the central system and from the central system to the vehicles anywhere where there is a private radio system or cellular signal present. | M | Y | | |
| 2.2.1 | Vehicle location shall be received by the Central CAD/AVL system at least once every 20 seconds (polling rate) for display and storage purposes and every 5 seconds during an Emergency Alarm situation. | M | Y | | Avail can provide a 20 sec. polling rate utilizing cellular communications. If Petaluma utilizes their exisitng two-way data radio system shall utilize a polling rate of every minute. |
| 2.3 | The contractor is responsible for arranging appropriate communication protocols with the Agency-preferred cellular providers. Petaluma Transit is using their Private Radio Network and Verizon for redundancy. | M | Y | | |
| 2.4 | Wireless Local Area Network (WLAN) | | | | |
| 2.4.1 | Complete or bi-directional bulk data transfer software is provided for transfer of data between vehicles on mobile data system and the central system. | M | Y | | |
| 2.4.2 | The bulk data transfer system shall be capable, at minimum, of the following tasks: | M | Y | | |
| 2.4.2.a | Downloading software updates/patches and configuration data for onboard devices. | M | Y | | |
| 2.4.2.b | Downloading all updated schedule and trigger zone locations data required for operation of the VLU firmware. | M | Y | | |
| 2.4.2.c | Uploading vehicle components monitoring configuration data. | M | Y | | |
| 2.4.2.d | Downloading updated trigger zones locations and announcement sign messages for automated annunciation systems on-board announcements. | M | Y | | |
| 2.4.2.e | Uploading revenue transactions data from fareboxes. | O | Y | | |
| 2.4.2.f | Allowing for the uploading of other on-board logged data when received. | M | Y | | |
| 2.4.2.g | The software shall be configurable to determine frequency and types of data transfers. | M | Y | | |
| 2.4.2.h | Automated system bulk transfers shall occur and be validated automatically – see technical requirements for specifics. | M | Y | | |
| 2.4.2.i | Once communications is established with the VLU, the bulk data transfer system shall automatically determine which required file transfers remain to be completed and initiate them. | M | Y | | |

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| 2.4.2.j | A validation process shall ensure multiple attempts are made to complete all required file transfers until the file transfer is successfully completed. | M | Y | | |
| 2.4.2.k | The system shall be able to complete a file transfer using a sequence of ad-hoc partial file transfers while the VLU is temporarily connected with the mobile data communications system. | M | Y | | |
| 2.4.2.l | WLAN Access Points | | | | |
| 2.4.2.l.1 | The Contractor shall provide a WLAN controller. The WLAN controller and wireless APs shall support the functions outlined in the technical requirements | M | Y | | |
| 2.4.2.l.2 | The contractor shall provide wireless Access Point coverage at each Agency's bus maintenance facilities to enable WLAN connectivity for data exchange between the VLU and central system via a Bulk Data Transfer. | M | Y | | |
| 2.4.2.l.3 | The WLAN coverage area available for bulk data transfer at each Bus Maintenance Facility shall include the area where the vehicles are to be parked. | M | Y | | |
| 2.4.2.l.4 | The Contractor shall review the plans for the Bus Maintenance Facility and design the optimal locations for the APs including the orientation of antennas to satisfy all bulk data transfer requirements. | M | Y | | |
| 2.4.2.l.5 | The VLU shall authenticate and connect automatically when vehicles enter Wi-Fi zone. | M | Y | | |
| 2.4.2.l.6 | WLAN equipment shall be outdoor-rated. See technical requirements for specific code requirements. | M | Y | | |
| 2.4.2.l.7 | Lightning arrestors shall be installed to vendor specifications on all exterior APs. | M | Y | | |
| 2.4.2.l.8 | The WLAN equipment shall be IEEE 802.11i compliant or be Wi-Fi Protected Access 2 (WPA2) certified by the Wi-Fi Alliance with AES encryption. | M | Y | | |
| 2.4.2.l.9 | Each single AP shall have a minimum 2x3, Dual Frequency, MIMO configuration. | M | Y | | |
| 2.4.2.l.10 | The APs shall support 5.0 GHz frequencies. The APs shall be capable of supporting multiple SSID's and assign separate SSID's to separate VLANs. | M | Y | | |
| 2.4.2.l.11 | The APs shall be able to support WMM (Wi-Fi multimedia). | M | Y | | |
| 2.4.2.l.12 | Installation shall be coordinated with Agency project manager with Agency clearance. | M | Y | | |
| 2.4.2.m | Antennas | | | | |

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| 2.4.2.m.1 | Antenna(s) shall be installed for cell data, GPS and WLAN. The antenna(s) shall support the ranges identified in the technical requirements. | M | Y | | |
| 2.4.2.m.2 | Petaluma Transit will require additional antennas for private radio operating in the 400 or 500 MHz range. | M | Y | | |
| 2.5 | Remote and Mobile Access to Central Software | | | | |
| 2.5.1 | Road Supervisors shall be capable of having remote access to the central CAD/AVL system through a mobile workstation (laptop). Relevant real-time information shall be gathered and transmitted to the mobile workstation through the CAD/AVL cellular data network. The mobile station shall be provided with a cellular data card. | M | Y | | |
| 2.5.2 | Provide map-based GUI for remote/mobile access per the technical requirements. | M | Y | | |
| 2.5.3 | The GUI shall be browser-based, or employ an application installed on the local workstation. | M | Y | | |
| 2.5.4 | The GUI shall be the same as the one used by Dispatchers, but with the ability to limit functionality as defined below. | M | Y | | |
| 2.5.5 | To reduce the amount of cellular data used, the GUI shall be configurable to only show selected vehicles. | M | Y | | |
| 2.5.6 | Vehicles shall be selectable by ID, pre-defined groups, routes, and pre-defined geographic distance. | M | Y | | Vehicles shall be selectable by ID, pre-defined groups (fleet groups) and routes |
| 2.5.7 | The laptops shall support text messaging to the dispatchers. The Contractor shall provide recommended laptop specifications and the Agency's will provide the hardware. | M | Y | | Supported by off the shelf third party applications. |
| 2.5.8 | The laptops shall have access to the internet, Microsoft Outlook, and Agency software applications. | M | Y | | |
| 2.5.9 | The laptops shall allow the road personnel to monitor and respond to incidents including covert alarms and file incident reports. | M | Y | | |
| 2.5.10 | The Contractor shall provide sufficient documentation and instructions for installing software such that Agency staff can perform the installation in the event of a laptop replacement or upgrade. | M | Y | | |
| 3 | On-board Equipment and Systems | | | | |
| 3.1 | All on-board equipment shall be new and designed for use in the transit industry rated to applicable industrial and vehicle standards. See technical requirements. | M | Y | | |

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| 3.2 | Equipment shall be the latest model in current production, as offered to commercial trade, and shall conform to transit industry requirements. | M | Y | | |
| 3.3 | The contractor shall represent that all equipment offered under these specifications is new. | M | Y | | |
| 3.4 | Contractor shall demonstrate that all equipment has been installed and operational for at least three other CAD/AVL systems for a period of not less than three (3) years. | M | Y | | |
| 3.5 | All equipment shall be constructed in accordance with best commercial practice, with such practices described in the associated design documentation. At a minimum, the design and installation construction shall provide for: | M | Y | | |
| 3.5.1 | Reliable and stable operation; | M | Y | | |
| 3.5.2 | Minimum maintenance and alignment procedures, with a minimum of special tools; | M | Y | | |
| 3.5.3 | Minimum number and variety of assemblies and spare parts; | M | Y | | |
| 3.5.4 | Maximum attention to human factors, engineering, and ergonomic design; and | M | Y | | |
| 3.5.5 | Simplified design and rapid fault isolation to reduce the requirement for maintenance personnel. | M | Y | | |
| 3.5.6 | All parts shall be made of corrosive resistant material. | M | Y | | |
| 3.5.7 | All parts shall be constructed with materials and quality suited to the intended use and shall use modular design wherever feasible | M | Y | | |
| 3.5.8 | Functionally identical modules and assemblies shall be interchangeable per the technical requirements. | M | Y | | |
| 3.5.9 | Functionally non-identical modules shall not be and shall not appear to be interchangeable. | M | Y | | |
| 3.5.10 | All modules and assemblies shall be connected using standardized durable, positive-locking, and indexed quick disconnect fasteners. | M | Y | | |
| 3.5.11 | Equipment, assemblies, and components shall be identified by a permanently affixed part number and/or serial number. | M | Y | | |
| 3.5.12 | Features identifying software module version within that device shall be provided on each device. | M | Y | | |

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| 3.5.13 | All equipment shall provide a usable life of not less than 15 years. | M | Y | | Avail currently has customers with systems that are over 15 years old still operating original equipment. However, we can't guarantee a usable life of 15 years. Avail has developed our entire suite of products to meet and exceed industry standards (7) years and we do our best to ensure a product life span well beyond (7) years. |
| 3.5.14 | Onboard equipment shall utilize most current microprocessor technology. | M | Y | | |
| 3.5.15 | Compatibility between current and future on-board equipment systems shall be maintained, including due to chip end-of-life issues. | M | Y | | |
| 3.5.16 | All on-board equipment shall have a minimum 40,000 hours Mean Time Between Failures (MTBF). | M | N | | The Equipment is designed for mobile environments and Transit. The VLU will meet this requirment, however Avail does not have calculated values for the rest of the equipment. The equipment is designed for its intended use. See requirement 3.6.3 for the design standards. |
| 3.5.17 | Internal (to the onboard equipment) batteries shall not be used to maintain parameter information in onboard equipment when it is in its powered down state. See technical requirements for real-time clock exception. | M | Y | | |
| 3.5.18 | The system shall check the battery state and create a warning message if the battery needs to be replaced. Onboard equipment shall be capable of being disassembled to fit through a coach door that is a minimum of 24 inches wide by 60 inches tall. | M | Y | | |
| 3.5.19 | Onboard equipment, including all exterior connectors and exposed ports, shall be rated for International Electrotechnical Commission (IEC) standard 60529, IP 54 for interior equipment, IP 65 for exterior equipment and designed for use in an industrial and mobile environment subjected to dirt, water, oil, and cleaning solvents. | M | Y | | |
| 3.5.20 | If existing vehicle wiring, switches, or contact points are used, testing shall occur to certify that the wiring, switches, or contact points are in an acceptable state and suitable for reuse. | M | Y | | |
| 3.5.21 | Data transferred from a device shall not be purged or written over until a successful transfer is confirmed. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.5.22 | In the event the transfer is not successful and the system is unable to re-attempt a transfer, it shall revert to the previous version of the data automatically and without corruption. Any data transfer failure shall be logged, alerted, and recorded. | M | Y | | |
| 3.5.23 | Devices shall include functionality to extract data directly from the device using a laptop computer in the event of a transfer failure (for any reason). Tools and processes shall be provided. | M | Y | | |
| 3.5.24 | Equipment shall be properly grounded, with onboard equipment connected as directly as possible to the chassis ground. | M | Y | | |
| 3.5.25 | Onboard equipment shall operate from the vehicle electrical system, between 9 and 35 volts. | M | Y | | |
| 3.5.26 | Onboard equipment shall be securely mounted in the interior of the vehicle, clear of obstructions and interference-generating devices. | M | Y | | |
| 3.5.27 | Customer-facing equipment shall meet or exceed all ADA requirements per technical requirements. | M | Y | | |
| 3.5.28 | Installations shall be performed at specific times as approved by the Agency. | M | Y | | |
| 3.5.29 | The agencies reserve the right to allow less of its vehicle fleet to be out of service if necessary in order to avoid disruption to revenue service in conjunction with maintenance requirements. | M | Y | | |
| 3.5.30 | The Contractor shall ensure that all vehicles made available for overnight installation work are ready for revenue service by the start of the next service day. | M | Y | | |
| 3.5.31 | Onboard equipment shall not interfere with Petaluma Transit's existing Cradlepoint/Verizon on board passenger wifi systems. | M | Y | | |
| 3.6 | Vehicle Logic Unit (VLU) | | | | |
| 3.6.1 | The CAD/AVL system shall include a VLU on each vehicle to serve as a central processing unit, memory, data storage, and vehicle software. | M | Y | | |
| 3.6.2 | VLU shall interface with vehicle's on-board equipment and support communications via a mobile wireless communications network with the central servers. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| 3.6.3 | The VLU shall meet environmental and vibration standards (MIL-STD-810D, NEMA-4) as well as appropriate electromagnetic immunity standards (SAE 1455 and ESD J1112/13) and protect against surge, and reverse polarity. | M | N | | Avail equipment is tested and designed to meet the conditions encounted in transit vehicles and is deployed in properties from Maine to Florida to California and Alsska. Specifically the equipment is designed and tested to meet SAE-J1211-"SAE Recommended Environmental Practices for Electronic Equipment Design", MIL-STD-810F – "DOD Environmental Engineering Considerations and Laboratory Tests", SAE-J1455 –"Joint SAE/TMC Recommended Environmental Practices for Electronic Equipment Design (Heavy-Duty Trucks)". In addition digital inputs and outputs are optically isolated and protested against EMI and ESD. The MDT is a sealed unit and all other equipment is either sealed or installed in teh vehicles radio cabinet and protected against direct expsure to water and other contaniments. Detailed environmental specifications and test results can be provided upon request. - |
| 3.6.4 | The VLU shall be of proven design (at least three other similar transit agency deployments for at least three years) and easy to install and replace. | M | Y | | |
| 3.6.5 | The VLU shall be capable of multiple radio control, real time updates and messaging to and from the vehicle. | M | Y | | |
| 3.6.6 | The VLU shall meet communication requirements for leased cellular communications, meshed wireless networks, private radio, as well as interfaces for current and future onboard equipment. | M | Y | | The MDC and VLU are capable of all of these data communications interfaces. Avail is proposing a cellular data solution. |
| 3.6.7 | Overall system interfaces shall include RS232, RS485 with busy line, TTL, SAE J1708, SAE J1939, USB, Ethernet, TCP/IP, discrete inputs and outputs, odometer, spare I/O pins, audio inputs and outputs, and full IDE capability for PC-type devices. | M | Y | | |
| 3.6.8 | Capability for automatic vehicle monitoring via J1708/1939 provided by the vehicle shall be included. | M | Y | | |
| 3.6.9 | Indication shall be provided for quick inspection of operation to indicate radio keyed, wireless network operating, software operational, proper voltage range, and ignition on. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| 3.6.10 | Data storage capacity shall also be sufficient to store at least five operating days worth of passenger counts and all event messages in the case where data communications are disrupted. | M | Y | | All passenger counts are sent in real-time and are not accumulated and delivered in bulk at the end of the day as some APC systems operate. In the event that the real-time data communications is down for an extended period of time, the MDC will store and forward stop data and APC counts in non-volatile memory until; 1) the real-time data communications system is restored, 2) the vehicle returns back to the garage and is in WIFI range. In both cases all store and forward messages will then be delivered.<br><br>In order for the vehicle to "login" the next day, the real-time or WIFI communications data systems must be up and operational. So, in essence, you can never store more than one day's worth of store and forward messages.<br><br>If the vehicle has store and forward messages that are undelivered, and the vehicle is in long term maintenance, the stop reports and APC data will be maintained for up to 30 days.<br><br>Even though the specific requirment specifies that 5 days worth of APC data needs to be stored, we can actually never actually get to storing more than one days worth.<br><br>Because of this, Avail believes we fully meet the intent and spirit of this requirement |
| 3.6.11 | The VLU shall support functionality of the following data sets, and must have sufficient non-volatile memory to simultaneously store at least the following: | M | Y | | The VLU/MDT shall support functionality of the following data sets, and must have sufficient non-volatile memory to simultaneously store at least the following: |
| 3.6.11.a | Entire set of current schedule data, including school, non-school, and Holiday schedule platforms; | M | Y | | |
| 3.6.11.b | Twenty (20) weeks of incremental schedule changes, for current schedule; | M | Y | | |
| 3.6.11.c | Entire set of future schedule data (i.e., next run-board); | M | Y | | |
| 3.6.11.d | Entire set of required AVA announcements; | M | Y | | |
| 3.6.11.e | Fifty-two (52) weeks of incremental AVA announcements, for current schedule; | M | Y | | |

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| 3.6.11.f | Five (5) days of Automatic Passenger Count (APC) data records; | M | Y | | The VLU sends APC data in real-time or via the wireless in the event the data can not be sent in real-time. If the data can not be sent via realtime or throught the WLAN then it will be stored in the MDT. |
| 3.6.11.g | Destination sign errors; | M | Y | | |
| 3.6.11.h | Current configuration data; | M | Y | | |
| 3.6.11.i | Future configuration data; | M | Y | | |
| 3.6.11.j | Current firmware; | M | Y | | |
| 3.6.11.k | Future firmware; | M | Y | | |
| 3.6.11.l | Any other data recording needs identified in this RFP; | M | Y | | |
| 3.6.11.m | 100% memory spare storage for growth, summing above requirements. | M | Y | | |
| 3.6.12 | CAD/AVL system configuration settings related specifically to the vehicle shall be stored in the vehicle's configuration module. See technical requirements for functionality. | M | Y | | |
| 3.6.13 | Each VLU shall have a unique IP address for purposes of participating in the wireless network and for remote monitoring. | M | Y | | |
| 3.6.14 | VLU shall be compatible with all on-board equipment options. | M | Y | | |
| 3.6.15 | The VLU shall integrate seamlessly with the Mobile Access Router (MAR), including the VLU providing a feed of GPS data to the MAR. | M | Y | | |
| 3.6.16 | The VLU shall act as the central processor, data storage, and device manager for all onboard devices integrated under this Contract. | M | Y | | |
| 3.6.17 | The contractor shall coordinate with the agencies the final location of VLU installation on each different vehicle type and configuration, subject to approval from the agencies. | M | Y | | |
| 3.6.18 | The VLU shall include at minimum the following ports and interfaces: | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.6.18.a | Two (2) opto-isolated SAE J1708: one (1) for transit devices, and one (1) for drivetrain; | M | Y | | The invehicle solution can be configured to have two SAE J1708 interfaces, (1) for transit devices, and (1) for drivertrain, However, since most vehicles are now equipped with J1939 interfaces to accomodate vehicle health monitoring from the engine, trans, etc., Avail does not belive a 2nd J1708 interface is required. The proposed configuration also includes (2) J1939 interfaces and (1) CAN interface. A second J1708 interface can be added, but is not included as the default configuration. The J1708 Specification does not specify a opto isolated input. We comply with SAE J1708. |
| 3.6.18.b | Opto-isolated SAE J1939 for drivetrain; | M | Y | | |
| 3.6.18.c | Ethernet; | M | Y | | |
| 3.6.18.d | Universal Serial Bus (USB); | M | Y | | |
| 3.6.18.e | RS-232 as an additional option to SAE J1708 for communication with the destination signs; and | M | Y | | |
| 3.6.18.f | Other ports and interfaces as required for specific device-to-device communications. | M | Y | | |
| 3.6.19 | The VLU shall manage power to listed onboard devices as follows: | M | Y | | |
| 3.6.19.a | The VLU shall have a configurable parameter of 0 to 180 minutes that controls the power down of the VLU, MDT, and MAR after the vehicle master ignition switch is turned to "off". | M | Y | | |
| 3.6.19.b | The VLU shall inform all managed devices to initiate a graceful power-down ofself and the MDT (including if necessary automatically logging off the VLU) between 0 to 30 minutes before power-down is activated and shall inform the MAR to do so. | M | Y | | |
| 3.6.19.c | Upon reaching the power-down threshold, the VLU shall remove power from all connected devices, and itself. | M | Y | | |
| 3.6.19.d | Upon the vehicle master ignition switch being turned to anything other than "off", the vehicle shall apply or maintain power to all connected devices, and also reset the timer unless ignition sense is again active. | M | Y | | |
| 3.6.19.e | If the vehicle operator has not logged off, the system shall automatically log off, prior to power down activation. | M | Y | | If the vehicle operator is not logged off, the system shall automatically log off the operator when the ignition switch is turned off. |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.6.20 | The VLU shall process AVL data and correlate it with operator ID, date, time (both 24 hour system clock and 36 hour service day clock), run, block, route, trip, and location. | M | Y | | |
| 3.6.21 | The VLU shall manage all communications processes and devices on the vehicle, and shall store any accumulated data and logs. | M | Y | | |
| 3.6.22 | The VLU shall reconcile any discrepancies between all the different sensors and position inputs it uses for AVL purposes – see technical requirements. | M | Y | | The In-Vehicle Solution software and algorithms do utilize velocity and other filter parameters to determine the validity of GPS to account for wander and gross multipath artifacts. |
| 3.6.23 | The VLU shall process and manage the transmission of data to/from the central system as follows: | M | Y | | |
| 3.6.23.a | Routine data including: schedule adherence, vehicle location data, passenger count, peak passenger load, messaging and communications requests, and event information on an event or periodic basis, via the data communications system. | M | Y | | |
| 3.6.23.b | Priority data including priority messages, and alarms on an immediate basis, via the data communications system. | M | Y | | |
| 3.6.23.c | Onboard equipment configuration data updates, non-critical logged or accumulated data, and other "batch" data, via the WLAN. | M | Y | | |
| 3.6.24 | The VLU shall be responsible for initiating and verifying the successful completion of data transfers, and shall not delete data until a successful transfer has been completed and confirmed. | M | Y | | |
| 3.6.25 | In the event of an uncompleted file transfer, the VLU shall reinitiate the file transfer in accordance with the technical requirements. | M | Y | | |
| 3.6.26 | The VLU shall manage the downloading of new configuration data that may include schedule updates, AVA announcement updates, firmware/configuration updates, as follows: | M | Y | | |
| 3.6.26.a | The VLU shall maintain current and one set of future configuration data that will automatically become the current configuration data once the defined activation date has arrived. | M | Y | | |
| 3.6.26.b | The VLU shall periodically check for configuration updates whenever it is within WLAN coverage. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.6.26.c | If a configuration data update is available, the VLU shall manage the download process and update other onboard equipment (the VLU shall provide a message on the MDT that a download and update is occurring so that the operator is aware). | M | Y | | |
| 3.6.26.d | The VLU shall automatically install updated firmware or configuration data it has received into the VLU, the destination sign and the AVA system. | M | Y | | The VLU shall automatically install updated firmware or configuration data it has received into the VLU, and the AVA system. |
| 3.6.26.e | To minimize potential impacts on pull-out, the VLU shall include functionality to download only the schedule information on startup. Functionality shall be provided to manage the download of more voluminous data (such as a firmware or configuration update) so that it is only downloaded and installed on shutdown or during non-operating hours. | M | Y | | Avail's in-vehicle download and software update is managed such that there is no impact to pull-out or any other operations while in service. |
| 3.6.26.f | If the VLU is unable to complete the download of configuration data via the WLAN, it shall continue using the previous configuration data. | M | Y | | |
| 3.6.27 | The VLU must monitor and log, tagged with time and location, the following existing discrete external circuits: | M | Y | | While Avail feels we fully meet the following requirements we would like to better understand how this data will be used by operations. Avail's in vehicle solution has the ability to monitor and log the discretes and signals listed below, but may not tie into a couple of them as the default configuration. Most of the logging is performed as a debug log, whose data can be offloaded wirelessly.<br><br>In addition, if the vehicle's multiplex system monitors these discretes and has J1939 gateway module installed and configured to provide these discretes as a J1939 messages, then the in-vehicle solution can log these discretes as J1939 messages. |
| 3.6.27.a | Front door and Rear door, open and close; | M | Y | | |
| 3.6.27.b | Kneel, and return from kneel (raise); | M | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| 3.6.27.c | Lift or Ramp deploy, and return from deploy (stow); | M | Y | | |
| 3.6.27.d | "Stop Requested" activation; | M | Y | | |

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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.6.27.e | Headlight activation and deactivation; | M | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| 3.6.27.f | Turn Signals, activation and deactivation; | M | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| 3.6.27.g | Hazard Lights, activation and deactivation; | M | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| 3.6.27.h | Master-Run switch, change in status (Off, Day-Run, Night-Run, Park); | M | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| 3.6.27.i | Ignition, activation and deactivation; | M | Y | | |
| 3.6.27.k | Covert Alarm switch activation; | M | Y | | |
| 3.6.27.l | Selected dashboard light activations for vehicle maintenance monitoring (e.g. oil pressure, check engine light, tire pressure); | M | Y | | |
| 3.6.27.m | Motion start; | M | Y | | This may not necessisarily be a discrete input, but would be deteremined through other means. |
| 3.6.27.n | Not in motion/idle. | M | Y | | This may not necessisarily be a discrete input, but would be deteremined through other means. |
| 3.6.28 | The VLU shall include functionality and external interfaces to provide location, time, and/or triggering messages to other on-vehicle systems. | M | Y | | The In-Vehicle solution is capable of providing these types of messages to external devices through any future developed data interfaces, with 3rd party devices. However, at this time, not knowing any specifics about what these 3rd party devices are, and what the devolopment, and integration effort would be to create these interfaces with these devices, any development and integration effort is not part of the scope of this project.<br><br>That said, the in-vehicle solution will send location, time, and other predefined trigger messages on the J1708/1587 interface currently. |
| 3.6.29 | The VLU shall include functionality to re-transmit data in the event of an unsuccessful transmission. | M | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.6.30 | The VLU shall run diagnostics and report any problems with onboard components (including the VLU itself, MDT, voice radio, AVL components, and destination sign). | M | Y | | |
| 3.6.31 | The VLU shall automatically recognize any system process failure or lock-up, log the problem and attempt a restart. | M | Y | | |
| 3.6.32 | If restart of the process fails, notification shall be sent to the operator via the MDT and logged the event in the VLU data for upload at the end of the day. | M | Y | | Even though process/services may be attempted to be restarted, an automatic "reboot" of the in-vehicle system may be required to resolve. |
| 3.6.33 | The VLU shall support remote diagnostics that allow central system access to check operations and functionality of the VLU. See technical requirements. | M | Y | | |
| 3.6.34 | In addition to providing routine position updates, the VLU shall record date, time and location when the following events occur: | M | Y | | |
| 3.6.24.a | Arrival into and departure from agency configurable geographic areas that define the stops, timepoints, and pull-out/pull-in locations (for these events the current schedule adherence shall also be recorded); | M | Y | | Whether private data radio modems or cellular data, the inbound messaging content is optimized to be very small and efficient, to get the most effeciency and incur the least cost (cellular). The Entry and Exit of defined geo shapes are combined into a single message reflecting the entry and exit information. Avail believes that we meet the intent of this requirement. |
| 3.6.24.b | Every activation and deactivation of each monitored onboard circuit, including: Door open/close, Kneel/Raise, Lift/Ramp deploy/stow, Stop-Requested light, Turn Signals; | M | Y | | Avail's in vehicle solution has the ability to monitor and log the discretes and signals listed below, but may not tie into a couple of them as the default configuration. Most of the logging is performed as a debug log, whose data can be offloaded wirelessly.<br><br>In addition, if the vehicle's multiplex system monitors these discretes and has J1939 gateway module installed and configured to provide these discretes as a J1939 messages, then the in-vehicle solution can log these discretes as J1939 messages.<br><br>In short, the Avail In-Vehicle solution is more than capable to monitor and log all of the interfaces listed below, as long as there is a J1939 message or tie-in to the IOControls output module to connect to. |
| 3.6.24.c | First stop/timepoint of the first trip; and | M | Y | | |

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| 3.6.24.d | Every toggling of operational conditions, including: operator key- press on MDT, off-route and return-to-route, early/late schedule adherence and return-to-on-time status, operator over-ride of destination sign. | M | Y | | Conditions such as schedule adherence, offroute, manual mode, etc are logged at the CAD. Operator key presses can be logged in the vehicle but are not sent to the CAD. "operator over-ride of the destination sign" is not sent to the CAD. |
| 3.6.35 | The VLU shall monitor diagnostic information for the Transit J1708, and log the following statistics upon every change in logon status or ignition status: | M | | | |
| 3.6.35.a | By Module Identification (MID): Time of last good received packet, Total good received packets, Total good transmitted packets. | M | Y | | J1708 logging of information is available when the debug logging mode is enabled. Debug data can then be offloaded wirelessly. |
| 3.6.35.b | Total bad (collision/checksum) packets received. | M | N | | Because of the robustness of the interface and protocol (collision detection, retries, priority management, etc), and Avail's implementation of application level retries, and monitoring, Avail does not believe there is any need to capture this information. |
| 3.6.25.c | Total bad (collision/checksum) packets transmitted. | M | N | | Because of the robustness of the interface and protocol (collision detection, retries, priority management, etc), and Avail's implementation of application level retries, and monitoring, Avail does not believe there is any need to capture this information. |
| 3.6.36 | The VLU shall monitor diagnostic information for connected onboard systems, and log the following statistics upon every change in logon status or ignition status: | M | Y | | |
| 3.6.36.a | Data Communication Statistics (Total: Polls, Transmits, Re-Transmits, Receives, Errors, Fallback, etc); | M | Y | | |
| 3.6.36.b | Navigation Quality (Time, Duration, Good GPS Navigation, Good Alternate Navigation, Poor Navigation, etc); | M | Y | | The in-vehicle system monitors many aspects of the GPS component internally and logs low level details as debug messages which can be offloaded wirelessly. |
| 3.6.36.c | All current VLU configuration data; | M | Y | | |

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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.6.36.d | Odometer Statistics, since previous record (total traveled distance, current calibration factor); and | M | Y | | |
| 3.6.36.e | WLAN Statistics, since previous record (VLU awake time, WLAN coverage time, data packets sent, data packets received, file transmissions/receptions attempted per file, file transmissions/receptions completed per file). | M | N | | Low level WLAN coverage statistics are not available to the IVU, however file download, information is collected via the PDC server for bulk file downloads and uploads, along with connection times and information |
| 3.6.36.f | All received text messages that were displayed to an operator | M | Y | | This data is collected by the CAD System and includes receipt and acknowledgement, Yes and No responses. |
| 3.6.36.g | All instances of lost data communications coverage exceeding 15 seconds once back in communications for more than ten (10) seconds. | M | Y | | This type of data is available in debug mode, and can be offloaded wirelessly. |
| 3.6.37 | The VLU schedule data shall include agency configurable geographic areas (i.e., trigger boxes), and will initiate special VLU functions. | M | Y | | |
| 3.6.37.a | Examples include: Change external destination sign; Initiate Transit Signal Priority (TSP) status change (enable/disable/activate/deactivate); Initiate AVA announcements and/or "clears"; Indicate locations where GPS is known to be degraded. | M | Y | | |
| 3.6.37.b | The system shall enable the agency to maintain the trigger boxes within the scheduling database, independently without need for any software changes. | M | Y | | |
| 3.6.37.c | The system shall support the creation, deletion, and relocation of trigger boxes and the designation or adjustment of the VLU action to be taken upon entering or exiting the trigger box. | M | Y | | |
| 3.6.38 | The VLU shall use AVL data to determine schedule adherence in real-time on the vehicle, without the need for central computation and communications. | M | Y | | |
| 3.6.39 | The VLU shall be fully operational within 90 seconds of power restoration for warm starts, and 150 seconds for cold starts under the full range of ambient conditions. | M | Y | | |
| 3.6.40 | Logged data shall be stored in non-volatile memory, and shall not become corrupted due to any power condition, including: spike, drop, or loss. | M | Y | | |

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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.7 | Mobile Data Terminal | | | | |
| 3.7.1 | The MDT shall be a rugged computing device designed for operation in a transit environment and shall function as the interface between the operator and all onboard components. | M | Y | | |
| 3.7.2 | MDT data storage shall be solid state. | M | Y | | |
| 3.7.3 | MDT shall have a color liquid crystal display (LCD) touch-screen. | M | Y | | |
| 3.7.4 | MDT shall be operable while wearing gloves. | M | Y | | Avail's MDT touch screen utilizes the same technology as todays smartphones and tablets. |
| 3.7.5 | MDT shall be readable by operators wearing polarized lenses. | M | Y | | |
| 3.7.6 | The MDT shall be legible for the color blind. | M | Y | | |
| 3.7.7 | MDT shall be readable in direct sunlight and must offer low-glare setting for night operation. | M | Y | | |
| 3.7.8 | MDT touch-screen shall have a video graphics array (VGA) resolution of at least 640 x 480 pixels. | M | Y | | |
| 3.7.9 | MDT shall display vehicle status including data transmission, pending messages, and communication mode. | M | Y | | |
| 3.7.10 | MDT shall be capable of providing aural tones to indicate incoming messages to operators while keeping operator attention on the road. | M | Y | | The MDT provides Aural tones for multiple events including invalid logon, data messages, or other events requiring operator attention. In addition the MDT provides detailed information and/or screens for the functions below. Not all of these include nor would it make sense to provide an aural tone. |
| 3.7.10.a | Logon | M | Y | | |
| 3.7.10.b | Emergency Alarm | M | Y | | |
| 3.7.10.c | Data Messaging | M | Y | | |
| 3.7.10.d | Transfer Notification | M | Y | | |
| 3.7.10.e | Schedule Adherence | M | Y | | |
| 3.7.10.f | Headsigns | M | Y | | |
| 3.7.10.g | Fare Collection | M | Y | | |
| 3.7.10.h | Passenger Count | M | Y | | |
| 3.7.10.i | Maintenance | M | Y | | |
| 3.7.10.j | Stop Announcement | M | Y | | |
| 3.7.10.k | Trip/Schedule | M | Y | | |
| 3.7.10.l | Route | M | Y | | |
| 3.7.10.m | Direction | M | Y | | |

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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.7.11 | When the power is turned on, the MDT software shall automatically perform a power-on self-test, followed by configuring and initializing the MDT to the user-specified default values. | M | Y | | |
| 3.7.12 | The MDT shall be self-restarting and shall not become unresponsive and require manual restarts to continue operations. The MDT shutdown process will be controlled by the MDT software and shall only be possible when the ignition is in the off position. | M | Y | | |
| 3.7.13 | A user specified shutdown delay shall be provided to continue operations and to initiate the shutdown procedure that shall automatically close all files, save values, and send a shutdown message to be recorded in the CAD/AVL system. | M | Y | | |
| 3.7.14 | An on-board covert microphone shall be included for communication between dispatcher and operator – refer to technical requirements for location requirements. | M | Y | | Covert microphone is only available to monitor activity on the bus during an emergency event. |
| 3.7.15 | Wheelchairs lifts and ramps shall be monitored and data shall be recorded for each cycle. | M | Y | | |
| 3.7.16 | MDT shall display warning to operator and dispatcher workstation and shall transmit to central system if wheelchair lift was not cycled prior to leaving garage. All messages and warning shall be stored. | M | Y | | |
| 3.7.17 | MDT shall display a warning if logon has not occurred following vehicle movement of predefined distance per technical requirements. Warning shall be transmitted to CAD/AVL system for storage and display at dispatcher station. | M | Y | | |
| 3.7.18 | A logon process shall be provided for maintenance purposes to enable a vehicle to be moved through-out a facility for servicing and maintenance purposes without triggering alarms. | M | Y | | |
| 3.7.19 | MDTs shall be capable of remote log-on/log-off via the data communications connection. | M | Y | | |
| 3.7.20 | MDT shall have the "safe driving" mode enabled when the vehicle is moving above a configurable speed limit. | M | Y | | |
| 3.7.21 | The safe driving mode shall allow the agency to stop vehicle operators from interacting with MDTs when driving, the MDT shall allow enabling of the following screen configurations under safe driving mode: | M | Y | | |
| 3.7.21.a | Blank display on the screen; | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.7.21.b | Disabled MDT buttons to stop vehicle operators from performing any actions on the screen; and | M | Y | | |
| 3.7.21.c | Display of information relevant to vehicle operators when of high priority (e.g., route and schedule adherence status, missed messages or calls from dispatchers). | M | Y | | |
| 3.7.22 | Dispatch shall have the ability to remotely change the configurations for the safe driving mode. | M | Y | | The safe driving configuration paramenters are configurable at the backend and will be downloaded at logon. The parameters could be changed by a dispatcher but it is not a dispatch function nor recommended. |
| 3.7.23 | Dispatch shall be able to change the safe driving mode configurations by vehicle operator login. For example, the safe driving mode could be disabled for maintenance or training purposes. | M | N | | Safe Driving mode is configurable by vehicle type. |
| 3.7.24 | The MDT shall allow two way text messaging between the transit vehicles and dispatch using a set of predefined messages, or free form text messaging. | M | Y | | |
| 3.7.25 | The MDT shall support the display of text messages longer than can fit on one line of the display. A minimum of 40 canned messages shall be supported. | M | Y | | |
| 3.7.26 | The MDT shall store multiple messages received from dispatch and indicate those text messages that are unread. | M | Y | | |
| 3.8 | Mobile Access Router (MAR) | | | | |
| 3.8.1 | Shall support both wireless and wired switched Ethernet Local Area Network (LAN) functionality, as well as multiple wireless Wide Area Network (WAN) links and a gateway. | M | Y | | |
| 3.8.2 | MAR shall be a separate device from the VLU and MDT. | M | Y | | |
| 3.8.3 | MAR shall be equipped with a minimum of 1 GB of internal data storage capacity. | M | N | | |
| 3.8.4 | MAR shall include a minimum of two (2) USB 2.0 connections through which USB enabled devices such as a portable computer or solid state memory can be connected. | M | N | | The proposed Avail Technologies solution includes 1-USB port. |
| 3.8.5 | MAR shall include a minimum of eight (8) switched Ethernet ports. | M | N | | The proposed Avail Technologies solution includes 4- LAN ports port |
| 3.8.6 | The wireless data communications device shall be easily replaceable to accommodate potential future adaptation to different wireless WAN link services. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.8.7 | MAR shall incorporate a LAN Ethernet multiport switch capability to interconnect CAD/AVL onboard system components and existing onboard Ethernet enabled equipment. | M | Y | | |
| 3.8.8 | MAR shall support the following wireless data services: | M | Y | | |
| 3.8.8.a | 3G and 4G WAN, including LTE | M | Y | | |
| 3.8.8.b | 802.11n Wi-Fi WLAN | M | Y | | |
| 3.8.8.c | Act as a WLAN access point capable of enabling LAN access from public WLAN client devices within the bus interior, supporting the 802.11n WLAN standard and on a separate subnet firewalled from the onboard Ethernet switched LAN. | M | Y | | |
| 3.8.9 | The MAR shall be integrated with onboard CAD/AVL components and other existing onboard Ethernet enabled systems per technical requirements. | M | Y | | |
| 3.8.10 | The MAR and all WLAN communications shall support Wi-Fi Protected Access 2 (WPA2) security and communications protocols, or alternate approved through the design review process. | M | Y | | |
| 3.9 | Global Positioning System (GPS) | | | | |
| 3.9.1 | AVL module shall provide a derived location using an onboard GPS receiver and other location determination devices (gyroscope, odometer, etc.) per technical requirements. | M | Y | | |
| 3.9.2 | Vehicle location shall be determined by a navigation algorithm – refer to technical requirements. | M | N | | |
| 3.9.3 | Other location determination devices other than GPS shall automatically calibrate and require no operator or maintenance personnel intervention for daily usage. | M | N | | |
| 3.9.4 | Proper operation of the onboard systems relying on location reporting shall not be interrupted for vehicles leaving from an enclosed storage area. | M | Y | | |
| 3.9.5 | The GPS antenna shall be a low-profile unit housed in a rugged and weather tight enclosure. The GPS antenna shall be securely mounted and sealed on the exterior of the vehicle, clear of obstructions, and clear of interference from other generating devices or 91 Radio Frequency interference. | M | Y | | |
| 3.9.6 | The GPS system shall provide a spare NMEA-based GPS output. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.9.7 | GPS system shall meet cold and warm acquisition and current position update times per technical requirements. The GPS system shall include multi-path rejection capabilities to help eliminate inaccurate signals caused by reflections off of buildings or other structures. | M | Y | | |
| 3.9.8 | Vehicle location shall be transmitted at least once every 20 seconds (polling rate) to the central CAD/AVL system for display and storage purposes and every 5 seconds during an Emergency Alarm situation. | M | Y | | |
| 3.9.9 | The AVL shall at all times provide current position information to the VLU per technical requirements. | M | Y | | |
| 3.9.10 | GPS delay time from location acquisition to formatting for transmission shall not exceed one (1) second. | M | Y | | |
| 3.9.11 | The GPS system shall store the most recent location to provide as the "last known good" location in the event that location reporting is interrupted. | M | Y | | |
| 3.9.12 | Location messages transmitted to dispatch shall indicate messages status as current or "last known verified". | M | Y | | |
| 3.1 | Automatic Passenger Counters | | | | |
| 3.10.1 | The APC system shall be integrated with the AVL system to provide the Agency with time, location, and on-off counts. | M | Y | | |
| 3.10.3 | The APC shall be designed to operate in accordance with these specifications for ambient temperatures from -20 °F to 140°F. | M | Y | | |
| 3.10.4 | Equipment shall withstand without damage being stored for extended periods in ambient temperatures from -40°F (-40°C) to 158°F (+70°C). | M | Y | | |
| 3.10.5 | The APC system devices shall be designed to withstand the vibration and shock forces associated with transit vehicles. | M | Y | | |
| 3.10.6 | The APC system device shall be sealed against dust and water intrusion, certified in compliance with or exceeding the NEMA4x or IP65 standard. Equipment shall be tested and proven capable of withstanding power transients, electromagnetic interference and radio frequency interference without degradation at levels encountered in typical transit operations. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.10.7 | Power and communications lines and the chassis the units shall be tested and proven resistant to electrostatic discharges from personnel in accordance with accepted industry procedures for testing computer equipment. | M | Y | | |
| 3.10.8 | The APC system shall be capable of being locally configured using a laptop computer, portable programming device or wireless device. | M | Y | | |
| 3.10.9 | The chosen method may also be used for performing routine diagnostic maintenance. | M | Y | | |
| 3.10.10 | Each component/module/subsystem distinctly defined in the proposed APC system shall be replaceable as a discrete unit, identified by a unique serial number or other contractor proposed method. | M | Y | | |
| 3.10.11 | The APC system shall be interfaced with a wheelchair lift sensor and bike rack sensor in order to record the number of wheelchair lift and bike rack operational cycles at each stop. | M | Y | | The Avail Technologies solution allows drivers to track wheelchairs and bikes via the mobile data terminal. |
| 3.10.12 | APC shall record the door opening, the number of boarding and alighting passengers for each doorway and the number of wheelchair lift or bicycle rack activations, and door closing at each stop. Refer to technical requirements for methods. | M | Y | | The Avail Technologies solution allows drivers to track wheelchairs and bikes via the mobile data terminal. |
| 3.10.13 | Each data record shall either be in real time, or by post processing match the APC system data to the stop identification, trip number, route pattern, vehicle ID, time and date recorded in the central database. | M | Y | | |
| 3.10.14 | APC system shall accommodate at least 72 hours of APC data. | M | Y | | Avail provides this information in real-time |
| 3.10.15 | APC data stored on board shall use non-volatile storage so that a power supply is not required to retain the data. | M | Y | | |
| 3.10.16 | Utility software shall be provided, for use on a laptop computer connected via a suitable (serial or Ethernet connection) to either the APC system, vehicle logic unit which supports calibration of the doorway sensors and review of stored data records. | M | Y | | |
| 3.10.17 | APC data shall be uploaded as initiated by central system via the WLAN bulk data transfer system. | M | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.10.18 | The APC subsystem shall not erase or allow the overwriting of data records until confirmation is received from the central system that the data records were successfully received. | M | Y | | |
| 3.10.19 | Equipment shall conform to the Federal Communication Commission (FCC) Part 15 Class A limits for conducted and radiated emissions of electromagnetic interference and radio frequency interference. | M | Y | | |
| 3.10.20 | Equipment shall withstand shock and vibration forces typical to transit operations. | M | Y | | |
| 3.11 | Emergency Alarms | | | | |
| 3.11.1 | When a covert alarm signal is received from a vehicle, the CAD/AVL software shall display the event in the performance queue to all dispatchers with configurable visual alerting methods. | M | Y | | Avail Technologies utilizes both visual and audible notification of emergency alarms |
| 3.11.2 | The CAD/AVL software shall provide a configurable audible and visual alert to all dispatchers, road supervisors, and others using the CAD/AVL software. | M | Y | | |
| 3.11.3 | The CAD/AVL software shall notify the dispatcher in the performance queue that a silent alarm message has been received using an Agency-approved visual notification method. | M | Y | | Avail Technologies utilizes both visual and audible notification of emergency alarms |
| 3.11.4 | Once a dispatcher selects the covert alarm event, this shall be so indicated to that dispatcher and all others. | M | Y | | |
| 3.11.5 | When acknowledging an alarm the CAD/AVL software shall zoom and center the map display on the alarming vehicle and locate the nearest road supervisor vehicle when selected by a dispatcher. The scale for the zoom shall be configurable by the Agency. | M | N | | Avail automatically centers the vehicle sending an alarm on the map and can identify supervisors by the vehicle icon. Dispatchers will locate the nearest supervisor via the map. |
| 3.11.6 | The CAD/AVL software shall allow dispatchers to downgrade emergency alarms to a lower message priority, or upgrade lower priority messages to an emergency alarm. The CAD system shall log all alarm status changes (create, upgrade, downgrade, and cancel). | M | Y | | The system adminstrator or other authorized user defines the priorities for messages and actions associated with events. All actions taken by the dispatcher are logged and can be reviewed in the event log. |
| 3.11.7 | Activation of an emergency message shall place the vehicle in a priority status for frequency of location and message updates which will result in vehicle location and status updates at a rate that is configurable by the Agency. | M | Y | | |
| 3.12 | Automatic Vehicle Announcements (AVA) | | | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.12.1 | The AVL central software shall be used to generate and manage next stop, customer, and other announcements, manage device configurations, generate reports, and manage device fault reporting and logs. | M | Y | | |
| 3.12.2 | The AVA central software shall meet or exceed requirements of the United States Access Board. | M | Y | | |
| 3.12.3 | The AVA central software shall include functionality to import route and stop data from an external system via Agency file(s) per technical requirements. | M | Y | | |
| 3.12.4 | The AVA central software shall include the capability to announce all or only selected stops per technical requirements. | M | Y | | |
| 3.12.5 | Location based stop announcement triggers shall be configurable by the Agency for any stop announcement. | M | Y | | |
| 3.12.6 | Stops to be announced shall be set through system configuration data managed by the Agency. | M | Y | | |
| 3.12.7 | The AVA central software shall include the ability to customize announcements per technical requirements (i.e. add, link, etc.). | M | Y | | |
| 3.12.8 | Content of the AVA announcements shall be configurable and shall include the minimum messages types: | M | Y | | |
| 3.12.8.a | Cross-street only | M | Y | | |
| 3.12.8.b | Current street and cross-street | M | Y | | |
| 3.12.8.c | Landmark | M | Y | | |
| 3.12.8.d | Transfer opportunities | M | Y | | |
| 3.12.8.e | Bus Stop Name | M | Y | | |
| 3.12.8.f | Service announcements | M | Y | | |
| 3.12.9 | The AVA central software shall include the ability for the Agency to independently configure audio and text messages associated with a specific stop. | M | Y | | |
| 3.12.10 | The AVA central software shall include the ability to append a standard message header to all messages per technical requirements. Different headers shall be available for different types of announcements. The AVA central software shall support English at a minimum plus any other languages as required by the Agency. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.12.11 | The AVA central software shall enable creating audio messages using both text-to-speech synthesized and recorded voice. Voice files shall be MP3 or WAV format as required by technical requirements. | M | Y | | |
| 3.12.12 | The AVA central software shall be able to create composite announcements that combine synthesized and recorded announcement segments. | M | Y | | |
| 3.12.13 | The AVA central software speech engine shall be a modular component that allows the Agency to independently replace it at a later date without other system changes. | M | Y | | |
| 3.12.14 | The AVA central software shall be configurable by the Agency so that external announcements may be set for activation on any route. External announcements shall include at minimum: | M | Y | | |
| 3.12.14.a | Route number. | M | Y | | |
| 3.12.14.b | Route name. | M | Y | | |
| 3.12.14.c | Destination. | M | Y | | |
| 3.12.14.d | Direction. | M | Y | | |
| 3.12.14.e | Branch. | M | Y | | |
| 3.12.14.f | Route Type. | M | Y | | |
| 3.12.15 | The AVA central software shall be configurable so that external announcements can be made less frequently, only at specified stops or not at all. | M | Y | | The system allows external announcement volume to be controlled by time of day. In additional the announcments can be configured to play by trip but not a specific stop. |
| 3.12.16 | The AVA central software shall allow specific volume levels to be configured for individual stops, times of day and/or sections of routes. | M | Y | | The system allows external announcement volume to be controlled by time of day. In additional the announcments can be configured to play by trip. |
| 3.12.17 | The AVA central software shall be able to configure external announcements to repeat without operator interaction at any or all stops at a time interval configurable by the Agency. | M | Y | | |
| 3.12.18 | The database of announcement messages shall associate stops with message data for each trip pattern. | M | Y | | |
| 3.12.19 | The AVA central software shall enable incremental updates of onboard message data on an as-needed basis. | M | Y | | |
| 3.12.20 | The user interface for entry/deletion/modification of messages shall be easy to use, and shall associate all messages with a trip pattern. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.12.21 | The system shall accept the addition, deletion, or movement (from one trip pattern to another) of stop association data. | M | Y | | |
| 3.12.22 | The database shall support direct SQL interfaces. | M | Y | | |
| 3.12.23 | Each message shall have a unique identifier, defined by the Agency. | M | Y | | |
| 3.12.24 | The AVA central software shall include look-up tables to associate messages entered through the workstation with the message identifier. | M | Y | | |
| 3.12.25 | Creation or deletion of a message shall not change the identifiers of the other messages. | M | Y | | |
| 3.12.26 | Provisions shall be included to rebuild the message database and identifiers on a periodic basis. (e.g., after there have been a significant number of message additions and deletions). | M | Y | | |
| 3.12.27 | The AVA central software shall provide means to record and generate announcement audio and to define message-stop associations. | M | Y | | |
| 3.12.28 | The AVA central software shall be installed on a desktop PC or server supplied by the Agency, accessible by multiple clients or workstations if on a server, and configured with required hardware and operating system software. | M | Y | | |
| 3.12.29 | Internal single line LED headsigns shall be provided | M | Y | | |
| 3.13 | Single Point Log-On | | | | |
| 3.13.1 | Vehicle logic unit should allow for single point of logon for all onboard equipment including headsigns, APC system, the AVA system, and other integrated devices. | M | Y | | |
| 3.13.2 | The single point logon shall log onto the other on-board equipment or override the current logon to those other devices. | M | Y | | |
| 3.13.3 | The central system should recognize that the vehicle is ready to commence its assigned work, has started work and completed work for the day. | M | Y | | |
| 3.14 | Not Used | | | | |
| 3.14.1 | Not Used | | | | |
| 3.14.2 | Not Used | | | | |
| 3.14.3 | Not Used | | | | |
| 3.14.4 | Not Used | | | | |
| 3.15 | Destination Headsign Interface | | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.15.1 | Existing destination signs shall interface with the VLU, which shall automatically provide sign codes for every route and direction change during revenue service. | M | Y | | |
| 3.15.2 | Firmware updates needed to the destination headsigns and any subcontracting for support services needed from the destination headsign vendor shall occur during interfacing of this system. | M | Y | | |
| 3.15.3 | The MDT shall be capable of changing the destination headsign and providing codes for the operator to manually determine the selection of destinations and to manually input codes when the CAD/AVL system is down. | M | Y | | |
| 3.16 | Connection Protection | | | | |
| 3.16.1 | The Contractor shall provide an option for the CAD/AVL system to provide and operate in conjunction with the Mobile Data Terminal software to provide Transfer Connection Protection (TCP). | M | Y | | |
| 3.16.2 | TCP shall be triggered when an incoming fixed route operator makes a transfer for a specific outgoing route, which the vehicle operator enters via the Mobile Data Terminal. | M | Y | | |
| 3.16.3 | The system shall, without any need for dispatcher intervention, hold the outgoing vehicle to allow the connection, if it would not need to be held more than a configurable time based on the estimated arrival time of the incoming vehicle. | M | Y | | |
| 3.16.4 | The system shall notify the outgoing vehicle via the Mobile Data Terminal if it is to hold, until what time and for what route. | M | Y | | |
| 3.16.5 | The dispatcher shall be able to review current pending transfers, including the incoming and outgoing vehicles involved, and the time the incoming vehicle is expected to arrive at the transfer. | M | N | | Dispatcher is notified in the event of a transfer in jeapordy |
| 3.16.6 | The dispatcher shall have the ability to intervene and override as necessary in the operation of transfers. | M | Y | | |
| 3.17 | Video System Interface | | | | |
| 3.17.1 | The VLU shall be interfaced with the existing video system (Seon, Trooper 2 Generation) including the digital video recorders (DVR) on-board. The Contractor shall be entirely responsible for developing and integrating this interface. | M | Y | | The VLU integration will include discrete monitoring of Alarm and DVR status. |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.17.2 | The VLU to DVR interface shall be accessible using the MDT. | M | Y | | MDT will receive message packets from the VLU that contain the interpreted discrete DVR and Alarm status transitions. |
| 3.17.3 | VLU shall be able to store alarms that are received from the DVR. | M | Y | | VLU logs and forwards all discrete alarm transitions. |
| 3.17.4 | The VLU shall send an update message to the MDT when there is an alarm received from the DVR. | M | Y | | |
| 3.17.5 | The VLU shall provide a discrete signal to the DVR when an emergency alarm is generated by the operator. | M | Y | | Alarm generated by the operator will be received by the DVR and the VLU through the wiring harness. |
| 3.17.6 | The CAD/AVL software shall support the ability to tag an incident record with an index or link to specific video frame(s)/snippets in the future. | M | Y | | Incident records are tagged with date of the event and included in the Incident Report. |
| 3.17.7 | The VLU shall send alert to dispatch and maintenance if the DVR is not functioning properly. | M | Y | | |
| 3.18 | Farebox Interface | | | | |
| 3.18.1 | The VLU shall be interfaced with the existing GFI Fareboxes. | O | N/A | | Per Addendum E (No existing fareboxes) |
| 3.18.2 | Interface completion shall include any firmware updates needed to the fareboxes and any subcontracting for support services needed from the farebox vendor. | O | N/A | | Per Addendum E (No existing fareboxes) |
| 3.18.3 | The VLU to farebox interface shall support farebox logon using the MDT. | O | N/A | | Per Addendum E (No existing fareboxes) |
| 3.18.4 | MDT logon shall logon to the farebox or override the current logon on the farebox. | O | N/A | | Per Addendum E (No existing fareboxes) |
| 3.18.5 | The VLU shall send an update message to the farebox when there is a change to the block, route, trip, operator, or fareset. | O | N/A | | Per Addendum E (No existing fareboxes) |
| 3.18.6 | VLU shall send the current location upon request message from the farebox. | O | N/A | | Per Addendum E (No existing fareboxes) |
| 3.18.7 | VLU shall be able to store farebox alarms received from the farebox. | O | N/A | | Per Addendum E (No existing fareboxes) |
| 3.18.8 | Data records transmitted from the farebox to the CAD/AVL system shall use synchronous time and location stamping to support central system reporting functions that combine farebox data with data from other systems (e.g. CAD/AVL, APC) – for example, fares collected by stop location. | O | N/A | | Per Addendum E (No existing fareboxes) |
| 3.19 | Transit Signal Priority | | | | |
| 3.19.1 | The Contractor shall provide an option for future Transit Signal Priority (TSP) integration. | O | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.19.2 | The VLU shall be interfaced with the TSP unit via a J1708 cable, J1939 cable or Ethernet to be installed and connected to the TSP unit by the Contractor. The Contractor shall be entirely responsible for completing this interface, including any firmware updates needed to the TSP emitter and any subcontracting for support services needed from the TSP emitter vendor. (Option) | O | Y | | |
| 3.19.3 | The VLU shall be able to activate and deactivate a third party TSP emitter device using a J1708 or J1939 connection. (Option) | O | Y | | |
| 3.19.4 | The VLU shall be able to activate and deactivate the TSP unit based on schedule adherence, on a command from the central system, or by pre-defined trigger points set in the GIS data. (Option) | O | Y | | |
| 3.19.5 | The VLU shall log all TSP emitter activations/deactivations on-board the vehicle, including data, time, GPS location, route, vehicle ID, and direction. These logs shall be available either through a system reporting function or through the WLAN communications with the vehicle. (Option) | O | N | | |
| 3.19.6 | The VLU shall only enable Transit Signal Priority functionality when the vehicle is logged into revenue service, with on-route status, and within a defined geographic area. (Option) | O | Y | | |
| 3.19.7 | Central system shall allow for a valid TSP polygon area to be defined, updated, and downloaded to each vehicle VLU through the WLAN. (Option) | O | N | | Avail Technologies provides the ability to enable TSP at stop level within a trip. |
| 3.2 | Transit Automatic Vehicle Monitoring - | | | | |
| 3.20.1 | Automatic Vehicle Monitoring (AVM) System shall be included as an option. | O | Y | | |
| 3.20.2 | Automatic Vehicle Monitoring (AVM) shall collect data on revenue-vehicle drive-train performance, CAD/AVL subsystem health warnings, pre run checklist completion, and discrete alarms in order to identify problems, improve maintenance, and reduce vehicle breakdowns. | O | Y | | |
| 3.20.3 | AVM data triggered by operating conditions beyond pre-defined threshold shall be reported in real-time to the CAD/AVL system and stored for reporting purposes. | O | Y | | |
| 3.20.4 | Standard AVM reports and user query tools shall be supplied for easy access to the stored data. | O | Y | | |

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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 3.20.5 | AVM drive-train data and mechanical alarms shall be collected from the installed Engine Control Module provided by the vehicle's manufacturer and/or the installed Multiplexer I/O system. | O | Y | | |
| 3.20.6 | Alarms shall be transmitted over the CAD/AVL data radio for real-time display to maintenance users. | O | Y | | |
| 3.20.7 | The AVM data messages and alarms shall be stored for analysis and interface to the Agency's Vehicle Maintenance System. | O | Y | | |
| 3.20.8 | Up to twelve (12) user defined discrete inputs shall be provided to monitor mechanical alarms. | O | Y | | |
| 3.20.9 | System shall monitor the Emergency Alarm, low oil pressure, hot engine, and low air pressure. | O | Y | | |
| 3.20.10 | System shall allow user/Agency to define and connect unused discrete inputs for future requirements. | O | Y | | |
| 4 | Dispatch and Data Reporting | | | | |
| 4.1 | Text Messaging | | | | |
| 4.1.1 | Messages shall be capable of being grouped into categories for quick selection. | M | Y | | |
| 4.1.2 | Canned message categories and message text shall be user definable. | M | Y | | |
| 4.1.3 | The operator and dispatcher shall be able to reply to a message in the queue in either a canned response or free-form text message. | M | Y | | The operator and dispatcher shall be able to reply to a message in the queue in a canned response |
| 4.1.4 | A text message shall support an acknowledgement message back to dispatch once the driver has viewed a message flagged by dispatch as requiring acknowledgement. | M | Y | | |
| 4.1.5 | Text messages shall be either deleted or saved by the Operator after viewing. Storage for saved text messages shall handle a minimum of eight messages. | M | Y | | |
| 4.2 | Automated Recording and Archiving | | | | |
| 4.2.1 | The CAD/AVL system shall store the position and tracking of the transit vehicles in some form of database. | M | Y | | |
| 4.2.2 | Database shall include ability to query the data with different parameters for performance and safety improvements. | M | Y | | |
| 4.2.3 | Data shall be stored in a database for planning and evaluation purposes. The specific requirements shall be decided by the Agency and should include an assessment of the following: | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 4.2.3.a | Length of time AVL data is to be stored | M | Y | | |
| 4.2.3.b | The sampling rate AVL data is to be stored (i.e. at every minute, at every stop). | M | Y | | |
| 4.3 | Real-time, Reporting, and Archival Data | | | | |
| 4.3.1 | System shall provide the Agency the right to access, use, and distribute data to create interfaces to the CAD/AVL system, export data to other agencies and third party licensed systems, generate reports, and for other Agency purposes. | M | Y | | |
| 4.3.2 | Access to real-time operating data shall not be affected by the Agencies reporting and data access by user groups other than dispatchers and supervisors. | M | Y | | |
| 4.3.3 | Proper safeguards shall also be enabled to ensure dispatcher and supervisors cannot overload the primary database server with faulty or ill-designed queries. | M | Y | | |
| 4.3.4 | If required, a secondary database server that takes the processing load off of the primary real time database shall be provided for the purpose of data retrieval for reporting and data analysis. | M | Y | | |
| 4.3.5 | Enough online data storage shall be provided to keep at least three (3) years of historical data. | M | Y | | |
| 4.3.6 | Applications and tools shall be provided for historical data access. | M | Y | | |
| 4.3.7 | Provisions shall be provided to save data and database schema more than three years old to long term storage media such as magnetic tape, CD, DVD, etc. and delete the archived data from the main or secondary database(s). | M | Y | | |
| 4.3.8 | Provisions shall be provided to restore data by copying archived data from long term storage to either a stand-alone database machine or onto the current database(s). | M | Y | | |
| 4.3.9 | Archiving data shall be possible by either a graphical user interface or via the command line for automating tasks. | M | Y | | |
| 4.4 | Daily Schedules | | | | |
| 4.4.1 | The CAD/AVL system shall automatically load the daily schedule of blocks, runs, driver/operator assignments, and vehicle assignments. | M | Y | | |
| 4.4.2 | The CAD/AVL system shall support an overlap of daily schedules for service that continues past midnight. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 4.4.3 | The CAD/AVL system shall support multiple service types to accommodate service variations at the route and trip level per technical requirements. | M | Y | | |
| 4.4.4 | Each schedule day shall permit assignment of multiple service types. | M | N | | The system can support multiple service types but only one service type is allowed be day. |
| 4.5 | Incident Reports | | | | |
| 4.5.1 | The CAD/AVL system shall provide an integrated Incident Reporting subsystem per technical requirements. | M | Y | | |
| 4.5.2 | Incident types and the association of data messages to incident types shall be user definable. | M | Y | | |
| 4.5.3 | A form creation editor shall be provided that provides the CAD/AVL System Administrator the capability to create property-specific customized incident forms that are accessible to dispatchers and other users of the CAD/AVL system. | M | N | | We support one incident form but it can be property specific. Avail's form includes all field necessary for each incident type. |
| 4.5.4 | Forms shall be created and associated with incident types. | M | N | | |
| 4.5.5 | Every new Incident Report shall be uniquely identified and the associated Incident Report form displayed for completion. | M | Y | | |
| 4.5.6 | Incident forms shall include data fields supported and auto-populated by the CAD/AVL system as well as user defined fields per the technical requirements. | M | Y | | |
| 4.5.7 | User definable fields shall be implemented such that custom fields do not inhibit upgrades to software. | M | Y | | |
| 4.5.8 | Incident forms shall include a combination of automatically filled in data fields and manually entered data fields. Upon creation of an incident report all known CAD/AVL data shall be "pre-populated" or automatically entered into the configured incident form fields. | M | Y | | |
| 4.5.9 | An open Incident Report Queue shall be provided for each dispatcher logged into the CAD/AVL system along with information about dispatcher responsibility. All Incident Reports must be closed or responsibility transferred prior to the dispatcher logging off. | M | Y | | The event queue shows the dispatcher who is responsible for the incident. In the event the dispatcher logs off the incident returns to the queue and is shown as open and available for another dispatcher. |
| 4.5.10 | The current date, time, and user ID shall be stamped to indicate information that is added to an Incident Report after the original owner of the Incident Form has closed the incident. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 4.5.11 | Incident Reports shall provide the following capabilities: | M | | | |
| 4.5.11.a | Incident Forms shall have the option to be required for specific incident types. | M | Y | | |
| 4.5.11.b | If a message requiring an Incident Form is deleted the CAD/AVL system shall generate the form and mark it as CAD/AVL generated. | M | N | | An incident can not be deleted without filling out the incident or logging the event. A dispatcher can logoff and the incident will remain open and available to other dispatchers. |
| 4.5.11.c | Incident Reports shall provide access to a spell checker. | M | Y | | |
| 4.5.11.d | Incident Reports shall be capable of being forwarded to individuals or groups of individual electronically. | M | Y | | |
| 4.5.11.e | Incident reports shall have the capability to be displayed online for at least twelve months for any new, open, or closed Incident Report. | M | Y | | |
| 4.5.11.f | Incident Reports shall be able to be queried based upon CAD/AVL variables such as open/closed status, date range, incident type, dispatcher ID, Operator ID, Route, or vehicle ID. | M | Y | | |
| 4.5.11.g | Mechanical, breakdown, and vehicle switch out Incident Reports shall provide an interface to the Maintenance system to document the incident for maintenance action. | M | N | | |
| 5 | Scheduling System | | | | |
| 5.1 | The Contractor shall convert the existing route and stop databases from each of the agencies to import that data in the proposed schedule software database. | M | Y | | |
| 5.2 | The scheduling system shall also have the ability to import stop data from an external system in excel or comma separated value (CSV) file format | M | Y | | One time only, to get initial set of stops in. |
| 5.3 | The scheduling system or CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) using a GTFS feed. | M | Y | | |
| 5.4 | The system shall have the capability to create and define an unlimited number of bus stops and nodes. | M | Y | | |
| 5.5 | The system shall be able to create new routes and update exiting routes. | M | Y | | |
| 5.6 | The system shall be able to create new patterns and update existing patterns, including time points and stops. | M | Y | | |
| 5.7 | The system shall permit the user to define bus stops using a variety of methods, as identified in the technical requirements. | M | N | | Direct entry of GPS coordinates only |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 5.8 | The system shall be capable of allowing stops to be properly positioned at intersections. | M | Y | | |
| 5.9 | The system shall be capable of allowing the user to assign stop amenities (e.g., bench, shelter, etc.) to each stop and other supplemental data. | M | Y | | |
| 5.1 | The system shall allow any number of trip patterns to be defined as distinct bus stop sequences, as identified in the technical requirements. | M | Y | | |
| 5.11 | The system shall be capable of displaying all trip patterns, or fixed portions of flexible trip patterns, on a map for visual display. | M | Y | | Pattern stops shown on a map in TALE |
| 5.12 | The system shall be capable of calculating distances for deadhead route segments, entire trip patterns, and selected trip pattern segments defined by the user. | M | Y | | System can calculate trip pattern distances from user entered stop to stop distances. |
| 5.13 | The system shall allow the definition of average running speeds, for various days and time periods, for deadhead segments and between designated pairs of stops along each trip pattern. | M | Y | | User enters stop to stop running times for each stop on a trip. Different running times can be entered for different days and time periods. |
| 5.14 | The system shall be able to generate a list of turning movements for an entire trip pattern. | M | N | | |
| 5.15 | The system shall allow routes to be defined as a sequence of trips using selected trip patterns during defined time periods. | M | Y | | |
| 5.16 | System Viewing | | | | |
| 5.16.1 | The system shall allow the viewing of pattern statistics, as identified in the technical requirements. | M | Y | | |
| 5.16.2 | View a pattern's route adherence along a route or corridor. | M | Y | | Via Replay |
| 5.17 | Creation of Timetables | | | | |
| 5.17.1 | The system shall be capable of rotating the extra board automatically. | M | N | | |
| 5.17.2 | The system shall be capable of calculating the running time between any pair of timepoints on any trip pattern, taking into account running speeds. The system shall also allow running times to be manually input if needed, such as for deviated/flexible route segments. | M | N | | System has only manual entry of running times. |
| 5.17.3 | The system shall be capable of automatic or manual trip building for each route, using the designated sequence of trip patterns, per the technical requirements. | M | N | | Manual trip building only |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 5.17.4 | The system shall permit users to automatically or manually assign trip numbers. | M | N | | Manual assignment only |
| 5.17.5 | The system shall allow for modifying built trips, based on modifying a single trip pattern, all trips in a single direction or a combination of the above. | M | N | | |
| 5.17.6 | The system shall permit authorized users to assign specific vehicle types to trips. | M | N | | |
| 5.17.7 | The system shall be capable of computing deadhead time, including the effect of varying running speed in various time periods. | M | Y | | System can compute total deadhead time in the schedule from user entered running times for deadhead trips. |
| 5.17.8 | The system shall provide summary data on trips and running times, per the technical requirements. | M | Y | | |
| 5.18 | Vehicle Assignment | | | | |
| 5.18.1 | The system shall be capable of either automatic or manual vehicle block development based on user-defined variables, per the technical requirements. | M | N | | Manual block development only |
| 5.18.2 | The system shall allow users to automatically or manually assign block numbers. | M | N | | Manual assignment only |
| 5.18.3 | The system shall be capable of developing potential interline relationships for the entire service or based on the user selecting specific routes or trips. | M | N | | |
| 5.19 | Runcutting | | | | |
| 5.19.1 | The system shall be capable of cutting single-piece or multi-piece work assignment runs, per the technical requirements. | M | N | | |
| 5.19.2 | The system shall allow users to automatically or manually assign run numbers. | M | N | | Manual only |
| 5.19.3 | The system shall generate runs that incorporate all applicable agency labor agreement provisions. | M | N | | |
| 5.19.4 | The system shall generate runs that incorporate agency management rules. | M | N | | |
| 5.19.5 | The system shall provide a notification flag when a manual or automatically generated runcut violates a management rule or labor agreement provision. | M | N | | |
| 5.19.6 | The system shall allow for the development of alternative runcut scenarios, per the technical requirements. | M | N | | |
| 5.19.7 | The system shall allow the shifting of trip relief times (stated in block tables) to optimize runcuts. | M | N | | |
| 5.19.8 | The system shall allow the user to specify compressed work weeks (e.g., 4 day work weeks, 10 hour days). | M | N | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 5.19.9 | The system shall permit the agency to manually cut some or all of the blocks. | M | Y | | All block and run definition is done manually. |
| 5.2 | Rostering and Bid Management | | | | |
| 5.20.1 | The system shall support both roster and cafeteria style bids. | M | N | | |
| 5.20.2 | The system shall be able to create and maintain rosters including the extra board. | M | N | | |
| 5.20.3 | The system shall be capable of building bid rosters automatically. | M | N | | |
| 5.20.4 | The system shall permit users to automatically or manually assign roster numbers. | M | N | | |
| 5.20.5 | The system shall have the capability to take into account special service in effect for selected dates (e.g., holidays). | M | Y | | |
| 5.20.6 | The system shall allow agency staff to establish rules on which rostering suggested by the system will be based. | M | N | | |
| 5.20.7 | The system shall have the capability to create separate rosters for various groups of vehicle operators (e.g., part-time rosters). | M | N | | |
| 5.20.8 | The system shall have the capability to validate the transitions between rosters for two consecutive bid periods. | M | N | | |
| 5.20.9 | The system shall have the capability to automatically generate one roster at a time or all rosters. | M | N | | |
| 5.20.10 | The system shall allow agency staff to access human resources information that has been imported into the system for any bus driver (optional). | M | N | | |
| 5.20.11 | The system shall validate driver choices to determine whether each driver meets minimum rest time requirements between runs. | M | N | | |
| 5.20.12 | The system shall validate driver choices to determine whether each driver meets requirements for minimum/maximum assigned work load. | M | N | | |
| 5.20.13 | The system shall be able to associate a driver to a specific roster or rosters. | M | N | | |
| 5.20.14 | The system shall generate work on a nightly basis from the schedule's bids. | M | N | | |
| 5.20.15 | The nightly generation shall generate work a user-defined number of days into the future. | M | N | | |
| 5.20.16 | Extra board items shall be included. | M | N | | |
| 5.20.17 | Report Generation errors or rule violations that occur during schedule generation shall be identified. | M | N | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 5.21 | Schedule Validation | | | | |
| 5.21.1 | Schedule Validation must allow the user to review different aspects of the schedule and validate the schedule against a set of rules. | M | Y | | Schedule is validated against a set of internal rules to verify that it is complete. It is not validated against user defined rules. |
| 5.21.2 | All additions, omissions, time modifications, conflicts and errors shall be propagated through the rest of the schedule and be validated against a set of rules developed by the agency. | M | Y | | See note above |
| 5.21.3 | Conflicts or errors associated with the changes must be highlighted in the application and noted to the agency. | M | Y | | See note above |
| 6 | Data Management | | | | |
| 6.1 | The CAD/AVL system should include data management software to manage the entry, and manipulation of data and automate reporting for performance monitoring. | M | Y | | |
| 6.2 | The data management system should integrate with the scheduling software and facilitate easy National Transit Database (NTD) reporting. | M | Y | | |
| 6.3 | The system shall be capable of establishing automatic daily, weekly, monthly, quarterly routines to produce and email standard PDF reports to defined user groups. | M | Y | | |
| 6.4 | Standard reports shall be developed through the design review process, and shall include at minimum: | M | | | |
| 6.4.1 | Schedule Adherence (by stop or timepoint) | M | Y | | |
| 6.4.2 | Passenger Loadings and Alightings (by stop and capacity) | M | Y | | Capicity is not included in report |
| 6.4.3 | Daily Revenue | M | Y | | |
| 6.4.4 | Missed Trips | M | Y | | |
| 6.4.5 | Stop Time Analysis | M | Y | | |
| 6.4.7 | Layover/Recovery | M | Y | | |
| 6.4.8 | In-service hours | M | Y | | |
| 6.4.9 | Actual hour and actual miles | M | Y | | |
| 6.4.10 | Route deviation | M | Y | | Available in Replay |
| 6.4.11 | Travel time and average speeds | M | Y | | Running Times Report |
| 6.4.12 | Driver Log ins (by bus and route) | M | Y | | Avail reports log ins by bus. |
| 6.4.13 | Origin and Destination Information | M | Y | | |
| 6.4.14 | Dashboard | M | Y | | |
| 6.4.15 | Wheelchair Lift Use (by stop) | M | Y | | |
| 6.4.16 | Bike Rack Use (by stop) | M | Y | | |
| 6.4.17 | Luggage Bay Use (by stop) | M | N | | Further Definition Required. |
| 6.4.18 | Incidents | M | Y | | |
| 6.4.19 | Bus Change-off | M | Y | | Log on/logoff report |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 6.4.20 | Collisions | M | Y | | Incident reports |
| 6.4.21 | General Delay | M | Y | | Running Times Report |
| 6.4.22 | Trip Delays | M | Y | | Running Times Report |
| 6.4.23 | Trip Cancellation | M | Y | | Missed Trips Report |
| 6.4.24 | Equipment Issues | M | Y | | |
| 6.4.25 | Vehicle Locations | M | Y | | |
| 6.4.26 | Vehicle Speeds | M | Y | | |
| 6.4.27 | Vehicle Performance | M | Y | | |
| 6.4.28 | Communications Status | M | Y | | |
| 6.4.29 | Emergency Alarm | M | Y | | |
| 6.4.30 | Driver Incident (incapacitated, sick, performance) | M | Y | | |
| 6.4.31 | System Diagnostics | M | Y | | |
| 6.4.32 | Maintenance | M | Y | | |
| 6.4.33 | On Peak Loading by Route, Trip and Stop | M | Y | | |
| 6.5 | All reports shall have the capability to export information into a common analysis and text editing office software such as Microsoft Excel and Word. | M | Y | | |
| 7 | Real Time Passenger Information | | | | |
| 7.1 | The system shall generate real-time arrival/departure predictions for all vehicles that are integrated in the proposed CAD/AVL system. | M | Y | | |
| 7.2 | The real-time arrival predictions shall report predicted arrival times based on actual arrivals and not based on scheduled arrivals. | M | Y | | |
| 7.3 | The CAD/AVL system shall be able to interface with field equipment including passenger information displays, agency websites and mobile applications to provide and display real-time arrival/departure data for fixed-route and demand-response vehicles. | M | Y | | Demand response information would need to be provided by Paratransit software |
| 7.4 | The data required to be provided to the field equipment, agency websites and mobile applications includes current bus schedules, bus schedule adherence status, and estimated (predicted) arrival/departure times of transit vehicles at designated bus stops and transit centers. | M | Y | | |
| 7.5 | The real-time arrival predictions shall meet or exceed the following performance criteria: | M | Y | | |
| 7.5.1 | For predictions between one and ten minutes, the prediction accuracy shall be three minutes or less for 90% of the generated predictions. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 7.5.2 | For predictions between 11 and 25 minutes, the prediction accuracy shall be four minutes or less for 85% of the generated predictions. | M | Y | | |
| 7.5.3 | For predictions more than 25 minutes, the prediction accuracy shall be six minutes or less for 85% of the generated predictions. | M | Y | | |
| 8 | Passenger Information Displays | | | | |
| 8.1 | The Contractor shall provide passenger information signs that display, at the stop level, the estimated count-down arrival time and/or departure time of the next buses at the stop within a defined time interval. | M | Y | | |
| 8.2 | Both scheduled and dynamic text message capabilities shall be provided to either individual or groups of signs. | M | Y | | |
| 8.3 | A user interface shall provide easy setup, configuration, diagnostic, and messaging status at all sign locations. | M | Y | | |
| 8.4 | The displays shall be able to display multiple routes, CAD/AVL system time, ad hoc messages, and scheduled messages. | M | Y | | |
| 8.5 | Physical design of the sign shall be modular for easy maintenance, vandal resistant, and suitable for an outdoor environment. | M | Y | | |
| 8.6 | Solar power, high brightness LED displays, and multi-line displays shall be available where required by operational needs. | M | Y | | |
| 8.7 | The final location of the Contractor supplied bus stop and shelter passenger information displays shall be determined prior to the final design approval. | M | Y | | |
| 8.8 | Assistance shall be provided to the Agency in acquiring necessary permits. | M | Y | | |
| 8.9 | Outdated information for a transit vehicle on the display shall be cleared within a maximum of fifteen (15) seconds of the transit vehicle departing the stop or station. | M | Y | | |
| 8.1 | Proposers shall indicate what means (wired or wireless) shall or can be used to connect to the passenger information displays. | M | Y | | |
| 9 | Mobile Applications (Apps) | | | | |
| 9.1 | The CAD/AVL system shall generate and disseminate real-time transit traveler information to the regional 511 system, agency-owned infrastructure, and web/mobile services. | M | Y | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 9.2 | The system shall update real-time arrival predictions and generate service alerts to mobile applications based upon real time service adjustments and measures implemented by the agency dispatchers including: | M | Y | | |
| 9.2.1 | Cancelled Service; | M | Y | | |
| 9.2.2 | Detours (planned or ad hoc); | M | Y | | |
| 9.2.3 | Drop off only; | M | Y | | |
| 9.2.4 | Additional of supplemental service ('trippers') in addition to scheduled trips. | M | Y | | |
| 9.3 | It is desired that the Contractor develop a mobile app to allow transit riders to communicate with Dispatch or other Operations staff to report suspicious activity, crime, or quality of life problems at a transit station or on a bus. | O | Y | | Avail will utilize the "feedback" feature of our mobile app to provide this capability |
| 10 | 511 Integration | | | | |
| 10.1 | The CAD/AVL system shall support the exchange of data with the Bay Area's regional 511 traveler information system operated by the Metropolitan Transportation Commission (MTC). | M | Y | | |
| 10.2 | Data exchange with 511 shall consist of the following: | M | Y | | |
| 10.2.1 | Export of static configuration data. | M | Y | | |
| 10.2.2 | Export of real-time arrival information. | M | Y | | |
| 10.2.3 | Export of CAD/AVL system status information to 511. | M | Y | | Avail would like to learn more about this requirement to clarify "system status" information |
| 10.2.4 | The latest requirements and specifications for the 511 integration shall be gathered from the Metropolitan Transportation Commission (MTC). | M | Y | | |
| 10.3 | The CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) and other types of static and real-time information using GTFS. | M | Y | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 1 | **Central Systems** | | | | |
| 1.1 | **CAD/AVL System Software** - The proposed CAD/AVL System Software shall have been deployed (installed and operational) in at least three (3) similar transit agencies in the United States for a period of not less than three (3) years. | M | Y | | |
| 1.1.1 | **Real-Time Graphical Displays** - System shall include a real-time graphical display for user and dispatch use. | M | Y | | |
| 1.1.1.a | Import and display of standard format vector, image, and point-based map layers. | M | Y | | |
| 1.1.1.b | Map layer feature labels provided based upon zoom level or with hover-over by a pointing device. | M | Y | | |
| 1.1.1.c | Continuous refreshed real-time updates of vehicle location and status. | M | Y | | |
| 1.1.1.d | Definition of multiple map views and ability to save them at the user level. | M | Y | | |
| 1.1.1.e | Definition of shared views for use by any dispatcher to be saved in their default set of views. | M | Y | | MyAvail is designed to be role based and customized to each role within the organization. As a result the administrator can define the screens and roles accessible by the user. A user can define a map view for easy retrival. |
| 1.1.1.f | Zoom, move, center, and fit to window independent within each map view. | M | Y | | |
| 1.1.1.g | Filtered map views based upon parameters such as vehicles by route, login status, fleet, and mechanical status. | M | Y | | Filtered map views based upon parameters such as vehicles by route, login status, and fleet |
| 1.1.1.h | Map layer that includes current route traces for each fixed route selected by the operator. | M | Y | | |
| 1.1.1.i | Options to display different vehicle icon labels per technical requirements. | M | Y | | |
| 1.1.1.j | Vehicle icons that are configurable and contain context sensitive information. | M | Y | | |
| 1.1.1.k | Query tools to locate vehicle and routes based upon vehicle, route, or intersection variables. | M | Y | | Query tools to locate vehicle and routes based upon vehicle or route |
| 1.1.1.l | Capability to establish voice/data communication by individual vehicle or by banding a group of vehicles together. | M | Y | | |

| Napa VINE Compliance Matrix | | | | | |
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| **1.1.1.m** | Access to a distance measuring tool. | **M** | Y | | Available in Avail's TALE and Replay modules. |
| **1.1.1.n** | Print capabilities of any customized map view. | **M** | Y | | Available in Replay |
| **1.1.1.o** | Automated focus and continuous vehicle tracking during Emergency Alarm condition. | **M** | Y | | |
| **1.1.2** | **Route Playback** | | Y | | |
| **1.1.2.a** | Historical event display shall play back all pertinent historical messages, per technical requirements. | **M** | Y | | |
| **1.1.2.b** | Playback of these events shall include the ability to perform the following functions: | **M** | Y | | |
| **1.1.2.b.1** | The display shall be by a sequence of events on a geographic map. | **M** | Y | | |
| **1.1.2.b.2** | Allow selection by vehicle(s), driver(s), route(s), fleet(s), or run(s) for specific time frames through a query action window. | **M** | Y | | Allow selection by vehicle(s), driver(s), route(s), or run(s) for specific time frames through a query action window. |
| **1.1.2.b.3** | Configurable speed of replay for moving forward and backward through events. | **M** | Y | | User defines window for replay. All data is displayed in both a tabular form as well as a map view and does not require operator to watch a dynamic view. The user can step indidually through the data using arrow keys. |
| **1.1.2.b.4** | Graphical representation of event data on a common CAD/AVL map. | **M** | Y | | |
| **1.1.2.b.5** | Selectable display of map layers including but not limited to stops, streets, routes, points of interest, and geographical attributes. | **M** | Y | | |
| **1.1.2.b.6** | Text display of attributes of each vehicle event message including messages related to other onboard systems including transit priority requests, farebox alarms, and passenger counts. | **M** | Y | | |
| **1.1.2.b.7** | Step forward, step backward and pause the historical display of events. | **M** | Y | | |
| **1.1.2.b.8** | Zoom, move, center, and fit to window views within the map window. | **M** | Y | | |
| **1.1.2.b.9** | Measuring distance tool. | **M** | Y | | |
| **1.1.2.b.10** | Vehicle label by number, adherence, route, driver, run, and block. | **M** | Y | | |
| **1.1.2.b.11** | Vehicle icons that are configurable and display adherence, login status, transfer status, and maintenance status. | **M** | Y | | |

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| 1.1.2.b.12 | Locate vehicles, routes, intersections or objects. | M | Y | | |
| 1.1.2.b.13 | Display route traces. | M | Y | | |
| 1.1.2.b.14 | Date and time messages are logged. | M | Y | | |
| 1.1.2.b.15 | Print the historical display. | M | Y | | |
| 1.1.3 | **Schedule Adherence** | | Y | | |
| 1.1.3.a | System shall monitor adherence by comparing current location versus the published schedule for all vehicles. | M | Y | | |
| 1.1.3.b | Schedule adherence data shall be stored and include parameters for analysis as specified in the technical requirements. | M | Y | | |
| 1.1.3.c | Both the time of arrival and departure at all scheduled timepoints shall be accurately recorded and stored. | M | Y | | |
| 1.1.3.d | The Agency shall be responsible for providing the schedule data used by the Contractor provided scheduling software interface to the CAD/AVL system. The Agency shall perform any stop and route geo-surveys required using Contractor supplied tools. The Contractor shall provide adequate training prior to the start of this activity in accordance with the project schedule. | M | Y | | |
| 1.1.3.e | Real-time (predictive to the next timepoint, which shall include all stops) schedule adherence shall be displayed for dispatchers and made available to customer information applications. | M | Y | | |
| 1.1.3.f | System shall identify vehicles predicted to be running early or late by predefined time parameters and shall report on both graphical and tabular displays. | M | Y | | |
| 1.1.3.g | Schedule adherence parameters shall be able to be set differently by route with separate early and late user supplied values. | M | N | | Schedule adherence parameters shall be able to be set globally with separate early and late user supplied values. |
| 1.1.3.h | Schedule adherence display will be shown to the Operator regardless of dispatcher selectable parameters. | M | Y | | |
| 1.1.3.i | Schedule adherence from the vehicle shall be calculated, transmitted, and stored regardless of the onboard display setting. | M | Y | | |
| 1.1.4 | **Route Adherence** | | | | |
| 1.1.4.a | Provide off-route status to the Operator and transmit a notification to be displayed at the dispatch workstation. | M | Y | | Provide off-route status to the Dispatcher and transmit a notification to be displayed to the Operator. |
| 1.1.4.b | The off-route notification displays shall display next stop when vehicle is off-route. | M | Y | | Drivers will see next scheduled timepoint on their MDT. |
| 1.1.4.c | The off-route distance value shall be a user definable parameter. | M | Y | | |

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| 1.1.4.d | System shall identify off-route distance from assigned route or deviation from corridor of travel. | M | Y | | Off route is shown as a vehicle status with deviation viewable via the GIS map |
| 1.2 | **CAD/AVL System Hardware** | | | | |
| 1.2.1 | Contractor shall provide a turnkey, central system including all necessary hardware – see technical requirements. | M | Y | | |
| 1.2.2 | Contractor shall supply all hardware required for networking and communications for the system – see technical requirements. | M | Y | | |
| 1.2.3 | The CAD/AVL system shall also consist of a backup or mirrored server that will take over operations should the main server fail. The mirrored server shall enable failover operations to be carried out in a seamless manner requiring minimal manual intervention. | M | Y | | |
| 1.2.4 | **CAD/AVL Servers** | | | | |
| 1.2.4.a | The Contractor shall submit a complete list of required IT equipment for the CAD/AVL System at the System Design Review stage. These requirements and specifications may be refined and finalized as part of System Design Review. The minimum computer server requirements are identified in the technical requirements. | M | Y | | |
| 1.2.5 | **CAD/AVL Workstations** | | | | |
| 1.2.5.a | All workstations shall use Dynamic Host Configuration Protocol (DHCP) for IP address assignment, unless otherwise approved by the Agency. | M | Y | | |
| 1.2.5.b | The Contractor shall provide and implement hardware for the Agency with capacity adequate to support the Agency's applications and other Contractor applications involved in the solution, maps, data, and associated files required for operation, with 100% expansion capacity of the specified hardware. | M | Y | | |
| 1.2.5.c | New workstations shall meet or exceed each Agency's current standard workstation specifications. | M | Y | | |
| 2 | **System Data Communications** | | | | |
| 2.1 | Set up radio/cellular data gateway to allow incoming and outgoing messages between the system and MDT's to be transmitted using the Agency-specific radio/cellular data communications system. | M | Y | | |
| 2.2 | The system shall allow data packets to be sent over the network from the vehicles to the central system and from the central system to the vehicles anywhere where there is a private radio system or cellular signal present. | M | Y | | |

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| 2.2.1 | Vehicle location shall be received by the Central CAD/AVL system at least once every 20 seconds (polling rate) for display and storage purposes and every 5 seconds during an Emergency Alarm situation. | M | Y | | |
| 2.3 | The contractor is responsible for arranging appropriate communication protocols with the Agency-preferred cellular providers. The cellular provider to be used for Napa VINE is Verizon. | M | Y | | |
| 2.4 | **Wireless Local Area Network (WLAN)** | | | | |
| 2.4.1 | Complete or bi-directional bulk data transfer software is provided for transfer of data between vehicles on mobile data system and the central system. | M | Y | | |
| 2.4.2 | The bulk data transfer system shall be capable, at minimum, of the following tasks: | M | Y | | |
| 2.4.2.a | Downloading software updates/patches and configuration data for onboard devices. | M | Y | | |
| 2.4.2.b | Downloading all updated schedule and trigger zone locations data required for operation of the VLU firmware. | M | Y | | |
| 2.4.2.c | Uploading vehicle components monitoring configuration data. | M | Y | | |
| 2.4.2.d | Downloading updated trigger zones locations and announcement sign messages for automated annunciation systems on-board announcements. | M | Y | | |
| 2.4.2.e | Uploading revenue transactions data from fareboxes. | M | Y | | |
| 2.4.2.f | Allowing for the uploading of other on-board logged data when received. | M | Y | | |
| 2.4.2.g | The software shall be configurable to determine frequency and types of data transfers. | M | Y | | |
| 2.4.2.h | Automated system bulk transfers shall occur and be validated automatically – see technical requirements for specifics. | M | Y | | |
| 2.4.2.i | Once communications is established with the VLU, the bulk data transfer system shall automatically determine which required file transfers remain to be completed and initiate them. | M | Y | | |
| 2.4.2.j | A validation process shall ensure multiple attempts are made to complete all required file transfers until the file transfer is successfully completed. | M | Y | | |

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| **2.4.2.k** | The system shall be able to complete a file transfer using a sequence of ad-hoc partial file transfers while the VLU is temporarily connected with the mobile data communications system. | **M** | Y | | |
| **2.4.2.l** | **WLAN Access Points** | | | | |
| **2.4.2.l.1** | The Contractor shall provide a WLAN controller. The WLAN controller and wireless APs shall support the functions outlined in the technical requirements | **M** | Y | | |
| **2.4.2.l.2** | The contractor shall provide wireless Access Point coverage at each Agency's bus maintenance facilities to enable WLAN connectivity for data exchange between the VLU and central system via a Bulk Data Transfer. | **M** | Y | | |
| **2.4.2.l.3** | The WLAN coverage area available for bulk data transfer at each Bus Maintenance Facility shall include the area where the vehicles are to be parked. | **M** | Y | | |
| **2.4.2.l.4** | The Contractor shall review the plans for the Bus Maintenance Facility and design the optimal locations for the APs including the orientation of antennas to satisfy all bulk data transfer requirements. | **M** | Y | | |
| **2.4.2.l.5** | The VLU shall authenticate and connect automatically when vehicles enter Wi-Fi zone. | **M** | Y | | |
| **2.4.2.l.6** | WLAN equipment shall be outdoor-rated. See technical requirements for specific code requirements. | **M** | Y | | |
| **2.4.2.l.7** | Lightning arrestors shall be installed to vendor specifications on all exterior APs. | **M** | Y | | |
| **2.4.2.l.8** | The WLAN equipment shall be IEEE 802.11i compliant or be Wi-Fi Protected Access 2 (WPA2) certified by the Wi-Fi Alliance with AES encryption. | **M** | Y | | |
| **2.4.2.l.9** | Each single AP shall have a minimum 2x3, Dual Frequency, MIMO configuration. | **M** | Y | | |
| **2.4.2.l.10** | The APs shall support 5.0 GHz frequencies. The APs shall be capable of supporting multiple SSID's and assign separate SSID's to separate VLANs. | **M** | Y | | |
| **2.4.2.l.11** | The APs shall be able to support WMM (Wi-Fi multimedia). | **M** | Y | | |
| **2.4.2.l.12** | Installation shall be coordinated with Agency project manager with Agency clearance. | **M** | Y | | |
| **2.4.2.m** | **Antennas** | | | | |

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| 2.4.2.m.1 | Antenna(s) shall be installed for cell data, GPS and WLAN. The antenna(s) shall support the ranges identified in the technical requirements. | M | Y | | |
| 2.5 | **Remote and Mobile Access to Central Software** | | | | |
| 2.5.1 | Road Supervisors shall be capable of having remote access to the central CAD/AVL system through a mobile workstation (laptop). Relevant real-time information shall be gathered and transmitted to the mobile workstation through the CAD/AVL cellular data network. The mobile station shall be provided with a cellular data card. | M | Y | | |
| 2.5.2 | Provide map-based GUI for remote/mobile access per the technical requirements. | M | Y | | |
| 2.5.3 | The GUI shall be browser-based, or employ an application installed on the local workstation. | M | Y | | |
| 2.5.4 | The GUI shall be the same as the one used by Dispatchers, but with the ability to limit functionality as defined below. | M | Y | | |
| 2.5.5 | To reduce the amount of cellular data used, the GUI shall be configurable to only show selected vehicles. | M | Y | | |
| 2.5.6 | Vehicles shall be selectable by ID, pre-defined groups, routes, and pre-defined geographic distance. | M | Y | | Vehicles shall be selectable by ID, pre-defined groups (fleet groups) and routes |
| 2.5.7 | The laptops shall support text messaging to the dispatchers. The Contractor shall provide recommended laptop specifications and the Agency's will provide the hardware. | M | Y | | Supported by off the shelf third party applications. |
| 2.5.8 | The laptops shall have access to the internet, Microsoft Outlook, and Agency software applications. | M | Y | | |
| 2.5.9 | The laptops shall allow the road personnel to monitor and respond to incidents including covert alarms and file incident reports. | M | Y | | |
| 2.5.10 | The Contractor shall provide sufficient documentation and instructions for installing software such that Agency staff can perform the installation in the event of a laptop replacement or upgrade. | M | Y | | |
| 3 | **On-board Equipment and Systems** | | | | |
| 3.1 | All on-board equipment shall be new and designed for use in the transit industry rated to applicable industrial and vehicle standards. See technical requirements. | M | Y | | |

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| 3.2 | Equipment shall be the latest model in current production, as offered to commercial trade, and shall conform to transit industry requirements. | M | Y | | |
| 3.3 | The contractor shall represent that all equipment offered under these specifications is new. | M | Y | | |
| 3.4 | Contractor shall demonstrate that all equipment has been installed and operational for at least three other CAD/AVL systems for a period of not less than three (3) years. | M | Y | | |
| 3.5 | All equipment shall be constructed in accordance with best commercial practice, with such practices described in the associated design documentation. At a minimum, the design and installation construction shall provide for: | M | Y | | |
| 3.5.1 | Reliable and stable operation; | M | Y | | |
| 3.5.2 | Minimum maintenance and alignment procedures, with a minimum of special tools; | M | Y | | |
| 3.5.3 | Minimum number and variety of assemblies and spare parts; | M | Y | | |
| 3.5.4 | Maximum attention to human factors, engineering, and ergonomic design; and | M | Y | | |
| 3.5.5 | Simplified design and rapid fault isolation to reduce the requirement for maintenance personnel. | M | Y | | |
| 3.5.6 | All parts shall be made of corrosive resistant material. | M | Y | | |
| 3.5.7 | All parts shall be constructed with materials and quality suited to the intended use and shall use modular design wherever feasible | M | Y | | |
| 3.5.8 | Functionally identical modules and assemblies shall be interchangeable per the technical requirements. | M | Y | | |
| 3.5.9 | Functionally non-identical modules shall not be and shall not appear to be interchangeable. | M | Y | | |
| 3.5.10 | All modules and assemblies shall be connected using standardized durable, positive-locking, and indexed quick disconnect fasteners. | M | Y | | |
| 3.5.11 | Equipment, assemblies, and components shall be identified by a permanently affixed part number and/or serial number. | M | Y | | |
| 3.5.12 | Features identifying software module version within that device shall be provided on each device. | M | Y | | |

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| 3.5.13 | All equipment shall provide a usable life of not less than 15 years. | M | Y | | Avail currently has customers with systems that are over 15 years old still operating original equipment. However, we can't guarantee a usable life of 15 years. Avail has developed our entire suite of products to meet and exceed industry standards (7) years and we do our best to ensure a product life span well beyond (7) years. |
| 3.5.14 | Onboard equipment shall utilize most current microprocessor technology. | M | Y | | |
| 3.5.15 | Compatibility between current and future on-board equipment systems shall be maintained, including due to chip end-of-life issues. | M | Y | | |
| 3.5.16 | All on-board equipment shall have a minimum 40,000 hours Mean Time Between Failures (MTBF). | M | N | | The Equipment is designed for mobile environments and Transit. The VLU will meet this requirment, however Avail does not have calculated values for the rest of the equipment. The equipment is designed for its intended use. See requirement 3.6.3 for the design standards. |
| 3.5.17 | Internal (to the onboard equipment) batteries shall not be used to maintain parameter information in onboard equipment when it is in its powered down state. See technical requirements for real-time clock exception. | M | Y | | |
| 3.5.18 | The system shall check the battery state and create a warning message if the battery needs to be replaced. Onboard equipment shall be capable of being disassembled to fit through a coach door that is a minimum of 24 inches wide by 60 inches tall. | M | Y | | |
| 3.5.19 | Onboard equipment, including all exterior connectors and exposed ports, shall be rated for International Electrotechnical Commission (IEC) standard 60529, IP 54 for interior equipment, IP 65 for exterior equipment and designed for use in an industrial and mobile environment subjected to dirt, water, oil, and cleaning solvents. | M | Y | | |

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| **3.5.20** | If existing vehicle wiring, switches, or contact points are used, testing shall occur to certify that the wiring, switches, or contact points are in an acceptable state and suitable for reuse. | **M** | Y | | |
| **3.5.21** | Data transferred from a device shall not be purged or written over until a successful transfer is confirmed. | **M** | Y | | |
| **3.5.22** | In the event the transfer is not successful and the system is unable to re-attempt a transfer, it shall revert to the previous version of the data automatically and without corruption. Any data transfer failure shall be logged, alerted, and recorded. | **M** | Y | | |
| **3.5.23** | Devices shall include functionality to extract data directly from the device using a laptop computer in the event of a transfer failure (for any reason). Tools and processes shall be provided. | **M** | Y | | |
| **3.5.24** | Equipment shall be properly grounded, with onboard equipment connected as directly as possible to the chassis ground. | **M** | Y | | |
| **3.5.25** | Onboard equipment shall operate from the vehicle electrical system, between 9 and 35 volts. | **M** | Y | | |
| **3.5.26** | Onboard equipment shall be securely mounted in the interior of the vehicle, clear of obstructions and interference-generating devices. | **M** | Y | | |
| **3.5.27** | Customer-facing equipment shall meet or exceed all ADA requirements per technical requirements. | **M** | Y | | |
| **3.5.28** | Installations shall be performed at specific times as approved by the Agency. | **M** | Y | | |
| **3.5.29** | The agencies reserve the right to allow less of its vehicle fleet to be out of service if necessary in order to avoid disruption to revenue service in conjunction with maintenance requirements. | **M** | Y | | |
| **3.5.30** | The Contractor shall ensure that all vehicles made available for overnight installation work are ready for revenue service by the start of the next service day. | **M** | Y | | |
| **3.6** | **Vehicle Logic Unit (VLU)** | | | | |
| **3.6.1** | The CAD/AVL system shall include a VLU on each vehicle to serve as a central processing unit, memory, data storage, and vehicle software. | **M** | Y | | |
| **3.6.2** | VLU shall interface with vehicle's on-board equipment and support communications via a mobile wireless communications network with the central servers. | **M** | Y | | |

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| 3.6.3 | The VLU shall meet environmental and vibration standards (MIL-STD-810D, NEMA-4) as well as appropriate electromagnetic immunity standards (SAE 1455 and ESD J1112/13) and protect against surge, and reverse polarity. | M | N | | Avail equipment is tested and designed to meet the conditions encounted in transit vehicles and is deployed in properties from Maine to Florida to California and Alsska. Specifically the equipment is designed and tested to meet SAE-J1211-"SAE Recommended Environmental Practices for Electronic Equipment Design", MIL-STD-810F – "DOD Environmental Engineering Considerations and Laboratory Tests", SAE-J1455 –"Joint SAE/TMC Recommended Environmental Practices for Electronic Equipment Design (Heavy-Duty Trucks)". In addition digital inputs and outputs are optically isolated and protested against EMI and ESD. The MDT is a sealed unit and all other equipment is either sealed or installed in teh vehicles radio cabinet and protected against direct expsure to water and other contaniments. Detailed environmental specifications and test results can be provided upon request. - |
| 3.6.4 | The VLU shall be of proven design (at least three other similar transit agency deployments for at least three years) and easy to install and replace. | M | Y | | |
| 3.6.5 | The VLU shall be capable of multiple radio control, real time updates and messaging to and from the vehicle. | M | Y | | |
| 3.6.6 | The VLU shall meet communication requirements for leased cellular communications, meshed wireless networks, private radio, as well as interfaces for current and future onboard equipment. | M | Y | | The MDC and VLU are capable of all of these data communications interfaces. Avail is proposing a cellular data solution. |

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| **3.6.7** | Overall system interfaces shall include RS232, RS485 with busy line, TTL, SAE J1708, SAE J1939, USB, Ethernet, TCP/IP, discrete inputs and outputs, odometer, spare I/O pins, audio inputs and outputs, and full IDE capability for PC-type devices. | **M** | Y | | |
| **3.6.8** | Capability for automatic vehicle monitoring via J1708/1939 provided by the vehicle shall be included. | **M** | Y | | |
| **3.6.9** | Indication shall be provided for quick inspection of operation to indicate radio keyed, wireless network operating, software operational, proper voltage range, and ignition on. | **M** | Y | | |
| **3.6.10** | Data storage capacity shall also be sufficient to store at least five operating days worth of passenger counts and all event messages in the case where data communications are disrupted. | **M** | Y | | All passenger counts are sent in real-time and are not accumulated and delivered in bulk at the end of the day as some APC systems operate. In the event that the real-time data communications is down for an extended period of time, the MDC will store and forward stop data and APC counts in non-volatile memory until; 1) the real-time data communications system is restored, 2) the vehicle returns back to the garage and is in WIFI range. In both cases all store and forward messages will then be delivered.<br><br>In order for the vehicle to "login" the next day, the real-time or WIFI communications data systems must be up and operational. So, in essence, you can never store more than one day's worth of store and forward messages.<br><br>If the vehicle has store and forward messages that are undelivered, and the vehicle is in long term maintenance, the stop reports and APC data will be maintained for up to 30 days.<br><br>Even though the specific requirment specifies that 5 days worth of APC data needs to be stored, we can actually never actually get to storing more than one days |

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| **3.6.11** | The VLU shall support functionality of the following data sets, and must have sufficient non-volatile memory to simultaneously store at least the following: | **M** | Y | | The VLU/MDT shall support functionality of the following data sets, and must have sufficient non-volatile memory to simultaneously store at least the following: |
| **3.6.11.a** | Entire set of current schedule data, including school, non-school, and Holiday schedule platforms; | **M** | Y | | |
| **3.6.11.b** | Twenty (20) weeks of incremental schedule changes, for current schedule; | **M** | Y | | |
| **3.6.11.c** | Entire set of future schedule data (i.e., next run-board); | **M** | Y | | |
| **3.6.11.d** | Entire set of required AVA announcements; | **M** | Y | | |
| **3.6.11.e** | Fifty-two (52) weeks of incremental AVA announcements, for current schedule; | **M** | Y | | |
| **3.6.11.f** | Five (5) days of Automatic Passenger Count (APC) data records; | **M** | Y | | The VLU sends APC data in real-time or via the wireless in the event the data can not be sent in real-time. If the data can not be sent via realtime or throught the WLAN then it will be stored in the MDT. |
| **3.6.11.g** | Destination sign errors; | **M** | Y | | |
| **3.6.11.h** | Current configuration data; | **M** | Y | | |
| **3.6.11.i** | Future configuration data; | **M** | Y | | |
| **3.6.11.j** | Current firmware; | **M** | Y | | |
| **3.6.11.k** | Future firmware; | **M** | Y | | |
| **3.6.11.l** | Any other data recording needs identified in this RFP; | **M** | Y | | |
| **3.6.11.m** | 100% memory spare storage for growth, summing above requirements. | **M** | Y | | |
| **3.6.12** | CAD/AVL system configuration settings related specifically to the vehicle shall be stored in the vehicle's configuration module. See technical requirements for functionality. | **M** | Y | | |
| **3.6.13** | Each VLU shall have a unique IP address for purposes of participating in the wireless network and for remote monitoring. | **M** | Y | | |
| **3.6.14** | VLU shall be compatible with all on-board equipment options. | **M** | Y | | |
| **3.6.15** | The VLU shall integrate seamlessly with the Mobile Access Router (MAR), including the VLU providing a feed of GPS data to the MAR. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.16** | The VLU shall act as the central processor, data storage, and device manager for all onboard devices integrated under this Contract. | **M** | Y | | |
| **3.6.17** | The contractor shall coordinate with the agencies the final location of VLU installation on each different vehicle type and configuration, subject to approval from the agencies. | **M** | Y | | |
| **3.6.18** | The VLU shall include at minimum the following ports and interfaces: | **M** | Y | | |
| **3.6.18.a** | Two (2) opto-isolated SAE J1708: one (1) for transit devices, and one (1) for drivetrain; | **M** | Y | | The invehicle solution can be configured to have two SAE J1708 interfaces, (1) for transit devices, and (1) for drivertrain, However, since most vehicles are now equipped with J1939 interfaces to accomodate vehicle health monitoring from the engine, trans, etc., Avail does not belive a 2nd J1708 interface is required. The proposed configuration also includes (2) J1939 interfaces and (1) CAN interface. A second J1708 interface can be added, but is not included as the default configuration. The J1708 Specification does not specify a opto isolated input. We comply with SAE J1708. |
| **3.6.18.b** | Opto-isolated SAE J1939 for drivetrain; | **M** | Y | | |
| **3.6.18.c** | Ethernet; | **M** | Y | | |
| **3.6.18.d** | Universal Serial Bus (USB); | **M** | Y | | |
| **3.6.18.e** | RS-232 as an additional option to SAE J1708 for communication with the destination signs; and | **M** | Y | | |
| **3.6.18.f** | Other ports and interfaces as required for specific device-to-device communications. | **M** | Y | | |
| **3.6.19** | The VLU shall manage power to listed onboard devices as follows: | **M** | Y | | |
| **3.6.19.a** | The VLU shall have a configurable parameter of 0 to 180 minutes that controls the power down of the VLU, MDT, and MAR after the vehicle master ignition switch is turned to "off". | **M** | Y | | |

| Napa VINE Compliance Matrix | | | | | |
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| **3.6.19.b** | The VLU shall inform all managed devices to initiate a graceful power-down ofself and the MDT (including if necessary automatically logging off the VLU) between 0 to 30 minutes before power-down is activated and shall inform the MAR to do so. | **M** | Y | | |
| **3.6.19.c** | Upon reaching the power-down threshold, the VLU shall remove power from all connected devices, and itself. | **M** | Y | | |
| **3.6.19.d** | Upon the vehicle master ignition switch being turned to anything other than "off", the vehicle shall apply or maintain power to all connected devices, and also reset the timer unless ignition sense is again active. | **M** | Y | | |
| **3.6.19.e** | If the vehicle operator has not logged off, the system shall automatically log off, prior to power down activation. | **M** | Y | | If the vehicle operator is not logged off, the system shall automatically log off the operator when the ignition switch is turned off. |
| **3.6.20** | The VLU shall process AVL data and correlate it with operator ID, date, time (both 24 hour system clock and 36 hour service day clock), run, block, route, trip, and location. | **M** | Y | | |
| **3.6.21** | The VLU shall manage all communications processes and devices on the vehicle, and shall store any accumulated data and logs. | **M** | Y | | |
| **3.6.22** | The VLU shall reconcile any discrepancies between all the different sensors and position inputs it uses for AVL purposes – see technical requirements. | **M** | Y | | The In-Vehicle Solution software and algorithms do utilize velocity and other filter parameters to determine the validity of GPS to account for wander and gross multipath artifacts. |
| **3.6.23** | The VLU shall process and manage the transmission of data to/from the central system as follows: | **M** | Y | | |
| **3.6.23.a** | Routine data including: schedule adherence, vehicle location data, passenger count, peak passenger load, messaging and communications requests, and event information on an event or periodic basis, via the data communications system. | **M** | Y | | |
| **3.6.23.b** | Priority data including priority messages, and alarms on an immediate basis, via the data communications system. | **M** | Y | | |
| **3.6.23.c** | Onboard equipment configuration data updates, non-critical logged or accumulated data, and other "batch" data, via the WLAN. | **M** | Y | | |

| Napa VINE Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.24** | The VLU shall be responsible for initiating and verifying the successful completion of data transfers, and shall not delete data until a successful transfer has been completed and confirmed. | **M** | Y | | |
| **3.6.25** | In the event of an uncompleted file transfer, the VLU shall reinitiate the file transfer in accordance with the technical requirements. | **M** | Y | | |
| **3.6.26** | The VLU shall manage the downloading of new configuration data that may include schedule updates, AVA announcement updates, firmware/configuration updates, as follows: | **M** | Y | | |
| **3.6.26.a** | The VLU shall maintain current and one set of future configuration data that will automatically become the current configuration data once the defined activation date has arrived. | **M** | Y | | |
| **3.6.26.b** | The VLU shall periodically check for configuration updates whenever it is within WLAN coverage. | **M** | Y | | |
| **3.6.26.c** | If a configuration data update is available, the VLU shall manage the download process and update other onboard equipment (the VLU shall provide a message on the MDT that a download and update is occurring so that the operator is aware). | **M** | Y | | |
| **3.6.26.d** | The VLU shall automatically install updated firmware or configuration data it has received into the VLU, the destination sign and the AVA system. | **M** | Y | | The VLU shall automatically install updated firmware or configuration data it has received into the VLU, and the AVA system. |
| **3.6.26.e** | To minimize potential impacts on pull-out, the VLU shall include functionality to download only the schedule information on startup. Functionality shall be provided to manage the download of more voluminous data (such as a firmware or configuration update) so that it is only downloaded and installed on shutdown or during non-operating hours. | **M** | Y | | Avail's in-vehicle download and software update is managed such that there is no impact to pull-out or any other operations while in service. |
| **3.6.26.f** | If the VLU is unable to complete the download of configuration data via the WLAN, it shall continue using the previous configuration data. | **M** | Y | | |

| Napa VINE Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.27** | The VLU must monitor and log, tagged with time and location, the following existing discrete external circuits: | **M** | Y | | While Avail feels we fully meet the following requirements we would like to better understand how this data will be used by operations. Avail's in vehicle solution has the ability to monitor and log the discretes and signals listed below, but may not tie into a couple of them as the default configuration. Most of the logging is performed as a debug log, whose data can be offloaded wirelessly.<br><br>In addition, if the vehicle's multiplex system monitors these discretes and has J1939 gateway module installed and configured to provide these discretes as a J1939 messages, then the in-vehicle solution can log these discretes as J1939 messages. |
| **3.6.27.a** | Front door and Rear door, open and close; | **M** | Y | | |
| **3.6.27.b** | Kneel, and return from kneel (raise); | **M** | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| **3.6.27.c** | Lift or Ramp deploy, and return from deploy (stow); | **M** | Y | | |
| **3.6.27.d** | "Stop Requested" activation; | **M** | Y | | |
| **3.6.27.e** | Headlight activation and deactivation; | **M** | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |

| Napa VINE Compliance Matrix | | | | | |
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| **3.6.27.f** | Turn Signals, activation and deactivation; | **M** | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| **3.6.27.g** | Hazard Lights, activation and deactivation; | **M** | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| **3.6.27.h** | Master-Run switch, change in status (Off, Day-Run, Night-Run, Park); | **M** | Y | | If there is a J1939 gateway unit installed and a configured message indicating this, or a discrete output from the IOCOntrols output module that has this discrete mapped as an output. |
| **3.6.27.i** | Ignition, activation and deactivation; | **M** | Y | | |
| **3.6.27.k** | Covert Alarm switch activation; | **M** | Y | | |
| **3.6.27.l** | Selected dashboard light activations for vehicle maintenance monitoring (e.g. oil pressure, check engine light, tire pressure); | **M** | Y | | |
| **3.6.27.m** | Motion start; | **M** | Y | | This may not necessisarily be a discrete input, but would be deteremined through other means. |
| **3.6.27.n** | Not in motion/idle. | **M** | Y | | This may not necessisarily be a discrete input, but would be deteremined through other means. |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.28** | The VLU shall include functionality and external interfaces to provide location, time, and/or triggering messages to other on-vehicle systems. | **M** | Y | | The In-Vehicle solution is capable of providing these types of messages to external devices through any future developed data interfaces, with 3rd party devices. However, at this time, not knowing any specifics about what these 3rd party devices are, and what the devolopment, and integration effort would be to create these interfaces with these devices, any development and integration effort is not part of the scope of this project.<br><br>That said, the in-vehicle solution will send location, time, and other predefined trigger messages on the J1708/1587 interface currently. |
| **3.6.29** | The VLU shall include functionality to re-transmit data in the event of an unsuccessful transmission. | **M** | Y | | |
| **3.6.30** | The VLU shall run diagnostics and report any problems with onboard components (including the VLU itself, MDT, voice radio, AVL components, and destination sign). | **M** | Y | | |
| **3.6.31** | The VLU shall automatically recognize any system process failure or lock-up, log the problem and attempt a restart. | **M** | Y | | |
| **3.6.32** | If restart of the process fails, notification shall be sent to the operator via the MDT and logged the event in the VLU data for upload at the end of the day. | **M** | Y | | Even though process/services may be attempted to be restarted, an automatic "reboot" of the in-vehicle system may be required to resolve. |
| **3.6.33** | The VLU shall support remote diagnostics that allow central system access to check operations and functionality of the VLU. See technical requirements. | **M** | Y | | |
| **3.6.34** | In addition to providing routine position updates, the VLU shall record date, time and location when the following events occur: | **M** | Y | | |

| Napa VINE Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.24.a** | Arrival into and departure from agency configurable geographic areas that define the stops, timepoints, and pull-out/pull-in locations (for these events the current schedule adherence shall also be recorded); | **M** | Y | | Whether private data radio modems or cellular data, the inbound messaging content is optimized to be very small and efficient, to get the most effeciency and incur the least cost (cellular). The Entry and Exit of defined geo shapes are combined into a single message reflecting the entry and exit information. Avail believes that we meet the intent of this requirement. |
| **3.6.24.b** | Every activation and deactivation of each monitored onboard circuit, including: Door open/close, Kneel/Raise, Lift/Ramp deploy/stow, Stop-Requested light, Turn Signals; | **M** | Y | | Avail's in vehicle solution has the ability to monitor and log the discretes and signals listed below, but may not tie into a couple of them as the default configuration. Most of the logging is performed as a debug log, whose data can be offloaded wirelessly.<br><br>In addition, if the vehicle's multiplex system monitors these discretes and has J1939 gateway module installed and configured to provide these discretes as a J1939 messages, then the in-vehicle solution can log these discretes as J1939 messages.<br><br>In short, the Avail In-Vehicle solution is more than capable to monitor and log all of the interfaces listed below, as long as there is a J1939 message or tie-in to the IOControls output module to connect to. |
| **3.6.24.c** | First stop/timepoint of the first trip; and | **M** | Y | | |

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| **3.6.24.d** | Every toggling of operational conditions, including: operator key- press on MDT, off-route and return-to-route, early/late schedule adherence and return-to-on-time status, operator over-ride of destination sign. | **M** | Y | | Conditions such as schedule adherence, offroute, manual mode, etc are logged at the CAD. Operator key presses can be logged in the vehicle but are not sent to the CAD. "operator over-ride of the destination sign" is not sent to the CAD. |
| **3.6.35** | The VLU shall monitor diagnostic information for the Transit J1708, and log the following statistics upon every change in logon status or ignition status: | **M** | | | |
| **3.6.35.a** | By Module Identification (MID): Time of last good received packet, Total good received packets, Total good transmitted packets. | **M** | Y | | J1708 logging of information is available when the debug logging mode is enabled. Debug data can then be offloaded wirelessly. |
| **3.6.35.b** | Total bad (collision/checksum) packets received. | **M** | N | | Because of the robustness of the interface and protocol (collision detection, retries, priority management, etc), and Avail's implementation of application level retries, and monitoring, Avail does not believe there is any need to capture this information. |
| **3.6.25.c** | Total bad (collision/checksum) packets transmitted. | **M** | N | | Because of the robustness of the interface and protocol (collision detection, retries, priority management, etc), and Avail's implementation of application level retries, and monitoring, Avail does not believe there is any need to capture this information. |
| **3.6.36** | The VLU shall monitor diagnostic information for connected onboard systems, and log the following statistics upon every change in logon status or ignition status: | **M** | Y | | |
| **3.6.36.a** | Data Communication Statistics (Total: Polls, Transmits, Re- Transmits, Receives, Errors, Fallback, etc); | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.36.b** | Navigation Quality (Time, Duration, Good GPS Navigation, Good Alternate Navigation, Poor Navigation, etc); | **M** | Y | | The in-vehicle system monitors many aspects of the GPS component internally and logs low level details as debug messages which can be offloaded wirelessly. |
| **3.6.36.c** | All current VLU configuration data; | **M** | Y | | |
| **3.6.36.d** | Odometer Statistics, since previous record (total traveled distance, current calibration factor); and | **M** | Y | | |
| **3.6.36.e** | WLAN Statistics, since previous record (VLU awake time, WLAN coverage time, data packets sent, data packets received, file transmissions/receptions attempted per file, file transmissions/receptions completed per file). | **M** | N | | Low level WLAN coverage statistics are not available to the IVU, however file download, information is collected via the PDC server for bulk file downloads and uploads, along with connection times and information |
| **3.6.36.f** | All received text messages that were displayed to an operator | **M** | Y | | This data is collected by the CAD System and includes receipt and acknowledgement, Yes and No responses. |
| **3.6.36.g** | All instances of lost data communications coverage exceeding 15 seconds once back in communications for more than ten (10) seconds. | **M** | Y | | This type of data is available in debug mode, and can be offloaded wirelessly. |
| **3.6.37** | The VLU schedule data shall include agency configurable geographic areas (i.e., trigger boxes), and will initiate special VLU functions. | **M** | Y | | |
| **3.6.37.a** | Examples include: Change external destination sign; Initiate Transit Signal Priority (TSP) status change (enable/disable/activate/deactivate); Initiate AVA announcements and/or "clears"; Indicate locations where GPS is known to be degraded. | **M** | Y | | |
| **3.6.37.b** | The system shall enable the agency to maintain the trigger boxes within the scheduling database, independently without need for any software changes. | **M** | Y | | |
| **3.6.37.c** | The system shall support the creation, deletion, and relocation of trigger boxes and the designation or adjustment of the VLU action to be taken upon entering or exiting the trigger box. | **M** | Y | | |
| **3.6.38** | The VLU shall use AVL data to determine schedule adherence in real-time on the vehicle, without the need for central computation and communications. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.6.39 | The VLU shall be fully operational within 90 seconds of power restoration for warm starts, and 150 seconds for cold starts under the full range of ambient conditions. | M | Y | | |
| 3.6.40 | Logged data shall be stored in non-volatile memory, and shall not become corrupted due to any power condition, including: spike, drop, or loss. | M | Y | | |
| 3.7 | **Mobile Data Terminal** | | | | |
| 3.7.1 | The MDT shall be a rugged computing device designed for operation in a transit environment and shall function as the interface between the operator and all onboard components. | M | Y | | |
| 3.7.2 | MDT data storage shall be solid state. | M | Y | | |
| 3.7.3 | MDT shall have a color liquid crystal display (LCD) touch-screen. | M | Y | | |
| 3.7.4 | MDT shall be operable while wearing gloves. | M | Y | | Avail's MDT touch screen utilizes the same technology as todays smartphones and tablets. |
| 3.7.5 | MDT shall be readable by operators wearing polarized lenses. | M | Y | | |
| 3.7.6 | The MDT shall be legible for the color blind. | M | Y | | |
| 3.7.7 | MDT shall be readable in direct sunlight and must offer low-glare setting for night operation. | M | Y | | |
| 3.7.8 | MDT touch-screen shall have a video graphics array (VGA) resolution of at least 640 x 480 pixels. | M | Y | | |
| 3.7.9 | MDT shall display vehicle status including data transmission, pending messages, and communication mode. | M | Y | | |
| 3.7.10 | MDT shall be capable of providing aural tones to indicate incoming messages to operators while keeping operator attention on the road. | M | Y | | The MDT provides Aural tones for multiple events including invalid logon, data messages, or other events requiring operator attention. In addition the MDT provides detailed information and/or screens for the functions below. Not all of these include nor would it make sense to provide an aural tone. |
| 3.7.10.a | Logon | M | Y | | |
| 3.7.10.b | Emergency Alarm | M | Y | | |
| 3.7.10.c | Data Messaging | M | Y | | |
| 3.7.10.d | Transfer Notification | M | Y | | |
| 3.7.10.e | Schedule Adherence | M | Y | | |
| 3.7.10.f | Headsigns | M | Y | | |

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| **3.7.10.g** | Fare Collection | **M** | Y | | |
| **3.7.10.h** | Passenger Count | **M** | Y | | |
| **3.7.10.i** | Maintenance | **M** | Y | | |
| **3.7.10.j** | Stop Announcement | **M** | Y | | |
| **3.7.10.k** | Trip/Schedule | **M** | Y | | |
| **3.7.10.l** | Route | **M** | Y | | |
| **3.7.10.m** | Direction | **M** | Y | | |
| **3.7.11** | When the power is turned on, the MDT software shall automatically perform a power-on self-test, followed by configuring and initializing the MDT to the user-specified default values. | **M** | Y | | |
| **3.7.12** | The MDT shall be self-restarting and shall not become unresponsive and require manual restarts to continue operations. The MDT shutdown process will be controlled by the MDT software and shall only be possible when the ignition is in the off position. | **M** | Y | | |
| **3.7.13** | A user specified shutdown delay shall be provided to continue operations and to initiate the shutdown procedure that shall automatically close all files, save values, and send a shutdown message to be recorded in the CAD/AVL system. | **M** | Y | | |
| **3.7.14** | An on-board covert microphone shall be included for communication between dispatcher and operator – refer to technical requirements for location requirements. | **M** | Y | | Covert microphone is only available to monitor activity on the bus during an emergency event. |
| **3.7.15** | Wheelchairs lifts and ramps shall be monitored and data shall be recorded for each cycle. | **M** | Y | | |
| **3.7.16** | MDT shall display warning to operator and dispatcher workstation and shall transmit to central system if wheelchair lift was not cycled prior to leaving garage. All messages and warning shall be stored. | **M** | Y | | |
| **3.7.17** | MDT shall display a warning if logon has not occurred following vehicle movement of predefined distance per technical requirements. Warning shall be transmitted to CAD/AVL system for storage and display at dispatcher station. | **M** | Y | | |
| **3.7.18** | A logon process shall be provided for maintenance purposes to enable a vehicle to be moved through-out a facility for servicing and maintenance purposes without triggering alarms. | **M** | Y | | |
| **3.7.19** | MDTs shall be capable of remote log-on/log-off via the data communications connection. | **M** | Y | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.7.20 | MDT shall have the "safe driving" mode enabled when the vehicle is moving above a configurable speed limit. | M | Y | | |
| 3.7.21 | The safe driving mode shall allow the agency to stop vehicle operators from interacting with MDTs when driving, the MDT shall allow enabling of the following screen configurations under safe driving mode: | M | Y | | |
| 3.7.21.a | Blank display on the screen; | M | Y | | |
| 3.7.21.b | Disabled MDT buttons to stop vehicle operators from performing any actions on the screen; and | M | Y | | |
| 3.7.21.c | Display of information relevant to vehicle operators when of high priority (e.g., route and schedule adherence status, missed messages or calls from dispatchers). | M | Y | | |
| 3.7.22 | Dispatch shall have the ability to remotely change the configurations for the safe driving mode. | M | Y | | The safe driving configuration paramenters are configurable at the backend and will be downloaded at logon. The parameters could be changed by a dispatcher but it is not a dispatch function nor recommended. |
| 3.7.23 | Dispatch shall be able to change the safe driving mode configurations by vehicle operator login. For example, the safe driving mode could be disabled for maintenance or training purposes. | M | N | | Safe Driving mode is configurable by vehicle type. |
| 3.7.24 | The MDT shall allow two way text messaging between the transit vehicles and dispatch using a set of predefined messages, or free form text messaging. | M | Y | | |
| 3.7.25 | The MDT shall support the display of text messages longer than can fit on one line of the display. A minimum of 40 canned messages shall be supported. | M | Y | | |
| 3.7.26 | The MDT shall store multiple messages received from dispatch and indicate those text messages that are unread. | M | Y | | |
| 3.8 | **Mobile Access Router (MAR)** | | | | |
| 3.8.1 | Shall support both wireless and wired switched Ethernet Local Area Network (LAN) functionality, as well as multiple wireless Wide Area Network (WAN) links and a gateway. | M | Y | | |
| 3.8.2 | MAR shall be a separate device from the VLU and MDT. | M | Y | | |
| 3.8.3 | MAR shall be equipped with a minimum of 1 GB of internal data storage capacity. | M | N | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.8.4** | MAR shall include a minimum of two (2) USB 2.0 connections through which USB enabled devices such as a portable computer or solid state memory can be connected. | **M** | N | | The proposed Avail Technologies solution includes 1-USB port. |
| **3.8.5** | MAR shall include a minimum of eight (8) switched Ethernet ports. | **M** | N | | The proposed Avail Technologies solution includes 4- LAN ports port |
| **3.8.6** | The wireless data communications device shall be easily replaceable to accommodate potential future adaptation to different wireless WAN link services. | **M** | Y | | |
| **3.8.7** | MAR shall incorporate a LAN Ethernet multiport switch capability to interconnect CAD/AVL onboard system components and existing onboard Ethernet enabled equipment. | **M** | Y | | |
| **3.8.8** | MAR shall support the following wireless data services: | **M** | Y | | |
| **3.8.8.a** | 3G and 4G WAN, including LTE | **M** | Y | | |
| **3.8.8.b** | 802.11n Wi-Fi WLAN | **M** | Y | | |
| **3.8.8.c** | Act as a WLAN access point capable of enabling LAN access from public WLAN client devices within the bus interior, supporting the 802.11n WLAN standard and on a separate subnet firewalled from the onboard Ethernet switched LAN. | **M** | Y | | |
| **3.8.9** | The MAR shall be integrated with onboard CAD/AVL components and other existing onboard Ethernet enabled systems per technical requirements. | **M** | Y | | |
| **3.8.10** | The MAR and all WLAN communications shall support Wi-Fi Protected Access 2 (WPA2) security and communications protocols, or alternate approved through the design review process. | **M** | Y | | |
| **3.9** | **Global Positioning System (GPS)** | | | | |
| **3.9.1** | AVL module shall provide a derived location using an onboard GPS receiver and other location determination devices (gyroscope, odometer, etc.) per technical requirements. | **M** | Y | | |
| **3.9.2** | Vehicle location shall be determined by a navigation algorithm – refer to technical requirements. | **M** | N | | |
| **3.9.3** | Other location determination devices other than GPS shall automatically calibrate and require no operator or maintenance personnel intervention for daily usage. | **M** | N | | |
| **3.9.4** | Proper operation of the onboard systems relying on location reporting shall not be interrupted for vehicles leaving from an enclosed storage area. | **M** | Y | | |

| Napa VINE Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 3.9.5 | The GPS antenna shall be a low-profile unit housed in a rugged and weather tight enclosure. The GPS antenna shall be securely mounted and sealed on the exterior of the vehicle, clear of obstructions, and clear of interference from other generating devices or 91 Radio Frequency interference. | M | Y | | |
| 3.9.6 | The GPS system shall provide a spare NMEA-based GPS output. | M | Y | | |
| 3.9.7 | GPS system shall meet cold and warm acquisition and current position update times per technical requirements. The GPS system shall include multi-path rejection capabilities to help eliminate inaccurate signals caused by reflections off of buildings or other structures. | M | Y | | |
| 3.9.8 | Vehicle location shall be transmitted at least once every 20 seconds (polling rate) to the central CAD/AVL system for display and storage purposes and every 5 seconds during an Emergency Alarm situation. | M | Y | | |
| 3.9.9 | The AVL shall at all times provide current position information to the VLU per technical requirements. | M | Y | | |
| 3.9.10 | GPS delay time from location acquisition to formatting for transmission shall not exceed one (1) second. | M | Y | | |
| 3.9.11 | The GPS system shall store the most recent location to provide as the "last known good" location in the event that location reporting is interrupted. | M | Y | | |
| 3.9.12 | Location messages transmitted to dispatch shall indicate messages status as current or "last known verified". | M | Y | | |
| 3.1 | **Automatic Passenger Counters** | | | | |
| 3.10.21 | Napa VINE currently owns and operates UTA APC's on board fixed route and demand response vehicles. The proposed AVL system shall integrate with the existing UTA APC's to provide the Agency with time, location, and on-off counts. | M | N | | Avail can interface with the UTA APC's currently installed on Napa fleet via J1708. Avail will also post process data from the UTA system for reporting |
| 3.11 | **Emergency Alarms** | | | | |
| 3.11.1 | When a covert alarm signal is received from a vehicle, the CAD/AVL software shall display the event in the performance queue to all dispatchers with configurable visual alerting methods. | M | Y | | Avail Technologies utilizes both visual and audible notification of emergency alarms |
| 3.11.2 | The CAD/AVL software shall provide a configurable audible and visual alert to all dispatchers, road supervisors, and others using the CAD/AVL software. | M | Y | | |

| Napa VINE Compliance Matrix | | | | | |
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| 3.11.3 | The CAD/AVL software shall notify the dispatcher in the performance queue that a silent alarm message has been received using an Agency-approved visual notification method. | M | Y | | Avail Technologies utilizes both visual and audible notification of emergency alarms |
| 3.11.4 | Once a dispatcher selects the covert alarm event, this shall be so indicated to that dispatcher and all others. | M | Y | | |
| 3.11.5 | When acknowledging an alarm the CAD/AVL software shall zoom and center the map display on the alarming vehicle and locate the nearest road supervisor vehicle when selected by a dispatcher. The scale for the zoom shall be configurable by the Agency. | M | N | | Avail automatically centers the vehicle sending an alarm on the map and can identify supervisors by the vehicle icon. Dispatchers will locate the nearest supervisor via the map. |
| 3.11.6 | The CAD/AVL software shall allow dispatchers to downgrade emergency alarms to a lower message priority, or upgrade lower priority messages to an emergency alarm. The CAD system shall log all alarm status changes (create, upgrade, downgrade, and cancel). | M | Y | | The system adminstrator or other authorized user defines the priorities for messages and actions associated with events. All actions taken by the dispatcher are logged and can be reviewed in the event log. |
| 3.11.7 | Activation of an emergency message shall place the vehicle in a priority status for frequency of location and message updates which will result in vehicle location and status updates at a rate that is configurable by the Agency. | M | Y | | |
| 3.12 | **Automatic Vehicle Announcements (AVA)** | | | | |
| 3.12.1 | The AVL central software shall be used to generate and manage next stop, customer, and other announcements, manage device configurations, generate reports, and manage device fault reporting and logs. | M | Y | | |
| 3.12.2 | The AVA central software shall meet or exceed requirements of the United States Access Board. | M | Y | | |
| 3.12.3 | The AVA central software shall include functionality to import route and stop data from an external system via Agency file(s) per technical requirements. | M | Y | | |
| 3.12.4 | The AVA central software shall include the capability to announce all or only selected stops per technical requirements. | M | Y | | |
| 3.12.5 | Location based stop announcement triggers shall be configurable by the Agency for any stop announcement. | M | Y | | |
| 3.12.6 | Stops to be announced shall be set through system configuration data managed by the Agency. | M | Y | | |

| Napa VINE Compliance Matrix | | | | | |
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| **3.12.7** | The AVA central software shall include the ability to customize announcements per technical requirements (i.e. add, link, etc.). | **M** | Y | | |
| **3.12.8** | Content of the AVA announcements shall be configurable and shall include the minimum messages types: | **M** | Y | | |
| **3.12.8.a** | Cross-street only | **M** | Y | | |
| **3.12.8.b** | Current street and cross-street | **M** | Y | | |
| **3.12.8.c** | Landmark | **M** | Y | | |
| **3.12.8.d** | Transfer opportunities | **M** | Y | | |
| **3.12.8.e** | Bus Stop Name | **M** | Y | | |
| **3.12.8.f** | Service announcements | **M** | Y | | |
| **3.12.9** | The AVA central software shall include the ability for the Agency to independently configure audio and text messages associated with a specific stop. | **M** | Y | | |
| **3.12.10** | The AVA central software shall include the ability to append a standard message header to all messages per technical requirements. Different headers shall be available for different types of announcements. The AVA central software shall support English at a minimum plus any other languages as required by the Agency. | **M** | Y | | |
| **3.12.11** | The AVA central software shall enable creating audio messages using both text-to-speech synthesized and recorded voice. Voice files shall be MP3 or WAV format as required by technical requirements. | **M** | Y | | |
| **3.12.12** | The AVA central software shall be able to create composite announcements that combine synthesized and recorded announcement segments. | **M** | Y | | |
| **3.12.13** | The AVA central software speech engine shall be a modular component that allows the Agency to independently replace it at a later date without other system changes. | **M** | Y | | |
| **3.12.14** | The AVA central software shall be configurable by the Agency so that external announcements may be set for activation on any route. External announcements shall include at minimum: | **M** | Y | | |
| **3.12.14.a** | Route number. | **M** | Y | | |
| **3.12.14.b** | Route name. | **M** | Y | | |
| **3.12.14.c** | Destination. | **M** | Y | | |
| **3.12.14.d** | Direction. | **M** | Y | | |
| **3.12.14.e** | Branch. | **M** | Y | | |
| **3.12.14.f** | Route Type. | **M** | Y | | |

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| **3.12.15** | The AVA central software shall be configurable so that external announcements can be made less frequently, only at specified stops or not at all. | **M** | Y | | The system allows external announcement volume to be controlled by time of day. In additional the announcments can be configured to play by trip but not a specific stop. |
| **3.12.16** | The AVA central software shall allow specific volume levels to be configured for individual stops, times of day and/or sections of routes. | **M** | Y | | The system allows external announcement volume to be controlled by time of day. In additional the announcments can be configured to play by trip. |
| **3.12.17** | The AVA central software shall be able to configure external announcements to repeat without operator interaction at any or all stops at a time interval configurable by the Agency. | **M** | Y | | |
| **3.12.18** | The database of announcement messages shall associate stops with message data for each trip pattern. | **M** | Y | | |
| **3.12.19** | The AVA central software shall enable incremental updates of onboard message data on an as-needed basis. | **M** | Y | | |
| **3.12.20** | The user interface for entry/deletion/modification of messages shall be easy to use, and shall associate all messages with a trip pattern. | **M** | Y | | |
| **3.12.21** | The system shall accept the addition, deletion, or movement (from one trip pattern to another) of stop association data. | **M** | Y | | |
| **3.12.22** | The database shall support direct SQL interfaces. | **M** | Y | | |
| **3.12.23** | Each message shall have a unique identifier, defined by the Agency. | **M** | Y | | |
| **3.12.24** | The AVA central software shall include look-up tables to associate messages entered through the workstation with the message identifier. | **M** | Y | | |
| **3.12.25** | Creation or deletion of a message shall not change the identifiers of the other messages. | **M** | Y | | |
| **3.12.26** | Provisions shall be included to rebuild the message database and identifiers on a periodic basis. (e.g., after there have been a significant number of message additions and deletions). | **M** | Y | | |
| **3.12.27** | The AVA central software shall provide means to record and generate announcement audio and to define message-stop associations. | **M** | Y | | |

| Napa VINE Compliance Matrix | | | | | |
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| **3.12.28** | The AVA central software shall be installed on a desktop PC or server supplied by the Agency, accessible by multiple clients or workstations if on a server, and configured with required hardware and operating system software. | **M** | Y | | |
| **3.12.29** | Internal single line LED headsigns shall be provided. | | Y | | |
| **3.13** | **Single Point Log-On** | | | | |
| **3.13.1** | Vehicle logic unit should allow for single point of logon for all onboard equipment including electronic fareboxes, headsigns, APC system, the AVA system, and other integrated devices. | **M** | Y | | |
| **3.13.2** | The single point logon shall log onto the other on-board equipment or override the current logon to those other devices. | **M** | Y | | |
| **3.13.3** | The central system should recognize that the vehicle is ready to commence its assigned work, has started work and completed work for the day. | **M** | Y | | |
| **3.14** | **Not Used** | | | | |
| **3.14.1** | Not Used | | | | |
| **3.14.2** | Not Used | | | | |
| **3.14.3** | Not Used | | | | |
| **3.14.4** | Not Used | | | | |
| **3.15** | **Destination Headsign Interface** | | | | |
| **3.15.1** | Existing destination signs shall interface with the VLU, which shall automatically provide sign codes for every route and direction change during revenue service. | **M** | Y | | |
| **3.15.2** | Firmware updates needed to the destination headsigns and any subcontracting for support services needed from the destination headsign vendor shall occur during interfacing of this system. | **M** | Y | | |
| **3.15.3** | The MDT shall be capable of changing the destination headsign and providing codes for the operator to manually determine the selection of destinations and to manually input codes when the CAD/AVL system is down. | **M** | Y | | |
| **3.16** | **Connection Protection** | | | | |
| **3.16.1** | The Contractor shall provide an option for the CAD/AVL system to provide and operate in conjunction with the Mobile Data Terminal software to provide Transfer Connection Protection (TCP). | **M** | Y | | |
| **3.16.2** | TCP shall be triggered when an incoming fixed route operator makes a transfer for a specific outgoing route, which the vehicle operator enters via the Mobile Data Terminal. | **M** | Y | | |

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| 3.16.3 | The system shall, without any need for dispatcher intervention, hold the outgoing vehicle to allow the connection, if it would not need to be held more than a configurable time based on the estimated arrival time of the incoming vehicle. | M | Y | | |
| 3.16.4 | The system shall notify the outgoing vehicle via the Mobile Data Terminal if it is to hold, until what time and for what route. | M | Y | | |
| 3.16.5 | The dispatcher shall be able to review current pending transfers, including the incoming and outgoing vehicles involved, and the time the incoming vehicle is expected to arrive at the transfer. | M | N | | Dispatcher is notified in the event of a transfer in jeapordy |
| 3.16.6 | The dispatcher shall have the ability to intervene and override as necessary in the operation of transfers. | M | Y | | |
| 3.17 | **Video System Interface** | | | | |
| 3.17.1 | The VLU shall be interfaced with the existing video system including the digital video recorders (DVR) on-board. The Contractor shall be entirely responsible for developing and integrating this interface. | O | N/A | | |
| 3.17.2 | The VLU to DVR interface shall be accessible using the MDT. | O | N/A | | |
| 3.17.3 | VLU shall be able to store alarms that are received from the DVR. | O | N/A | | |
| 3.17.4 | The VLU shall send an update message to the MDT when there is an alarm received from the DVR. | O | N/A | | |
| 3.17.5 | The VLU shall provide a discrete signal to the DVR when an emergency alarm is generated by the operator. | O | N/A | | |
| 3.17.6 | The CAD/AVL software shall support the ability to tag an incident record with an index or link to specific video frame(s)/snippets in the future. | O | N/A | | |
| 3.17.7 | The VLU shall send alert to dispatch and maintenance if the DVR is not functioning properly. | O | N/A | | |
| 3.17.8 | The Video System Interface will be an optional item for Napa VINE to be potentially added in the future. | O | N/A | | |
| 3.18 | **Farebox Interface** | | | | |
| 3.18.1 | The VLU shall be interfaced with the existing GenFare Fareboxes. | M | Y | | |
| 3.18.2 | Interface completion shall include any firmware updates needed to the fareboxes and any subcontracting for support services needed from the farebox vendor. | M | Y | | |
| 3.18.3 | The VLU to farebox interface shall support farebox logon using the MDT. | M | Y | | |
| 3.18.4 | MDT logon shall logon to the farebox or override the current logon on the farebox. | M | Y | | |

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| 3.18.5 | The VLU shall send an update message to the farebox when there is a change to the block, route, trip, operator, or fareset. | M | Y | | |
| 3.18.6 | VLU shall send the current location upon request message from the farebox. | M | Y | | Location is sent to the farebox at a stop. It is not sent upon a request. |
| 3.18.7 | VLU shall be able to store farebox alarms received from the farebox. | M | Y | | |
| 3.18.8 | Data records transmitted from the farebox to the CAD/AVL system shall use synchronous time and location stamping to support central system reporting functions that combine farebox data with data from other systems (e.g. CAD/AVL, APC) – for example, fares collected by stop location. | M | Y | | |
| 3.2 | **Transit Automatic Vehicle Monitoring** | | | | |
| 3.20.1 | Automatic Vehicle Monitoring (AVM) System shall be included as an option. | O | Y | | |
| 3.20.2 | Automatic Vehicle Monitoring (AVM) shall collect data on revenue-vehicle drive-train performance, CAD/AVL subsystem health warnings, pre run checklist completion, and discrete alarms in order to identify problems, improve maintenance, and reduce vehicle breakdowns. | O | Y | | |
| 3.20.3 | AVM data triggered by operating conditions beyond pre-defined threshold shall be reported in real-time to the CAD/AVL system and stored for reporting purposes. | O | Y | | |
| 3.20.4 | Standard AVM reports and user query tools shall be supplied for easy access to the stored data. | O | Y | | |
| 3.20.5 | AVM drive-train data and mechanical alarms shall be collected from the installed Engine Control Module provided by the vehicle's manufacturer and/or the installed Multiplexer I/O system. | O | Y | | |
| 3.20.6 | Alarms shall be transmitted over CAD/AVL cellular for real-time display to maintenance users. | O | Y | | |
| 3.20.7 | The AVM data messages and alarms shall be stored for analysis and interface to the Agency's Vehicle Maintenance System. | O | Y | | |
| 3.20.8 | Up to twelve (12) user defined discrete inputs shall be provided to monitor mechanical alarms. | O | Y | | |
| 3.20.9 | System shall monitor the Emergency Alarm, low oil pressure, hot engine, and low air pressure. | O | Y | | |
| 3.20.10 | System shall allow user/Agency to define and connect unused discrete inputs for future requirements. | O | Y | | |

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| 4 | **Dispatch and Data Reporting** | | | | |
| 4.1 | **Text Messaging** | | | | |
| 4.1.1 | Messages shall be capable of being grouped into categories for quick selection. | M | Y | | |
| 4.1.2 | Canned message categories and message text shall be user definable. | M | Y | | |
| 4.1.3 | The operator and dispatcher shall be able to reply to a message in the queue in either a canned response or free-form text message. | M | Y | | The operator and dispatcher shall be able to reply to a message in the queue in a canned response |
| 4.1.4 | A text message shall support an acknowledgement message back to dispatch once the driver has viewed a message flagged by dispatch as requiring acknowledgement. | M | Y | | |
| 4.1.5 | Text messages shall be either deleted or saved by the Operator after viewing. Storage for saved text messages shall handle a minimum of eight messages. | M | Y | | |
| 4.2 | **Automated Recording and Archiving** | | | | |
| 4.2.1 | The CAD/AVL system shall store the position and tracking of the transit vehicles in some form of database. | M | Y | | |
| 4.2.2 | Database shall include ability to query the data with different parameters for performance and safety improvements. | M | Y | | |
| 4.2.3 | Data shall be stored in a database for planning and evaluation purposes. The specific requirements shall be decided by the Agency and should include an assessment of the following: | M | Y | | |
| 4.2.3.a | Length of time AVL data is to be stored | M | Y | | |
| 4.2.3.b | The sampling rate AVL data is to be stored (i.e. at every minute, at every stop). | M | Y | | |
| 4.3 | **Real-time, Reporting, and Archival Data** | | | | |
| 4.3.1 | System shall provide the Agency the right to access, use, and distribute data to create interfaces to the CAD/AVL system, export data to other agencies and third party licensed systems, generate reports, and for other Agency purposes. | M | Y | | |
| 4.3.2 | Access to real-time operating data shall not be affected by the Agencies reporting and data access by user groups other than dispatchers and supervisors. | M | Y | | |
| 4.3.3 | Proper safeguards shall also be enabled to ensure dispatcher and supervisors cannot overload the primary database server with faulty or ill-designed queries. | M | Y | | |

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| 4.3.4 | If required, a secondary database server that takes the processing load off of the primary real time database shall be provided for the purpose of data retrieval for reporting and data analysis. | M | Y | | |
| 4.3.5 | Enough online data storage shall be provided to keep at least three (3) years of historical data. | M | Y | | |
| 4.3.6 | Applications and tools shall be provided for historical data access. | M | Y | | |
| 4.3.7 | Provisions shall be provided to save data and database schema more than three years old to long term storage media such as magnetic tape, CD, DVD, etc. and delete the archived data from the main or secondary database(s). | M | Y | | |
| 4.3.8 | Provisions shall be provided to restore data by copying archived data from long term storage to either a stand-alone database machine or onto the current database(s). | M | Y | | |
| 4.3.9 | Archiving data shall be possible by either a graphical user interface or via the command line for automating tasks. | M | Y | | |
| 4.4 | **Daily Schedules** | | | | |
| 4.4.1 | The CAD/AVL system shall automatically load the daily schedule of blocks, runs, driver/operator assignments, and vehicle assignments. | M | Y | | |
| 4.4.2 | The CAD/AVL system shall support an overlap of daily schedules for service that continues past midnight. | M | Y | | |
| 4.4.3 | The CAD/AVL system shall support multiple service types to accommodate service variations at the route and trip level per technical requirements. | M | Y | | |
| 4.4.4 | Each schedule day shall permit assignment of multiple service types. | M | N | | The system can support multiple service types but only one service type is allowed be day. |
| 4.5 | **Incident Reports** | | | | |
| 4.5.1 | The CAD/AVL system shall provide an integrated Incident Reporting subsystem per technical requirements. | M | Y | | |
| 4.5.2 | Incident types and the association of data messages to incident types shall be user definable. | M | Y | | |
| 4.5.3 | A form creation editor shall be provided that provides the CAD/AVL System Administrator the capability to create property-specific customized incident forms that are accessible to dispatchers and other users of the CAD/AVL system. | M | N | | We support one incident form but it can be property specific. |
| 4.5.4 | Forms shall be created and associated with incident types. | M | N | | Avail's form includes all field necessary for each incident type. |

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| 4.5.5 | Every new Incident Report shall be uniquely identified and the associated Incident Report form displayed for completion. | M | Y | | |
| 4.5.6 | Incident forms shall include data fields supported and auto-populated by the CAD/AVL system as well as user defined fields per the technical requirements. | M | Y | | |
| 4.5.7 | User definable fields shall be implemented such that custom fields do not inhibit upgrades to software. | M | Y | | |
| 4.5.8 | Incident forms shall include a combination of automatically filled in data fields and manually entered data fields. Upon creation of an incident report all known CAD/AVL data shall be "pre-populated" or automatically entered into the configured incident form fields. | M | Y | | |
| 4.5.9 | An open Incident Report Queue shall be provided for each dispatcher logged into the CAD/AVL system along with information about dispatcher responsibility. All Incident Reports must be closed or responsibility transferred prior to the dispatcher logging off. | M | Y | | The event queue shows the dispatcher who is responsible for the incident. In the event the dispatcher logs off the incident returns to the queue and is shown as open and available for another dispatcher. |
| 4.5.10 | The current date, time, and user ID shall be stamped to indicate information that is added to an Incident Report after the original owner of the Incident Form has closed the incident. | M | Y | | |
| 4.5.11 | Incident Reports shall provide the following capabilities: | M | | | |
| 4.5.11.a | Incident Forms shall have the option to be required for specific incident types. | M | Y | | |
| 4.5.11.b | If a message requiring an Incident Form is deleted the CAD/AVL system shall generate the form and mark it as CAD/AVL generated. | M | N | | An incident can not be deleted without filling out the incident or logging the event. A dispatcher can logoff and the incident will remain open and available to other dispatchers. |
| 4.5.11.c | Incident Reports shall provide access to a spell checker. | M | Y | | |
| 4.5.11.d | Incident Reports shall be capable of being forwarded to individuals or groups of individual electronically. | M | Y | | |
| 4.5.11.e | Incident reports shall have the capability to be displayed online for at least twelve months for any new, open, or closed Incident Report. | M | Y | | |
| 4.5.11.f | Incident Reports shall be able to be queried based upon CAD/AVL variables such as open/closed status, date range, incident type, dispatcher ID, Operator ID, Route, or vehicle ID. | M | Y | | |

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| 4.5.11.g | Mechanical, breakdown, and vehicle switch out Incident Reports shall provide an interface to the Maintenance system to document the incident for maintenance action. | M | N | | |
| 5 | **Scheduling System** | | | | |
| 5.1 | The Contractor shall convert the existing route and stop databases from each of the agencies to import that data in the proposed schedule software database. | M | Y | | |
| 5.2 | The scheduling system shall also have the ability to import stop data from an external system in excel or comma separated value (CSV) file format | M | Y | | |
| 5.3 | The scheduling system or CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) using a GTFS feed. | M | Y | | |
| 5.4 | The system shall have the capability to create and define an unlimited number of bus stops and nodes. | M | Y | | |
| 5.5 | The system shall be able to create new routes and update exiting routes. | M | Y | | |
| 5.6 | The system shall be able to create new patterns and update existing patterns, including time points and stops. | M | Y | | |
| 5.7 | The system shall permit the user to define bus stops using a variety of methods, as identified in the technical requirements. | M | Y | | |
| 5.8 | The system shall be capable of allowing stops to be properly positioned at intersections. | M | Y | | |
| 5.9 | The system shall be capable of allowing the user to assign stop amenities (e.g., bench, shelter, etc.) to each stop and other supplemental data. | M | Y | | |
| 5.1 | The system shall allow any number of trip patterns to be defined as distinct bus stop sequences, as identified in the technical requirements. | M | Y | | |
| 5.11 | The system shall be capable of displaying all trip patterns, or fixed portions of flexible trip patterns, on a map for visual display. | M | Y | | |
| 5.12 | The system shall be capable of calculating distances for deadhead route segments, entire trip patterns, and selected trip pattern segments defined by the user. | M | Y | | |
| 5.13 | The system shall allow the definition of average running speeds, for various days and time periods, for deadhead segments and between designated pairs of stops along each trip pattern. | M | Y | | |

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| 5.14 | The system shall be able to generate a list of turning movements for an entire trip pattern. | M | Y | | |
| 5.15 | The system shall allow routes to be defined as a sequence of trips using selected trip patterns during defined time periods. | M | Y | | |
| 5.16 | **System Viewing** | | | | |
| 5.16.1 | The system shall allow the viewing of pattern statistics, as identified in the technical requirements. | M | Y | | |
| 5.16.2 | View a pattern's route adherence along a route or corridor. | M | Y | | |
| 5.17 | **Creation of Timetables** | | Y | | |
| 5.17.1 | The system shall be capable of rotating the extra board automatically. | M | Y | | |
| 5.17.2 | The system shall be capable of calculating the running time between any pair of timepoints on any trip pattern, taking into account running speeds. The system shall also allow running times to be manually input if needed, such as for deviated/flexible route segments. | M | Y | | |
| 5.17.3 | The system shall be capable of automatic or manual trip building for each route, using the designated sequence of trip patterns, per the technical requirements. | M | Y | | |
| 5.17.4 | The system shall permit users to automatically or manually assign trip numbers. | M | Y | | |
| 5.17.5 | The system shall allow for modifying built trips, based on modifying a single trip pattern, all trips in a single direction or a combination of the above. | M | Y | | |
| 5.17.6 | The system shall permit authorized users to assign specific vehicle types to trips. | M | Y | | |
| 5.17.7 | The system shall be capable of computing deadhead time, including the effect of varying running speed in various time periods. | M | Y | | |
| 5.17.8 | The system shall provide summary data on trips and running times, per the technical requirements. | M | Y | | |
| 5.18 | **Vehicle Assignment** | | | | |
| 5.18.1 | The system shall be capable of either automatic or manual vehicle block development based on user-defined variables, per the technical requirements. | M | Y | | |
| 5.18.2 | The system shall allow users to automatically or manually assign block numbers. | M | Y | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 5.18.3 | The system shall be capable of developing potential interline relationships for the entire service or based on the user selecting specific routes or trips. | M | Y | | |
| 5.19 | **Runcutting** | | | | |
| 5.19.1 | The system shall be capable of cutting single-piece or multi-piece work assignment runs, per the technical requirements. | M | Y | | |
| 5.19.2 | The system shall allow users to automatically or manually assign run numbers. | M | Y | | |
| 5.19.3 | The system shall generate runs that incorporate all applicable agency labor agreement provisions. | M | Y | | |
| 5.19.4 | The system shall generate runs that incorporate agency management rules. | M | Y | | |
| 5.19.5 | The system shall provide a notification flag when a manual or automatically generated runcut violates a management rule or labor agreement provision. | M | Y | | |
| 5.19.6 | The system shall allow for the development of alternative runcut scenarios, per the technical requirements. | M | Y | | |
| 5.19.7 | The system shall allow the shifting of trip relief times (stated in block tables) to optimize runcuts. | M | Y | | |
| 5.19.8 | The system shall allow the user to specify compressed work weeks (e.g., 4 day work weeks, 10 hour days). | M | Y | | |
| 5.19.9 | The system shall permit the agency to manually cut some or all of the blocks. | M | Y | | |
| 5.2 | **Rostering and Bid Management** | | | | |
| 5.20.1 | The system shall support both roster and cafeteria style bids. | M | Y | | |
| 5.20.2 | The system shall be able to create and maintain rosters including the extra board. | M | Y | | |
| 5.20.3 | The system shall be capable of building bid rosters automatically. | M | Y | | |
| 5.20.4 | The system shall permit users to automatically or manually assign roster numbers. | M | Y | | |
| 5.20.5 | The system shall have the capability to take into account special service in effect for selected dates (e.g., holidays). | M | Y | | |
| 5.20.6 | The system shall allow agency staff to establish rules on which rostering suggested by the system will be based. | M | Y | | |
| 5.20.7 | The system shall have the capability to create separate rosters for various groups of vehicle operators (e.g., part-time rosters). | M | Y | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 5.20.8 | The system shall have the capability to validate the transitions between rosters for two consecutive bid periods. | M | Y | | |
| 5.20.9 | The system shall have the capability to automatically generate one roster at a time or all rosters. | M | Y | | |
| 5.20.10 | The system shall allow agency staff to access human resources information that has been imported into the system for any bus driver (optional). | M | Y | | |
| 5.20.11 | The system shall validate driver choices to determine whether each driver meets minimum rest time requirements between runs. | M | Y | | |
| 5.20.12 | The system shall validate driver choices to determine whether each driver meets requirements for minimum/maximum assigned work load. | M | Y | | |
| 5.20.13 | The system shall be able to associate a driver to a specific roster or rosters. | M | Y | | |
| 5.20.14 | The system shall generate work on a nightly basis from the schedule's bids. | M | Y | | |
| 5.20.15 | The nightly generation shall generate work a user-defined number of days into the future. | M | Y | | |
| 5.20.16 | Extra board items shall be included. | M | Y | | |
| 5.20.17 | Report Generation errors or rule violations that occur during schedule generation shall be identified. | M | Y | | |
| 5.21 | **Schedule Validation** | | | | |
| 5.21.1 | Schedule Validation must allow the user to review different aspects of the schedule and validate the schedule against a set of rules. | M | Y | | |
| 5.21.2 | All additions, omissions, time modifications, conflicts and errors shall be propagated through the rest of the schedule and be validated against a set of rules developed by the agency. | M | Y | | |
| 5.21.3 | Conflicts or errors associated with the changes must be highlighted in the application and noted to the agency. | M | Y | | |
| 6 | **Data Management** | | | | |
| 6.1 | The CAD/AVL system should include data management software to manage the entry, and manipulation of data and automate reporting for performance monitoring. | M | Y | | |
| 6.2 | The data management system should integrate with the scheduling software and facilitate easy National Transit Database (NTD) reporting. | M | Y | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| Section Number | Description | Mandatory or Optional (M/O) | Comply? (Y/N) | If yes, provide proposal section reference | If no, propose alternate requirement language |
| 6.3 | The system shall be capable of establishing automatic daily, weekly, monthly, quarterly routines to produce and email standard PDF reports to defined user groups. | M | Y | | |
| 6.4 | Standard reports shall be developed through the design review process, and shall include at minimum: | M | | | |
| 6.4.1 | Schedule Adherence (by stop or timepoint) | M | Y | | |
| 6.4.2 | Passenger Loadings and Alightings (by stop and capacity) | M | Y | | Capicity is not included in report |
| 6.4.3 | Daily Revenue | M | Y | | |
| 6.4.4 | Missed Trips | M | Y | | |
| 6.4.5 | Stop Time Analysis | M | Y | | |
| 6.4.6 | Farebox vs. APC validation | M | Y | | |
| 6.4.7 | Layover/Recovery | M | Y | | |
| 6.4.8 | In-service hours | M | Y | | |
| 6.4.9 | Actual hour and actual miles | M | Y | | |
| 6.4.10 | Route deviation | M | Y | | Available in Replay |
| 6.4.11 | Travel time and average speeds | M | Y | | Running Times Report |
| 6.4.12 | Driver Log ins (by bus and route) | M | Y | | Avail reports log ins by bus. |
| 6.4.13 | Origin and Destination Information | M | Y | | |
| 6.4.14 | Dashboard | M | Y | | |
| 6.4.15 | Wheelchair Lift Use (by stop) | M | Y | | |
| 6.4.16 | Bike Rack Use (by stop) | M | Y | | |
| 6.4.17 | Luggage Bay Use (by stop) | M | N | | Further Definition Required. |
| 6.4.18 | Incidents | M | Y | | |
| 6.4.19 | Bus Change-off | M | Y | | Log on/logoff report |
| 6.4.20 | Collisions | M | Y | | Incident reports |
| 6.4.21 | General Delay | M | Y | | Running Times Report |
| 6.4.22 | Trip Delays | M | Y | | Running Times Report |
| 6.4.23 | Trip Cancellation | M | Y | | Missed Trips Report |
| 6.4.24 | Equipment Issues | M | Y | | |
| 6.4.25 | Vehicle Locations | M | Y | | |
| 6.4.26 | Vehicle Speeds | M | Y | | |
| 6.4.27 | Vehicle Performance | M | Y | | |
| 6.4.28 | Communications Status | M | Y | | |
| 6.4.29 | Emergency Alarm | M | Y | | |
| 6.4.30 | Driver Incident (incapacitated, sick, performance) | M | Y | | |
| 6.4.31 | System Diagnostics | M | Y | | |
| 6.4.32 | Maintenance | M | Y | | |
| 6.4.33 | On Peak Loading by Route, Trip, and Stop | M | Y | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 6.5 | All reports shall have the capability to export information into a common analysis and text editing office software such as Microsoft Excel and Word. | M | Y | | |
| 7 | **Real Time Passenger Information** - | | | | |
| 7.1 | The system shall generate real-time arrival/departure predictions for all vehicles that are integrated in the proposed CAD/AVL system. | M | Y | | |
| 7.2 | The real-time arrival predictions shall report predicted arrival times based on actual arrivals and not based on scheduled arrivals. | M | Y | | |
| 7.3 | The CAD/AVL system shall be able to interface with field equipment including passenger information displays, agency websites and mobile applications to provide and display real-time arrival/departure data for fixed-route and demand-response vehicles. | M | Y | | Demand response information would need to be provided by Paratransit software |
| 7.4 | The data required to be provided to the field equipment, agency websites and mobile applications includes current bus schedules, bus schedule adherence status, and estimated (predicted) arrival/departure times of transit vehicles at designated bus stops and transit centers. | M | Y | | |
| 7.5 | The real-time arrival predictions shall meet or exceed the following performance criteria: | M | Y | | |
| 7.5.1 | For predictions between one and ten minutes, the prediction accuracy shall be three minutes or less for 90% of the generated predictions. | M | Y | | |
| 7.5.2 | For predictions between 11 and 25 minutes, the prediction accuracy shall be four minutes or less for 85% of the generated predictions. | M | Y | | |
| 7.5.3 | For predictions more than 25 minutes, the prediction accuracy shall be six minutes or less for 85% of the generated predictions. | M | Y | | |
| 8 | **Passenger Information Displays** | | | | |
| 8.1 | The Contractor shall provide passenger information signs that display, at the stop level, the estimated count-down arrival time and/or departure time of the next buses at the stop within a defined time interval. | M | Y | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 8.2 | Both scheduled and dynamic text message capabilities shall be provided to either individual or groups of signs. | M | Y | | |
| 8.3 | A user interface shall provide easy setup, configuration, diagnostic, and messaging status at all sign locations. | M | Y | | |
| 8.4 | The displays shall be able to display multiple routes, CAD/AVL system time, ad hoc messages, and scheduled messages. | M | Y | | |
| 8.5 | Physical design of the sign shall be modular for easy maintenance, vandal resistant, and suitable for an outdoor environment. | M | Y | | |
| 8.6 | Solar power, high brightness LED displays, and multi-line displays shall be available where required by operational needs. | M | Y | | |
| 8.7 | The final location of the Contractor supplied bus stop and shelter passenger information displays shall be determined prior to the final design approval. | M | Y | | |
| 8.8 | Assistance shall be provided to the Agency in acquiring necessary permits. | M | Y | | |
| 8.9 | Outdated information for a transit vehicle on the display shall be cleared within a maximum of fifteen (15) seconds of the transit vehicle departing the stop or station. | M | Y | | |
| 8.1 | Proposers shall indicate what means (wired or wireless) shall or can be used to connect to the passenger information displays. | M | Y | | |
| 9 | **Mobile Applications (Apps)** | | | | |
| 9.1 | The CAD/AVL system shall generate and disseminate real-time transit traveler information to the regional 511 system, agency-owned infrastructure, and web/mobile services. | M | Y | | |
| 9.2 | The system shall update real-time arrival predictions and generate service alerts to mobile applications based upon real time service adjustments and measures implemented by the agency dispatchers including: | M | Y | | |
| 9.2.1 | Cancelled Service; | M | Y | | |
| 9.2.2 | Detours (planned or ad hoc); | M | Y | | |
| 9.2.3 | Drop off only; | M | Y | | |
| 9.2.4 | Additional of supplemental service ('trippers') in addition to scheduled trips. | M | Y | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| 9.3 | It is desired that the Contractor develop a mobile app to allow transit riders to communicate with Dispatch or other Operations staff to report suspicious activity, crime, or quality of life problems at a transit station or on a bus. | O | Y | | Avail will utilize the "feedback" feature of our mobile app to provide this capability |
| 10 | **511 Integration** | | | | |
| 10.1 | The CAD/AVL system shall support the exchange of data with the Bay Area's regional 511 traveler information system operated by the Metropolitan Transportation Commission (MTC). | M | Y | | |
| 10.2 | Data exchange with 511 shall consist of the following: | M | Y | | |
| 10.2.1 | Export of static configuration data. | M | Y | | |
| 10.2.2 | Export of real-time arrival information. | M | Y | | |
| 10.2.3 | Export of CAD/AVL system status information to 511. | M | Y | | Avail would like to learn more about this requirement to clarify "system status" information |
| 10.2.4 | The latest requirements and specifications for the 511 integration shall be gathered from the Metropolitan Transportation Commission (MTC). | M | Y | | |
| 10.3 | The CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) and other types of static and real-time information using GTFS. | M | Y | | |

# 7 System Warranty and Support

> *The support staff has been awesome in answering questions and resolving issues related to our move to a new facility. They call to check in on how things are functioning and reiterate that they are available for assistance in support, for planning, and for any technical issues, etc.*
>
> *Kelly Stewart*
> *Public Relations/IT Manager*
> *The Bus – Butler, PA*

By this point in our proposal we hope you see the theme that runs through everything we do as a company; from our Progressive Technologies, to our Unique & Innovative Processes, to our Traditional Values approach to doing business we guarantee your success. As your partner we want to make sure you get the most out of your investment with us and truly achieve every goal and objective that led you to make this commitment in the first place. We understand that you might be concerned about making sure your staff has adequate knowledge to operate your new system. In addition to our elite training program, Avail offers a comprehensive warranty and support plan to ensure that the solution we deploy stays in peak condition to provide the long life cycle our current customers enjoy. But our support is much more than just a guarantee. It is built around offering value-added services for no additional charge ensuring your staff gets the most benefit from the system. Need more training, we provide it. Have a question, we'll answer it. Need a new query, we'll write it. Forget how to do something in particular with the system, we'll show you or if you want we'll do it for you! By this point in our relationship we will have earned your trust and our staff will simply be an extension of your staff to help do whatever it is you need done. How do we know this? Because we trust if you call any of our customers, that's exactly what they will tell you based on their experience of working and partnering with us. Below are more details on key aspects of our warranty and support offering:

### 7.1.1 System Support

Within our baseline solution we have included Avail's 24/7 support for this solution. Our help desk can be reached via our office number (814-234-3394) at extension 1050 or via email support@availtec.com. If you call and all of our staff is on the phone, you can leave a voicemail message. Voicemails and incoming emails are automatically routed to all help desk staff to ensure the most prompt response. The same phone number is used after hours, but 24/7 customers have a special PIN number to get routed to the on-call help desk staff.

As we've mentioned previously, another unique step we take to ensure we provide you with the best possible support is we assign a primary Customer Support Engineer at the start of your project to provide all training. That same CSE is your personal contact for support after System Acceptance. The benefit of this practice is you get to know and build a relationship with the support person who is going to assist you long after System Acceptance. For them the benefit is they get to know your staff and your operations intimately, allowing them to provide intuitive and insightful support when you do call. Any one of our support staff can handle your needs, but knowing you have a primary contact offers peace of mind and is one of the key reasons for our high marks in customer satisfaction.

Avail's system hardware and vehicle architecture has been designed to withstand the rigors of the transit industry. But in the event a part does malfunction, the modular design and high reliability of Avail's solution allows you to swap and replace components as needed with very little effort, restoring your fleet to revenue service without skipping a beat. All backend services and support are handled via the remote VPN access by Avail's highly skilled support engineers and staff.

### 7.1.2 Software Updates

Avail continuously invests in R&D to ensure our products and solutions lead the industry in forward thinking innovation. While we would like to believe all of our great ideas come from us, the truth is a great deal of our innovation comes from working hand-in-hand with our customers. We listen to their suggestions and feedback and incorporate what we learn into our products and processes. Therefore it is extremely important to us that we offer a generous software update policy to our customers to reward the vital role they play in the advancement of our products:

- ✓ We include software updates and upgrades as part of our software maintenance contract
- ✓ We ensure as we add features and capabilities we always maintain backwards-compatibility

The end result is we make sure your system stays up-to-date and therefore you always benefit from our latest advances and progressive technologies.

### 7.1.3 Software Maintenance & Licensing Agreement

We provide the most comprehensive full-service value-added annual maintenance plan in the industry. Our goal is to earn customers for life. For our customers, the Avail solution is the last major ITS system investment they will ever need to make. We work closely with our customers to ensure a capital investment strategy in annual maintenance, as well as coordinating with their bus replacement schedule to keep our customers current with our latest offerings. Some of the key services we provide as part of the annual maintenance plan include:

- ✓ Software updates and upgrades, query writing services, and report development;
- ✓ Follow-on Adoption Support Training and an invite to annual FAST™ regional forums;
- ✓ Development and maintenance of a FAST™ and Technology Adoption Plan;
- ✓ Refresher training or training for new hires;
- ✓ and more...

Offering these services is the key to fulfilling our Vision and ensures our customers achieve the goals, objectives, and ROI that led them to invest in our system in the first place. Please take a moment to review the standard Maintenance Agreement and Software Licensing Agreement on the next few pages.

**DRAFT: Maintenance and Support Agreement**

THIS AGREEMENT ("AGREEMENT"), by and between the [*insert property name*] hereinafter "PROPERTY", and AVAIL TECHNOLOGIES, INC., a corporation, located at 1960 Old Gatesburg Rd., Suite 200, State College, PA 16803, hereinafter called "AVAIL", collectively referred to as the "PARTIES", shall become effective the date of System Acceptance.

WHEREAS, AVAIL has licensed to the PROPERTY certain systems as specified in the Software License Agreement of near or even date herewith (the "License Agreement") and PROPERTY wishes to have AVAIL perform maintenance services on the software and associated hardware of the licensed systems pursuant to the following terms and conditions and the terms and conditions of the License Agreement:

1. **Description and Term**

   a. Systems Covered
   The materials covered in this Agreement are the hardware and software required for deployment of the AVAIL Intelligent Transportation System (ITS). The software which includes AVAIL's OmniPoint Software Suite ("Software"), is defined and more fully described in, and subject to, the signed Software License Agreement, as updated with any improvements or modifications furnished to PROPERTY hereunder;
   b. Sites
   c. Term

The initial term shall be for five years (5), commencing upon the Support Date as defined in this document. The Agreement shall be reviewed by both Parties for any renewal of term at least sixty (60) days prior to the expiration of the current term.

d. Defined Inclusive Period of Service:
   1. System Acceptance Date – Ending five years (5) post System Acceptance

2. **Definitions**

a. "Specifications" shall mean the documentation to which the Software must conform as set forth in the license Agreement;
b. "Error" shall mean a material and reproducible failure of the Software to function in conformity with the Specifications.
c. "Additional Services" shall mean any service that is not covered by this agreement;
d. "Hosted Support" shall mean AVAIL will house, implement, maintain and backup the customer fixed-end system on AVAIL owned (or leased) equipment for the duration of the contract period.

3. **Customer Support Plans**

a. Customer has elected the level of support as defined in Figure 1

4. **AVAIL Responsibilities**

During the term of this Agreement, AVAIL shall provide the following support measures.

AVAIL shall provide:

a. There are two problem resolution standards for the levels of support (See Figure 1):

   1. General Provision:

      a. Telephone hot line access for problem and error reporting and response of diagnostic services;
      b. Ability to initiate support requests via e-mail to Support@Availtec.com
      c. AVAIL shall staff their Call Center during regular business hours see Figure 1. In case of a support call, AVAIL will want to collect the pertinent information as soon as practical. In the event that AVAIL cannot answer the initial call, a voicemail service shall be operative as a backup system;

   2. Routine Care – (as defined in Figure 1)

      a. AVAIL shall respond to the call as stated in Figure 1;
      b. The problem will be entered into the AVAIL tracking system, entering the Caller's Name, Property Name and Contact Phone Number;
      c. AVAIL shall keep PROPERTY advised of a plan for resolution of the error as soon as practical;
      d. If the error occurs after AVAIL business hours, the Caller shall still leave a voice message with the same information as listed above.

   3. Urgent Care – (as defined in Figure 1)

      a. AVAIL will respond to a call as stated in Figure 1;
      b. Upon receipt of the call, the Support Team will immediately begin to assess the error and begin the process of resolving the problem. Resolution shall be conveyed to PROPERTY as soon as practical;
      c. The error will be entered into the AVAIL tracking system:
      d. On-site response for requests for remedial support and diagnostic repair services in response to shall be pursuant to Section 11.b.4 of this Agreement.

   4. System Self-Diagnostics and Self-Healing capabilities

      a. Through the use of sophisticated software monitoring system, the system will notify the operations staff of potential system degradation and alerts the on-call staff via message 24 hours / 7 days a week.

b. Through these same techniques, the system has the capability to self-heal processes that have stalled or failed.

5. **PROPERTY Responsibilities**

PROPERTY shall give AVAIL, their full cooperation to facilitate proper and prompt performance of the Support Services and any additional services that the PARTIES agree.

PROPERTY shall provide:

a. A key technical contact that shall be familiar with the System to provide adequate information and feedback in order to facilitate problem reporting and resolution;
b. The key technical contact will be aware of the terms and conditions under which AVAIL Systems provides after hours support:
c. Promptly notify AVAIL of any error in the System;
d. Provide sufficient information for AVAIL to effectively diagnose errors including a detailed description of the issue in text format, an explanation of what the user was doing when the issue occurred, any error messages that the system returned, screen shot images of the error, the current status of the system, a determination if the system is functional, and a state retrieval, if requested;
e. Permit AVAIL to take such reasonable steps as AVAIL shall consider necessary to remedy any errors;
f. Allow AVAIL prompt and reasonable access to:
1. The Software and ITS Server system through a Virtual Private Network (VPN) in case of primary server hardware failure and access to other 3rd party systems such as the communications network provider, as described in the IT/IS Vendor Guidelines as presented in the contract.
2. PROPERTY's physical sites, at the locations specified in the Support Plan of this Maintenance and Support Agreement.
g. Provide a safe and secure work environment at the site(s) for AVAIL's authorized personnel performing Support Services and additional services on-site.

PROPERTY shall not permit any person other than authorized AVAIL personnel to make corrections or in any way modify the Software. Any work, repair, replacement, remedial support, emergency support, or correction necessary will be in violation of this provision shall be considered additional services.

6. **Software Maintenance**

AVAIL shall notify and make available to the PROPERTY all, Purchased Feature Enhancement and Bug Fixes to the software for the current software license. The nature and extent of the elements to be included or covered in any Enhancement, or Bug Fix shall be determined solely by AVAIL.

Purchased Feature Enhancements and Bug Fixes will be made available to the PROPERTY at no additional charge other than the costs for additional hardware, configuration, integration, testing, travel and lodging and per diem, provided they are current in their payment for Maintenance and Support fees.

In the event the PROPERTY has elected not to pay the Maintenance and Support Fees, they may obtain updates of a Purchased Feature Enhancements and Bug Fixes by paying the aggregate annual Maintenance and Support Fees which would otherwise have been due from the date of discontinued Maintenance and Support Services to the date such Purchased Feature Enhancement or Bug Fixes becomes generally available.

As soon as practical, AVAIL will provide the PROPERTY with information relating to any software New Features during the term of this Agreement. New Feature Purchase shall be negotiated and agreed to in writing, between the PARTIES, prior to any work beginning on the requested task. All efforts shall be made by the PROPERTY to provide AVAIL access to the individual Software server through the VPN process. Any New Feature Purchases, Purchased Feature Enhancement and Bug Fixes provided shall be governed by all of the terms and provisions of this agreement.

Upon notification, the PROPERTY shall have six (6) months from receipt of such notice to authorize AVAIL to deliver the product, provided they are current in their payment for support fees. All New Feature Purchases,

Purchased Feature Enhancements, or Bug Fixes provided, shall be considered Software for purposes of the Software License Agreement and this Maintenance and Support Agreement.

AVAIL agrees to provide to the PROPERTY the elected level of support as defined in section 3a for the Software and any subsequent upgrades during the full term of this Agreement (including all renewals) through the end of this contract or any subsequent extension of Maintenance and Support Services; provided that the PROPERTY has paid the applicable Maintenance and Support Charges hereunder as and when they become due. AVAIL agrees that its failure to continue to provide such support shall constitute a material breach of this Agreement.

AVAIL agrees to provide to the PROPERTY the Level of Support as stated in Figure 1 for the Software and any subsequent upgrades during the full term of this Agreement (including all renewals) through the end of this contract or any subsequent extension of Maintenance and Support Services; provided that the PROPERTY has paid the applicable Support Charges hereunder as and when they become due. AVAIL agrees that its failure to continue to provide such support shall constitute a material breach of this Agreement.

7. **Maintenance and Support Services**

a. PROPERTY shall pay the Maintenance and Support charges set forth, and PROPERTY will receive technical support for the term of this Contract;

b. Provided PROPERTY has paid the applicable Maintenance and Support, AVAIL shall support the Hardware and Software as set forth in this Agreement;

c. Corrections - For a period of Twelve (12) months following the release of a Major Release upgrade, AVAIL will use reasonable efforts to support any previously Release of that Software program. AVAIL shall advise PROPERTY as soon as practical, of the intention to discontinue support services of any version of AVAIL software currently in use by PROPERTY. AVAIL shall also maintain this requirement for the subcontractors they use for this Project;

d. AVAIL shall have no obligation to correct problems which are traced to any PROPERTY errors, modifications, enhancements, software or hardware;

In the event that AVAIL provides any additional services requested by PROPERTY, AVAIL shall invoice for such additional services based upon its then-current time and material rates. PROPERTY shall pay all charges for such additional services within thirty (30) days from the date of invoice. Charges for additional services may include fees for labor, materials, hardware components, shipping, software, documentation, and/or other products or services and associated expenses, including reasonable travel expenses incurred by AVAIL when providing additional services at PROPERTY's request.

Additional Maintenance and Support, which shall follow the completion of the five (5) year Support period may be extended for an agreed upon timeframe by the PARTIES. The cost would be at AVAIL's then-current standard Maintenance and Support Fees for as long as AVAIL offers such support. The intent is to make payment of the applicable fees in advance of each anniversary of the completion date. If PROPERTY purchases Maintenance and Support for any copy of the Software, it must purchase Maintenance and Support for all licenses of such Software unless PROPERTY has discontinued the use of certain licensees within the Avail Suite of purchased and installed modules.

8. **Travel Expenses**

PROPERTY will reimburse the AVAIL for any reasonable out-of-pocket expenses deemed appropriate and as approved by PROPERTY's staff assigned to this project, including airfare, travel to and from PROPERTY's site, lodging, meals and shipping, as may be necessary in connection with the duties performed under this Agreement by AVAIL. Appropriate expenses shall be limited to those incurred on site visits associated with the performance of this Agreement which shall receive prior approval from PROPERTY. AVAIL shall submit requests for reimbursement to PROPERTY. Such requests shall be accompanied by documentation substantiating the expense. Invoices for these expenses shall be presented to PROPERTY by the AVAIL within fifteen (15) days of the end of the month.

9. **Confidentiality**

The Confidentiality provision of the Software license Agreement is hereby incorporated by reference into this Agreement.

10. **Maintenance and Support**

AVAIL represents to PROPERTY that all services provided hereunder will be performed in a workmanlike manner.

This Maintenance and Support agreement includes the software and hardware listed below for this entire term. If during the period of this Maintenance and Support Agreement, any software or device of the System were to become obsolete, AVAIL agrees to work with PROPERTY to provide a replacement device and to ensure its downward compatibility with the rest of the deployed system.

11. **Maintenance and Support Components**

a. Software (includes all applicable license fees):

CommandPoint Dispatch
CommandPoint Replay
CommandPoint TALE
CommandPoint WiNG
Control Point - Fixed Route
DataPoint
InfoPoint Sign Controller
InfoPoint Departure Estimator
InfoPoint Web – Public License
OmniPoint Database
OpenPoint WLAN
VitalPoint

1. System Support:

a. AVAIL will provide remote and, if necessary, on-site system support as per Section 11.b.4, for the term specified in this Agreement, for all software initially provided by AVAIL for sustaining the accepted system configuration;

1. Phone and Remote Diagnostic system Support:

a. AVAIL will provide consultation to PROPERTY's Key Technical Contact to:

1. Facilitate remote troubleshooting and solution implementation;
2. Acquire and review data logs for problem identification via remote access line;
3. Provide problem analysis and possible resolution;
4. PROPERTY must maintain remote access capability for AVAIL to diagnose reported software and systems problems. Remote access will be via a VPN connection;
5. AVAIL can, at PROPERTY's request, assist in arranging for service and support of non-warranted components (i.e. LAN interface to the Communications system and Installation / Removal services). AVAIL will not be responsible for the service call or system repair costs. Such costs will be billed to PROPERTY.

2. Exceptions:

a. If it is determined by AVAIL that a system problem was not due to an AVAIL installed component, PROPERTY will be responsible for all engineering and technical support, time and material costs. All labor will be charged at AVAIL's prevailing rates;
b. On-site support is not included in the offer but is available on a time and material basis. However, AVAIL will provide remote support to PROPERTY without additional charge.

b. Hardware
   1. Covered Equipment
   2. Covered Computer Equipment
   3. Time and Material Components
   4. Non-Covered Equipment
   5. Products deemed defective will be repaired at no additional cost for parts, material and labor. Products will be replaced, instead of repaired, at AVAIL discretion.
   6. System Maintenance:
      a. PROPERTY is responsible for equipment replacement as required for all installed equipment including:
         1. In-vehicle equipment;
         2. Wireless modem;
         3. Wireless LAN;
         4. Wayside Sign Component modules.

      b. System Maintenance includes removal of equipment, replacement with a spare, initial triage diagnostics and shipping to a designated repair point. Any item returned to AVAIL must follow AVAIL's RMA procedures;
         1. PROPERTY is responsible for shipping cost to AVAIL or designated repair point. AVAIL will return ship at AVAIL's expense.

   1. Exceptions:
   a. Non-technical hardware items such as batteries, racks, cables, connectors, mounts, handsets, speakers, antennas, sign audio buttons, KVM switches, network switches, memory storage media, panels and punch blocks are wear items and are not covered beyond the Vehicle Installation Support;

   b. AVAIL is not responsible for:

      1. Products that are not used and serviced according to the training and instructions provided by AVAIL;
      2. Products that have been altered, repaired or modified without prior consent from AVAIL;
      3. Products damaged by any third party equipment or intervention, force of nature or other conditions not In AVAIL's control;
      4. Products damaged due to negligence or abuse.
      5. Cost, loss or damages resulting from the use of AVAIL supplied products, including but not limited to, loss of time, inconvenience and loss of production;
      6. Shipping and shipping related costs of products mailed to AVAIL;
      7. Costs associated with parts, materials and labor provided by PROPERTY's Maintenance personnel.

   c. AVAIL may evaluate items not covered under Maintenance and Support and an assessment will be provided to PROPERTY. If PROPERTY agrees with the assessment, they will be charged for the labor to complete the evaluation, shipping and shipping related costs, parts and materials used and repair labor. If PROPERTY elects not to repair the item, only the labor required for the assessment will be charged. All labor is charged at AVAIL's prevailing rates for the required skill level.

   2. Time and Material Charges for Non-Supported Hardware Repairs or Support:
      a. To maintain system support coverage, all systems hardware must be returned to AVAIL for repair or approved for repair by AVAIL at a specified repair facility;
      b. Any returned unit may be repaired or replaced at the sole discretion of AVAIL;
      c. AVAIL will charge a minimum of one (1) hour for each issue or return with subsequent increments billed at one-quarter (1/4) hour intervals at AVAIL's prevailing rate charges (Please refer to Figure 1);

d. Charges for non-supported repair / replacement or support will include the prevailing Preferred Customer rates (subjected to periodic updates).
e. Travel and associated travel labor costs for on-site work (if required) are not included and will be invoiced to PROPERTY at travel costs shall be pursuant to Section 8 of this Maintenance and Support Agreement. An estimate of on-site costs will be provided prior to any travel expenses being incurred.

c. Installation

| | |
|---|---|
| Vehicle Installation | 90 Days |

d. System Maintenance Logging

All system maintenance or repair information, whether Hardware or Software, is collected and recorded via CRM Case Logs entry, RMA Tracking for Hardware and configuration management tools for Software.

The maintenance and support set forth in this agreement is a limited maintenance and support. The hardware and software, included under the initial installation, new feature purchases, purchased feature enhancements or bug fixes, are subject to the representations, warranties, indemnifications, limitations and disclaimers set forth in the license agreement.

1. Limitation of Liability

a. Except with respect to the obligations of Avail pursuant to section 8 of the software license agreement, in no event shall Avail's liability for any reason and upon any cause of action under the software license agreement exceed the maintenance and support fees paid by property to Avail;
b. Aside from the provisions listed in the contract and section 9 of the Software License Agreement Avail shall not be liable for any loss of profits, any incidental, special, exemplary or consequential damages; or any claims or demands brought against property or any third party.
c. The parties shall not rely upon and shall not grant any means of remedy arising from any statement, representation, maintenance and support or understanding of any person other than as expressly set out in this agreement.

2. Termination

a. Notwithstanding the foregoing, all provisions here of relating to confidentiality, proprietary rights, nondisclosure, indemnity and limitations of liability shall survive the termination of this agreement. In the event of termination under this paragraph, property will not be entitled to any refund of any portion of the fees paid to Avail under this agreement, unless Avail:
b. Materially breaches this agreement and fails to cure such breach within thirty (30) days after notice from property;
c. Delivers a notice that the software has been declared obsolete or withdrawn from sale;
d. Otherwise discontinues providing standard level of support for the OMNIPOINT software suite:
1. Avail shall refund to property an amount equal to the aggregate support charges paid by property for the time during which the standard level of support services was not provided to property.

**Figure 1 - Maintenance and Support Plan**

**Available Customer Support Plans**

| Plan | Description | |
|---|---|---|
| Standard Business Hours Support | • Routine Care and Urgent Care are provided during standard business hours. Progress updates provided every two business hours.<br>• If needed for a non-covered item, Time and Material | • Included in this Agreement |

| Plan | Description | |
|---|---|---|
| | charge mechanism must be in place before work will commence | |
| Extended Hours Support | • Urgent Care response 24/7 access to the Avail Support Team which includes Standard Business Hours Support and all NON-business hours of coverage to support Urgent Care needs.<br>• A customer support line to contact the on-duty support engineer at Avail.<br>• The continuation of Urgent Care resolution after Standard Business Hours.<br>• Progress updates provided every 2nd hour (or as agreed by your team). | • Selected |
| Hosted System | • Includes all features of Standard Business Hour Support and Extended Hours Support<br>• Avail operates and maintains the fixed end computer system in our dedicated data center operation<br>• Avail connects to your high speed communications interface provider<br>• Avail maintains system backup services and operational system redundancy<br>• Includes system hardware maintenance and software release maintenance and upgrades<br>• Avail provides the staff for operation and maintenance of the computer system at the hosted location | • Not Selected |

**Problem Resolution Standards**

| Level | Definition | Target action |
|---|---|---|
| Routine Care | • Production use of the system is possible, but a business function is disabled and no workaround exists;<br>• This category also applies to problems which severely impact the progress of an implementation project where no workaround exists. | • Initial response within (4) four business hours;<br>• Resource assigned within a day and remains assigned until resolution;<br>• Activity to resolve problem during business hours;<br>• Target Resolution: 72 hours. |
| Urgent Care | • Business Critical – Production use of the system is not possible;<br>• No communication with vehicles and no | • Initial response within (1) one business hour for Standard Business Hours Support; |

| Level | Definition | Target action |
|---|---|---|
| | workaround exists;<br>• PROPERTY requires resolution urgently do to financial, legal and public risk exposure. | • Extended Hours Support response time will be one (1) hour<br>• Resource assigned immediately and remains assigned until resolution;<br>• Immediate activity to resolve problem;<br>• Target Resolution: 24 hours. |

**Prevailing Labor Charges for non-Supported Repairs and Services**

a. Software Engineer - $154.00/hour
b. Technician - $88.00/hour

Rates are subject to periodic review and adjustment. Changes to the rate, if any, will occur no more frequently than annually.

**Reporting Process:**

1. Contact the Call Center and register problem with system - (814)-234-3394 (extension 1050);
2. If no answer at the Call Center, be sure to leave caller name, property name and contact phone number, description of problem;
3. Alternate contact:
   a. Fax - (814)-234-3393;
   b. E-mail- support@availtec.com.

**Standard Business Hours:**

1. Monday through Friday;
2. 7:30 AM to 6:30 PM EST;
3. National holidays excluded.

**Work Flow:**

Upon receipt of an issue, AVAIL support staff will begin documentation of the issue. The documentation shall record all pertinent information that has been received either by telephone or email. Following completion of the gathering of information regarding the problem, AVAIL support staff will categorize the issue and communicate the target action back to PROPERTY contact.

Once a problem has been identified, AVAIL support staff will work with AVAIL or third party engineering staff to determine an appropriate solution timeframe. Once the solution has been tested and proven viable, AVAIL support staff will contact PROPERTY to make arrangements for implementation. In the event that the solution cannot be tested and implemented within the timeframe that was initially communicated to PROPERTY, AVAIL support staff will attempt to implement a workaround for PROPERTY while pursuing resolution. In all cases, AVAIL will attempt to minimize the amount of time necessary to resolve the issue.

If AVAIL personnel cannot recreate the problem in the lab configuration, additional information may be required from PROPERTY. This may include but is not limited to screen shots in .bmp or .jpg format and/or retrieval of files from the affected software.

AVAIL will endeavor to resolve any system problems remotely through use of a Virtual Private Network (VPN). If both parties deem it necessary to travel to PROPERTY premises to resolve the problem, the on-site engineering /technical support services are included in this agreement. The cost for the travel and living expenses shall be agreed upon between the PARTIES. The engineering / technical support services rendered will be billed to PROPERTY if it is determined while on site that the problem resolution was not due to AVAIL's inability to re-create and resolve the problem remotely.

# 8 PRICE PROPOSAL & REQUIRED FORMS

Avail Technologies, Inc. is pleased to provide SolTrans, Petaluma Transit and VINE with this price proposal for the CAD and AVL System. The goal of our proposal was to introduce you to Avail and our offering plus show you how we are surprisingly different than the others submitting proposals. Hopefully at this point, we have reached that goal. Our proposal presents a compelling argument that we are the company to be your partner and history tells us this will yield great benefits. Our system is designed just as the RFP requested and that is to provide information to:

> *"Since the integration of the Avail Technologies' suite of ITS products, Votran has been saving over $400K annually in operating expenses."*
>
> ***Jim Dorsten***
> *Director of Finance/PM*
> ***Votran—Volusia County, FL***

- ☑ Improve on-time performance;
- ☑ Improve Dispatch Reliability and Efficiency;
- ☑ Increase Ridership;
- ☑ Improve Scheduling and Planning;
- ☑ Improve Communication;
- ☑ Improve Data Management and Reporting.

Now that you have read all the technical, programmatic, and informational substance that we feel is necessary to implement a successful project, we will bring the offering to a close with the cost proposal.

Because this system will be an integral part of your operation for many years to come, initial cost is not necessarily as significant as the overall value of the system and the ongoing operational costs. Avail's system provides ***exceptional value*** for your initial investment but also during the life cycle of the use of the system.

We have found as explained earlier that if you cut certain corners on projects of this nature, not only don't you get something that works properly; there is a good chance it won't work at all. We have taken great care to include all of the services that will make the agencies successful now and for many years to come.

In an effort to facilitate your review and ensure the agencies' evaluation committee has all the information you need to make an informed decision, Avail has included the following subsections within our Price Proposal:

1. Avail will provide some additional detail on our pricing, i.e. "Pricing Notes";
2. Next Avail will provide some information as to the standard "Value Added" features and services that we provide to all of our customers and that we feel truly set Avail apart from our competition;
3. The Price Forms have been completed and are included at the end of this section;
4. Finally, just as a means of putting four corners around exactly what Avail has included from an equipment standpoint and to provide the appropriate detail requested, Avail has provided a detailed Deliverables List to clearly detail what we are to deliver as part of our proposed solution.

## 8.1 PRICING NOTES

Avail would like to provide the following additional details regarding our pricing:

1. Avail will be partnering with ESP Enterprises, Inc. ESP is a certified DBE in California, and has a great deal of experience in projects of this scope. We have successfully partnered with ESP in the past and have an excellent working relationship. Below is the participation of ESP and the approximate percentage at each property.
    - For Petaluma Transit – $15,550, 2.7%
    - For SolTrans - $67,900, 3.4%
    - For VINE - $71,300, 3.9%
2. Avail has included the requested 5-years of warranty in the base proposal which commences when the system has formally passed our System Acceptance Test milestone. This is a full-service support and extended software and hardware warranty and is based on Avail's standard support agreement. Support is based on Avail's 24/7 support. Please refer to the Proposal for a sample maintenance agreement for additional information with the supplemental material. This document will be provided within the USB stick provided with the proposal.
3. Avail has included the cost for providing the MAR equipment that will meet your needs. However, we believe that we can meet your needs with our proposed IVU eliminating the need for the MAR. The end result would be a simplified solution and reduce your overall cost. With that in mind, we would like to have further discussions on the MAR and come to the best solution for you.
4. Avail has provided the cost estimate for recurring cellular data fees for 5 years. Avail recommends a 5MB plan pooled plan per month per vehicle for the basic system. Avail has also provided cellular cost for the Solar Signs.
5. Avail has included in our bid the requested signs for Passenger Information. Our price includes standard mounting and installation to an existing structure and they include cellular connection and solar power. Avail will survey final sign locations during the early stages of the project; any site construction or permitting necessary is the responsibility of the agencies.
6. Interfaces for the optional Vehicle Health Monitoring hardware assumes that the proper signals will be available to tap into for proper collection of the data on the J1708/J1939 network.
7. For VINE's and SolTrans' paratransit vehicles, Avail has proposed a MDT only solution which provides all the communication and tracking aspects of our system and meets all of your requirements. As an option you will find a price that includes all the equipment to essentially make the paratransit equivalent to a fixed-route vehicle since it was unclear whether this was required. Items included are the IVU, Annunciation, APCs and associated cabling.
8. In reading the concept of operations and your RFP it is clear that you prefer a solution where you own the servers. Specifically related to the Petaluma the concept of operations stressed that Petaluma desires to leverage the IT resources of the other two agencies. As a result Avail has proposed a solution that virtualizes the Petaluma servers on the equipment provided wor either Soltrans or VINE. This will make it easier leverage those IT resources and reduce the overall cost without the additional burden of having equipment on-site to manage. If this solution is not acceptable to Petaluma Transit or SolTrans and VINE, Avail can put the appropriate infrastructure in for approximately $54,000. Avail can also offer a hosted solution for one or more properties if that is desired as well.
9. For Petaluma Transit, as an alternative to buying a separate scheduling program, Avail is providing our DataPoint tool to implement your scheduling system. DataPoint will enable Petaluma to maintain and manage their schedule data and eliminate their existing Excel Spreadsheets for the CAD/AVL System and

believe this is a more cost effective approach. As an option, we have proposed the TMS scheduling program and have included all the costs to integrate and deploy that software if that option is selected.

10. In the Addendum E question 2 and 20 it was clearly stated that the vendor shall include the costs for integrating to Trapeze Pass. Also has included costs for integrating to Trapeze Pass in our proposal and will take full responsibility for this effort. Our base proposal assumes that Soltrans will procure the license directly since they have an existing Trapeze customer and this is the most cost effective solution for Soltrans. Avail did include the cost to procure Trapeze Software as an option if desired.
11. Options are priced with the assumption they would be included in the base contract, and deployed as part of the overall project.
12. Taxes have not been included.
13. Avail has provided an alternative milestone payment schedule below, Avail will invoice for the amount noted with payment due Net 30 days.

## 8.2 Value Added

As requested, Avail has filled out the Price Proposal Form provided by each agency. Avail firmly believes that when the evaluation teams are finished with their review of all of the proposals and have truly normalized all the differences in features, pricing, etc. and have a true apples-to-apples comparison in front of them, the value that Avail is providing will be obvious. One thing we will not do as a company in the name of trying to be cost competitive is cut out things we know in our hearts are truly necessary, based on our decade and a half of experience. So to assist your evaluation, we would like to point out a few impactful areas of discussion:

> *Through Avail's data-analysis solution, we can monitor ridership, trip-by-trip, and quickly and easily see where we can eliminate unneeded buses, or add additional capacity. With each daily pullout costing us at least $100, the savings add up very quickly.*
>
> **Hugh Mose**
> *Executive Director*
> *CATA—State College, PA*

As part of our exceptional value initiative, Avail has bid the necessary man-hours of time to be onsite at each of your agencies to ensure a seamless integration of this technology suite to their respective operations with the support and training required to be confident that you are successful with these systems. Avail typically finds that our onsite time is higher than many of our competitors, but so is Avail's track record of customer satisfaction with the ability to leverage the use of the system once integrated to their operations.

Avail has included a site license for our DataPoint Analysis and Reporting module. This is an industry proven tool that provides one of the simplest user interfaces for unleashing a properties ability to easily use the vast amounts of operational performance data that will soon be available to you. Once you see what this tool is capable of, Avail is confident that you will want everyone in your operation to have access, and that is why we have provided a full site license for its use.

Features that are embedded in our system such as over-air-passenger-counts, the ability correlate fare data to stops, a 3rd party hosted website, a dynamic map display of vehicles, and the ability to email information to your customers are just more examples of the value added you will receive with our system.

Finally a "Signature" service that Avail provides which is not being offered by any other vendor in the ITS for transit market, is our FAST Track. FAST is our "Follow on Adoption Support Training" which we discussed in the technical proposal. The FAST team is part of the initial project team but they will also plan to be on site at each of the properties approximately 2-3 months following final system acceptance, and will work with you to put together a Success Plan and then follow up with you regularly to help you carry out that plan, ensuring that your agencies will receive the return on investment that led you to invest in these technologies in the first place.

## 8.3 SolTrans Pricing

SOLTRANS PRICE PROPOSAL

| NO. | ITEM DESCRIPTION | UNIT | QTY. | UNIT PRICE | EXTENDED PRICE |
|---|---|---|---|---|---|
| **BASE PRICE ITEMS** | | | | | |
| 1 | System Design | LS | 1 | $ 187,787.37 | $ 187,787.37 |
| 2 | CAD/AVL System Software and Licensing | LS | 1 | $ 61,425.47 | $ 61,425.47 |
| 3 | Servers at Dispatch | LS | 1 | $ 34,812.81 | $ 34,812.81 |
| 4 | Workstations at Dispatch and Administrative offices | EA | 5 | $ 2,036.39 | $ 10,181.96 |
| 5 | Scheduling Software | EA | 1 | $ 116,753.17 | $ 116,753.17 |
| 6 | On Board Equipment (Fixed Route) | EA | 47 | $ 12,420.93 | $ 583,783.57 |
| 7 | On Board Equipment (Paratransit) | EA | 12 | $ 3,792.30 | $ 45,507.64 |
| 8 | On Board Equipment (Supervisor Vehicles) | EA | 7 | $ 2,851.58 | $ 19,961.06 |
| 9 | Communications System for Mobile Devices – at Dispatch | LS | 1 | $ 10,697.85 | $ 10,697.85 |
| 10 | Mobile Communications Equipment - fixed, paratransit, supervisor vehicles | EA | 59 | $ 988.33 | $ 58,311.42 |
| 11 | Cellular (3G/4G) Service (5 years) | LS | 1 | $ 74,086.34 | $ 74,086.34 |
| 12 | Testing | LS | 1 | $ 72,836.65 | $ 72,836.65 |
| 13 | Maintenance Service Agreement (5 years) (Years 2-5, Year 1 is included) | LS | 5 | $ 69,248.36 | $ 346,241.79 |
| 14 | Training | LS | 1 | $ 23,255.92 | $ 23,255.92 |
| 15 | 511 Integration | LS | 1 | Included | $ - |
| 16 | Connection Protection | EA | 1 | Included | $ - |
| 17 | Video System Integration | EA | 47 | $ 203.64 | $ 9,571.04 |
| 18 | Data Management System | LS | 1 | $ 4,166.67 | $ 4,166.67 |
| 19 | Farebox Integration | EA | 40 | $ 923.50 | $ 36,940.16 |
| 20 | Mobile Work Stations for Supervisors | EA | 7 | $ 2,307.91 | $ 16,155.38 |
| 21 | Spare VLU | EA | 5 | $ 2,161.29 | $ 10,806.46 |
| 22 | Spare GPS receiver | EA | 5 | Included in MDT | $ - |
| 23 | Spare Antenna | EA | 5 | $ 67.88 | $ 339.40 |
| 24 | Spare MDT | EA | 5 | $ 2,106.57 | $ 10,532.84 |
| 25 | Spare MAR | EA | 5 | $ 988.33 | $ 4,941.65 |
| 26 | Spare Cellular Router (3G/4G) and WLAN communications card | EA | 5 | Included in MDT | $ - |
| 27 | Spare APC | EA | 5 | $ 2,071.69 | $ 10,358.45 |
| 28 | Spare AVA | EA | 5 | $ 309.53 | $ 1,547.66 |
| 29 | Real-time Bus Stop Sign | EA | 20 | $ 14,212.51 | $ 284,250.22 |
| 30 | Spare Power Filters | EA | 5 | $ 224.61 | $ 1,123.07 |
| 31 | Spare RCU | EA | 5 | $ 468.26 | $ 2,341.31 |
| | | | | **TOTAL BASE PRICE:** | **$ 2,038,717.35** |
| **ADD ALTERNATE PRICE ITEMS** | | | | | |
| **A1** | Automatic Vehicle Monitoring | EA | 59 | $ 206.38 | $ 12,176.48 |
| **A2** | Trapeze Pass Mon | EA | 1 | $ 80,759.25 | $ 80,759.25 |
| **A3** | Optional Paratransit Equipment | EA | 12 | $ 10,146.56 | $ 121,758.68 |

## 8.4 PETALUMA PRICING

Petaluma PRICE PROPOSAL

| NO. | ITEM DESCRIPTION | UNIT | QTY. | UNIT PRICE | EXTENDED PRICE |
|---|---|---|---|---|---|
| **BASE PRICE ITEMS** | | | | | |
| 1 | System Design | LS | 1 | $ 55,507.06 | $ 55,507.06 |
| 2 | CAD/AVL System Software and Licensing | LS | 1 | $ 17,498.20 | $ 17,498.20 |
| 3 | Servers at Dispatch | LS | 1 | To be Hosted at Soltrans or VINE | |
| 4 | Workstations at Dispatch and Administrative offices | EA | 3 | $ 2,036.39 | $ 6,109.18 |
| 7 | On Board Equipment (Fixed Route) | EA | 11 | $ 12,444.04 | $ 136,884.39 |
| 8 | On Board Equipment (Supervisor Vehicles) | EA | 4 | $ 5,040.04 | $ 20,160.17 |
| 9 | Communications System for Mobile Devices – at Dispatch | LS | 1 | $ 10,697.85 | $ 10,697.85 |
| 10 | Mobile Communications Equipment - fixed, paratransit, supervisor vehicles | EA | 15 | $ 988.33 | $ 14,824.94 |
| 11 | Cellular (3G/4G) Service (5 years) | LS | 1 | $ 27,713.69 | $ 27,713.69 |
| 12 | Testing | LS | 1 | $ 42,190.10 | $ 42,190.10 |
| 13 | Maintenance Service Agreement (5 years) (Years 2-5, Year 1 is included) | LS | 5 | $ 29,228.26 | $ 146,141.30 |
| 14 | Training | LS | 1 | $ 17,083.54 | $ 17,083.54 |
| 15 | 511 Integration | LS | 1 | Included | $ - |
| 16 | Connection Protection | EA | 1 | Included | $ - |
| 17 | Video System Integration | EA | 11 | Lot | $ 24,025.36 |
| 18 | Data Management System | LS | 1 | $ 1,666.67 | $ 1,666.67 |
| 19 | Mobile Work Stations for Supervisors | EA | 4 | $ - | $ - |
| 20 | Spare VLU | EA | 2 | $ 2,161.29 | $ 4,322.58 |
| 21 | Spare GPS receiver | EA | 2 | Included in MDT | $ - |
| 22 | Spare Antenna | EA | 2 | $ 67.88 | $ 135.76 |
| 23 | Spare MDT | EA | 2 | $ 1,888.79 | $ 3,777.58 |
| 24 | Spare MAR | EA | 2 | $ 988.33 | $ 1,976.66 |
| 25 | Spare Cellular Router (3G/4G) and WLAN communications card | EA | 2 | Included in MDT | $ - |
| 26 | Spare APC | EA | 2 | $ 2,071.69 | $ 4,143.38 |
| 27 | Spare AVA | EA | 2 | $ 309.53 | $ 619.06 |
| 29 | Real-time Bus Stop Sign | EA | 5 | $ 14,212.51 | $ 71,062.56 |
| 30 | Spare Power Filters | EA | 5 | $ 89.85 | $ 449.23 |
| 31 | Spare RCU | EA | 5 | $ 187.30 | $ 936.52 |
| | | | | **TOTAL BASE PRICE:** | **$ 607,925.76** |
| **ADD ALTERNATE PRICE ITEMS** | | | | | |
| A1 | Transit Signal Prioirity Integration | EA | 11 | $ 1,350.81 | $ 14,858.88 |
| A2 | Farebox Inegration | EA | 11 | Not Provided as Per Appendix E | |
| A3 | Automatic Vehicle Monitoring | EA | 11 | $ 287.27 | $ 3,160.02 |
| A4 | Scheduling Software | EA | 1 | $ 116,753.17 | $ 116,753.17 |

## 8.5 VINE PRICING

NAPA Vine PRICE PROPOSAL

| NO. | ITEM DESCRIPTION | UNIT | QTY. | UNIT PRICE | EXTENDED PRICE |
|---|---|---|---|---|---|
| **BASE PRICE ITEMS** | | | | | |
| 1 | System Design | LS | 1 | $ 187,787.37 | $ 187,787.37 |
| 2 | CAD/AVL System Software and Licensing | LS | 1 | $ 60,407.28 | $ 60,407.28 |
| 3 | Servers at Dispatch | LS | 1 | $ 34,812.81 | $ 34,812.81 |
| 4 | Workstations at Dispatch and Administrative offices | EA | 3 | $ 2,036.39 | $ 6,109.18 |
| 5 | Scheduling Software | EA | 1 | $ 116,753.17 | $ 116,753.17 |
| 6 | On Board Equipment (Fixed Route) | EA | 42 | $ 10,352.33 | $ 434,797.94 |
| 7 | On Board Equipment (Paratransit) | EA | 34 | $ 3,726.42 | $ 126,698.29 |
| 8 | On Board Equipment (Supervisor Vehicles) | EA | 4 | $ 2,982.49 | $ 11,929.97 |
| 9 | Communications System for Mobile Devices – at Dispatch | LS | 1 | $ 10,697.85 | $ 10,697.85 |
| 10 | Mobile Communications Equipment - fixed, paratransit, supervisor vehicles | EA | 80 | $ 988.33 | $ 79,066.33 |
| 11 | Cellular (3G/4G) Service (5 years) | LS | 1 | $ 69,554.69 | $ 69,554.69 |
| 12 | Testing | LS | 1 | $ 73,357.97 | $ 73,357.97 |
| 13 | Maintenance Service Agreement (5 years) (Years 2-5, Year 1 is included) | LS | 5 | $ 63,152.04 | $ 315,760.20 |
| 14 | Training | LS | 1 | $ 23,255.92 | $ 23,255.92 |
| 15 | 511 Integration | LS | 1 | Included | $ - |
| 16 | Connection Protection | EA | 42 | Included | $ - |
| 17 | Data Management System | LS | 1 | $ 4,166.67 | $ 4,166.67 |
| 18 | Farebox Integration | EA | 42 | $ 27.15 | $ 1,140.38 |
| 19 | Mobile Work Stations for Supervisors | EA | 1 | $ 2,307.91 | $ 2,307.91 |
| 20 | Spare VLU | EA | 7 | $ 2,161.29 | $ 15,129.04 |
| 21 | Spare GPS receiver | EA | 7 | Included in MDT | $ - |
| 22 | Spare Antenna | EA | 7 | $ 67.88 | $ 475.16 |
| 23 | Spare MDT | EA | 7 | $ 2,030.93 | $ 14,216.52 |
| 24 | Spare MAR | EA | 7 | $ 988.33 | $ 6,918.30 |
| 25 | Spare Cellular Router (3G/4G) and WLAN communications card | EA | 7 | Included in MDT | $ - |
| 26 | Spare AVA | EA | 7 | $ 309.53 | $ 2,166.72 |
| 27 | Real-time Bus Stop Sign | EA | 20 | $ 14,212.51 | $ 284,250.22 |
| 28 | Spare Power Filters | EA | 7 | $ 224.61 | $ 1,572.30 |
| 29 | Spare RCU | EA | 7 | $ 468.26 | $ 3,277.83 |
| | | | | **TOTAL BASE PRICE:** | **$ 1,886,610.02** |
| **ADD ALTERNATE PRICE ITEMS** | | | | | |
| A1 | Video System Integration | EA | 42 | Not Applicable | |
| A1 | Automatic Vehicle Monitoring | EA | 76 | $ 190.58 | $ 14,484.39 |

## 8.6 DELIVERABLES LIST

| Item | Property Quantity | | |
|---|---|---|---|
| | NAPA VINE | SolTrans | Petaluma Transit |
| **Servers and Fixed End Hardware** | | | |
| Dell PowerEdge R620 | 2 | 2 | * |
| SAN - EMC VNXE 3150 SAN | 1 | 1 | * |
| Dell 6224 Switches | 2 | 2 | * |
| APC Smart UPS x 3000VA | 1 | 1 | * |
| Garage 802.11 WLAN POE Access Points | 2 | 2 | 2 |
| Bus-in-a-Box Driver Training Unit (to be populated with 1 set of spares) | 1 | 1 | 1 |
| Dell Workstations | 3 | 5 | 3 |
| **CAD/AVL System Software and Licensing** | | | |
| **Software Licenses – Server** | | | |
| Scheduling Software - TMS from Schedule Masters | 1 | 1 | Option |
| myAvail – Transit Database, Business Web, Data, and Comms Services | 1 | 1 | 1 |
| myAvail PDC | 1 | 1 | 1 |
| Bing Mapping License, site | 1 | 1 | 1 |
| Bing Mapping License, per vehicle | 87 | 71 | 17 |
| MapInfo Professional & Run-time Licenses (import and use of ESRI GIS data) | 2 | 2 | 2 |
| SQL Server 2008R2, processor licensing | 1 | 1 | 1 |
| VMware Vv2sphere Enterprise | 1 | 1 | 1 |
| myStop Traveler Information Data Service (TIDS) | 1 | 1 | 1 |
| myStop Google Transit Export (GTFS and GTFS-realtime) | 1 | 1 | 1 |
| myStop Mobile Web/App | 1 | 1 | 1 |
| myAvail Voice Recording Software (VRS) | 1 | 1 | 1 |
| **Software Licenses – Client** | | | |
| myAvail Dispatch | Site | Site | Site |
| myAvail DataPoint | Site | Site | Site |
| MyAvail GIS Replay | Site | Site | Site |
| **Communications System for Mobile Devices – at Dispatch** | | | |
| myAvail Wireless Network Gateway (WiNG) | 1 | 1 | 1 |
| **Vehicle Equipment** | | | |
| On Board Equipment (Fixed Route) | | | |
| Mobile Data Computer w/ internal GPS , 802.11 WLAN, world cellular data modem | 42 | 47 | 11 |
| Roof-mount GPS antenna | 42 | 47 | 11 |
| Cabling harness for vehicle area network | 42 | 47 | 11 |
| In-Vehicle Logic Unit (IVLU) w/ J1939/J1708 Expansion socket and 802.11 WLAN | 42 | 47 | 11 |
| Automatic Voice Announcement System module | 42 | 47 | 11 |
| Power Management Module w/ backup battery and filtering | 42 | 47 | 11 |
| Redundant Control Unit | 42 | 47 | 11 |
| Mobile Access Router | 42 | 47 | 11 |
| Automated Passenger Counter | Not Provided | 47 | 11 |
| Cellular Radio (3G/4G) | 42 | 47 | 11 |
| Destination Headsign Interface | 42 | 47 | 11 |
| Video System Interface | Not Provided | 47 | 11 |
| Farebox Interface | 42 | 47 | Option |
| **On Board Equipment (Paratransit Vehicles** | | | |
| Mobile Data Computer w/ internal GPS , 802.11 WLAN, world cellular data modem | 34 | 12 | Not Provided |
| Roof-mount GPS antenna | 34 | 12 | Not Provided |
| Cabling harness for vehicle area network | 34 | 12 | Not Provided |
| Power Management Module w/ backup battery and filtering | 34 | 12 | Not Provided |
| **On Board Equipment (Supervisor Vehicles)** | | | |
| Mobile Work Stations for Supervisors | 4 | 7 | 4 |
| Roof-mount GPS antenna | 4 | 7 | 4 |
| Cabling harness for vehicle area network | 4 | 7 | 4 |
| **Other Equipment and Interfaces** | | | |
| Real-time Bus Stop Sign | 20 | 20 | 5 |
| 511 Integration | 1 | 1 | 1 |
| Connection Protection | 1 | 1 | 1 |
| Data Management System | 1 | 1 | 1 |
| **Spares** | | | |
| Spare VLU | 7 | 5 | 2 |
| Spare GPS receiver | 7 | 5 | 2 |
| Spare Antenna | 7 | 5 | 2 |
| Spare MDT | 7 | 5 | 2 |
| Spare MAR | 7 | 5 | 2 |
| Spare Cellular Router (3G/4G) and WLAN communications card | Included in MDT | Included in MDT | Included in MDT |
| Spare APC | 7 | 5 | 2 |
| Spare AVA | 7 | 5 | 2 |
| Spare Power Filters | 7 | 5 | 2 |
| Spare RCU | 7 | 5 | 2 |

* Petaluma to be hosted at either SolTrans or VINE

# REQUIRED FORMS

## "BUY AMERICA" PROVISION

This procurement is subject to the Federal Transit Administration "Buy America" Requirements in 49 CFR Part 661.

A "Buy America" Certificate, as per the format presented below, must be completed and submitted with the bid/proposal. A bid/proposal which does not include the certificate will be considered non-responsive.

A waiver from the "Buy America" Provision may be sought by

_____ if grounds for the waiver exists.

Section 165a of the Surface Transportation Assistance (STA) Act of 1982 permits FTA participation on this contract only if steel, cement, and manufactured products used in the contract are produced in the United States

## BUY AMERICA CERTIFICATE

This certification shall be fully executed by all bidders/proposers submitting bids/proposals.

**Avail Technologies, Inc.** hereby certifies that

_____ All of the manufacturing processes for steel and manufactured products takes place in the United States and all items of material used in the product must be of the United States origin.

__X__ The cost of rolling stock and bus components produced in the United States is more than 50 percent of the cost of all of the components and final assembly takes place in the United States.

BY:

Signature of Company Official

President & CEO

Official's Title

Date

or

The bidder/proposer hereby certifies that it cannot comply with the requirements of Section 165a of the Surface Transportation Assistance Act of 1982, but may qualify for an exemption to the required pursuant to Section 165b of the STA Act and regulations in 49 CFR 661.7.

Signature _____

Title _____

Date _____

ACORD

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DATE (MM/DD/YYYY) 06/18/2014

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| | |
|---|---|
| PRODUCER<br>Frost & Conn, Inc.<br>P. O. Box 469<br>State College, PA 16804-0469<br>John P. Conroy, CIC | CONTACT NAME: John P. Conroy, CIC<br>PHONE (A/C, No, Ext): 814-237-1492 FAX (A/C, No): 814-234-0389<br>E-MAIL ADDRESS: |
| INSURED Avail Technologies, Inc.<br>1960 Old Gatesburg Rd.,Ste 200<br>State College, PA 16803-2241 | INSURER(S) AFFORDING COVERAGE — NAIC #<br>INSURER A : Cincinnati Insurance Co — 10677<br>INSURER B : Cincinnati Casualty Ins Co — 28665<br>INSURER C : Atlantic Specialty Ins Co<br>INSURER D :<br>INSURER E :<br>INSURER F : |

**COVERAGES** **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

| INSR LTR | TYPE OF INSURANCE | ADDL INSR | SUBR WVD | POLICY NUMBER | POLICY EFF (MM/DD/YYYY) | POLICY EXP (MM/DD/YYYY) | LIMITS | |
|---|---|---|---|---|---|---|---|---|
| A | GENERAL LIABILITY<br>X COMMERCIAL GENERAL LIABILITY<br>CLAIMS-MADE X OCCUR<br>GEN'L AGGREGATE LIMIT APPLIES PER:<br>X POLICY PRO-JECT LOC | | | EPP 0124403 | 01/01/2014 | 01/01/2015 | EACH OCCURRENCE<br>DAMAGE TO RENTED PREMISES (Ea occurrence)<br>MED EXP (Any one person)<br>PERSONAL & ADV INJURY<br>GENERAL AGGREGATE<br>PRODUCTS - COMP/OP AGG | $ 1,000,000<br>$ 100,000<br>$ 5,000<br>$ 1,000,000<br>$ 2,000,000<br>$ 2,000,000 |
| A | AUTOMOBILE LIABILITY<br>ANY AUTO<br>ALL OWNED AUTOS<br>SCHEDULED AUTOS<br>X HIRED AUTOS<br>X NON-OWNED AUTOS | | | EPP 0124403 | 01/01/2014 | 01/01/2015 | COMBINED SINGLE LIMIT (Ea accident)<br>BODILY INJURY (Per person)<br>BODILY INJURY (Per accident)<br>PROPERTY DAMAGE (PER ACCIDENT) | $ 1,000,000<br>$<br>$<br>$ |
| A | UMBRELLA LIAB X OCCUR<br>X EXCESS LIAB CLAIMS-MADE<br>DED X RETENTION $ 0 | | | EPP 0124403 | 01/01/2014 | 01/01/2015 | EACH OCCURRENCE<br>AGGREGATE | $ 2,000,000<br>$ 2,000,000 |
| B | WORKERS COMPENSATION AND EMPLOYERS' LIABILITY<br>ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N<br>(Mandatory in NH)<br>If yes, describe under DESCRIPTION OF OPERATIONS below | N / A | | WC 8992345-10 | 01/01/2014 | 01/01/2015 | X WC STATU-TORY LIMITS OTH-ER<br>E.L. EACH ACCIDENT<br>E.L. DISEASE - EA EMPLOYEE<br>E.L. DISEASE - POLICY LIMIT | $ 1,000,000<br>$ 1,000,000<br>$ 1,000,000 |
| C | Professional Liab. | | | TPP0892913 | 10/29/2013 | 10/29/2014 | Occurrenc<br>Aggregate | 1,000,000<br>1,000,000 |

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

**CERTIFICATE HOLDER**

SOLTRAN

SolTrans -
SolTrans
311 Sacramento Street
Vallejo, CA 94590

**CANCELLATION**

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Alona J Baney


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| C | Professional Liab. | | | TPP0892913 | 10/29/2013 | 10/29/2014 | Occurrenc<br>Aggregate | 1,000,000<br>1,000,000 |

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

**CERTIFICATE HOLDER**

PETROTR

Petaluma Transit
555 North McDowell Blvd
Petaluma, CA 94954

**CANCELLATION**

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Alona J Baney


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PRODUCER
Frost & Conn, Inc.
P. O. Box 469
State College, PA 16804-0469
John P. Conroy, CIC

CONTACT NAME: John P. Conroy, CIC
PHONE (A/C, No, Ext): 814-237-1492 FAX (A/C, No): 814-234-0389
E-MAIL ADDRESS:

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| INSURER C : Atlantic Specialty Ins Co | |
| INSURER D : | |
| INSURER E : | |
| INSURER F : | |

INSURED
Avail Technologies, Inc.
1960 Old Gatesburg Rd.,Ste 200
State College, PA 16803-2241

**COVERAGES** **CERTIFICATE NUMBER:** **REVISION NUMBER:**

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| C | Professional Liab. | | | TPP0892913 | 10/29/2013 | 10/29/2014 | Occurrenc<br>Aggregate | 1,000,000<br>1,000,000 |

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

**CERTIFICATE HOLDER**

NAPAVIN

Napa VINE -
VINE Transit
625 Burnell Street
Napa, CA 94559-3420

**CANCELLATION**

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Alona J Baney


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# REQUEST FOR PROPOSALS

**for a**

# COMPUTER AIDED DISPATCH (CAD) AND AUTOMATED VEHICLE LOCATION (AVL) SYSTEM

**for**

RFP Release: May 8, 2014
Pre-proposal Meeting: May 15, 2014
Proposals Due: June 19, 2014

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# Acronyms and Abbreviations

| | |
|---|---|
| AES | Advanced Encryption Standard |
| ATP | Acceptance Test Procedures |
| APTS | Advanced Public Transportation Systems |
| ADA | Americans with Disabilities Act |
| AVA | Automated Vehicle Announcement System |
| APC | Automatic Passenger Counters |
| AVL | Automated Vehicle Location |
| CSV | Comma Separated Value |
| CAD | Computer-Aided Dispatch |
| CFR | Code of Federal Regulations |
| DVR | Digital Video Recorder |
| DMS | Dynamic Message Sign |
| XML | Extensible Markup Language |
| FAT | Factory Acceptance Test |
| FCC | Federal Communications Commission |
| FTA | Federal Transit Administration |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| HVAC | Heating, Ventilation and Air-conditioning |
| HTTPS | Hypertext Transport Protocol Secure |
| IT | Information Technology |
| IEEE | Institute of Electrical and Electronics Engineers |
| ITS | Intelligent Transportation Systems |
| IVR | Interactive Voice Response |
| ICD | Interface Control Document |
| LCD | Liquid Crystal Display |
| IVLU | Integrated Vehicle Logic Unit |
| LED | Light Emitting Diode |
| LAN | Local Area Network |
| MAR | Mobile Access Radio |
| MS | Microsoft |
| MPEG | Moving Picture Experts Group |
| NCTPA | Napa County Transportation and Planning Agency |
| NEMA | National Electrical Manufacturers Association |
| NMEA | National Marine Electronics Association |
| NTCIP | National Transportation Communications for ITS Protocol |

# Acronyms and Abbreviations

| | |
|---|---|
| NTP | Notice to Proceed |
| ODBC | Open Database Connectivity |
| OS | Operating System |
| OCU | Operator Control Unit |
| PDF | Portable Document Format |
| PST | Pacific Standard Time |
| PA | Public Address |
| RAM | Random Access Memory |
| RTIS | Real-Time Information System |
| RDP | Remote Desktop Protocol |
| RFP | Request for Proposals |
| RCM | Requirements Compliance Matrix |
| SSID | Service Set Identifier |
| SAE | Society of Automotive Engineers |
| SQL | Structured Query Language |
| SM | Systems Manuals |
| TCP | Transfer Connection Protection |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| USB | Universal Serial Bus |
| UTA | Urban Transportation Associates |
| VAN | Vehicle Area Network |
| VLU | Vehicle Logic Unit |
| VPN | Virtual Private Network |
| WAN | Wide Area Network |
| Wi-Fi | Wireless Fidelity |
| WLAN | Wireless Local Area Network |
| WPA2 | Wi-Fi Protected Access 2 |

# I. Organization of Document

This document is organized into the following sections including appendices:

**Project Overview** – presents a high level overview and the goals of the project including a background of the agency's operations and existing conditions

**Project Scope** – provides a summary of the overall scope of the project.

**Project Schedule** – provide details on the anticipated schedule of the project

**Instructions to Proposers** – provides details on what is to be included in the responses to the RFP

**Proposer Evaluation Criteria** – provides the basis for the criteria upon which the proposals will be evaluated.

**General Requirements** – provides the requirements that are more geared towards process including the detailed design, installation and acceptance of the system.

**Appendix A – Concept of Operations**

**Appendix B – Technical Requirements and Specifications**

**Appendix C – SolTrans**

Appendix C1 – SolTrans Compliance Matrix

Appendix C2 – SolTrans Fleet Details

Appendix C3 – SolTrans Price Proposal

Appendix C4 - SolTrans Standard Agreement

**Appendix D – Petaluma Transit**

Appendix D1 – Petaluma Transit Compliance Matrix

Appendix D2 - Petaluma Transit Fleet Details

Appendix D3 – Petaluma Transit Price Proposal

Appendix D4 - Petaluma Transit Standard Agreement

**Appendix E – Napa VINE**

Appendix E1 – Napa VINE Compliance Matrix

Appendix E2 – Napa VINE Fleet Details

Appendix E3 – Napa VINE Price Proposal

Appendix E4 – Napa VINE Standard Agreement

# II. Project Overview

## 1. Background

Solano County Transit (SolTrans), Petaluma Transit, and Napa VINE have identified the need to implement technological tools to assist in managing their operations and serving their customers through the collection, analysis and dissemination of reliable data on its existing fleet of transit vehicles. Based on this high priority need, SolTrans, Petaluma Transit, and Napa VINE will deploy a state-of-the-art Automatic Vehicle Location (AVL) System and Computer-Aided Dispatch (CAD) for fixed route and demand response fleets of vehicles (refer to Appendices C2, D2 and E2 for more details on the fleets to be included as part of this deployment).

## 2. Goals

The overarching goals for the new CAD/AVL system include the following:

- *Improve On-time Performance* - The AVL system shall disseminate continuous, real-time information to drivers to speed up or slow down between established time points and provide transit planners with systematic schedule adherence problems on routes, due to factors such as peak hour congestion and periodic increased passenger loading throughout the day. With this information, planners will be able to adjust routes or schedules accordingly.

- *Improve Dispatch Reliability and Efficiency* - By disseminating real-time information to the dispatchers, much of the current communications used to determine where a transit vehicle is located, how full the vehicle is, and who is driving will be eliminated. With real-time information at their desk, dispatch operators could provide this information quickly to transit agency supervisors, respond to public inquiries more proactively and make necessary adjustments.

- *Increase Ridership* - By improving on-time performance, automating on-board announcements and signs, and making transit more user-friendly by enabling 511 Transit and third party vendors to produce mobile applications. Increasing the availability of real-time information to transit riders will allow them to plan for upcoming trips, select specific stops to find real time departures, and set alarms for upcoming departures.

- *Improve Scheduling and Planning* - By providing more accurate data and reducing the schedule preparation time and staffing. The CAD/AVL system should provide access to an accurate database which enables planners and transit analysts to select more effective bus stop placements and generate more accurate ridership counts.

- *Improve Data Management and Reporting* - By automating data collection and improving the accuracy and accessibility of data for transit operators, transit planners, and National Transit Database passenger mile reporting.

## 3. Existing Conditions

This section describes in general terms the existing operating conditions of the participating transit agencies. For SolTrans and Petaluma Transit, please refer to Appendix A, Concept of Operations.

**Napa VINE**

Napa VINE currently has 42 fixed route vehicles, 21 VINEGO Paratransit vehicles, four Supervisor Vehicles, and 3 additional Paratransit vehicles ordered and pending. Additionally, they have 4 trolley/shuttle routes in the cities of Calistoga, American Canyon, St.Helena, and Yountville. The Yountville Trolley has one active and one inactive vehicle, the Calistoga Shuttle has two active vehicles, American Canyon Transit has two active and two pending vehicles, and the St. Helena Shuttle has two active vehicles. Service operates from 5:20 a.m. until 9:10 p.m. Monday through Friday, from 6:00 a.m. until 8:10 p.m. on Saturday and Route 10 and 11 is the only service running on Sundays and is available from 8:30 a.m. until 7:00 p.m. See Appendix E2 for specific details on the Napa VINE bus fleet.

Napa VINE's fixed route service area covers Napa County and also includes fixed routes to Fairfield, Suisun City, Sonoma Plaza, and the El Cerrito del Norte BART station. VINE Go is an origin to destination, shared ride service which provides demand response, door-to-door, transportation to persons with disabilities in the cities of Calistoga, St. Helena, Napa, American Canyon, the Town of Yountville and the unincorporated areas of Napa County. VINE Go operates at the same times as the fixed route operations.

Napa VINE's key operational facilities are the Soscol Gateway Transit Center, located at 625 Burnell Street, Napa, CA 94559, and the Bus Maintenance Facility at 720 Jackson Street, Napa, CA, 94559. Refer to Napa VINE's website for a VINE Transit System Map. The Napa VINE permanent staff includes a Manager of Transit, Transit Planner, Manager of Finance and Accounting Technician.

Napa VINE currently does not have internal cameras installed on their bus fleet. However, there is potential for them to procure and install cameras in the near future. Their fixed-route bus fleet currently has GenFare Fareboxes, as well as UTA APC's on board their fixed route and demand response vehicles.

Currently, communication is handled through their existing AVL system, which is owned and operated by their operations and maintenance contractors, Veolia Transportation. Napa VINE contracts all of their operations, dispatch and maintenance, safety and training, and management tasks to Veolia.

A summary of the Veolia contractor's staffing and operations are described below.

*Maintenance*

Napa VINE's maintenance facility is located at 720 Jackson Street, Napa, CA, 94559. Currently, there is one full time Maintenance Manager who is responsible for management of the maintenance department and staff; one full time Parts Clerk who is responsible for the management of parts orders and inventory; one full time bus stop tech who is responsible for bus stop maintenance; five full time utility workers, who are responsible for cleaning and

fueling the fleet; and five full time mechanics who are responsible for the maintenance, repairs and road calls of the fleet.

*Operations*

Currently, there is one full time General Manager responsible for the overall Management of the Operations and Finance, and one full time Administrative Assistant responsible for payroll, AP and HR. Additionally, there is one full time Operations Manager who is responsible for the management of the Operation and Department Staff, 6.5 Full-Time Equivalent (FTE) Dispatchers and Reservationists who are responsible for oversight of the Public Transit service including Paratransit trips, one full time Operations Supervisor who is responsible for the oversight of the Reservationist and Paratransit Dispatchers and is also responsible for data management as it pertains to invoicing, 77 full time bus operators, and three full time customer service representatives that are responsible for customer service relations and pass sales, etc.

*Safety and Training*

Currently, there is one full time Safety and Training Manager who is responsible for new hire and bus operator training to include Risk Management and Staff; and four full time Road Supervisors who are responsible for safety of the operations.

*IT*

Napa VINE does not have an IT department on site. They rely on Veolia's to provide technical support on any needed IT services.

# III. Project Scope

The project will include the design, procurement, installation, integration and testing of a CAD/AVL system involving vehicles and facilities owned and operated by the three agencies. Additional details on the fleets and facilities are contained in Appendices A, C2, D2 and E2.

The CAD/AVL system shall consist of a traditional agency-owned model where each agency owns and operates all elements of the CAD/AVL system. All CAD/AVL equipment including all software, servers, workstations, communications equipment and peripheral equipment shall be housed in, and operated out of, agency-owned facilities and be dedicated operating the specific agency's CAD/AVL system including all software and hardware.

For the remainder of this document, the use of the terms "Provider," "Proposer" and "Contractor" are used interchangeably.

## 1. Proposed CAD/AVL System

The agencies have varying needs and requirements for the deployment of the new CAD/AVL system across their fleets. This includes the deployment of CAD/AVL equipment on certain agency fleets as well as a staged deployment of certain elements of the overall system. For the proposed agency fleets, the deployment will consist of the following fleets for each agency:

**SolTrans**

- Fixed Route Vehicles
- Paratransit Vehicles
- Supervisor Vehicles
- Contingency Fleet

**Petaluma Transit**

- Fixed Route Vehicles
- Supervisor Vehicles

**Napa VINE**

- Fixed Route Vehicles
- Paratransit Vehicles
- Supervisor Vehicles
- Shuttles

The agencies will deploy the overall system in a staged manner, creating a core system under the initial deployment and then potentially expanding this core system to add more capabilities. The staged deployment will factor the various vehicle configurations desired by the agencies.

Tables 1 to 3 below provide more details on the required on-board equipment and systems for each agency's vehicle fleet. The contingency fleets represent each agency's spare fleet that will also be outfitted with the following on-board systems. See Appendices C2, D2 and E2 for more information on each agency's bus fleets.

**Table 1: Required On Board Equipment for SolTrans Vehicles**

| On-Board Equipment/System | Vehicle | | | |
|---|---|---|---|---|
| | Fixed Route | Paratransit Cutaway | Supervisor | Contingency Fleet |
| Vehicle Logic Unit | ■ | | | ■ |
| Mobile Data Terminal | ■ | ■ | ■ | ■ |
| Mobile Access Router | ■ | | | ■ |
| Global Positioning System Receiver | ■ | ■ | ■ | ■ |
| Automated Passenger Counter | ■ | | | ■ |
| Cellular Radio (3G/4G) | ■ | ■ | ■ | ■ |
| Automated Vehicle Announcement | ■ | | | ■ |
| Destination Headsign Interface | ■ | | | ■ |
| Video System Interface | ■ | | | ■ |
| Farebox Interface | ■ | | | ■ |

| Table 2: Required On Board Equipment for Petaluma Transit | | |
|---|---|---|
| **On-Board Equipment/System** | **Vehicles** | |
| | **Fixed Route** | **Supervisor** |
| Vehicle Logic Unit | ■ | |
| Mobile Data Terminal | ■ | ■ |
| Mobile Access Router | ■ | |
| Global Positioning System Receiver | ■ | ■ |
| Automated Passenger Counter | ■ | |
| Cellular Radio (3G/4G) | ■ | ■ |
| Automated Vehicle Announcement | ■ | |
| Destination Headsign Interface | ■ | |
| Video System Interface | ■ | |
| Farebox Interface (future) | | |

| Table 3: Required On Board Equipment for Napa VINE | | | | |
|---|---|---|---|---|
| **On-Board Equipment/System** | **Vehicle** | | | |
| | **Fixed Route** | **Paratransit Cutaway** | **Supervisor** | **Shuttles** |
| Vehicle Logic Unit | ■ | | | |
| Mobile Data Terminal | ■ | ■ | ■ | ■ |
| Mobile Access Router | ■ | | | |
| Global Positioning System Receiver | ■ | ■ | ■ | ■ |
| Automated Passenger Counter Interface | ■ | | | |
| Cellular Radio (3G/4G) | ■ | ■ | ■ | ■ |
| Automated Vehicle Announcement | ■ | | | |
| Destination Headsign Interface | ■ | | | |
| Video System Interface | ■ | | | |
| Farebox Interface | ■ | | | |

The general scope of the CAD/AVL system will achieve the goals set forth above for each of the three agencies and will provide a complete and fully-functional traditional CAD/AVL system. Reference is made to the Concept of Operations which is provided in Appendix A. The main components of the CAD/AVL system shall, at a minimum, include the following:

- *CAD/AVL Servers* - servers will be installed at the dispatch/maintenance centers which communicate with and collect data from the fixed route bus fleet, paratransit buses, and supervisor vehicles (see Appendices C2, D2 and E2 for more details on the agency fleets that will be part of the CAD/AVL system). The CAD/AVL servers will also communicate with real-time signs at designated bus stops, and at transit centers such as the Vallejo Transit Center and Sereno Transit Center for SolTrans, the Eastside Transit Center and Copeland Transit Mall for Petaluma Transit, and the Soscol Gateway Transit Center for Napa VINE. From the dispatch/maintenance centers, the CAD/AVL servers will disseminate real-time information via the internet to 511 and other mobile applications to make real time departure information and other transit information available to the public.

- *CAD/AVL Workstations* - workstations will be installed at dispatch/maintenance centers and administration offices to enable staff to generate reports, play back routes, and allow for ad hoc analysis and planning. The CAD/AVL workstations will be key for monitoring where specific routes are running off-schedule and identify how to diagnose and correct the problem. See Appendix B for the Technical Requirements of the CAD/AVL Workstations.

- *System Data Communications* - the communications system shall be via private radio and/or cellular connections and will only involve data communications. Voice communications will be conducted via separate system and is not part of the CAD/AVL system. All computer based CAD/AVL systems require industry standard communications to and from the transit vehicles. SolTrans and Napa VINE will utilize a leased cellular connection, and Petaluma Transit will utilize a private radio system.

- *On-Board Equipment* - agency vehicles will be equipped with a variety of on-board equipment for vehicle location and monitoring, passenger counting, route and stop dissemination (via on-board voice announcements and signs) and mobile wireless communications. Additionally, several existing on-board equipment will be integrated into the new CAD/AVL system. All on-board equipment shall communicate using industry standard communications (e.g., J1708, J1939).

- *Software Applications (Mobile Devices)* - The CAD/AVL servers will collect/generate system information including vehicle location, route, schedule adherence, real-time arrival times and disseminate the information to 511 and third party vendors/developers to produce mobile applications. Mobile applications will allow transit users at a minimum to identify where bus stops are located, plan for an upcoming transit trip, select specific stops to find real time departures, and set alarms for upcoming departures.

- *Real-Time Transit Arrival/Departure Information and Displays* – real-time passenger and information displays will be installed at various local stop and transit center locations in the agency systems. The signs will communicate with the CAD/AVL servers to inform transit riders of real time departures or arrivals, or other important information regarding bus routes. Additionally, real-time predictions will be provided to the San Francisco Bay Area 511 System to allow for real-time information to be displayed on regional transit hub signs (e.g., Vallejo Transit Center).

- *Maintenance Support* - The day-to-day operations and maintenances of the CAD/AVL system will be undertaken by SolTrans, Petaluma Transit, and Napa VINE staff. The provider shall include training for the agency operational staff, maintenance assistance, and troubleshooting in a maintenance agreement in order to properly implement a new technology like an AVL system.

Reference is made to Appendices B, C1, D1, and E1 for the detailed technical requirements and specifications and compliance matrices for each agency system.

# IV. Project Schedule

The following is the proposed schedule for the procurement of the new CAD/AVL system. The dates are subject to change, but proposers shall consider these dates as target dates.

| Milestone | Date |
|---|---|
| Release of RFP | May 8, 2014 |
| Pre-proposal meeting and Site Visits | May 15, 2014 |
| Deadline for questions | May 29, 2014 |
| Response to questions | June 9, 2014 |
| **Proposals due** | **June 19, 2014 at 4pm (PST)** |
| Interviews (if needed) | June 25th and June 26th 2014 |
| Selection of Provider | July 11, 2014 |
| Notice to Proceed | TBD |
| System Design | Within three (3) months from Notice to Proceed |
| System Procurement | TBD |
| Integration/Non-Revenue Testing | TBD |
| Revenue Operations | TBD |

# V. Instructions to Proposers

This project shall include the furnishing of all labor, materials, software, licenses and services as set forth in the Scope of Work, Technical Requirements and Specifications and the Compliance Matrix sections of this Request for Proposals.

A pre-proposal conference will be conducted at 8:00 am, Pacific Standard Time, on May 15, 2014 at the ***SolTrans Administration Building on 311 Sacramento Street, Vallejo, CA***. Attendance at this conference is highly recommended, but not required.

Additionally, site visits will be conducted at each of the transit agencies that same day. These site visits are highly encouraged, and should one decide to attend, please be prepared to spend the entire day visiting each of the agency's facilities. The site visits will be conducted at the following facilities:

- SolTrans Operations Facility, 1850 Broadway, Vallejo, CA
- NCTPA (Napa VINE) Maintenance Facility, 720 Jackson Street, Napa, CA
- Petaluma Maintenance Yard, 555 N. McDowell Boulevard, Petaluma, CA

Please send an RSVP to David Berman (david@soltransride.com) by Tuesday, May 13th if you plan on attending the pre-proposal meeting and site visits.

***Technical and Price proposals are due on or before 4:00 pm, Pacific Standard Time, on June 19, 2014, at SolTrans facilities (311 Sacramento Street, Vallejo, CA 94590).*** Proposals received after this day and time, or at any other place other than the place stated above will not be considered and the proposals will be returned.

Proposals shall be submitted to:

David Berman
SolTrans
Program Analyst I
311 Sacramento Street
Vallejo, CA 94590

All questions and inquiries shall be in writing and shall be sent to David Berman via e-mail at david@soltransride.com.

Upon receipt and evaluation of the proposals, the agencies will shortlist (if necessary) and conduct in-person interviews. Those proposers who are shortlisted will be notified and provided with further instructions and details for the interviews.

It is the intent of the participating agencies to select the provider and award the contract according to the process and procedures described in this RFP. The agencies intend to procure the highest quality of services and materials possible for the best value possible.

**Minimum System Requirements**

The proposed CAD/AVL System and software shall have been deployed (installed and operational) in at least three (3) similar transit agencies in the United States for a period of not less than three (3) years.

The proposer shall provide documentation that demonstrates this level of system deployment.

**Disadvantaged Business Enterprise (DBE)**

It is the policy of the US Department of Transportation that Disadvantaged Business Enterprises (DBEs) as defined in 49 CFR Part 26 shall be encouraged to participate in the performance of contracts financed whole or in part with federal funds. As a condition of

federal grant assistance, the Agencies (i.e., SolTrans, Petaluma Transit and Napa VINE) have each adopted a DBE program for federally funded contracts. No DBE goal has been established for this project. However, provider shall ensure that DBEs have the opportunity to participate in the performance of this contract and shall take all necessary and reasonable steps to obtain DBE participation. The contractor shall not discriminate on the basis of race, color, national origin, sex, disability, or age in the award and performance of subcontracts.

The Provider shall not discriminate on the basis of race, color, national origin, or sex in the performance of the contracts. Provider shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this DOT-assisted contract. Failure by the Provider to carry out these requirements is a material breach of this contract, which may result in the termination of the contracts or such other remedy as the agencies deem appropriate. Each subcontract the Provider executes with a subcontractor must include the assurance in this paragraph (see 49 CFR 26.13(b)).

The Provider will be required to report its DBE participation obtained through race-neutral means throughout the period of performance.

The Provider is required to pay its subcontractors performing work related to this contract for satisfactory performance of that work no later than 30 days after the contractor's receipt of payment for that work from the Agencies. In addition, Provider is required to return any retainage payments to those subcontractors within 30 days after the subcontractor's work related to this contract is satisfactorily completed.

The Provider must promptly notify the Agencies whenever a DBE subcontractor performing work related to this contract is terminated or fails to complete its work, and must make good faith efforts to engage another DBE subcontractor to perform at least the same amount of work. The Provider may not terminate any DBE subcontractor and perform that work through its own forces or those of an affiliate without prior written consent of the Agency.

**Buy America**

All equipment including, but not limited to, hardware, software, firmware, any associated cabling, connectors, mounting assemblies and fasteners shall meet the Federal Buy America requirements - Federal Transit Administration (FTA) 49 U.S.C. § 5323(j) and 49 C.F.R. Part 661 (Buy America Requirements). The Provider shall submit written proof/evidence that all components supplied under this Contract meets the Buy America requirements. Failure to submit this written evidence will be grounds for rejection of any and all components supplied by the Provider.

**Proposal Format and Content**

Proposals shall be presented clearly and concisely, and shall reflect the Proposer's understanding of the project objectives and convey a sound technical approach and management plan to meet the agencies' goals and requirements. Proposals shall convey the proposer and system capabilities and qualifications to competently and cost-effectively complete the work in a timely manner.

Proposal presentation shall be construed as evidence of the proposer's ability to develop and convey technical information in a clear and concise manner.

For ease of comparison and validating completeness of submittals, proposers must adhere to the organizational structure and section headings outlined below. Proposals are limited to 80 pages, not including required forms, the compliance matrices, the price proposal and staff resumes. Proposals that deviate from this organizational structure or are missing key information elements may be considered non-responsive. SolTrans, Petaluma Transit, and Napa VINE will not review pages that exceed the 80 page limitation.

Proposals shall contain at minimum the following information in the order that it is presented:

*Introductory Letter*

Proposers shall provide a cover letter with introductory information, such as point of contact, address and phone number. This letter should reference the RFP by name and number, provide a concise statement of the Proposer's understanding of the goals and requirements of the project, identify the Project Manager and his/her relevant experience, and generally introduce the Agencies to the capabilities of the company and the proposed system.

The Introductory Letter must confirm that the proposal and all subject offerings are valid for a period not less than 90 working days unless otherwise required in the RFP from the proposal due date. It must also acknowledge receipt of all addendums issued, and be signed by a representative of the firm authorized to enter binding contracts on its behalf.

The introductory letter shall include a statement that the Provider is willing to enter into a binding agreement with all three agencies utilizing the standard agency agreements contained herein as Appendices C4, D4 and E4. The agencies do NOT desire to negotiate any elements of their standard agreements. Proposers must be willing to execute agreements with each agency using the agency's standard agreements "AS IS".

The Agencies will not consider, under any circumstances, statements by the Proposer that any requirement or provision of this RFP is subject to negotiations or discussion. Any such statements may be considered basis for rejection of the revised proposal.

*Section I – Proposer Information*

Provide an introduction of the Proposer, and/or an introduction of all partner firms or sub-consultants proposed to be involved in completing the work of this Contract.

**I. Company Information**

a) Years in business and name of the parent company (if the proposer is a subsidiary)

b) Location of headquarters

c) Number of employees (full-time)

State whether the Proposer has any pending litigation, and state whether the firm has had any litigation in the last five (5) years and the outcome of such litigation.

### II. Qualifications of the Proposer

The Proposer shall describe its history, experience and past projects and performance which are similar in nature, scope and complexity to that required by this RFP. The roles and responsibilities of each member of the Proposers team (Providers, subcontractors, consultants and suppliers) shall be described.

Proposal shall provide a list of similar North American fixed route transit technology system installations that have been completed within the previous five (5) years. The following shall be provided for each project at a minimum:

a) Name of agency (transit agencies)

b) Agency contact (name, address, phone and email)

c) Size of fleet under CAD/AVL

d) Fleet vehicle details (no. of fixed route, paratransit, supervisor, etc.)

e) Total system cost

f) Date of acceptance of system by agency (month and year)

The projects listed should provide evidence that the Proposer meets the minimum criteria and is qualified to successfully implement the System based on demonstrable successful implementations at other similar transit properties.

### III. References

From the project qualifications and/or ongoing installations listed under the above sections, the Proposer shall provide a minimum of three (3) references for systems similar in scope and scale involving similar transit agency systems. The Agencies reserve the right to contact references to verify information and to investigate past performance.

*Section II – Project Organization and Staffing*

### I. Key Personnel

At a minimum, Proposers shall clearly identify and describe the qualifications of the key personnel listed below (at a minimum). Proposers are encouraged to include other categories and staff leads as deemed necessary for the successful implementation of the systems. Note that the Proposer may not substitute key personnel at any time without prior written consent by the owning Agency or Agencies.

a) Project Manager

b) On-Board Systems Lead

c) Central Systems Lead

d) Communications System Lead

e) Installation and Integration Lead

### II. Organizational Chart

Provide an organizational chart that clearly identifies the Key Personnel described above, other personnel who will be assigned to the work under these contracts, and their roles. Brief descriptions of additional personnel may be included.

### III. Availability and Location of Project Staff

Indicate the primary work location(s) and percentage time commitment of the Project Manager and other key personnel for this project. Discuss how responsibilities of the Project Manager, key personnel and other project staff will be managed and balanced over the course of the project, and how support will be provided to the Agencies during the design, implementation, testing, training and acceptance stages of the project. Identify where the key personnel are located, i.e., their primary office location(s).

### IV. Resumes

Resumes shall be submitted for the Key Personnel. Resumes must be complete and concise, including, at a minimum, projects completed, education, training, degrees and certificates earned. Resumes should indicate experience directly relevant to the work to be performed under this Contract, and will not count toward the 80 page limitation.

*Section III – Management Plan*

### I. Management Plan

Discuss the proposed management approach to ensure adequate technical and administrative oversight over the work and to manage project schedule and budget. Describe the proposed procedures for technical and administrative communications between the Proposer and The Agencies. Discuss proposed Quality Control (QC)/Quality Assurance (QA) measures procedures and any certifications pertaining thereto. Discuss tools and procedures for engineering management of System design, revisions and change management, software configuration, etc.

### II. Project Schedule

The Proposer shall provide in its response a Gantt chart showing the major activities, primary sub-activities, milestones, and timelines required to implement the System. The Successful Proposer shall submit for approval a Master Schedule for the overall project for each Agency.

All project events and/or milestones, which the Proposer views as the responsibility of the Agency or Agencies shall be clearly identified in the Project Schedule.

The project schedule shall include, at a minimum, the following activities for each of the Agencies:

a) Notice To Proceed
b) System Design Document Approved
c) Acceptance Testing Procedures Approved
d) Factory Acceptance Testing Completion
e) Fleet Installation (start and end)
f) Pilot Fleet Testing Completion
g) Full Fleet Testing Completion
h) Training Completion
i) System Documentation Approved
j) System Acceptance Testing Completion
k) Operation Period Testing Completion
l) System Acceptance

### III. Implementation Plan

Proposers shall include an initial implementation plan in their response describing the sequence of work and how they propose to plan, design, install and implement the new CAD/AVL system. The plan shall minimize disruption to existing operations. Disruptions expected shall be described in the proposal.

*Section IV – Technical Approach and Work Plan*

### I. Project Understanding

Describe Proposer understanding of the scope of services, and how the proposed System and approach fulfills that scope including any major assumptions.

### II. System Description and Architecture

Describe the overall technical approach and the primary subsystems and components to be deployed, their relationships to one another, network requirements and their relationship to existing The Agencies' systems and infrastructure.

Proposers shall provide a ten (10) year vision for recommended hardware and software refreshes and replacements that will be necessary to keep the system in optimal operating condition. The vision shall include what of such future efforts will be covered by the Provider under that warranty and subsequent maintenance and support agreements, and identify any expectations for the Agencies for ongoing maintenance.

a) Licensing

Describe all third-party licensing necessary for the proposed system, to include: Simultaneous users, total defined/configured users, system consoles, total defined/configured vehicles

b) Central System

Proposers shall describe their standard, off the shelf service restoration function. Describe the proposed central system, its principal features and functionality, and its relationship with other Agency systems to fulfill the requirements outlined in this RFP.

c) Testing and Training

Proposal shall describe their proposed testing and training process. This includes the overall features and functions of the testing/training, proposed hardware, software and licenses needed for a fully functional testing and training environment.

d) On Board Systems

Discuss the proposed on board system architecture and technical approach, including the integration of new and legacy sub-systems as described in the Technical Requirements and Specifications.

e) Expectations of the Agencies

Identify any assumptions regarding work, services, information, facilities to be provided by the Agencies or the third-party providers of systems or services to the Agencies.

f) Documentation, Testing, Training, Installation, and Integration

Provide a comprehensive description of the proposed documentation, testing, training, installation, and cutover plan and procedures. Note that on-site design, installation, testing, commissioning, and cutover activities of the Proposer shall pose minimal disruption to normal Agency activities and be in accordance with specific requirements outlined in this RFP.

g) Communications Integration

Describe the proposed technical solutions to integrate the new cellular data communications and private radio system (Petaluma Transit) into the CAD/AVL system.

*Section V – Compliance Matrices*

I. Proposers shall complete and submit the Compliance Matrices with responses for each requirement identified in the matrices. ***Since each agency has a tailored Compliance Matrix, the proposers shall submit the Compliance Matrices with responses as provided in Appendices C1, D1 and E1, i.e., one for each agency. Word versions of the Compliance Matrices are available upon request. Please contact*** david@soltransride.com ***to request the Word files.***

Submitted proposals that do not adhere to these instructions may be considered non-responsive. The Agencies reserve the right to request more information for any and all responses provided. The matrices will not count towards the 80 page limit. The Successful Proposer shall submit a final Compliance Matrix for each agency which will used for traceability and testing purposes.

*Section VI – System Warranty and Maintenance Support*

I. Describe the terms and conditions of the proposed System Warranty and Maintenance Support which shall include one for each Agency in a manner that is consistent with, and elaborates on the warranty-related requirements (see Appendix B, Technical Requirements and Specifications). Describe processes and procedures for:

a) Preventative and remedial maintenance, including assumptions regarding responsibilities of Proposer and each of the Agencies.

b) Responsible parties for performing System Warranty obligations and their locations.

c) Any items proposed for exclusion from the System Warranty.

d) Provisions for telephone and/or help desk support during the System Warranty.

e) Proposed software update, upgrade and support process during the System Warranty.

*Section VII – Price Proposal*

I. Proposers shall submit the Price Proposal Forms as provided in Appendices C3, D3 and E3. These forms shall include prices for all items indicated in the price proposal forms including all optional items. Submitted proposals that do not adhere to these instructions may be considered non-responsive. The price proposals will not count towards the 80 page limit. Word versions of the Price Proposals are available upon request. Please contact david@soltransride.com to request the Word files.

# VI. Proposer Evaluation Criteria

The proposals will be evaluated using the criteria and points indicated in the table below.

| Table 4: Proposer Evaluation Criteria | | |
|---|---|---|
| **Category** | **Description** | **Points** |
| Qualifications of Organization and Staff | • Overall qualifications including experience references and capabilities for providing the required services<br>• Technical and Management experience and location of key personnel<br>• History and years of experience of organization<br>• Demonstrated financial capacity to complete the system<br>• Project descriptions of the provider's related projects<br>• Experience in working with local transit agencies<br>• Management practices including project management processes and tools, quality control procedures, and schedule adherence. | 40 |
| Technical Approach and Compliance | • Overall quality and responsiveness of the proposal and meeting the project's objectives including functionality, features and suitability for transit operators.<br>• Tenure/maturity of the proposed CAD/AVL system<br>• Features of the proposed CAD/AVL system<br>• Performance characteristics and reliability of components<br>• Compliance with the System Requirements and Specifications<br>• Terms of the System Warranty and Technical Support | 40 |
| Price Proposal | • Price proposal score will be calculated based on a "weighted score" that considers the base prices of all proposers. Each proposer's price score will be calculated using the following formula:<br>[(Lowest Base Price) / (Proposer's Base Price)] * 20<br>The Proposer's Base Price will be based on the prices that are provided as part of the Price Proposals as outlined in Appendices C3, D3, and E3. | 20 |
| | **TOTAL POSSIBLE POINTS** | **100** |

# VII. General Requirements

## 1. Project Management

### Agency Responsibilities

Each agency shall be responsible for the following during each process of this project

*Design and Procurement*

- Oversight of the design and procurement documents and working with the selected provider on the implementation of the system.

*Installation and Integration*

- Oversight of the installation and integration of the system. Receive training on the use and operations of the system
- Oversight of installation of the system's technology elements (hardware and software). Receive training on the use, operations and maintenance of the system.
- Receive comprehensive training on the use and operations of the system and how to properly maintain the on-board hardware.

*System Commissioning*

- Conduct live testing of the system prior to going live. Actively monitor system during burn in and initial system commissioning periods.

*Operations*

- Conduct live testing of the system prior to going live. Actively monitor system during burn in and initial system commissioning periods.
- Work with provider on troubleshooting and repairs of technology components of the system. Maintain the AVL servers and ensure the quality of data. Pull reports and set up and implement new queries as necessary for transit operations monitoring and reporting.
- Operate and maintain system elements and work with provider on troubleshooting and repairs.

### Provider Responsibilities

The provider shall be responsible for the following during each process of this project:

*Design and Procurement*

- Complete design of the system based on the project goals and objectives and Agency feedback.

*Installation and Integration*

- Complete installation, integration and testing of the system. Ensure that current bus features are integrated and operating into the new system properly.

*System Commissioning*

- Respond, troubleshoot and correct any deficiencies during the burn in and system commissioning periods.

*Operations and Maintenance Support*

- On-going maintenance checks and troubleshooting. Pending contract terms, provide repairs of the system in a timely manner and provide technical support for CAD/AVL elements.

## 2. System Design

The design process for the system shall be comprised of three stages as described in the following requirements.

- Preliminary Design;
- Draft Final Design; and
- Final Design

Each design stage shall include submission of the System Design Document.

The System Design Document shall be comprised of documents relating to the design and implementation of the desired system so that the intent of the design may be reasonably reviewed by the Agencies. At a minimum, the System Design Documents shall include details on the system interfaces with each and every component of the CAD/AVL system and any appropriate shop drawings to illustrate detailed connections and hardware interfaces, particularly with the on board equipment.

Should there be interfaces with equipment and/or software supplied by different manufacturers, the Provider shall submit an Interface Control Document (ICD) which shall describe all of the proposed hardware and software interfaces with each of those components. The Proposer shall include as part of the System Design the interface with the 511 System for the exchange of static and real-time information.

The Proposer shall attend Preliminary and Draft Final Design meetings with each Agency to discuss the comments and proposed responses. Such meetings shall be scheduled to take place shortly after the Proposer has responded to comments. The meeting will be used to reach agreement on any outstanding issues raised through the review process. The Proposer shall be expected to issue notes with agreed action items following from the meeting.

The Proposer may only proceed from one phase of the project to the next following written approval from the respective Agency. The Proposer shall assume at least two (2) meetings for each of the design phases. The Proposer shall provide software display screen samples in all submissions to illustrate the look and feel of the system.

The Proposer will not be able to proceed with the installation or commissioning contained in each document until it has been reviewed by the owning Agency and the document approved. It is the responsibility of the Proposer to secure appropriate approvals prior to installation and commissioning.

All drawings submitted shall be in U.S. English only and shall use inches and feet, as well as meters, for all measurements.

The drawings shall be submitted and approved by the Agencies prior to production and shall include photos or AutoCAD drawings of the equipment locations and electrical wiring routing, and electrical schematics of wiring. The shop drawings shall establish the actual detail of the work, the location and method of attachment of the equipment on the buses shall be approved by each agency's Project Manager and should be replaceable with a "plug-in" feature allowing rapid change-out.

Final shop drawings shall reflect the actual "as built" conditions and shall be submitted in both print & electronic format.

## 3. Submittals

The Provider shall submit for approval a list and delivery schedule for all called for under the deliverables indicated in the table below and others requested by the Agencies. The table provided below is for reference only, and the Successful Proposer shall submit a final list of submittals for approval by the agencies.

**Table 5: Required Submittals**

| Submittal | RFP Reference Section |
|---|---|
| Project Master Schedule | Section V |
| Final Compliance Matrices | Section V |
| System Design Documents | Section VII.2 |
| Equipment Documentation | Section VII.4 |
| Interface Control Document | Section VII.2 |
| Installation Plan | Section VII.4 |
| On Board Systems Integration Test Plan | Section VII.5.3.2 |
| Factory Acceptance Test Plan | Section VII.5.3.1 |
| Pilot Fleet Test Plan | Section VII.5.3.3 |
| System Acceptance Test Plan | Section VII.5.3.5 |
| System Manuals | SectionVII.6.10 |

| Table 5: Required Submittals | |
|---|---|
| **Submittal** | **RFP Reference Section** |
| Training Documentation | Section VII.6 |
| Final Shop Drawings | Section VII.2 |
| Spare Parts List | Section VII.7 |

## 4. Installation Plan

The installation plan and installation procedures shall be submitted to the Agencies for approval at least 30 days prior to installation for review and commenting. Unless otherwise specified, the Provider shall provide a turn-key installation solution, including all labor, materials, parts, interconnect cables and connectors. This includes any and all mounting brackets, stanchion extensions, hardware, cable labels, grommets, cable clamps and harnesses, and other materials required to install the equipment in Agency approved locations and orientations. The Provider shall ensure that all onboard and central system materials and components are delivered to the installation site(s). The Provider shall be responsible for providing their own secure storage.

At the Agency's option, an Agency representative shall be present during the onsite installation to monitor quality control of the installation process. Equipment shall be installed in a neat and workmanlike manner, in accordance with good practice, by competent technicians and mechanics. Resumes of key installation staff shall be provided to the Agency for approval no less than 30 days prior to installation.

All installers shall be properly trained by the Provider. The Agency reserves the right to require the Provider to immediately replace any unqualified installer.

Notwithstanding the details presented in the Scope of Work, it is the responsibility of the Provider to verify the correctness of the material lists and suitability of devices proposed to meet the intent of the Scope of Work.

The Provider shall be responsible for providing or arranging the provision of all parts and labor necessary for the equipment and its installation up to and including system acceptance. The Provider shall be responsible for the equipment until it has been installed or received by the Agency into inventory as a spare component. The Agency is not responsible for damage during shipping and prior to acceptance.

Any equipment or parts required to provide a complete and operational system, and not specifically mentioned herein, shall be provided by the Provider without any claim for additional payment. It shall be understood that the contract and agreement contemplates and requires the "turnkey" construction and installation of a completely operational communication and dispatch system that meets the standards set by the Agency.

All rubbish and debris associated with site preparation, unpacking of shipping materials, and/or installation of new equipment related to this project shall be removed from the premises by the

Provider and properly disposed of. All dumpsters and related containers used for disposal, are the responsibility of the Provider. Removal of rubbish and debris shall be performed daily.

For purposes of quality control and efficiency, to the greatest extent possible the Provider shall maintain the same installation crew(s) throughout completion of all vehicle installations.

The Provider shall bear responsibility for the safety of their workmen and all others involved with the installation phase.

A prototype installation for each vehicle type shall be performed by the Provider. The prototype installations shall be approved by the Agency or its representative(s) before proceeding with installation of remaining buses of that vehicle type.

The Provider shall implement a Quality Assurance (QA) program to ensure the quality of the equipment installation. The Provider shall provide an installation checklist for each vehicle installation. For each installation the installers shall fill out the checklist and certify that all required installation steps, operational checks, and quality control (QC) reviews have been performed. The checklists shall be submitted to the Agency at least weekly and will be considered a required item for system acceptance.

The Provider shall ensure regular, clear, and consistent communication between the installers and the Agency vehicle maintenance personnel during the installation process. Installers shall check in with the Agency Maintenance Supervisors at the start of each work day and check out to report the work progress at the end of the work day. All Provider, SubProvider, and Supplier employees shall comply with the Agency policies and procedures while on Agency property.

The equipment installation shall not result in a decrease in seating or standing capacity of the vehicle. Equipment, electrical connections, and wiring shall be protected and concealed from view as much as possible and shall be designed so that there is no hazard to the passenger in the event of incidental contact. Potential damage to passengers, their clothing, and their property shall be minimized.

The equipment shall be firmly secured to the bus to prohibit tampering and to avoid damage by accidental abuse of the equipment including routine bus washing processes. Tamper-proof hardware to secure the equipment shall be required.

Any damage to the vehicle or its equipment due to the mistake or negligence of the Provider during installation shall be corrected at Provider expense.

The Agency reserves the right to suspend installations upon significant failures during installation or testing.

The Provider shall provide detailed electronic information (i.e., equipment cut sheets and other detailed information) documenting the following for all equipment provided under this Contract:

1. Agency asset tracking number,
2. Manufacturer,
3. Manufacturer Model Number,
4. Manufacturer Part Number,

5. Provider Model Number (if different from Manufacturer Model Number),
6. Provider Part Number (if different from Manufacturer Part Number),
7. Serial number,
8. Make,
9. Model,
10. Description,
11. Battery Type (if applicable),
12. Firmware and programming versions,
13. Date of Installation,
14. Vehicle installed into (if applicable), location (if fixed), or assigned person if portable,
15. Warranty Provisions (e.g. type, expiration date), and

These records shall be in formats useable by Microsoft products and databases in use by the Agency for tracking controlled assets.

### 4.1 Installation Systemic Failures (Pre-System Acceptance)

If during the installation period, component failures occur to an extent of 5% of the same components used for the same function in the same assembly or subsystem among all system elements furnished under this Contract, the Provider shall, within 30 days of notification of such instance, commence a modification program to repair or replace all such components to correct the cause(s) of such failures at no additional cost to the Agency. The Agency may, at its sole discretion, prohibit additional installation of such components until issue is corrected.

The design of the repair or replacement of the component(s) involved in each such modification program shall be developed by the Provider to remedy the nature and probable cause of the component failures and shall be approved in advance of the repair or replacement by the Agency.

Repair and/or replacement of components pursuant to each modification program shall be according to the same provisions herein as if such components were failed components requiring repair and/or replacement, whether or not actual failures for some or most of the involved components have occurred following notification of a requirement for a modification program.

### 4.2 On Board Equipment

The Provider shall prepare, install, test, and commission onboard CAD/AVL components for all vehicles to be included under the CAD/AVL system. All equipment shall be installed in a manner that allows for simple, component-level replacement of failed equipment by Agency maintenance personnel.

For touch-screen MDTs, the touch-screen is considered a component of the MDT for this purpose and shall be replaceable. Equipment shall allow for easy installation/removal in transit vehicles through the doors without requiring door disassembly.

In-vehicle (onboard) system devices shall be identical in installation characteristics for each vehicle type and model. Equipment components shall be able to be replaced in a vehicle in ten (10) minutes or less by a trained technician, when the proper tools and a spare unit are available.

Unless otherwise approved by the Agency, all connectors, fasteners and connections shall be water-tight and solvent-resistant. All connectors shall provide for positive and secure connections which will not be impacted by vibration, cable movement/kinking, and normal operating activities.

The Provider shall recommend the final location of all onboard components installed on each different vehicle type and configuration, for approval through the design review process and documented via shop drawings (see Section VII.3, Submittals).

The Provider shall use new wiring and connectors and shall properly dispose of all old wiring and connectors. The Provider shall remove all decommissioned equipment, and properly dispose of all equipment not eligible for resale.

Sellable decommissioned equipment shall be inventoried, placed on pallets, labeled, wrapped and readied for shipment. Items identified as scrap (as having no value except for basic material content) will be considered eligible for resale for this purpose. Wrapped pallets shall be stored in an Agency approved location.

Extreme care must be taken when drilling into the vehicle body panels and structure to prevent damage to components hidden behind the drilling surface. Drill stops must be used to prevent unnecessary penetration of drill bits. Drill shavings shall be contained to prevent contamination or shorting out of other bus equipment. Drilling into the bus structure shall require prior approval by the Agency.

All cables and wiring shall be routed inside conduits located in electrical panels or behind body panels. These conduits may be rigid or flexible, and must be non-conductive. Any exposed cables and wiring must be protected by cable loom or equivalent device, secured to a solid point on the vehicle at intervals that prevent cable damage, and shall be approved by the Agency.

All wiring shall be secured but with sufficient slack to allow movement without strain on wire terminals, connectors, or other wire termination hardware, and must be protected against chafing, and any contact with conductive, sharp or abrasive objects. Wiring shall be located such that normal equipment motions, maintenance access, heat sources, radiation, and the environment do not damage or reduce the life of the wiring.

Wire dress shall allow for sufficient slack at terminals to provide for shock and vibration induced movements, equipment lifting, alignment, cover removal and component replacement. All cables, wiring, inter-connectors, switches, circuit breakers shall be heavy duty and specifically designed for their purposes and for transit automotive applications. They shall meet all applicable industry standards and shall meet the SAE J1292 recommended practice.

All circuits shall be protected by circuit breakers. The main power circuit from the vehicle to the system shall be protected by a circuit breaker similar to what already exists in the vehicle. All circuit breakers shall be permanently labeled to show their functions.

### 4.3 Central Computer System

The Provider shall be responsible for the installation, local configuration, network configuration, commissioning, and testing of all central computer system equipment. This shall include the backup and test environment systems and the backup system option if selected, in addition to the primary central system.

The Provider, as part of the design phase, shall prepare design drawings, elevations and wiring connection diagrams illustrating the location of all central computer system and related components and their interconnection, including any network and central system equipment to be located at remote sites or vehicle depots.

The Agency will provide power and a network demarcation point at all central computer system sites. The Provider shall be responsible for any local cabling requirements to connect to the demarcation points.

Central CAD/AVL workstations, monitors, and other related hardware shall be installed at each agency's Dispatch/Maintenance offices.

All servers and associated racks and other hardware shall be installed at designated locations as per the Agency's explicit instruction.

The Agency will provide access during normal business hours for central system installation work that does not disrupt normal operations. All installation and cutover work that disrupts normal operation shall be conducted at night, weekends, or during other off-hours with Agency approval.

## 5. Inspection, Testing, and Acceptance

### 5.1 Inspection

The Provider shall permit Agency staff or its representative's access to the Provider's facilities while system manufacturing and testing are taking place and to any facility where hardware or software is being produced for the CAD/AVL System.

The Agency will perform inspections that include visual examination of hardware, cables, and equipment. Provider documentation may also be examined to verify that it adequately identifies and describes all hardware and software.

The inspection rights described above shall not apply to sub-Providers supplying commercial off-the-shelf components such as servers, network equipment, and third-party software products. Standard hardware and software products shall be tested as part of the Functional Performance Test. However, inspection rights shall apply to sub-Providers that are developing new hardware or software for inclusion in the CAD/AVL system.

### 5.2 Testing

The Provider shall be responsible for conducting all testing as described herein. Work under this section shall include all labor, materials, and support services required to completely test all hardware and software of the installed system.

No adjustments, modifications, or substitutions shall be made to the system by the Provider during testing, except with written approval by the Agency.

Where mutually agreed by the Agency and the Provider, system components, subsystems, interfaces and software processes shall be tested individually and as a whole to demonstrate that the system meets contract requirements.

The Provider shall perform all testing so as to satisfy the objectives of each testing stage as per the Agency approved test plan.

Each Agency or its representatives shall have the right to witness any and all tests. No test shall be considered complete until results are signed off by an authorized Agency representative.

Unless otherwise specified, all test plans shall include at a minimum the following:

1. Overview of testing including test objectives
2. Pass/fail criteria
3. Test setup and test measuring equipment (including descriptive diagrams)
4. Listing of tools, test applications, simulators, etc. required to perform the test
5. Entry/startup conditions
6. Exit/closing conditions
7. Test procedures and scripts to be executed
8. Traceability matrix linking each requirement proposed to be demonstrated to applicable test procedure(s)
9. Test recording form
10. Test comments form
11. Sign-in sheet or list of all individuals present for testing
12. Signatures and verification form

The Provider shall provide written notification of readiness to test for each required testing stage a minimum of 10 days in advance or 15 days when/if travel by Agency personnel or representatives is required to witness the tests. Readiness to test shall include dry run results performed by the Provider.

Upon completion of any test, the Provider shall prepare and submit within 10 days, a report summarizing the results with relevant test records and any actions required by the Provider or Agency. All such test reports will be reviewed and approved by the Agency prior to acceptance of the test results.

Immediately upon completion of each vehicle installation, the Provider shall test that the onboard system and general operating features (e.g., turn signals, doors, APC) of the vehicle is fully functional. The Provider shall also be prepared to demonstrate that the onboard system is fully functional upon request whenever an Agency Inspector is available.

## 5.3 Test Stages

The following are the minimum test stages that shall be completed as part of the contracts:

1. Factory Acceptance Test
2. On Board Systems Integration Test
3. Pilot Fleet Test
4. Burn-In Test
5. System Acceptance Test

Each of these tests are described below.

### 5.3.1 Factory Acceptance Test (FAT)

A Factory Acceptance Testing (FAT) shall be performed to ensure that the supplied and developed components meet all functional and environmental requirements and specifications. FAT shall be performed at the Provider's manufacturing or development site prior to any delivery of equipment to the Agency. At a minimum the Provider Project Manager and Engineers shall be present during the FAT.

The Provider shall develop and submit for approval by the agencies a comprehensive FAT program consisting, at a minimum, of the following individual test programs:

1) Hardware test to verify the operating parameters of all equipment are per the requirements of this Contract, Original Equipment Manufacturer (OEM) specifications, and System Design Document;

2) Functional test to demonstrate that all functional and operational requirements and specifications applicable to the device/subsystem have been delivered;

3) Submit documents supporting appropriate certifications showing environmental and electrical compliance; and

4) Human factors test for all devices/subsystems with a user interface.

5) Scenario or use-case testing to demonstrate end-to-end connectivity and correct processing/handling of data.

All equipment types shall be tested. A minimum of two (2) units of each equipment type, identically configured to all other units of that same equipment type, shall be subject to FAT unless waived by each Agency's Project Manager or designated representative.

Any device certifications required by regulatory agencies shall be the responsibility of the Provider.

All required certifications shall be submitted with each shipment of devices or subsystems. Any changes to the hardware or hardware configuration shall require a FAT retest.

### 5.3.2 On Board Systems Integration Test

The Provider shall install the fixed end systems onsite and, in conjunction with the completed data communications systems and the pre-revenue onboard integrated configuration, demonstrate the integrated operation of all System components onsite (along with simulated data loading) but prior to use of the system in pilot testing. The integrated operation of all System components shall be demonstrated both when the system is running on the primary central system hardware and after it has automatically been failed over to the backup central system hardware. Pilot-Fleet Testing shall not commence until Onboard System Integration Testing has been successfully completed.

The on-board testing shall include time and provisions for Agency staff to conduct independent system integration testing using their own or ad-hoc scripted test cases. Provider support during these tests shall be provided.

The on-board testing shall be conducted using approved Agency vehicles on the Agency network but not in revenue service.

To be approved by the Agency, the Provider shall identify a subset of the on-board testing to be re-run once a limited number of vehicles have been equipped.

### 5.3.3 Pilot-Fleet Testing

The Provider shall complete the pilot-fleet testing. The Agency will designate at least 10% of the vehicle fleet to receive CAD/AVL equipment and representative of a mixture of the entire fleet and non-revenue vehicles to be equipped to enable pilot-fleet testing with all components as will be installed and interfaced to existing transit hardware. The test shall demonstrate all vehicle-related aspects of required system functionality. The Provider shall prepare and submit a Pilot Fleet Test Plan for the agency's approval.

Pilot-fleet testing shall be completed after installation of the central system and the initial set of agreed vehicle installations, and deficiencies shall be rectified before the completion of any additional vehicle installations.

The Pilot Fleet shall run without errors or interruptions for a minimum of twenty-one (21) calendar days. Should there be any substantial errors as determined by the agencies during this period, the Provider shall correct the deficiency immediately and re-run the Pilot Fleet test. The testing shall start over and shall not be deemed completed until the full 21 day test period is satisfied without any substantial errors.

Pilot-fleet testing shall be witnessed by the Agencies representatives (Agency staff and/or designated support consultants).

### 5.3.4 Burn-In Test

Once the Pilot Fleet has been completed through testing, each subsequent vehicle shall undergo a burn in test. This burn in test shall consist of running each vehicle connected to the central system, for a minimum of ten (10) calendar days. Any errors during this period shall be corrected and the test re-started.

#### 5.3.5 System Acceptance Test (SAT)

SAT will only be initiated once all of the system elements have been installed and configured and all pre-installation and installation tests have been successfully completed. The SAT will test the entire system where the tests are completed to ensure that the functional requirements are met to the satisfaction of the agencies.

The SAT shall be an end-to-end test that is typically performed from the central system software out to each device. Where software interfaces with other software, this interface shall be tested through the SAT for each software subsystem.

Each requirement listed in the requirements and specifications shall be tested. The SAT will also include those cases where a test procedure is not feasible. In these cases, the SAT will document what form of verification will be performed to confirm the requirement and/or specification is satisfied.

The SAT shall be tested for a period of no less than 15 consecutive calendar days without any errors that interrupt CAD/AVL operations and reporting.

SAT shall be witnessed by an Agency representative (Agency staff and/or designated support consultants).

The provider shall provide a SAT Plan for review and approval by the agencies at least three (3) weeks in advance of the planned start of the acceptance testing.

### 5.4 System Acceptance

Final acceptance of the CAD/AVL System shall occur after the following items are completed:

1) Completion of all contractual requirements to each Agency's satisfaction
2) Successful completion of all tests as measured by Agency acceptance and approval of all test reports
3) Agency acceptance of all delivered equipment as listed in the Provider-supplied hardware inventory
4) Agency approval of all drawings, manuals, and all other documentation
5) Integration of all on-board equipment and systems
6) Agency approval of all Provider-supplied training

## 6. Training

The Provider shall be responsible to train Agency designated personnel according to the requirements specified herein. Training shall take place at Agency designated facilities. The training presentations and material shall be in English. Instruction shall cover

equipment familiarization and systems operation. The minimum training is that which is necessary to bring those employees designated to the level of proficiency required for performing their respective duties.

The Provider shall provide experienced and qualified instructors to conduct all training sessions. The Provider is responsible for ensuring that the instructors teaching these courses are not only familiar with technical information but are able to utilize proper methods of instruction, training aids, audiovisuals and other materials to provide for effective training. Resumes for all training instructors shall be provided to the Agency for approval prior to the training class.

The Provider is responsible for providing all training materials, training aids, audiovisual equipment and visual aids for the conduct of these courses.

Instructional materials consisting of applicable equipment operation and maintenance manuals, and supplemental notebooks consisting of additional drawings, procedures, and descriptive information shall be provided.

Student guides shall include full topic descriptions, illustrations as needed to enhance content presentation, and common problems with comprehensive solutions given. Student guides shall mirror the instructor guides.

All training materials are to become the property of the Agency at the conclusion of training. Maintenance training shall commence during the time when equipment is stored on the buses. At the request of Agency, the Provider shall provide additional training sessions at the contract price per session.

The Provider shall submit the training curricula, presentations, and materials for review and approval by the Agency. No training shall commence until these items have been approved by the Agency.

Training curricula shall meet all training requirements and indicate trainee prerequisite knowledge, course content, training time requirements, and who should attend. Training curricula shall be provided to the Agency for review a minimum sixty days prior to commencement of equipment installation. Level of competency required to pass course examinations shall be determined by the Agency.

As a minimum, training should be provided on the following systems:

1) Computer-Aided Dispatch Training;
2) Data Analysis and Report Generation;
3) Laptop Training;
4) System Administration Training; and
5) Maintenance Training.

Provider shall provide 6 fully functional CAD/AVL units (i.e. bus in a box) for training purposes.

### 6.1 Computer Aided Dispatch Training

Provider shall provide Computer Aided Dispatch training for each Dispatcher and Road Supervisor.

The Provider shall work with the Agency's Operations Manager to define a training program that will minimize impact to operations.

### 6.2 Onboard Systems Training

Provider shall provide a "Train the trainer" approach for onboard systems.

Provider shall provide hands on training on the operation and appropriate use of onboard equipment.

Training shall include operational scenarios that incorporate new features and functionality of the CAD/AVL system.

### 6.3 Desktop Web Application Training

Provide training for various agency departments for AVL viewing and playback as well as incident entry.

### 6.4 Service Planning and Scheduling

Provider shall provide training for experienced staff on the service planning and scheduling aspects of the systems.

### 6.5 System Administration Training

Training shall be provided for experience staff on the configuration, administration and troubleshooting of the system.

### 6.6 IT Training

Training shall be provided to fully familiarize IT personnel with all aspects of the system including the structure of the applications, tables utilized, network connections and settings, and other similar information.

The trainer for this course shall be technical in background as this training will be highly technical "back end" information and not end-user type training.

At the conclusion of training, personnel involved, including database administrators, developers and system analysts shall have a thorough understanding of the following as applicable:

1) Applications' architectures
2) Data flows
3) Interfaces
4) Development tools

5) Development assumptions
6) Directory structures
7) Processing scripts
8) Data dictionaries
9) System flows
10) Table relationships
11) Table growth
12) Data conversion methods
13) Recommended backup strategies
14) Application programs

All programs shall be defined and described fully, showing all inputs/outputs, samples of reports, logic flows and major functions described.

### 6.7 Reporting Training

Training for reporting capabilities of the system and on the mechanics of creating reports and/or developing ad hoc reports.

### 6.8 Maintenance Training

First Line Maintenance training shall commence during the time when equipment is installed on the coaches.

Provider shall provide First Line (diagnostics, troubleshooting, configuration and remove and replace) maintenance training.

Provider shall provide preventative maintenance training during first line maintenance training.

Provider shall provide Second Line (subassembly or board-level troubleshooting, diagnostics, configuration, and replacement) maintenance training two months prior to the end of the warranty period.

Provider shall provide manufacturer certified training for radio/electronics maintenance technicians on the following:

Provider will provide integration and line replaceable unit level training on the Vehicles such that a radio/electronics technician can safely and efficiently:

1) Diagnose Failure
2) Isolate troubles in the integrated system to the CAD/AVL system components or the Radio system components
3) Determine and identify faulty equipment (subscriber units)
4) Repair, replace, remove as indicated the faulty device or devices

5) Provide schematics, block diagrams, test points, test equipment, specialized tools or other items as need to maintain the onboard equipment

Provider will provide training to radio/electronics maintenance technicians, Dispatchers, Supervisors and IT staff on the use of the CAD/AVL system to include:

1) Integration of radio dispatch functions into the CAD/AVL system
2) All screens, geo displays, messaging, and other functions in the CAD/AVL to facilitate text messaging.
3) All adjustments and configuration changes allowed to items such as lists, volumes, priorities, alerts, messages and other features provided by the Provider.
4) Operation of the system for day-to-day transit operations
5) Operator level fault clearing and error notices

Provider will provide detailed hands-on training in repair and maintenance of the CAD/AVL back office implementation to include:

1) Line Replacement Unit remove and/or repair
2) Detailed System diagnostics
3) Operating Systems
4) File systems
5) Automated Tests
6) Theory of Operation
7) Systems and Subsystems fault isolation

### 6.9 Follow-Up Training

Follow-up training sessions shall be provided six (6) months after the initial sessions and shall consist of the same modules as the initial training. Sessions shall be at least half the length of the initial training sessions.

### 6.10 Manuals

The Provider shall provide Maintenance Manuals documenting how the system components were installed, how to install and configure spare components, and the schedule/procedures for preventative maintenance, inspection, fault diagnosis, component replacement and warranty administration on each system component.

The Provider shall provide User Manuals for Dispatchers, documenting use of all functions of the software.

The Provider shall provide Operator Manuals for all operators, documenting the use of the MDTs and other on-board equipment.

The Provider shall provide Systems Manuals, documenting the configuration and topology of central systems hardware and software, central systems software functions

and operations, scheduled maintenance required for the central systems, and database structure and data dictionaries.

## 7. Spare Parts

The Provider shall propose for consideration a list of spare parts to be provided (Spare Parts List). This list shall include replacement parts, components or sub-assemblies for all items of equipment provided, in sufficient quantities to meet the estimated need for warranty and maintenance purposes for a period of two years, including a minimum of 10% of the installed quantity for each component. The Spare Parts List shall include complete sets of all necessary replacement parts, including, but not limited to:

1) VLU
2) GPS receiver
3) Antenna
4) MDT
5) MAR
6) Cellular router and WLAN communications card
7) APC
8) AVA

This list is a master list of all possible spare parts items. Each agency will have a different need for spare parts depending on which items are deployed as part of their specific CAD/AVL system. Please refer to other Section III, Project Scope of this RFP, the Technical Requirements and Specifications and the Compliance Matrices for more details on the minimum required spare parts list for each agency.

The Spare Parts List shall contain a set of all specialized tools and equipment necessary to install, calibrate, test and maintain the system. All wiring, cabling and adapters shall also be provided. Each item on the spare parts list shall include all ancillary components (e.g., cables, hardware) needed to complete a rapid onboard replacement for the component.

The Provider shall provide spare parts in accordance with the agreed Spare Parts List, the full cost of which shall be included in the Contract Price.

The Spare Parts shall be placed into the spare parts inventory and become the property of the Agency upon handover.

The Agency shall receive replacement spares within 7 calendar days of notice of shipment of the defective part to the Provider.

The Agency shall have the option to purchase additional spare components are the proposed price at any time within the warranty period. Additional purchased spares shall be received within 7 calendar days of order.

## 8. Warranty, Maintenance and Support

All materials, components, and parts furnished under this Contract shall be new and of high quality and in conformance with this contract.

The Provider shall represent that all equipment offered under these specifications is new. Used, shopworn, demonstrator, prototype, remanufactured, reconditioned, or discontinued equipment shall not be supplied under this contract. Reuse of existing Agency material, equipment, or software will not be accepted, with the exception of hardware, software, or infrastructure interfaces permitted by this scope of work.

All workmanship provided under this contract shall be of high quality, and in conformance with this contract.

The Provider warrants that all hardware and software meets the functional and performance requirements as described in the requirements.

The Provider warrants that all materials, components, parts and workmanship of CAD/AVL elements, spare parts or assemblies, and all special tools and diagnostic test equipment provided under this Contract to be free of defects and faults in material, design and workmanship. Such warranties by the Provider shall apply to all CAD/AVL software, components, parts and workmanship, whether performed or provided by the Provider, Provider's SubProviders, or suppliers at any tier. Such warranties shall not apply to CAD/AVL elements or components abused or neglected by the Agency, or damaged by some unusual and unforeseeable supervening cause occurring after System Acceptance.

This system warranty shall commence upon System Acceptance, and shall be for a period of not less than three (3) years, except for any longer period provided in this Contract.

The Provider shall furnish, at its own expense, all material, parts, labor, shipping costs, remote access equipment and services, and all other expenses required to fulfill its CAD/AVL warranty obligations.

All software, keys, equipment, and warranties shall be in the Agency's name.

### 8.1 Period

All installation and hardware provided by the Provider shall be covered by a parts and labor Warranty, which shall commence upon System Acceptance, and shall be for a period of five (5) years, except for any longer period provided in this Contract.

All software warranties shall be extended to cover the System warranty period at no additional cost to the Agency.

Onboard equipment failures shall be repaired or replaced by the Provider on a seven (7) calendar day turnaround throughout the warranty period.

Central system equipment and server failures shall be diagnosed within four (4) hours of being reported, and repaired or replaced by the Provider within twenty-four (24) hours.

For all onboard vehicle components, the Agency shall attempt to resolve problems prior to contacting the Provider. If the Agency cannot resolve the problems, upon notification the Provider shall provide seven (7) days per week, 24 hours per day phone support and a four (4) hour response time for the agencies. All defective elements that are under warranty will be swapped out by the Provider unless the agency decides to perform the swap.

Any warranty from the Provider's SubProvider or supplier to the Provider exceeding the periods described herein shall be extended to the Agency for the same period of time as given to the Provider.

Hardware and software manufacturer's warranties shall be extended through the System Warranty period, including any extended warranty the Agency chooses to purchase.

The Agency shall be notified of all updates to provided hardware and software until end of the warranty period.

During the warranty period, the Agency shall receive all updates at no cost for all software applications, interfaces, and/or modules provided by the Provider to the Agency prior to System Acceptance, including those which correct bugs or enhance system functionality).

All issues identified during the warranty period shall be resolved under the warranty even if the warranty period expires before the issue is resolved.

### 8.2 Repair and Replacement

For each system component or workmanship failure during the warranty period, the Agency shall determine whether to correct the failure by repair or replacement of part(s) within an assembly, or by replacement of the entire assembly.

For onboard equipment, the Agency shall perform removal of failed parts or assemblies and installation of spare parts or assemblies for accepted system elements under warranty, unless the Agency and the Provider agree to other arrangements for such work.

The Provider may provide technical supervision for such removal or installation work by the Agency. The Provider shall receive such removed failed parts or assemblies at a location on Agency premises to be designated, unless the Provider requests shipment of such failed parts or assemblies to its facilities; in such case, the Agency will ship such failed parts or assemblies at the Provider's expense.

The Provider shall deliver to the Agency a replacement or repaired part or assembly for each such returned failed part or assembly within 7 days of notice of shipment of a failed part or assembly.

In the event that a failed onboard part or assembly is manufactured to order only and cannot be repaired or replaced within the seven (7) day period, the Provider and Agency mutually shall consider whether the defective unit is to be repaired or replaced. The decision as to which alternative will be used shall be based on minimizing down time of the system, and the Provider shall return the repaired or replaced unit at the earliest possible date.

The Provider shall provide during the warranty period the latest compatible version of the failed part/hardware with the latest firmware.

The Provider shall retain full responsibility for replaced or repaired parts or assemblies throughout the duration of the warranty coverage period for all parts and assemblies replaced by the Agency.

### 8.3 Failure Analysis Report

All parts or material returned to the Provider for repair or replacement shall be accompanied by a Failure Analysis Report Form, which will be provided by the Agency. The Provider shall complete this form and shall deliver to the Agency a full and complete report of the exact nature and probable cause of each system component failure within ten (10) days of the Provider's receipt of such failed component.

### 8.4 Systemic Failures

Systemic failures shall be defined as the occurrence of component failures in excess of 5% during the warranty period.

In the event of systemic failures during the warranty period, the Provider shall at their expense, within 30 days of notification of such instance, commence a modification program to repair or replace all such components, including those that have passed beyond the warranty period, to correct the cause(s) of such failures. The design of the repair or replacement for the component(s) involved in each such modification program shall be developed by the Provider to remedy the nature and probable cause of the component failures and shall be approved by the Agency. Repair and/or replacement of components pursuant to each modification program shall be according to the same provisions herein as if such components were failed components requiring warranty repair and/or replacement, whether or not actual failures for some or most of the involved components have occurred following notification of a requirement for a modification program.

In no case shall the correction of defects in design, material or workmanship result in an increase in maintenance requirement beyond that specified in the Contract Documents.

The Provider shall warrant replacement of part or assemblies due to systemic failures for three (3) years from replacement. Warranty terms and conditions shall be the same as for the original system warranty.

### 8.5 Replaced Parts

Any materials, parts or components used for replacement under the initial warranty period shall be warranted again, such that the new warranty period shall begin upon date of replacement as recorded in the Agency's system maintenance records, and be of the same duration as the original warranty period (i.e. three years from replacement if the original warranty period was three years), regardless of the timeframe of the failure. In the case of components that are replaced pursuant to a modification program but have not yet failed, the new warranty period shall be computed from the date of the Agency's notification to the Provider of a requirement for the particular modification program.

### 8.6 Software Updates and Support

All software provided by the Provider shall be covered by the Warranty from installation until three (3) years from System Acceptance.

The Provider shall supply compatible hardware and software versions across the fleet over the term of this contract including the warranty.

As part of the proposal, the Provider shall provide the migration path or schedule for compatibility with updates to 3rd party software.

During the warranty period, the Provider shall update all applicable systems with the then-current version of software at no additional cost to the Agency.

Any “patches” recommended by the hardware or software Providers, (including operating systems), shall not void the system warranty.

# APPENDIX A – CONCEPT OF OPERATIONS

# Automated Vehicle Location System

## *Concept of Operations*

## *Final*

***Prepared for:***

SolTrans

***Prepared by:***

Kimley-Horn and Associates, Inc.

**February 7, 2014**

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# EXECUTIVE SUMMARY

## Forward

The Concept of Operations is intended to evaluate SolTrans and Petaluma Transit's current operating environment needs for a new Computer-Aided Dispatch (CAD) and Automated Vehicle Location (AVL) System, describe the characteristics of a new CAD/AVL system, and document anticipated benefits and impacts that result from the implementation of a new CAD/AVL system into both agencies' operations.

Neither SolTrans nor Petaluma Transit has an existing CAD/AVL system. There are currently no automated bus features on the existing SolTrans bus fleet, making the proposed operational concept for the system completely original.

## Needs Assessment

The operational needs were identified through meetings with key SolTrans and Petaluma Transit staff. These needs represent the necessary changes from today's operations to achieve the goals set out in the project purpose. The key needs that contribute to forming the proposed system concept are as follows:

- Improve quality and quantity of data for transit operations (e.g., maintenance, scheduling, customer info, etc.) to allow for better transit planning capabilities.
- Improve on-time performance by automating and monitoring vehicle location, and timestamps at major transit stops.
- Provide better customer interface for accessing real time data to increase ridership (e.g. dynamic signs at stops, and mobile applications).
- Seek a maintenance agreement that includes training for contractors (e.g., operation, maintenance, IT support, data management, etc.).
- Seek a maintenance agreement that allows SolTrans to capitalize their equipment and requires the provider to provide assistance in operating and maintaining equipment.
- Seek a life cycle and equipment projection that provides a 10-year budget outlook with replacement costs and lifecycle of products.
- Include cost and account for future expansion of the system as an evaluation function.

## Preferred CAD/AVL Procurement Delivery Method

Based on the agency and industry scans, and an overall assessment of SolTrans and Petaluma Transit's needs and requirements for the CAD/AVL system, it is recommended that SolTrans and Petaluma Transit move forward with a traditional CAD/AVL procurement model. While the other solutions (hosted and SaaS) have their own set of advantages, they would only fulfill a smaller set of SolTrans and Petaluma Transit's needs compared with a traditional solution. The following points support this recommendation and are offered for consideration.

- While the SaaS option can provide lower initial costs for AVL and real-time passenger information, the product offerings are generally limited in regards CAD system management and voice radio control functionality. Therefore, the SaaS option will not be an adequate option for SolTrans or Petaluma Transit.
- The ongoing costs for a hosted CAD/AVL and SaaS solution are higher compared with a traditional solution due to the recurring hosting fees and remote communications costs.

- With a hosted solution, the transit agency is very dependent on the provider for data reporting, data accuracy and troubleshooting of the CAD/AVL servers. Customized reports are typically performed by the provider. SolTrans and Petaluma Transit's needs require the agencies to have full control of their data and to enable standard and on-demand queries for data reporting as the agencies see fit without dependencies on a third party.
- Many providers offering a hosted solution do not have standardized business models, and they vary their pricing structure client-by-client. This could result in higher costs for transit agencies depending solely on the providers perceived level of effort to host the agency's servers.
- It is not anticipated that a traditional CAD/AVL system will result in the need for additional agency staff, but it enables the agency to have full control of the CAD/AVL operations, data management and reporting.
- Traditional CAD/AVL providers generally had a longer tenure than hosted solution providers.

### Proposed CAD/AVL System Concept

The proposed CAD/AVL system concept is a solution-independent, high-level, operational representation of the proposed approach. It addresses the operational needs, and fulfills the project purpose and objectives. Figures E-1 and E-2 provide an illustration of the proposed CAD/AVL system concepts for SolTrans and Petaluma Transit, respectively

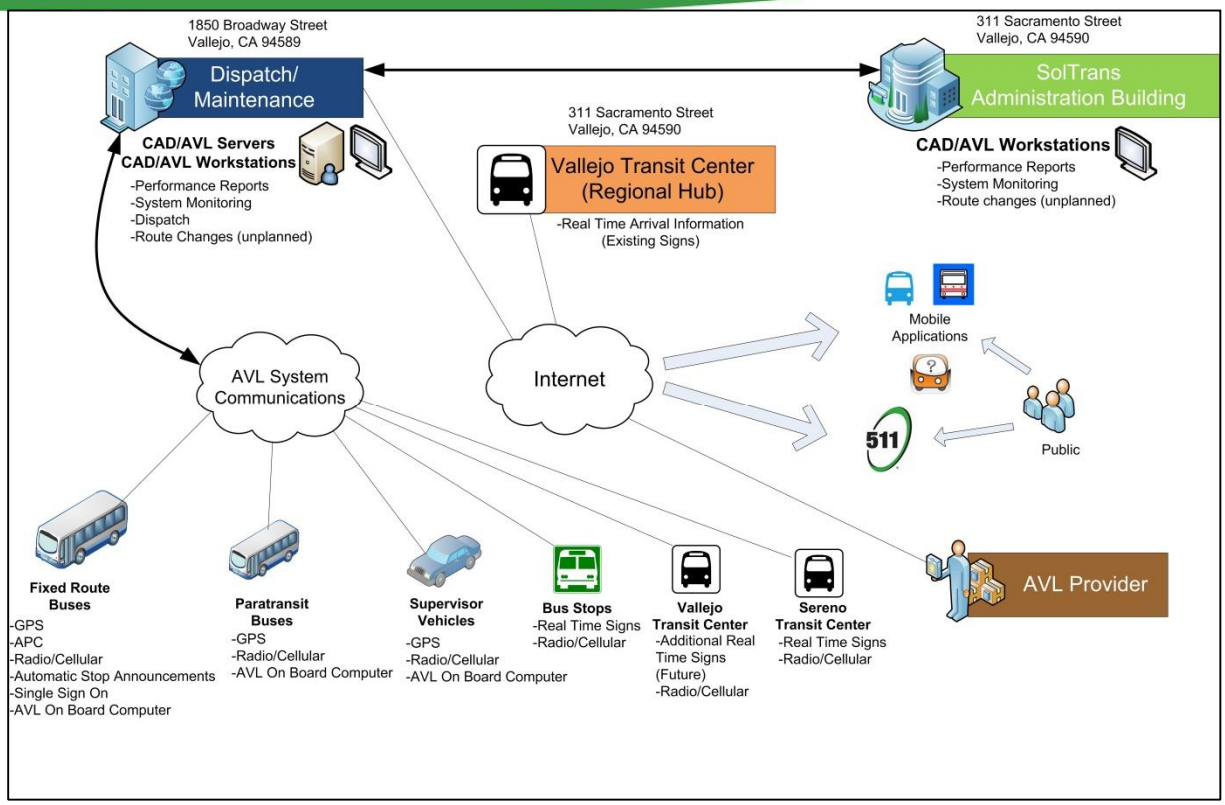


**Figure E-1: Proposed CAD/AVL System Concept (SolTrans)**

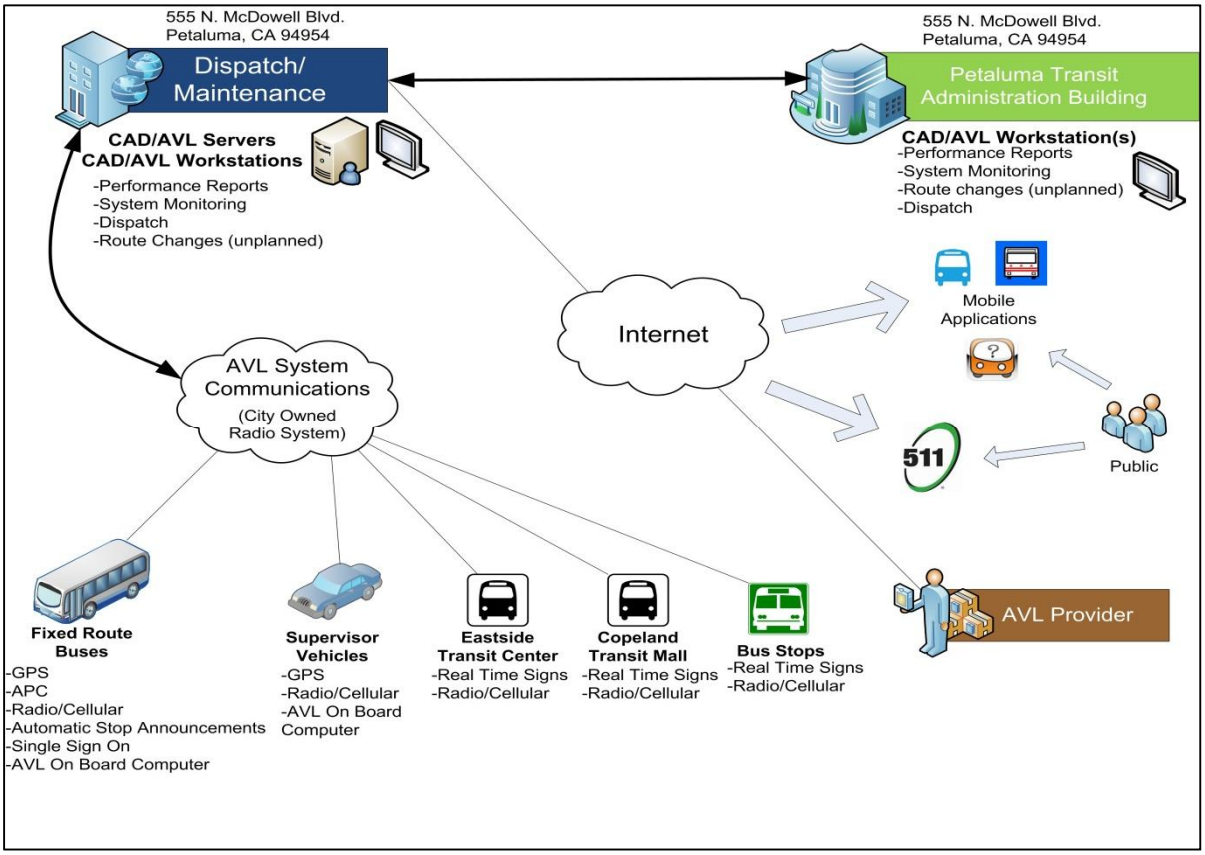


**Figure E-2: System Concept (Petaluma Transit)**

## Proposed Concept

The main components of the proposed CAD/AVL System will include the following:

### *AVL Servers*

AVL servers will be installed at the dispatch/maintenance centers which communicate with and collect data from the fixed route bus fleet, paratransit buses, and supervisor vehicles. The CAD/AVL servers will also communicate with real-time signs at bus stops and at the Vallejo and Sereno Transit Centers (for SolTrans), and Eastside Transit Center and Copeland Transit Mall (for Petaluma Transit) via a radio or cellular connection. From the dispatch/maintenance center, the CAD/AVL servers will disseminate real time data via the internet to 511 Transit and other mobile applications to make real time departure information and other transit information available to the public.

### *CAD/AVL Workstations*

AVL workstations will be installed at the Administration Buildings to enable staff to pull data reports, play back routes, and allow for ad hoc analysis and planning. The AVL workstations will be key for monitoring where specific routes are running off-schedule and identify how to diagnose and correct the problem.

### *On-Board Equipment*

The transit vehicles (fixed route buses, ADA Paratransit, and supervisor vehicles) can be equipped with a variety of in-vehicle equipment to enhance system monitoring and performance. At minimum, the CAD/AVL system will require a GPS tracking system on-board the transit vehicles and wireless communication to relay position data to the dispatch center. The transit vehicles will also be equipped with on-board computers that can display maps with routes and schedules. The computers will also be integrated into the CAD/AVL system to provide passenger information and stop announcements on the fixed route buses.

Automatic Passenger Counters will be installed on-board the fixed route bus fleet, as well as an option for a Single Sign On feature. The Single Sign On feature would require each bus driver to log on once, allowing dispatchers to know who is operating each bus, while also automating announcements and head signs.

### *Software Applications (Apps)*

The CAD/AVL servers will collect vehicle location information and disseminate the information to 511 Transit, third party vendors, and/or to the native CAD/AVL provider to produce mobile applications. Mobile applications will allow transit users to identify where bus stops are located, plan for an upcoming transit trip, select specific stops to find real time departures, and set alarms for upcoming departures.

### *Communications*

All computer based CAD/AVL systems require communications to and from the transit vehicles. Due to the nature of the system, all voice and data communications need to be over a wireless network. The two options being considered for SolTrans are a dedicated radio system (requires a dedicated radio frequency) or a 4G cellular connection. A dedicated radio system would be the preferred option for SolTrans, however it has not been determined whether a City owned frequency and radio equipment are available. Therefore, SolTrans will proceed with the assumption that a 4G connection will be used, unless a City owned frequency and radio equipment become available to Soltrans prior to the procurement. Petaluma Transit already has a dedicated radio frequency, therefore it is recommended to continue utilizing this communication system.

### *Real-Time Transit Arrival/Departure Information Signs*

Signs displaying real time data will be installed at the Vallejo Transit Center and possibly Sereno Transit Center (for SolTrans), and Copeland Transit Mall and Eastside Transit Center (for Petaluma Transit) and other key bus stops as

necessary. The signs will communicate with the AVL servers to inform transit riders of real time departures or other important information regarding bus routes.

*Operations and Maintenance*

The day-to-day operation and maintenance of the AVL system will be undertaken by SolTrans and Petaluma Transit staff. It is recommended that both agencies include training for their operational staff, maintenance assistance, and troubleshooting in the maintenance agreement in order to properly implement a new technology like an AVL system. Initial and ongoing training to increase the level of expertise within staff and contracted operators is the key to successful implementation.

## Operational Impacts

The new AVL system will create efficiencies and facilitate the dissemination of better, more accurate information to stakeholders and transit customers. Implementation of the AVL system will also streamline processes and tools, and will develop and deploy new applications. Roles that each operational unit will play will likely remain the same, but with the addition and availability of more accurate information and advanced features, current processes and activities may evolve. Some of these operational changes may include:

*Dispatch*

Implementation of a CAD/AVL system will allow dispatch to enter changes occurring daily in real time (e.g., changes made to vehicle and crew assignments). This will allow dispatch to have the most accurate and up to date information. Dispatchers will also know the exact position of their buses and can identify if a bus is running behind or ahead of schedule, enabling them to provide better customer service.

*Maintenance*

Availability for remote vehicle monitoring will provide the agency with proactive monitoring of vehicle health and allow the maintenance crew to troubleshoot issues remotely. Access to automated status messages from the CAD/AVL system will also facilitate better communications between the various responders about maintenance issues (controllers, dispatch, road supervisors, and maintenance). Maintenance personnel will be required to take on additional responsibilities such as replacing broken on-board equipment with spares, and occasionally working in tandem with the provider to troubleshoot problems with the CAD/AVL on-board equipment.

*Road Supervisors*

The new system will help controllers easily locate road supervisors to facilitate incident response. Controllers will also be able to better manage the work distribution to road supervisors using the new system.

*Bus Operators*

With the new onboard features, bus operators will be able to log into all systems using a single log on. This will reduce the number of log on errors and issues. With the advanced automated message and support tools available to dispatchers, their communications with operators will be more clear and consistent.

*Service Planning and Scheduling*

Transit Managers and Planners will be equipped with better, more robust information to inform decision-making and provide better transit service. With this information, planning and scheduling can be refined to improve performance, resulting in increased ridership and fewer customer complaints. With new information at their

fingertips, planners will take on additional duties of creating and analyzing reports in order to inform service planning.

### *IT Support and Data Management*

It is anticipated that with the implementation of the new CAD/AVL system there will be the need to reallocate existing staff resources in the areas of data management and IT support. The automation of data management will streamline the reporting process and would allow SolTrans to optimize or reallocate their staffing resource from the current data management duties to more of an IT support role. Since Petaluma Transit does not have staff with dedicated data management duties, it is anticipated that the new CAD/AVL system will provide the agency with an abundance of new data that could necessitate the reallocation of staff resources to be able to utilize this new data for their operations. Moreover, the City of Petaluma's IT department and SolTrans contractors would need to assume responsibilities for system monitoring, maintenance and troubleshooting of the AVL servers should issues arise. Based on discussions with other similar transit agencies with CAD/AVL systems, it is not anticipated that these IT support duties would have a significant impact on SolTrans or Petaluma Transit's staffing and operations.

## 1. Introduction and Purpose of Document

Solano County Transit (SolTrans) and Petaluma Transit have partnered for the procurement of a Computer-Aided Dispatch (CAD) and Automated Vehicle Location (AVL) system to be deployed at each respective transit agency. The vision of this project is to assist SolTrans and Petaluma Transit with the design, procurement, and implementation of the CAD/AVL system for their transit fleets.

This Concept of Operations is intended to evaluate the current operating environment needs for a new CAD/AVL system, describe the characteristics of a new CAD/AVL system, and document anticipated benefits and impacts that result from the implementation of a new CAD/AVL system into SolTrans and Petaluma Transit's operations. Neither SolTrans nor Petaluma Transit currently has an existing computer aided dispatching or automated vehicle location system. There are currently no automated bus features on their existing bus fleets, therefore the proposed operational concept for the system will be completely original.

## 2. Document Overview

This document serves as the Concept of Operations (ConOps) for the Solano County Transit and Petaluma Transit, Procurement Technical Assistance for an Automatic Vehicle Location (AVL) System Project. This document is organized as follows:

- Section 1 – Introduction and Purpose of Document
- Section 2 – Document Overview
- Section 3 – Need for a Concept of Operations
- Section 4 – Existing Operations
- Section 5 – System Goals and Objectives
- Section 6 – Operational Needs
- Section 7 – CAD/AVL Procurement and Delivery
- Section 8 – System Concept
- Section 9 – Operational Impacts
- Section 10 – Operational Scenarios
- Section 11 – Roles and Responsibilities
- Section 12 – Risk Management
- Section 13 – Next Steps

## 3. Need for a Concept of Operations

This ConOps describes the way the system works from the operator's perspective. It includes the user description and summarizes the needs, goals, and characteristics of the system's user base including operation, maintenance, and support personnel. The primary goal of this ConOps document is to capture, early in the system life cycle, an implementation free understanding of the user's needs by defining what is needed and the characteristics required of the system in the context of other systems with which it interfaces, and captures the manner in which the users will interact with the system for which the system must provide capabilities. The ConOps is a living document and is updated as critical elements evolve that warrant revisions to the overall system concept.

# 4. Existing Operations

## *4.1 SolTrans*

SolTrans currently has 40 fixed route buses including three Orion buses, 16 MCI buses, and 21 Gillig buses. Their Paratransit fleet consists of 12 Ford vans that have a capacity of 16 seats and four wheelchair positions. The contingency fleet consists of two Orion buses and five MCI buses. They also currently have four existing road supervisor vehicles which will be replaced by six new road supervisor vehicles prior to procurement of the CAD/AVL system. Ten commuter buses are also currently being leased to Fairfield and Suisun Transit (FAST). The buses being leased to FAST may also be included in the fleet to be updated with the CAD/AVL system.

SolTrans local service area is in Vallejo, but also includes a dial-a-ride service to Benicia, a fixed route to the El Cerrito Del Norte BART station, a fixed route to Pleasant Hill and Walnut Creek BART stations, and a fixed route to Fairfield which ends at the Westfield Solano Mall. The ADA Paratransit system also operates as a dial-a-ride service and are scheduled using Trapeze PASS. Both the ADA Paratransit and Benicia dial-a-ride are curb-to curb services, not door-to-door. Reservations for both are taken up to three days before the ride is scheduled and ADA Paratransit services must be scheduled by the night before the service. Reservations for Benicia dial-a-ride can be made on the day of, subject to availability.

SolTrans key operational facilities are the Administrative Offices located at 311 Sacramento Street in Vallejo, and the Dispatch/Maintenance Facility located at 1850 Broadway Street in Vallejo. Figure 1 provides a map of the existing operating service area for SolTrans including key facilities.

SolTrans currently has six internal cameras and two external cameras installed on each fixed route bus which allows them to monitor bus operations if an incident is reported. New GFI Odyssey fare boxes are currently being installed on all fixed route and contingency buses to streamline the payment process. SolTrans bus drivers and dispatchers currently use AT&T 2-way phones to communicate to each other since there is not an integrated communication system on board. The City of Vallejo has a designated radio frequency for communication but it is unknown at this point whether or not radio equipment would need to be purchased, or if the frequency is available for SolTrans use.

SolTrans currently contracts their operations and maintenance to National Express Transit Corporation. National Express is responsible for all maintenance except for major engine work and operates all fixed route, Paratransit, and supervisor vehicles. Solutions for Transit is also under contract with SolTrans for daily, monthly and yearly mileage reporting. National Express provides four dispatchers and three administrative/customer service personnel. They perform all operations and maintenance functions except for major engine repairs, which are done out of house.

A summary of SolTrans current staffing and organizational roles are described in Sections 4.1.1 – 4.1.7, below.

### 4.1.1 Planning and Operations

SolTrans program managers and analysts are responsible for planning and operations for the Agency's fixed route, and demand response services. Their responsibilities include service planning, policy development, system surveying and mapping, grant management, public outreach, and preparing presentations for the Board of Directors.

SolTrans Planning and Operations team consists of one Planning & Operations Manager, two Program Analysts, and one Program Assistant.

### 4.1.2 Dispatch

Dispatch governs and records all movements of vehicles in and out of the maintenance yard. Their responsibilities are to act as coordinate bus movements and organize vehicle assignments at pullout. Additionally, dispatchers track

vehicle location and maintain communication with the bus operators, road supervisors and maintenance to resolve maintain service quality and deal with emergencies.

SolTrans has eight dispatchers which are employed by their operations contractor, National Express Transit. In addition to eight dispatchers, SolTrans also has six contract (National Express Transit) customer service employees that provide assistance to SolTrans customers.

#### 4.1.3 Maintenance

SolTrans maintenance facility is located at 1850 Broadway Street in Vallejo, CA. SolTrans contracts all maintenance positions to National Express Transit (NEXT). Currently, there are two "A Mechanics," four "B Mechanics," two "C Mechanics," one bus stop maintenance person, and two maintenance clerks. The National Express Transit maintenance crew is responsible for servicing, testing, and repairing all vehicles. All maintenance except for major engine work is done in house. The mechanics are also responsible for coordinating with dispatch in the event of a vehicle failure that they would need to recover from the field.

#### 4.1.4 Road Supervisors

Supervision of field operations is performed by Road Supervisors deployed in the field to monitor, report, and coordinate the operation on a first-hand basis, while also handling emergencies as they arise. They maintain constant communications with dispatchers and are sent to bus locations in the event of breakdowns. Soltrans has four Road Supervisors which are employees of National Express Transit. The Road Supervisor vehicles will be equipped with a CAD/AVL System for quality control purposes.

#### 4.1.5 Bus Operators

Bus operators are responsible for operating the bus fleet. They are required to check in and be assigned to their duty for the day from dispatch prior to boarding a bus. When beginning their operating day from the yard, operators are required to perform a series of vehicle checks. The bus operator will interact with dispatch and the road supervisors throughout the day. Incidents, equipment defect, and other issues occurring on the vehicle are reported by the bus operator through the AT&T two-way radio devices.

All bus operators are employed by SolTrans operations contractor, National Express Transit. Currently, SolTrans has 53 full-time and 19 part time bus drivers. In order to streamline operations, a CAD/AVL workstation shall be installed on all fixed route buses.

#### 4.1.6 IT and Data Management Personnel

IT and data management personnel oversee and support the collection, storage, transmittal and manipulation of data. SolTrans currently contracts their manual reporting tasks to Solutions for Transit. Solutions for Transit has two employees that support SolTrans current operations, and reporting.

### *4.2 Petaluma Transit*

Petaluma Transit has 11 fixed route buses including eight Gilligs, and three New Flyers. They also have four Ford support vehicles, two of which are operated by Petaluma Transit and two of which are operated by the operations and maintenance contractors, MV Transportation. Their Paratransit fleet consists of three Elkhart Coach, two ElDorado National's, one Supreme Bus, and one Champion Bus. At this point, Petaluma's Paratransit vehicles will not be included in Petaluma Transit's CAD/AVL system.

Petaluma Transit has seven local bus routes that serve the City of Petaluma. Paratransit is a dial-a-ride service and is scheduled using Trapeze PASS. Trips can be reserved for Paratransit travel up to seven days in advance, but at least one day in advance.

Petaluma Transit's Administrative Offices and Dispatch and Maintenance Facilities are located at 555 N. McDowell Blvd in Petaluma. Figure 2 provides a map of the existing operating service area for Petaluma Transit including key facilities.

There are currently several cameras installed on each fixed route bus which allows them to monitor bus operations if an incident is reported. Currently, fare boxes are not automated and payments get deposited into a non-electronic farebox at the entrance of the bus, near the bus driver. Bus drivers and dispatchers communicate via a designated radio frequency which, for the most part, is fairly reliable. Radio coverage is spotty in the Northwest part of Petaluma, the far west side, and in the hills near Cherry Valley.

MV Transportation is currently on contract with Petaluma Transit for operations and maintenance services. MV Transportation is responsible for operating all fixed route, Paratransit, and two of the four supervisor vehicles. MV provides two dispatchers and one bus maintenance staff person. A summary of the current staffing and organizational roles is described in Sections 4.2.1 – 4.2.6, below.

### 4.2.1 Planning and Operations

Petaluma Transit's transit managers and transit specialists are responsible for planning and operations for the Agency's fixed route, and paratransit services. Their responsibilities include service planning, policy development, system surveying and mapping, grant management, public outreach, and preparing presentations for the Board of Directors.

Petaluma Transit has one transit manager, one part-time Senior Transit Specialist, and one part time Marketing and Travel Trainer.

### 4.2.2 Dispatch

Dispatch governs and records all movements of vehicles in and out of the maintenance yard. Their responsibilities are to act as operator and organize vehicle assignments at pullout. Additionally, dispatchers track vehicle location and maintain communication with the bus operators, road supervisors and maintenace to resolve degraded service or emergency issues.

Petaluma Transit has three workstations with one full time contract Operations Manager, two full time contract dispatchers and one part time contract dispatcher.

### 4.2.3 Maintenance

Petaluma Transit's maintenance facility is located at 555 N. McDowell Blvd in Petaluma, CA. There is one full time mechanic employed by MV Transit who is responsible for servicing, testing, and repairing all vehicles. The mechanic also coordinates with dispatch in the event of a vehicle failure that they would need to recover from the field.

### 4.2.4 Road Supervisors

Supervision of field operations is performed by Road Supervisors deployed in the field to monitor, report, and coordinate on degraded or emergency situations. They maintain constant communications with dispatchers and are sent to bus locations in the event of breakdowns. Petaluma Transit has one full time contract employee that will need access to the CAD/AVL System for quality control purposes.

### 4.2.5 Bus Operators

Bus operators are responsible for driving and operating the bus fleet. They are required to check in and be assigned to their duty for the day from dispatch prior to boarding a bus. When beginning their operating day from the yard, operators are required to perform a series of vehicle checks. Often times, the bus operator will be interacting with dispatch and the road supervisor throughout the day. Incidents, equipment defect, and other issues occuring on the vehicle are reported by the bus operator through radio calls.

Petaluma Transit has 15 – 20 full time and part time contract employees. In order to streamline bus operations, a CAD/AVL workstation shall be installed on all fixed route buses.

### 4.2.6 IT Personnel

IT personnel oversee and support the collection, storage, transmittal and manipulation of data. The City's IT department is required to support the entire IT infrastructure, including Trapeze PASS, Petaluma Transit's current schedulding and dispatching software. The City has four full time IT employees.

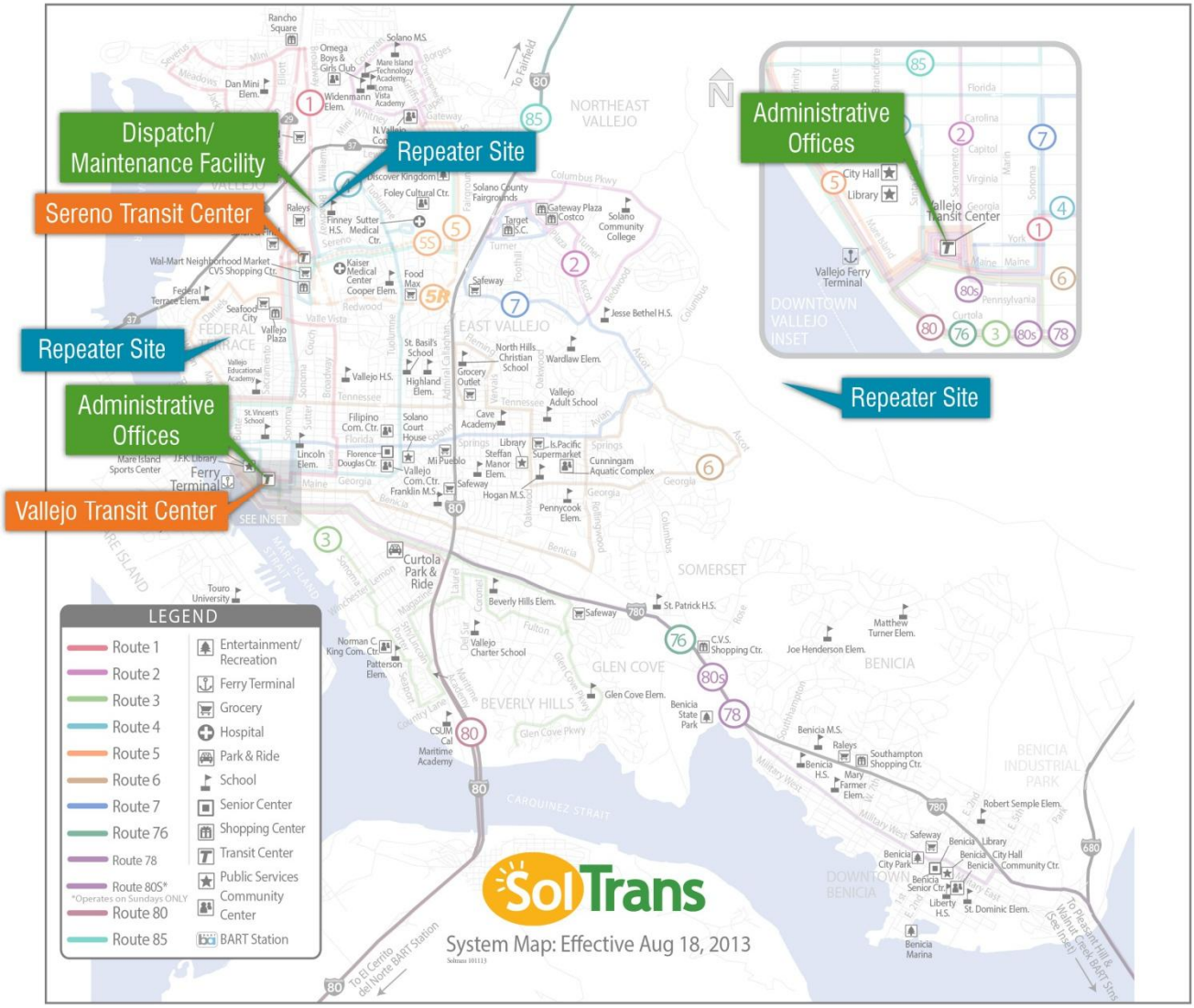


**Figure 1: SolTrans Service Operating Area**

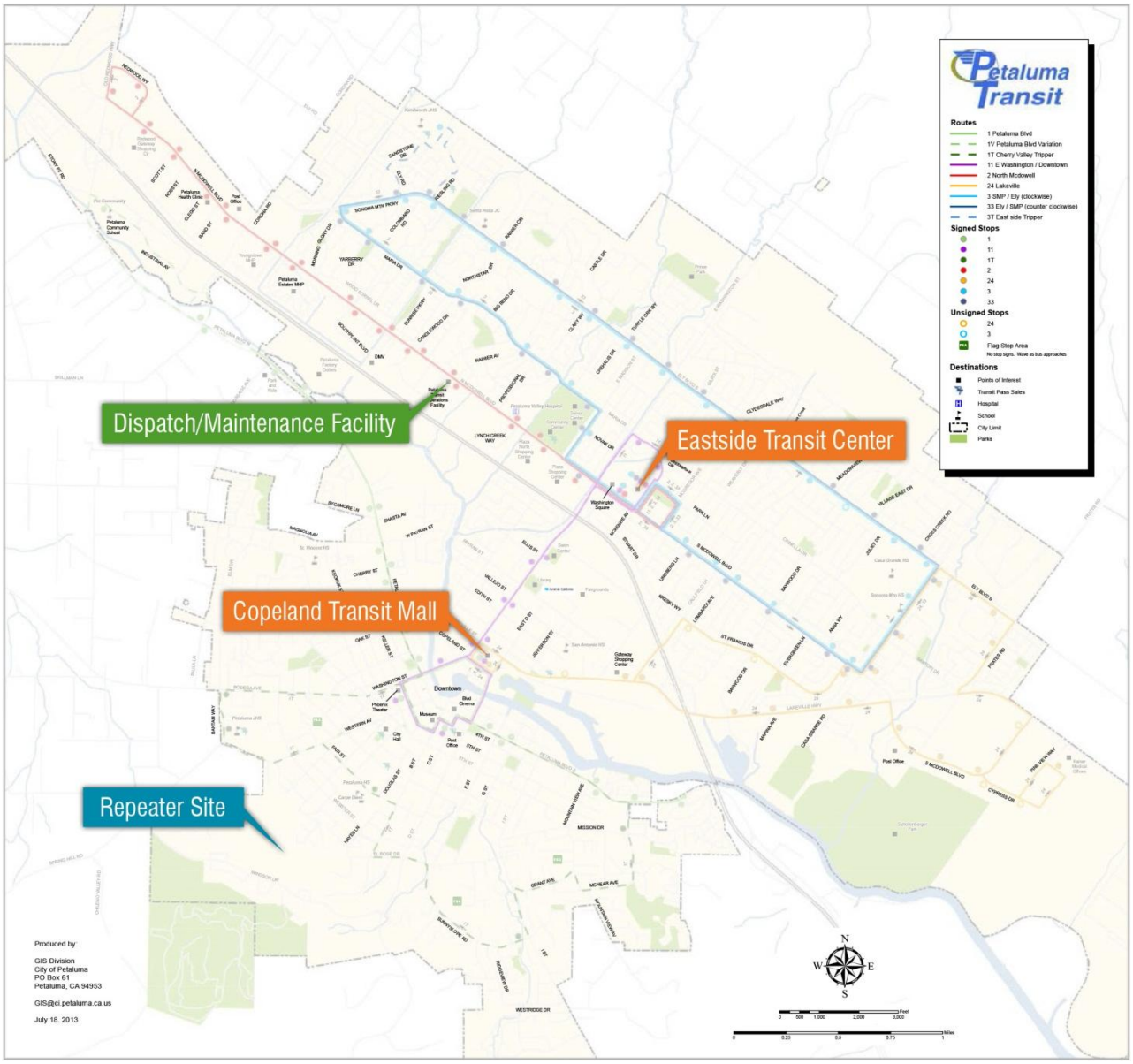


**Figure 2: Petaluma Transit Service Operating Area**

## 5. System Goals and Objectives

The overarching goals of the CAD/AVL System are as follows:

- **Improve On-time Performance**

  The AVL system will disseminate continuous, real-time information to drivers to speed up or slow down between established time points and provide transit planners with systematic schedule adherence problems on routes, due to factors such as peak hour congestion and periodic increased passenger loading throughout the day. With this information, planners can adjust routes or schedules accordingly.

- **Improve Dispatch Reliability and Efficiency**

  By disseminating real-time information to the dispatchers, much of the current communications used to determine where a transit vehicle is located, how full the vehicle is, and who is driving can be eliminated. With real-time information at their desk, dispatch operators could provide this information quickly to transit agency supervisors, respond to public inquiries more proactively and make necessary adjustments.

- **Increase Ridership**

  By improving on-time performance, automating on-board announcements and signs, and making transit more user-friendly by enabling 511 Transit and third party vendors to produce mobile applications. Increasing the availability of real-time information to transit riders will allow them to plan for upcoming trips, select specific stops to find real time departures, and set alarms for upcoming departures.

- **Improve Schedule and Planning**

  By providing more accurate data and reducing the schedule preparation time and staffing. The CAD/AVL system should provide access to an accurate database which enables planners and transit analysts to select more effective bus stop placements and generate more accurate ridership counts.

- **Improve Communication**

  By reducing the voice radio traffic between the dispatch center and bus drivers, and establishing priority for the calls. The CAD/AVL system should prevent lost or ignored calls, and should improve communication between supervisors, dispatchers, and bus drivers.

- **Improve Data Management and Reporting**

  By automating data collection and improving the accuracy and accessibility of data for transit operators, transit planners, and National Transit Database passenger mile reporting.

## 6. Operational Needs

The operational needs were identified through meetings with key SolTrans and Petaluma Transit staff. These needs represent the necessary changes from today's operations to achieve the goals set out in the system goals and objectives. The key needs that contribute to forming the proposed system concept for both SolTrans and Petaluma Transit are as follows:

- Improve quality and quantity of data for transit operations (e.g., automatic passenger counters, maintenance, scheduling, customer info, etc.) to allow for better transit planning capabilities.
- Improve on-time performance by automating and monitoring vehicle location, and timestamps at major transit stops.
- Comply with ADA requirements by automating on-board announcements and signs.
- Automate data management and reporting to increase accuracy and transit planning capabilities.
- Allow for flexible report management by owning the data to manipulate for ad-hoc reports.
- Provide better customer interface for accessing real time data to increase ridership (e.g. dynamic signs at stops, and mobile applications).
- To the extent possible, enable CAD/AVL system to be integrated with Clipper® Cards.
- Ensuring compliance with FTA and MTC requirements to adhere to National and Regional ITS Architecture Standards
- Seek a maintenance agreement that includes training for planning and operations staff and contractors (e.g., operation, maintenance, IT support, data management, etc.).
- Seek a maintenance agreement that allows the agencies to capitalize their equipment and future maintenance agreement costs and requires the provider to assist in operating and maintaining equipment.
- Seek an equipment life cycle replacement projection that provides a 10-year budget outlook with replacement costs and lifecycle of products.
- Include system costs and account for future expansion of the system as an evaluation factor for the selection of the system.
- Integrate existing hardware and software such as GFI Odyssey Fareboxes, data management software, Trapeze PASS (dial-a-ride) scheduling software, and the new fixed route scheduling software that will be acquired in this procurement.

In addition to the joint needs listed above, SolTrans has identified the following needs:

- Improve communication system for entire service area from current Nextel communication system.
- Incorporate all Paratransit Cutaway vehicles including the Benicia dial-a-ride into the CAD/AVL system.

In addition to the joint needs listed above, Petaluma Transit identified the following needs:

- Allow for future potential integration of the CAD/AVL system with their pilot Transit Signal Priority project.
- Provide connection protection for successful bus transfers.
- Integrate dedicated radio frequency into the CAD/AVL system and improve communication where current dead zones exist.

## 7. CAD/AVL Procurement and Delivery

There are various procurement model types for the delivery of a CAD/AVL system. These procurement model types differ based on ownership and operations of various parts of the system including the on-board equipment, the central system hardware and software and the on-going operations and maintenance. This section presents those options and evaluates the recommended option for SolTrans and Petaluma Transit.

### *7.1 CAD/AVL Model Options*

There are several different options for CAD/AVL procurement models, but all options generally fall within three categories which are described in detail below.

#### 7.1.1 Traditional CAD/AVL System Model

This model option would enable the full ownership of all the elements of the CAD/AVL by SolTrans and Petaluma Transit. It would be purchased from the CAD/AVL provider and all elements would be owned, housed and operated by SolTrans and Petaluma Transit within their premises.

This type is the most common model in the transit CAD/AVL industry to date. It is an agency-owned system, procured from a CAD/AVL provider, including all on-board and central hardware, software systems and licenses. While an agency in this option owns the central system hardware, it actually only licenses the right to use the central system software, which remains owned by the provider. The agency is generally responsible for system maintenance and operations, often with a provider under a maintenance contract.

#### 7.1.2 Hosted CAD/AVL System

This option would enable ownership and operation of certain elements of the CAD/AVL system by SolTrans and Petaluma Transit and ownership and operation of other elements by a contractor under a lease with SolTrans and Petaluma Transit. Certain system elements would be purchased from the CAD/AVL provider and owned and operated by SolTrans and Petaluma Transit, while other elements would be leased from the CAD/AVL provider and housed, owned and operated by the CAD/AVL provider.

This is an emerging procurement model that is very similar to the Traditional model in terms of breadth of product availability (i.e., most of the Traditional CAD providers are offering, or considering offering, the hosted solution model). In the most common hosted models, the central system hardware and software is owned by the provider and is leased to the agency where the central hardware and software is housed, operated and maintained at the provider's facilities. This model allows for easier central system updates since the provider has full control of the central system including more responsibility for minimizing service impacts. The agency would pay annual or monthly service fees to the provider, and having the provider take on the central system responsibilities has the potential to save on agency operations and maintenance costs.

#### 7.1.3 Software as a Service (Saas)

This is an emerging service model through which the CAD/AVL system would be built on software applications that are hosted on a "cloud" server with little to no back office equipment (e.g., central data manager) housed or maintained within the agency's facilities. Most SaaS providers offer passenger-focused systems (i.e., real-time information) and lack many of the advanced functions needed for SolTrans and Petaluma Transit's operations. Additionally, the SaaS provider will typically have to provide customized integration for each type of CAD/AVL hardware that is selected and implemented by the agencies.

The purchasers of SaaS typically have the intent of replacing capital investments in hardware and licenses with services fees. The strategy is that the fees for services would result in reduced operations and maintenance costs.

In many market sectors, SaaS is a preferred delivery model by customers looking to reduce IT support costs by avoiding capital purchases and outsourcing hardware and software maintenance and support to the SaaS provider.

### *7.2 Industry Scan*

The purpose of the Industry Scan was to survey several CAD/AVL providers in order to gather information on their current product offerings, solution options, and overall functionality. Several providers were contacted in order to identify whether or not the technical requirements of SolTrans and Petaluma Transit could be supported with their CAD/AVL technology. Key information that was received from the providers is summarized below.

#### Traditional CAD/AVL Providers

In most cases, traditional CAD/AVL solutions provide a high level of customization that is geared towards each of the specific transit agencies who own and operate their own CAD/AVL system. Of the CAD/AVL provider's surveyed, more offer a traditional CAD/AVL solution as opposed to other solution types including the hosted and software as a service solutions. Traditional CAD/AVL providers also had longer tenure and software maturity compared with the other solution types of providers.

Other items to note from the scan of traditional CAD/AVL systems:

- Traditional CAD/AVL systems typically offer a higher level of functionality and integration capabilities with many of the related external software systems including scheduling software, on-board vehicle equipment and data management software systems.
- In general, traditional CAD/AVL providers offer spare parts and extended warranties on equipment. The agency is trained to troubleshoot faulty equipment, and if necessary install the spares and return the faulty equipment to the provider for a replacement.
- Traditional CAD/AVL providers offer options for maintenance contracts and warranties.
- Traditional CAD/AVL solutions require the agency to procure, own and operate the on-board equipment.
- Some traditional CAD/AVL providers also have an option to host the CAD/AVL servers at their facilities.
- The traditional CAD/AVL providers have no recurring fees for software or server support, other than what is normally covered in a maintenance agreement.
- All CAD/AVL data is collected and sent to the transit agency's servers at the agency's facilities. The transit agency is responsible for operations and management of the servers, and does not have to use a remote portal or site to gain access to the system software.

#### Hosted CAD/AVL Providers

The hosted solution requires that the transit agencies own and operate all of the on-board equipment and any equipment needed for maintenance and troubleshooting. Of the hosted solution providers surveyed, one offered a hosted-only solution, i.e., the provider did not offer an option for the agency to own and operate the CAD/AVL servers.

Other items to note from the scan of hosted CAD/AVL systems:

- The hosted CAD/AVL solutions provide a high level of customization similar to traditional systems.
- In general, hosted CAD/AVL systems offer a moderate level of integration capabilities with scheduling systems, on-board equipment and data management software systems. This is due to pure hosted solutions still emerging in the CAD/AVL market.
- Similar to traditional systems, hosted CAD/AVL providers offer spare parts and extended warranties on equipment that is owned and operated by the agency. The agency is trained to troubleshoot faulty equipment, and if necessary install the spares and return the faulty equipment to the provider for a replacement.

- Similar to traditional systems, hosted CAD/AVL providers require the agency to procure, own and operate the on-board equipment.
- Hosted CAD/AVL providers offer options for maintenance contracts and extended warranties.
- Some hosted CAD/AVL providers also allow the agency to purchase, operate and maintain the CAD/AVL servers at the agency's facilities.
- The hosted CAD/AVL providers have recurring fees for software and server support including the fees for remote communications with their facilities regardless of level of effort of the provider. This can be in addition to what is normally covered in a maintenance agreement which typically includes troubleshooting and technical support.
- All CAD/AVL data is collected and sent directly to the provider's facilities. The transit agency has to remote into a portal or site to gain access to the system software and the data including any reports that are generated.

### Software as a Service Providers

The SaaS solution requires that the transit agencies own and operate all of the on-board equipment and any equipment needed for maintenance and troubleshooting of the agency-owned equipment. Of the SaaS providers surveyed, few had transit agencies as customers, and none appeared to have systems in Northern California. In addition, all of the SaaS solutions were very new to the transit AVL market.

Other items to note from the scan of SaaS systems:

- The SaaS option provided the lowest initial cost for basic AVL and real-time passenger information.
- SaaS product offerings have little to no CAD features including fleet management, voice radio control and data management features.
- In most cases, SaaS options provide very little customization of products and modules.
- Similar to traditional and hosted solutions, SaaS providers require the agency to procure, own and operate the on-board equipment.
- SaaS providers utilize the "cloud" for remote communications, which enables the servers to be located in any facility and not necessarily in the provider's facility
- The SaaS providers have recurring fees for software and server support including the fees for remote communications with their facilities regardless of level of effort of the provider. This can be in addition to what is normally covered in a maintenance agreement which typically includes troubleshooting and technical support.

## *7.3 Agency Scan*

The purpose of the Agency Scan was to survey several transit agencies with CAD/AVL systems in the Bay Area similar in size and operations as SolTrans to gather information on their procurement models. The intent was to learn from the experiences from those agencies that have recently deployed a CAD/AVL system on their solution type, provider, communications and data solutions, maintenance contract details, and costs. The discussions are summarized below.

### Santa Rosa CityBus

Santa Rosa City Bus had 40 buses included in the procurement and installation of their CAD/AVL system. They implemented a hosted solution, opting to minimize the responsibility of maintaining and operating their AVL system given that they currently have little in house support for a traditional system. They purchased and own all of the CAD/AVL equipment on board the buses, and the CAD/AVL provider owns and operates the central CAD/AVL servers from the provider's facilities. The system operates on a leased cellular system (Verizon). The hosted servers are on a 5-year contract and the on-board equipment are on a 5-year warranty.

### Marin Transit

Marin Transit has 48 buses in their fleet, of which 28 were included in the procurement and installation of their CAD/AVL system. They chose to implement a hosted solution since they are a small agency and wanted to minimize the responsibility of operating and maintaining the system. They purchased all of their CAD/AVL on-board equipment, and the CAD/AVL provider owns and operates the CAD/AVL servers in the provider's facilities. Marin Transit uses leased cellular service through Sprint for their voice and data communications, although Golden Gate Transit and Whistlestop (contractors of Marin Transit) use separate radio communication systems. Marin Transit is still under warranty for their on-board equipment but the agency did not confirm how long the warranty is scheduled for.

### LAVTA

The Livermore Amador Valley Transit Authority (LAVTA) has a fleet size of 89 buses, 79 of which are fixed route, and 15 are cutaway buses used for paratransit purposes. All 89 buses were included in the procurement and installation of their CAD/AVL system. LAVTA procured their CAD/AVL system in 2003 and chose a traditional solution. The own and operate all of the CAD/AVL on-board equipment and CAD/AVL servers opting to reduce on-going maintenance costs that could be performed in-house. The agency utilizes the County-owned trunked radio system for both voice and data communications. This results in no recurring costs for communications. They also do not have a maintenance contract, but instead pay an annual fee for system support and upgrades. Since they are past their initial warranty period of 10 years, they now purchase new equipment as needed and receive a one-year warranty on each piece of new hardware. LAVTA experienced minimal impacts to staffing and operations with implementation of their CAD/AVL system. No additional maintenance or dispatch personnel were hired to support the new CAD/AVL system, and only one additional IT/data management staff person was hired. The CAD/AVL system has also streamlined dispatch and road supervisor duties, allowing the agency to shift their resources to IT and data management tasks.

### WestCAT

The Western Contra Costa Transit Authority (WestCAT) has 36 buses which were all included in the procurement and installation of their CAD/AVL system. They started the process of procuring a CAD/AVL system in 2008 and signed off on their system in June 2013. They chose a traditional system, opting to own all of their on-board equipment and servers since they wanted to have full control over the maintenance and operations of their system. The agency felt it was important to manage their own data, do their own scheduling updates, and ensure the system was being operated to their desire. Additionally, the agency wanted to minimize overall and recurring costs, and was able to do so by owning and operating their equipment and declining a maintenance contract. Their only on-going cost is for leased cell service for voice and data communications from Verizon. WestCAT indicated that they did not have to hire additional staff to operate and maintain the new CAD/AVL system, but did indicate that they have had to rework assignments to make good use of all the new data that is generated by the CAD/AVL system. Implementation of WestCAT's system did not require any additional staff. The agency has a very small staff, and they were all provided with ample training to take on additional roles and responsibilities in order to operate and maintain their CAD/AVL system.

### CCCTA

The Central Contra Costa Transit Authority (also known as CCCTA or County Connection) has 121 buses in their fleet, which were all included in the procurement and installation of their CAD/AVL system. They procured a traditional CAD/AVL system, opting to own the on-board equipment and servers in order to reduce on-going costs. They also indicated that their staff is able to adequately maintain the CAD/AVL servers with a small amount of training and with little impact to their current operations. The agency uses a radio voice communications system and a leased cell service (Sprint) for data communications. They also signed a three year maintenance contract and a two-year extended warranty on hardware. CCCTA indicated that their staff is able to adequately maintain the CAD/AVL servers with a small amount of training and with little impact to their current operations. The agency did not have to hire additional staff as a result of the new CAD/AVL system, and in fact reported that the new CAD/AVL enabled them to

reduce staff resources in certain areas of their operations in reporting, particularly because NTD reporting was streamlined.

## *7.4 CAD/AVL Model Options Analysis*

Based on the three CAD/AVL model options, this section provides a more detailed evaluation of those options.

### 7.4.1 Traditional Solution (Agency-Owned and Operated CAD/AVL System)

This option represents the most common choice for transit agencies in the United States and within the San Francisco Bay Area. Transit agencies both small (i.e. WestCAT) and large (i.e. AC Transit) have implemented traditional, agency-owned and operated CAD/AVL systems. For this option, all network, central, and onboard equipment for the CAD/AVL system is purchased and maintained by the agency. This option typically needs agency staff expertise and/or training, and staff positions for IT and system maintenance. Based on the industry scan, most CAD/AVL providers provided this option and had successfully implemented a CAD/AVL solution for agencies similar in size and scope.

Functionality for these systems varies across providers. Some providers offer more advanced features and functionality (disaster recovery support, bus bridge, staff workload distribution, etc) as standard, off-the-shelf products. All providers within this model responded that they offer the following functionalities:

- Schedule Adherence
- Headway Management
- Off-route notification
- Detours/re-routes
- Connection protection
- Computer aided system response and recovery
- Incident and accident response and recovery
- Onboard Integration
- Central system integration
- Voice and data radio integration

*The Traditional Solution provides the following advantages:*

- Many providers currently offer desired features and functionality "off the shelf"
- Providers offer a robust troubleshooting and development cycle
- Providers typically include bug fixes and development upgrades as part of the warranty and maintenance agreements
- Has the lowest on-going operations and maintenance lifecycle costs

*The Traditional Solution has the following disadvantages:*

- Requires in-house staff resources and may require additional staffing
- The agency must procure and maintain on-board equipment and central servers

The Traditional Solution providers that were part of the Industry Scan are able to meet the basic needs of SolTrans and Petaluma Transit. The most significant operational impacts with this solution are those associated with staffing (operational and maintenance) and the eventual need to replace aging hardware. This model does

have the benefit of the agency being less reliant on an external service provider for typical and non-typical data reporting and changes to the system's operations.

### 7.4.2 Hosted Solution (Agency-Owned Equipment, Agency-Leased Central Hardware/Software)

A Hosted Solution is where the central system servers are located within the provider's premises and maintained under a support contract with the agency. As with the Traditional Solution, this option provides the full-featured functions that will meet the needs that have been identified in the Needs Assessment. This emerging model has been used mainly for smaller systems (i.e., less than 50 vehicle fleet) given the perception that the need for on-going staff resources will be minimized and the savings will pay for the recurring fees to the provider. A few of the CAD/AVL providers offer this model, but there are only a few implemented in California.

*The Hosted Solution provides the following advantages*

- Many providers currently offer desired features and functionality "off the shelf"
- Providers offer a robust troubleshooting and development cycle
- Requires minimal in-house staff resources for the operations and maintenance of the central system hardware and software
- Providers typically include bug fixes and development upgrades as part of the warranty and maintenance agreements
- Hosting provider will provide support and maintenance for central server equipment

*The Hosted Solution has the following disadvantages*

- The agency must procure and maintain on-board equipment
- Ongoing lifecycle costs to replace hardware are not typically include in the provider O&M agreements
- Operating and maintenance costs will be high due to the recurring hosting fees including communications
- The agencies will have less control over changes, updates and reporting since the provider makes all the changes to the central server and software

The Hosted Solution offers similar functionalities as the Traditional Solution, and also has similar initial capital costs. This is because the investment in on-board equipment and other agency-owned elements of the CAD/AVL System are the same for the Hosted and Traditional Solutions. The most significant operational impacts with this solution are those associated with on-going costs to the CAD/AVL provider and the eventual need to replace aging hardware. While this model has the benefit of the agency requiring less staff resources for on-going operations, the agency will be more reliant on the provider for implementation of all (typical and non-typical) data reporting and changes to the system's operations. Since the capital costs are roughly the same compared with the Traditional Solution, the financial viability for this solution will generally depend on the agency to offset the recurring costs for the provider's fees with the perceived savings of not requiring additional staffing resources.

### 7.4.3 SaaS Solution (Agency-Owned Equipment, Agency-Leased Central Hardware/Software)

In this service model, the CAD/AVL system is built on software applications hosted on a "cloud" server with little back office equipment (e.g. central data manager) maintained on-site by the agency. Most providers within this category primarily provide passenger-focused system (e.g. real time passenger information) and lack the ability to offer many of the advanced functions desired by SolTrans and Petaluma Transit to support their daily operations. Providers offer both leased and agency-owned on-board equipment business models.

The SaaS providers offer basic vehicle location functionality, but typically lacks the ability to offer more advanced features (headway management, re-routes/detours, specialized reporting, fare box integration, onboard equipment integration, voice radio integration, etc.) as standard, off the shelf products. Providers in this model typically offer the following functionalities "off-the-shelf":

- Schedule Adherence
- Off-route notification
- Data radio integration
- Covert alarm on-board integration
- Central system integration

*The SaaS Solution provides the following advantages:*

- Low initial capital cost (for software)
- Offer effective real-time passenger information solutions
- Operations and maintenance costs for central system hardware and software can be minimized (if built into maintenance contract)

*The SaaS Solution has the following disadvantages:*

- Offers only basic AVL functionality
- Limited to no CAD functionality such as vehicle tracking with basic dispatching tools
- Limited backend data integration
- Limited on-board equipment integration
- On-going yearly operating and maintenance costs
- Leased equipment fees (if part of contract to reduce capital cost)

The SaaS Solution offers basic AVL functions that are intended for more simple systems without the need for advanced functions. The initial investment in on-board equipment would be similar to the Hosted and Traditional Solutions, but the SaaS Solution would require customized integration with the selected on-board equipment and systems. Additionally, any advanced data reporting and analysis tools, including interfaces with scheduling systems and any data management tools would be customized for the agency.

The most significant operational impacts with this solution are those associated with on-going costs to the SaaS provider and also the eventual need to replace aging on-board equipment. While this model has the benefit of the agency requiring less staff resources for on-going operations, the agency will be significantly more reliant on the SaaS provider for implementation of all (typical and non-typical) data reporting and changes to the system's operations, if even these functions are possible within SaaS systems. Since the initial capital costs are roughly the same compared with the Traditional Solution, the financial viability for this solution will generally depend on the agency to offset the recurring costs for the provider's fees with the perceived savings of not requiring additional staffing resources.

Table 1 presents a comparative overview of these options.

| Table 1: CAD/AVL System Procurement Types - Comparative Overview | | | |
|---|---|---|---|
| **Type** | **Description** | **Advantages** | **Disadvantages** |
| **Traditional** | • Agency owns and operates all of the CAD/AVL system and its elements. | • Full feature functions and a high level of standardization and customizations available.<br>• Moderate operations and maintenance costs.<br>• Agency can capitalize the costs and not be dependent on the provider for any data ownership, licensing and system operational issues.<br>• Most common form of CAD/AVL system deployment. | • Requires high up front capital costs<br>• Requires agency staff resources for on-going operations and maintenance of the system. |
| **Hosted** | • Agency owns and operates certain CAD/AVL elements including all on-board equipment and the bus communications system.<br>• Other CAD/AVL elements are owned by the provider and leased by the Agency including the CAD/AVL servers and software. | • Full-feature functions and customizations available. Potential reduction in initial capital costs.<br>• The service is expandable and provides for some future-proofing of the software and server by the provider. | • Requires initial capital costs for certain AVL elements.<br>• High on-going operations and maintenance costs.<br>• Agency dependent on provider for data ownership and system operational issues.<br>• Risk of the system failing should the provider cease operations and support for their system. |
| **SaaS** | • System is built on software applications that are hosted on a "cloud" server.<br>• The software applications are owned and operated by the provider and leased by the Agency. | • Low initial costs for the software systems compared with the other types.<br>• Possible to have unlimited software upgrades depending on lease agreement. | • High on-going costs with only basic AVL functionality. CAD functionality is very limited.<br>• Limited backend data and on board integration.<br>• High dependence on the software provider for operations and maintenance.<br>• Requires initial capital costs for certain AVL elements. |

### *7.5 CAD/AVL Procurement Model Recommendations*

Based on the agency and industry scans, and an overall assessment of SolTrans and Petaluma Transit's needs and requirements for the CAD/AVL system, it is recommended that SolTrans and Petaluma Transit move forward with a traditional CAD/AVL procurement model. While the other solutions (hosted and SaaS) have their own set of advantages, they would only fulfill a smaller set of SolTrans and Petaluma Transit's needs compared with a traditional solution. The following points support this recommendation and are offered for consideration.

- While the SaaS option can provide lower initial costs for AVL and real-time passenger information, the product offerings are generally very light in CAD system management and voice radio control functionality. Therefore, the SaaS option will not be an adequate option for SolTrans or Petaluma Transit.
- The ongoing costs for a hosted CAD/AVL and SaaS solution are higher compared with a traditional solution due to the recurring hosting fees and remote communications costs.
- With a hosted solution, the transit agency is very dependent on the provider for data reporting, data accuracy and troubleshooting of the CAD/AVL servers. Customized reports are typically performed by the

provider. SolTrans and Petaluma Transit's needs are to have full control of their data and to enable standard and on-demand queries for data reporting as the agencies see fit without dependencies on a third party.

- Many providers offering a hosted solution do not have standardized business models, and they vary their pricing structure client-by-client. This could result in higher costs for transit agencies depending solely on the providers perceived level of effort to host the agency's servers.
- It is not anticipated that a traditional CAD/AVL system will result in the need for additional agency staff, but it enables the agency to have full control of the CAD/AVL operations, data management and reporting.
- Traditional CAD/AVL providers generally had longer tenure than hosted solution providers.

There are some commonalities between a traditional and a hosted solution. These include:

- The on-going operations and maintenance costs between the hosted and traditional solutions for the onboard equipment will be the same since the agency must own, operate and maintain this equipment under either solution. Thus, from an initial cost perspective, both solutions are essentially identical.
- Traditional and hosted CAD/AVL solutions offer options for maintenance contracts and warranties.
- Traditional and hosted solution providers offer spare parts and require the agency to troubleshoot, return and replace parts when they are inoperable.

Given these commonalities, the main difference between the two solutions then comes down to the higher recurring costs and data control and ownership.

All three procurement models require the agency to procure, own and operate all of the on-board equipment. Thus, all of the solutions have essentially the same costs for onboard and field equipment. Similar transit agencies in Bay Area reported very high satisfaction rates with their traditional CAD/AVL solutions, particularly those agencies that have many customized reports and require high availability of their system. In addition, the same transit agencies reported that they did not have to increase their staff size with their CAD/AVL system, but either had to reassign duties of certain staff members to be able to process all of the additional information that was available with the new CAD/AVL system, or in some cases optimize the staff size given the streamlined process for reporting.

Based on these agency scans, one of the main lessons from the other transit agency's is that their reasons for implementing a traditional solution align well with SolTrans' and Petaluma Transit's priorities to reduce recurring costs and have minimal impact to current staffing and operations. It is felt that SolTrans and Petaluma Transit would be able to utilize their existing staff and contractors to more effective and efficient roles with the new CAD/AVL system. This includes increasing levels of IT support while minimizing efforts in reporting and performance monitoring.

Given that there are several other similar transit agencies with successful implementations of traditional CAD/AVL systems, the support of these local transit agencies will be a valuable resource for SolTrans and Petaluma Transit, particularly for maintenance and operations questions and technical support. However, it is recommended that maintenance contracts with the CAD/AVL provider be included in the procurement to have the added level of support if and when needed.

## 8. System Concept

This section presents the CAD/AVL System Concepts for SolTrans and Petaluma Transit. The concepts are presented separately for both agencies given the differences in certain system elements, infrastructures, systems and operating personnel.

### *8.1 SolTrans*

SolTrans proposed system concept is a solution-independent, high-level, operational representation of the proposed system. It addresses the operational needs, and fulfills the project purpose and objectives. Figures 3 and 4 provide illustrations via conceptual diagrams for SolTrans' CAD/AVL System Concept.

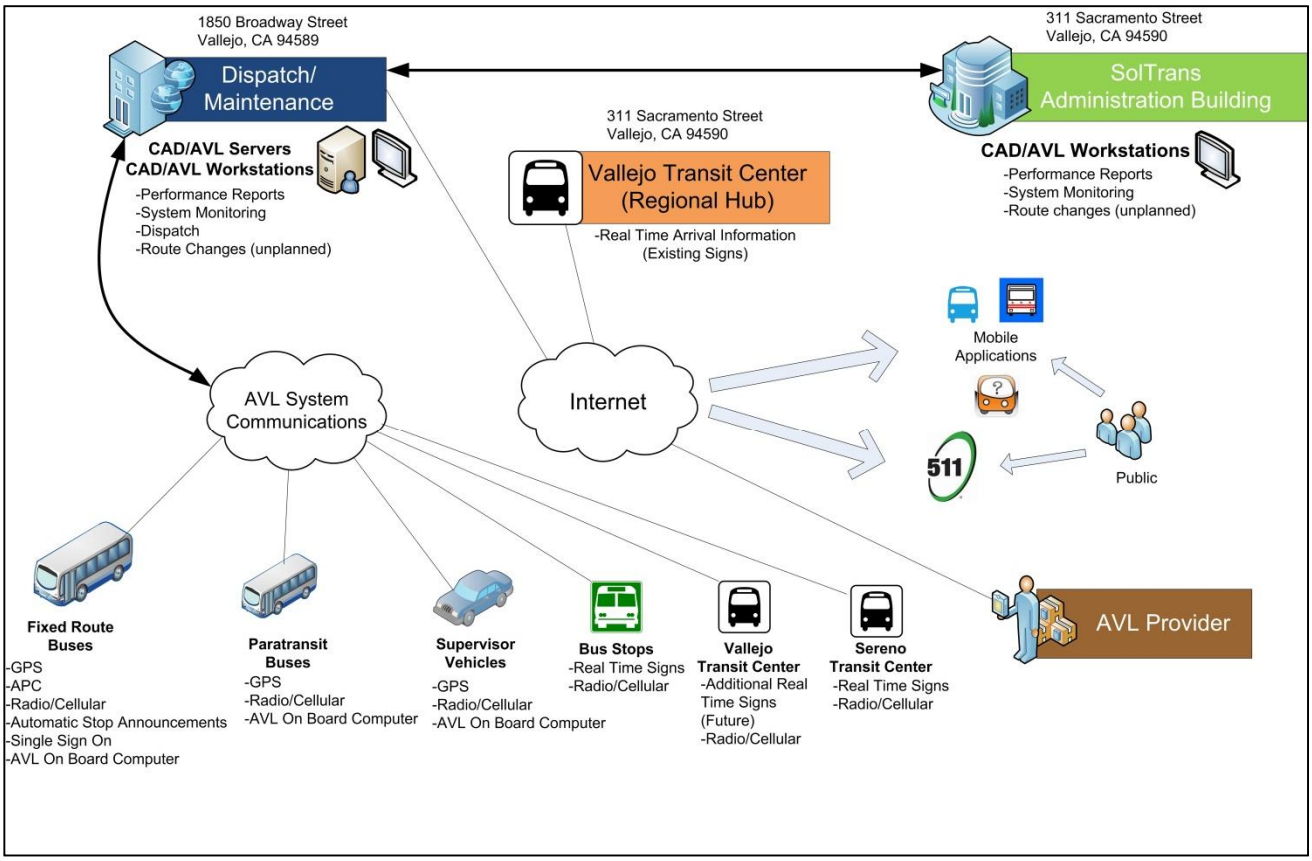


**Figure 3 – High Level System Concept (SolTrans)**

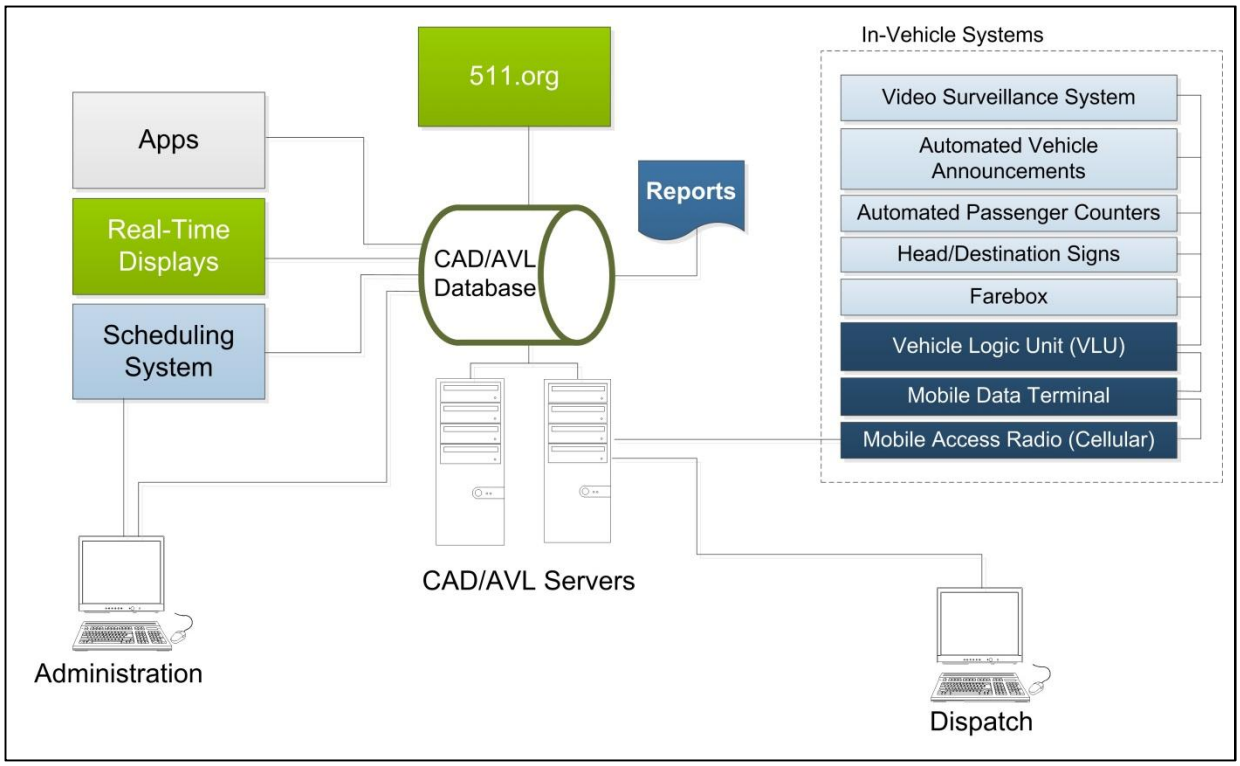


**Figure 4- System Level Diagram (SolTrans)**

The main components of the proposed CAD/AVL System Concept for SolTrans include the following elements:

### 8.1.1 CAD/AVL Servers

The CAD/AVL servers will be installed at the Dispatch/Maintenance Building which communicate with and collect data from the fixed route bus fleet, paratransit buses, and supervisor vehicles. The CAD/AVL servers will also communicate with real-time signs at key bus stops and at Vallejo Transit Center and possibly Sereno Transit Center via a radio or cellular connection. From the Dispatch/Maintenance Building, the CAD/AVL servers will disseminate real time data via the internet to 511 Transit and other mobile applications to make real time departure information as well as other transit information available to the public.

### 8.1.2 CAD/AVL Workstations

CAD/AVL software will be installed on designated workstations at the SolTrans Administration Building and the Dispatch/Maintenance Building to enable SolTrans staff to pull data reports, playback routes, and allow for ad hoc analysis and planning. The CAD/AVL workstations will be key for monitoring where specific routes are running off-schedule and to identify how to diagnose and correct the problem.

### 8.1.3 On-Board Computers

The CAD/AVL system will be installed on all fixed route buses, paratransit Cutaway buses, and supervisor vehicles. The computers will display maps that track the transit vehicles movement in real-time. Additionally, schedule adherence can be processed and requests made from the transit vehicle without a centrally controlled system. The on-board computers would be updated with the latest routes and schedules on a regular basis. The

computers will also be integrated into the CAD/AVL system to collect passenger information and provide stop announcements on the fixed route buses. Figure 5 illustrates typical vehicle onboard equipment.

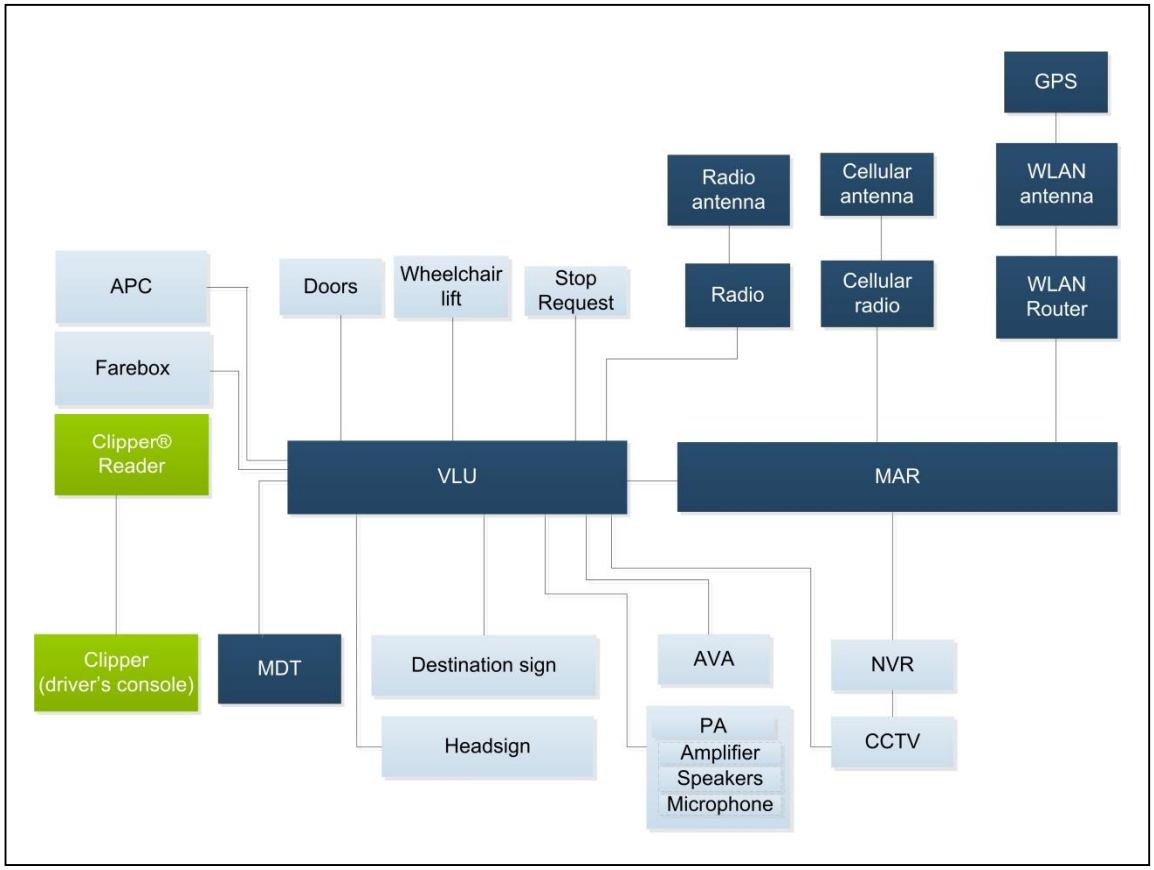


**Figure 5 – Typical Vehicle Onboard Equipment**

### 8.1.4 Vehicle Tracking

The main technology that will be used to locate transit vehicles for the CAD/AVL system is a Global Positioning System (GPS). Generally, the GPS receiver will calculate its position and relay the information back to the AVL server. The near real-time tracking of the transit vehicle will allow dispatchers and transit managers to know the location of the transit vehicle at any given time. Based on the actual position, the dispatchers and transit managers can make decisions that will improve the efficiency, and overall performance of the transit system.

### 8.1.5 Automated Recording and Archiving

The CAD/AVL system will store the position and tracking of the transit vehicles in some form of database. This valuable information allows transit managers to process and analyze routes based on actual and real time data. The analysis of the actual data becomes the basis for route analysis and performance measurements, such as schedule adherence and others. Ability to query the data with different parameters enables the transit managers to make sound decisions toward improving the future performance and safety of the transit system operation.

CAD/AVL data would be stored in a database for planning and evaluation purposes. The specific requirements will be decided by SolTrans and should include an assessment of the following:

- Length of time AVL data is to be stored
- The sampling rate AVL data is to be stored (i.e. at every minute, at every stop)

### 8.1.6 Route Playback

The CAD/AVL system will have mapping features to track the transit vehicles and will allow transit managers to graphically play back the vehicle route. This tool is helpful for analyzing routes and can also be used to investigate passenger complaints whereby the transit vehicle's route is evaluated throughout its run to verify and confirm any complaints. The playback feature directly accesses the database and presents the data in a graphical format. Most playback features of the AVL systems can be viewed in pause and slow or fast motion; these tools assist the transit analysts in efficiently post processing the data to make sound decisions. The playback systems are date and time stamped, allowing minute-by-minute analysis of the transit vehicle movement on any given date or period of operation.

### 8.1.7 Automatic Passenger Counters

Automatic Passenger Counters (APC's) will be integrated with the CAD/AVL system to relay passenger counts to the CAD/AVL database for route scheduling and occupancy analysis. APC's are crucial for justifying changes to services, obtaining grants, and simply assessing ridership on transit routes.

### 8.1.8 Single Sign-On

The Single Sign On feature will enable the bus driver to log in once and gain access to all systems without being prompted to do so at any other time during the route. Having this feature allows the dispatchers to know who is operating each bus, while also automating announcements and head signs.

### 8.1.9 Software Applications (Apps)

The CAD/AVL servers will collect vehicle location information and disseminate the information to 511 Transit, third party vendors, and/or to the native CAD/AVL provider to produce mobile applications. Mobile applications will allow transit users to identify where bus stops are located, plan for an upcoming transit trip, select specific stops to find real time departures, and set alarms for upcoming departures.

### 8.1.10 Communications

All computer based CAD/AVL systems require communications to and from the transit vehicles. Due to the nature of the system, all voice and data communications need to be over a wireless network. The two options being considered for SolTrans are a dedicated radio system (requires a dedicated radio frequency) or a 4G cellular connection. A dedicated radio system would be the preferred option for SolTrans, however it has not been determined whether a City owned frequency and radio equipment are available. Therefore, SolTrans will proceed with the assumption that a 4G connection will be used, unless a City owned frequency and radio equipment become available to Soltrans prior to the procurement.

### 8.1.11 Real-Time Transit Arrival/Departure Information Signs

Signs displaying real time data will be installed at the Vallejo Transit Center and possibly the Sereno Transit Center and other key bus stops as necessary. The signs will communicate with the CAD/AVL servers to inform transit riders of real time departures or other important information regarding bus routes.

### 8.1.12 Wheelchair Ramp and Bike Rack Deployment Sensors

There is a desire for SolTrans to know when and where wheelchair ramps and bike racks are deployed so that transit managers and planners can be informed as to why delays are occurring, and if there are certain routes that are prone to more wheelchair users and bike riders. The sensors will useful in planning and scheduling to improve on-time performance.

### 8.1.13 Operations and Maintenance

The day-to-day operation and maintenance of the CAD/AVL system will be undertaken by SolTrans staff and National Express contractors. It is recommended that SolTrans include training for their operational staff, maintenance assistance, and troubleshooting in the maintenance agreement in order to properly implement a new technology like a CAD/AVL system. Initial and ongoing training of personnel to increase the level of expertise within SolTrans staff and National Express operators is the key to successful implementation.

### 8.1.14 Data Management and Reports

The CAD/AVL system should include data management software to manage the entry, and manipulation of data and automate reporting for performance monitoring. These reports should be determined by SolTrans and could include daily ridership, on time performance, total revenue, etc. In addition to canned reports, the system should allow SolTrans staff to export raw data freely in order to manipulate or analyze data in a spreadsheet or database program. The data management system should also integrate with SolTrans scheduling software and facilitate easy National Transit Database (NTD) reporting.

### 8.1.15 Scheduling Software

Soltrans currently uses Trapeze PASS scheduling software for their paratransit (dial-a-ride) service, and an older version of Trapeze FX for their fixed route service. Since the CAD/AVL system will require a scheduling software to communicate route information to the bus and to dispatch, it is recommended that an updated scheduling software be included in the procurement of the CAD/AVL system.

### *8.2 Petaluma Transit*

Petaluma Transit's proposed system concept is a solution-independent, high-level, operational representation of the proposed system. It is intended to addresses the operational needs, and fulfills the project purpose and objectives.

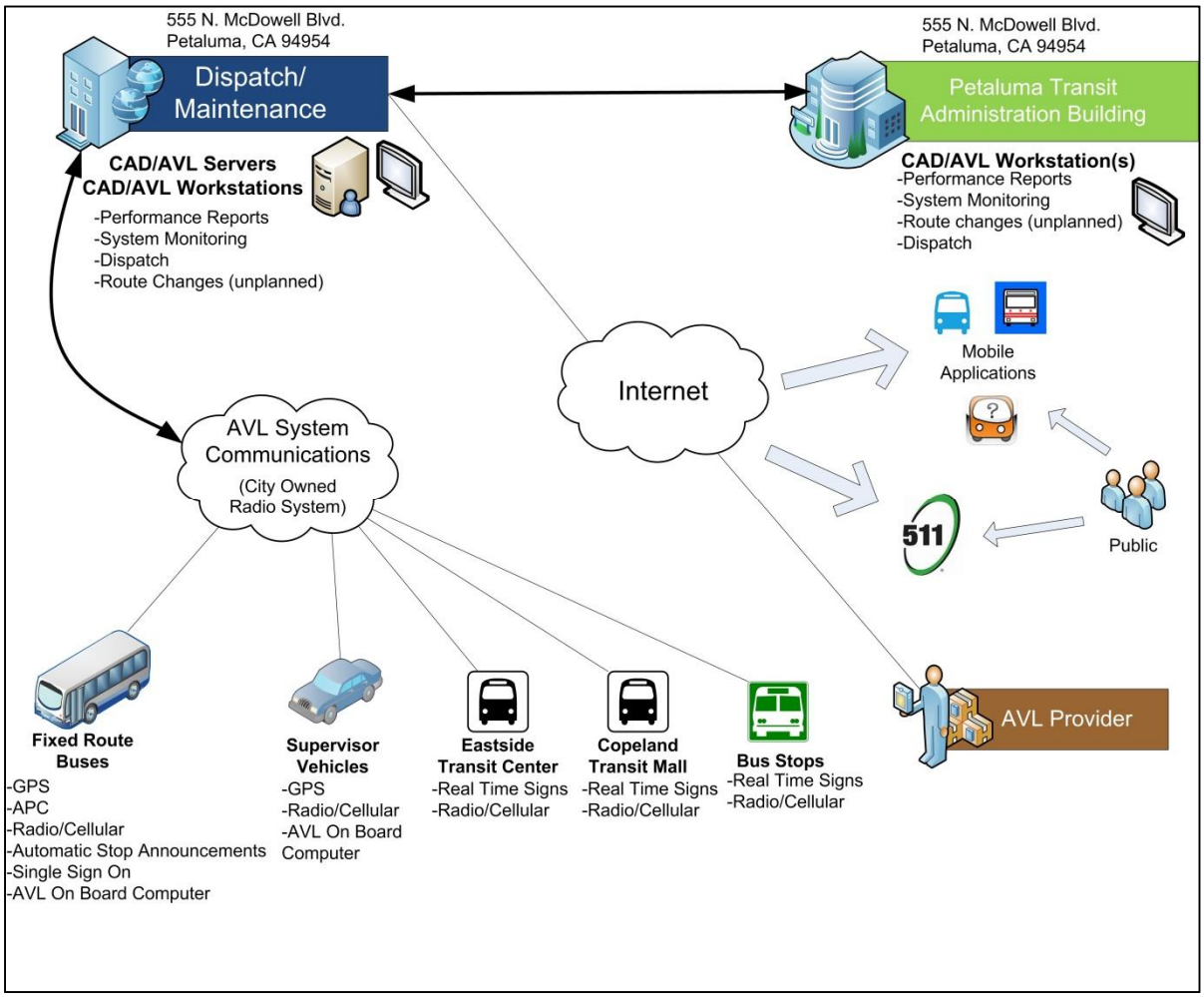


**Figure 6 – High Level System Concept (Petaluma Transit)**

Figures 6 and 7 provide illustrations via a conceptual diagram for CAD/AVL System Concept for Petaluma Transit.

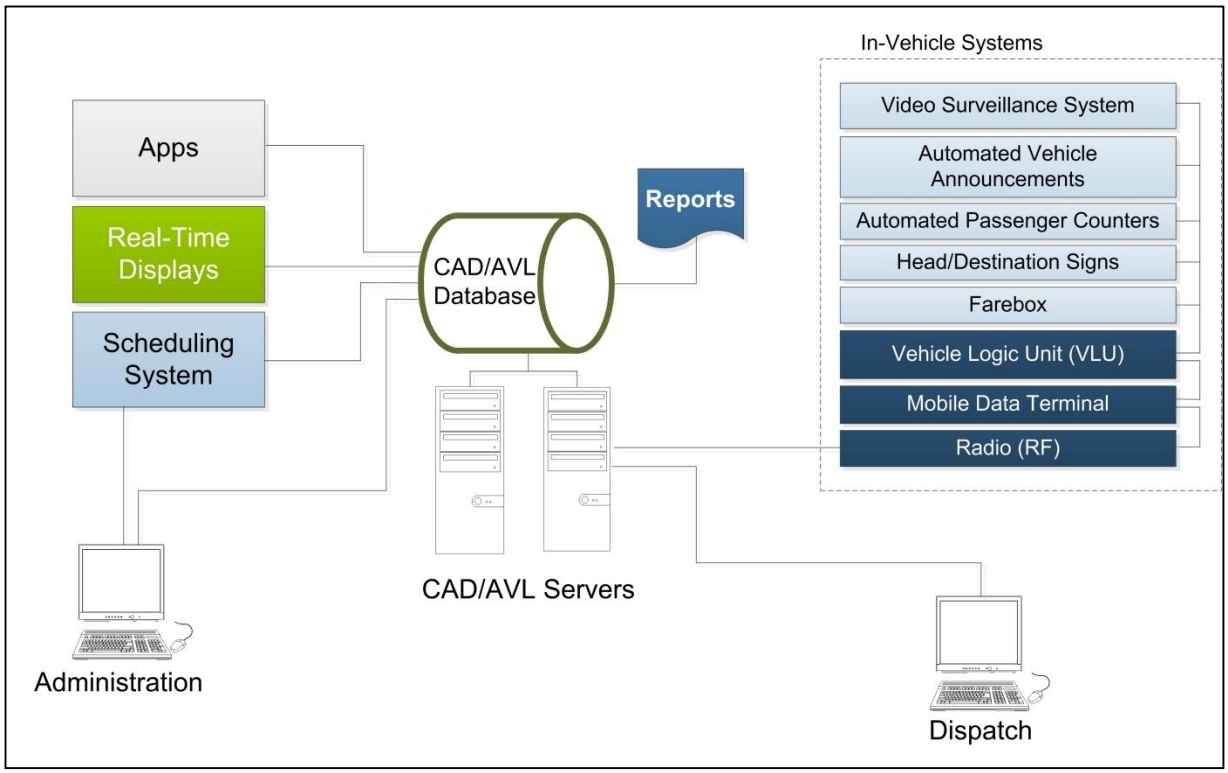


**Figure 7 – System Level Diagram (Petaluma Transit)**

The main components of the proposed CAD/AVL System for Petaluma Transit will include the following:

### 8.2.1 CAD/AVL Servers

The AVL servers will be installed at the Dispatch/Maintenance Building which will communicate with and collect data from the fixed route bus fleet, and supervisor vehicles. The CAD/AVL servers will also communicate with real-time signs at key bus stops via a radio connection. From the Dispatch/Maintenance Building, the CAD/AVL servers will disseminate real time data via the internet to 511 Transit and other mobile applications to make real time departure information as well as other transit information available to the public.

### 8.2.2 CAD/AVL Workstations

CAD/AVL software will be installed on designated workstations at the Petaluma Transit Dispatch/Maintenance Building and Administration Building to enable Petaluma Transit staff to pull data reports, playback routes, and allow for ad hoc analysis and planning. The CAD/AVL workstations will be key for monitoring where specific routes are running off-schedule and identify how to diagnose and correct the problem.

### 8.2.3 On-Board Computers

The CAD/AVL system will include computers on-board to display maps that track the transit vehicles movement in real-time. Schedule adherence and transit priority requests can be processed and requests made from the transit vehicle without a centrally controlled system. The on-board computers would be updated with the latest routes and schedules on a regular basis. The computers will also be integrated into the CAD/AVL system to provide passenger information and stop announcements on the fixed route buses. See Figure 5 for typical vehicle onboard equipment.

### 8.2.4 Vehicle Tracking

The main technology that will be used to locate transit vehicles for the CAD/AVL system is a Global Positioning System (GPS). Generally, the GPS receiver will calculate its position and relay the information back to the AVL server. The near real-time tracking of the transit vehicle will allow dispatchers and transit managers to know the location of the transit vehicle at any given time. Based on the actual position, the dispatchers and transit managers can make decisions that will improve the efficiency, and overall performance of the transit system.

### 8.2.5 Automated Recording and Archiving

The CAD/AVL system will store the position and tracking of the transit vehicles in some form of database. This valuable information allows transit managers to process and analyze routes based on actual and real time data. The analysis of the actual data becomes the basis for route analysis and performance measurements, such as schedule adherence and others. Ability to query the data with different parameters enables the transit managers to make sound decisions toward improving the future performance and safety of the transit system operation.

CAD/AVL data would be stored in a database for planning and evaluation purposes. The specific requirements will be decided by Petaluma Transit and should include an assessment of the following:

- Length of time AVL data is to be stored
- The sampling rate AVL data is to be stored

### 8.2.6 Route Playback

The CAD/AVL system will have mapping features to track the transit vehicles and will allow transit managers to graphically play back the vehicle route. This tool is helpful for analyzing routes and can also be used to investigate passenger complaints whereby the transit vehicle's route is evaluated throughout its run to verify and confirm any complaints. The playback feature directly accesses the database and presents the data in a graphical format. Most playback features of the AVL systems can be viewed in pause and slow or fast motion; these tools assist the transit analysts in efficiently post processing the data to make sound decisions. The playback systems are date and time stamped, allowing minute-by-minute analysis of the transit vehicle movement on any given date or period of operation.

### 8.2.7 Automatic Passenger Counters

Automatic Passenger Counters (APC's) will be integrated with the CAD/AVL system to relay passenger counts to the CAD/AVL database for route scheduling and occupancy analysis. APC's are crucial for justifying changes to services, obtaining grants, and simply assessing ridership on transit routes.

### 8.2.8 Single Sign-On

The Single Sign On feature will enable the bus driver to log in once and gain access to all systems without being prompted to do so at any other time during the route. Having this feature allows the dispatchers to know who is operating each bus, while also automating announcements and head signs.

### 8.2.9 Software Applications (Apps)

The CAD/AVL servers will collect vehicle location information and disseminate the information to 511 Transit, third party vendors, and/or to the native CAD/AVL provider to produce mobile applications. Mobile applications will allow transit users to identify where bus stops are located, plan for an upcoming transit trip, select specific stops to find real time departures, and set alarms for upcoming departures.

### 8.2.10 Communications

Petaluma Transit already has a dedicated radio frequency, therefore it is recommended to continue utilizing this communication system. A 4G cellular connection may be added to improve redundancy throughout the service area and could extend the geographical extent of their communication system if Petaluma Transit were to expand their service area.

### 8.2.11 Real-Time Transit Arrival/Departure Information Signs

Dynamic LED signs displaying real time data will be installed at key bus stops, such as Eastside Transit Mall Center and Copeland Transit Mall, as necessary. The signs will communicate with the CAD/AVL servers to inform transit riders of real time departures or other important information regarding bus routes.

### 8.2.12 Wheelchair Ramp and Bike Rack Deployment Sensors

There is a desire for Petaluma Transit to know when and where wheelchair ramps and bike racks are deployed so that transit managers and planners can be informed as to why delays are occurring, and if there are certain routes that are prone to more wheelchair users and bike riders. The sensors will be useful in planning and scheduling to improve on-time performance.

### 8.2.13 Operations and Maintenance

The day-to-day operation and maintenance of the CAD/AVL system will be done by Petaluma Transit staff and the MV Transportation contractors. It is recommended that Petaluma Transit include training for their operational staff, maintenance assistance, and troubleshooting in the maintenance agreement in order to properly implement a new technology like a CAD/AVL system. Initial and ongoing training of personnel to increase the level of expertise of the CAD/AVL operators is the key to successful implementation.

### 8.2.14 Data Management and Reports

The CAD/AVL system should include data management software to manage the entry, and manipulation of data and automate reporting for performance monitoring. These reports should be determined by Petaluma Transit and could include daily ridership, on time performance, total revenue, etc. In addition to canned reports, the system should allow Petaluma Transit staff to export raw data freely in order to manipulate or analyze data in a spreadsheet or database program. The data management system should also integrate with Petaluma Transit's scheduling software and facilitate easy National Transit Database (NTD) reporting.

### 8.2.15 Scheduling Software

Petaluma Transit currently uses Trapeze PASS scheduling software for their paratransit (dial-a-ride) service. For their fixed-route service they currently do not utilize scheduling software, but instead use a simple Excel spreadsheet for scheduling service. Since the CAD/AVL system will require a scheduling software to communicate route information to the bus and to dispatch, it is recommended that a scheduling software be included in the procurement of the CAD/AVL system.

## 9. Operational Impacts

The new CAD/AVL system will create efficiencies and facilitate the dissemination of better, more accurate information to stakeholders and transit customers. Implementation of the CAD/AVL system will also streamline processes and tools, and will develop and deploy new applications. Roles that each operational until will play will likely remain the same, but with the addition and availability of more accurate information and advanced features, current processes and activities may evolve. Some of these operational changes may include:

### *9.1 Dispatch*

Implementation of a CAD/AVL system will allow dispatch to enter changes occurring daily in real time (e.g., changes made to vehicle and crew assignments). This will allow dispatch to have the most accurate and up to date information. Dispatchers will also know the exact position of their buses and can identify if a bus is running behind or ahead of schedule, enabling them to provide better customer service.

### *9.2 Maintenance*

Availability for remote vehicle monitoring will provide the agency with proactive monitoring of vehicle health and allow the maintenance crew to troubleshoot issues remotely. Access to automated status messages from the CAD/AVL system will also facilitate better communications between the various responders about maintenance issues (controllers, dispatch, road supervisors, and maintenance). Maintenance personnel will be required to take on responsibilities such as replacing inoperable on-board equipment with spares, and occasionally working in tandem with the provider to troubleshoot problems with the CAD/AVL on-board equipment.

### *9.3 Road Supervisors*

The new system will help controllers easily locate road supervisors to facilitate incident response. Controllers will also be able to better manage the work distribution to road supervisors using the new system.

### *9.4 Bus Operators*

With the new onboard features, bus operators will be able to log into all systems using a single log on. This will reduce the number of log on errors and issues. With the advanced automated message and support tools available to dispatchers, their communications with operators will be more clear and consistent.

### *9.5 Service Planning and Scheduling*

Transit Managers and Planners will be equipped with better, more robust information to inform decision-making and provide better transit service. With this information, planning and scheduling can be refined to improve performance, resulting in increased ridership and fewer customer complaints. With new information at their fingertips, planners will take on additional duties of creating and analyzing reports in order to inform service planning.

### *9.6 IT Support and Data Management*

It is anticipated that with the implementation of the new CAD/AVL system there will be the need to reallocate existing staff resources in the areas of data management and IT support. The automation of data management will streamline the reporting process and would allow SolTrans to optimize or reallocate their staffing resource from the current data management duties to more of an IT support role. Since Petaluma Transit does not have staff with dedicated data management duties, it is anticipated that the new CAD/AVL system will provide the agency with an abundance of new data that could necessitate the reallocation of staff resources to be able to utilize this new data for their operations. Moreover, the City of Petaluma's IT department and SolTrans contractors would need to assume responsibilities for system monitoring, maintenance and troubleshooting of the AVL servers should issues arise. Based on discussions

with other similar transit agencies with CAD/AVL systems, it is not anticipated that these IT support duties would have a significant impact on SolTrans or Petaluma Transit's staffing and operations.

## 10. Operational Scenarios

A series of representative operational scenarios can be explored in order to understand how the proposed concept will function in different potential scenarios. This section presents some operational scenarios for the System.

1. **Daily Operations** describes a standard Pull in/out for a fixed route bus.
2. **Deviation from Planned Operations** examines the actions taken by dispatchers/controllers to restore service impacted by a non-safety related issue.
3. **System Monitoring and Reports –** describes how a transit manager would access and use information from the AVL server to inform decision making and improve performance.
4. **Traveler Requesting Real-Time Bus Arrival Information** describes how a transit rider would gain access and utilize the real time information.

### *10.1 Daily Operations*

A typical day for a bus operator begins with "pull-out," meaning a bus operator logs into the single log-on system on the vehicle, enabling all accessories including the overhead sign, farebox, wheelchair sensor, CAD system, etc. The bus operator would then cycle the wheelchair lift, perform a brake test and drive to the start of the first trip. Prior to the bus operator pulling out of the Maintenance Yard, the dispatchers would have logged in to the CAD/AVL Server and workstation and would be monitoring the bus locations as they began to depart. During the route the bus operator and dispatch will be getting real-time feedback on on-time performance particularly if the bus operator is running ahead of schedule. The service day generally ends when the transit vehicles pull back into the Maintenance Yard and the bus operator logs off the vehicle equipment.

### *10.2 Deviation from Planned Operations*

Throughout the transit day several common situations often require some form of interaction between Dispatch, Road Supervisors, and Bus Operators. These situations, such as mechanical issues and missed or late pull-outs, can sometimes require a schedule adjustment and may require interaction between several different departments.

Occurrences such as special events and incidents may cause a transit vehicle to deviate from its path, turn-back, miss a stop, or even suspend or add service for a period of time. The impact may also affect customer queries (e.g., request for arrival times at a stop that is currently deactivated), current message displays (e.g., trip suspension or additional service not listed), and predictions using loaded planned schedules (e.g., schedule times used when predictions are not available or outside of the prediction window).

In the event of a localized disruption or irregularity in service affecting a single vehicle (e.g., running late), a single line (e.g. bus bunching), or a specific sector of the system (e.g. impacts of a traffic accident) returning operations to a normal, steady state will require communication between the bus driver and dispatch to send out additional buses, update bus stop signs with messages alerting travelers of a delay, and at times could result in the dispatcher sending out a replacement bus. In this situation, an alarm would be set to notify dispatch that the bus was on a detour, and running late. Dispatch would then communicate the new route to the bus operator (or vice versa) and the route would appear on their CAD workstation. In the case of an emergency, alarms would also be set to notify dispatch if a single bus had not moved for a considerably long amount of time or was traveling off route. This would prompt the dispatcher to contact the bus operator to make sure the bus is still operational and there is no back-up needed.

#### 10.2.1 Service Correction

When the dispatcher initiates a call to the bus operator to provide an action to restore service, the actions and decisions that the dispatcher takes will be recorded for use with current automatic or pre-populated service recovery forms to allow more efficient response to service correction incidents. This will also allow for capture of better data and a more cohesive record of the response. In addition, the new system will allow for tracking Road Supervisor locations. Knowing where Road Supervisors are when assistance is required for a service correction allows more efficient allocation of resources. Road Supervisors will also be equipped with CAD monitors to track vehicles and access performance reports. With this information readily available, Road Supervisors will be able to respond to service issues in a timely manner and will likely be able to assist with the proactive identification of issues (rather than being stuck in a reactive response mode).

#### 10.2.2 Detour

Entering and activating detours will become more efficient and disseminate information automatically to all impacted vehicles, stakeholders, and downstream systems (e.g., regional 511 system, agency website, customer service applications). This information will also be automatically captured in the CAD/AVL database for use with scheduling and reporting applications.

### *10.3 System Monitoring and Reports*

In the event that an Operations Manager wants to monitor how the transit system is performing, they would log into an AVL workstation and pull a report. In this particular case, the Operations Manager is interested in knowing if there were any early departures the day before, and if so where they occurred and on which transit route. In order to find out, she queries the server to show her arrival and departure times from the day before. She then queries again to find buses that left prior to their scheduled departure time. By isolating these incidences, she can then determine if early departures are occurring on one particular bus route, with one particular bus driver, or are occurring at a certain time of day. With this knowledge she can then inform the bus operators and/or dispatch of her diagnosis and decide the necessary steps of action she needs to take in order to improve performance.

### *10.4 Traveler Requesting Real-Time Bus Arrival Information*

#### 10.4.1 Traveler requesting real-time transit information via phone

A traveler leaves school and as she walks to her transit stop she calls 511 to find out the next few arrivals for her bus at her normal bus stop. When she hears the initial greeting on the 511, she calls out the applicable transit agency (SolTrans or Petaluma Transit). This takes her to the transit real-time menu for the applicable agency. She calls out her bus route, direction, and her stop, and the System asks her to confirm the information. Once she confirms this, the System reads out the estimated time of arrivals for the next three buses at her stop. Alternatively the traveler could create a user profile that enables her to customize her trips so that when she calls 511 the System recognizes her and immediately plays her customized trip for that time of day.

#### 10.4.2 Traveler at home or office requesting real-time transit information via computer

Another traveler is about to leave for home and decides to check 511.org to obtain the estimated departure times for his route at a transit center. He types in 511.org on his web browser and enters the website. He clicks on the 511 arrival times menu and then clicks on the applicable Transit Agency button. The web page then gives him options on the routes, directions, and stops for estimated departure times. After selecting his specific route, direction and stop (transit center), he views the estimated departure times for the next five buses. He decides he has time to work a few more minutes, walk to the transit center and catch the fourth bus.

#### 10.4.3 Traveler requesting real-time transit information via Internet enabled mobile phone

A traveler is shopping at a popular commercial establishment on her day off. She is about done with her shopping and just as she starts to head out to the transit stop, she uses her Internet-enabled mobile phone to check the 511 mobile application on the estimated arrival times for the line she needs to take to get back to her apartment, and discovers that line will be arriving in about 23 minutes. She then uses this time to enjoy a cup of coffee before heading off to her bus stop.

#### 10.4.4 Traveler en-route requesting real-time transit information

A traveler left his cell phone at home and cannot call 511 for estimate arrival times, so he is determined to get to the bus stop to catch the next scheduled bus on his route. Once he arrives at the bus stop he reads a message on the arrival times display sign that his bus will be arriving in ten minutes, which is about nine minutes behind the scheduled time. He takes a seat and relaxes.

## 11. Roles and Responsibilities

Implementation of the CAD/AVL will depend on a number of SolTrans and Petaluma Transit staff, operational and maintenance contractors, the provider, SolTrans Board and the City of Petaluma Council.

Tables 2 and 3 provide a summary of the roles and responsibilities for staff at SolTrans and Petaluma Transit, respectively. The roles and responsibilities at this point are high level and will be subject to additional details and refinements as the design and implementation of the system progresses.

| Table 2: Roles and Responsibilities with CAD/AVL System *(SolTrans)* | | | | | | |
|---|---|---|---|---|---|---|
| | **Transit Managers & Planners** | **IT Staff** | **Operations and Maintenance** | **Provider** | **Contractor[1]** | **Board** |
| **DESIGN AND PROCUREMENT** | Oversight of the procurement documents and working with the selected provider on the implementation of the system. | | | Responsible for installation, integration and testing of the system based on the design. | Developing the procurement documents, assisting in selecting and in negotiating a contract with the selected provider. | Approval of the design, procurement and selection of the system and provider. |
| **INSTALLATION AND INTEGRATION** | Oversight of the installation and integration of the system. Receive training on the use and operations of the system | Oversee the installation of the system's technology elements (hardware and software). Receive training on the use, operations and maintenance of the system. | Receive comprehensive training on the use and operations of the system and how to properly maintain the on-board hardware. | Responsible for installation, integration and testing of the system. Ensure that current bus features are integrated into the new system properly. | Assist in oversight of installation, integration and testing of the system. Monitor and enforce system requirements and specifications. | |
| **SYSTEM COMMISSIONING** | Conduct live testing of the system prior to going live. Actively monitor system during burn in and initial system commissioning periods. | Conduct live testing of the system prior to going live. Actively monitor system during burn in and initial system commissioning periods. | Conduct live testing of the system prior to going live. Actively monitor system during burn in and initial system commissioning periods. | Respond, troubleshoot and correct any deficiencies during the burn in and system commissioning periods. | Conduct live testing of the system prior to going live. Actively monitor system during burn in and initial system commissioning periods. | Approval to go live with system. |
| **OPERATIONS** | Utilize new system for operations. Pull reports and data for on-going transit operations. Oversee contractors utilizing the system. | Work with provider on troubleshooting and repairs of technology components of the system. Maintain the AVL servers and ensure the quality of data. Pull reports and set up and implement new queries as necessary for transit operations monitoring and reporting. | Day-to-day operational use of the system including the dispatch functions. Notify staff when there are issues with the system. Pull reports and data for on-going transit operations.<br>Operate and maintain system elements and work with provider on troubleshooting and repairs. | Responsible for on-going maintenance checks, and troubleshooting. Pending contract terms, provide repairs of the system in a timely manner. | | |

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| Table 3: Roles and Responsibilities with CAD/AVL System *(Petaluma Transit)* | | | | | | |
|---|---|---|---|---|---|---|
| | **Transit Managers & Planners** | **IT Staff** | **Operations and Maintenance** | **Provider** | **Contractor[1]** | **City Council** |
| **DESIGN AND PROCUREMENT** | Oversight of the procurement documents and working with the selected provider on the implementation of the system | | | Responsible for installation, integration and testing of the system based on the design. | Developing the procurement documents, assisting in selecting and in negotiating a contract with the selected provider. | Approval of the design, procurement and selection of the system and provider. |
| **INSTALLATION AND INTEGRATION** | Oversight of the installation and integration of the system. Receive training on the use and operations of the system | Oversee the installation of the system's technology elements (hardware and software). Receive training on the use, operations and maintenance of the system. | Receive comprehensive training on the use and operations of the system and how to properly maintain the on-board hardware. | Responsible for installation, integration and testing of the system. Ensure that current bus features are integrated into the new system properly. | Assist in oversight of installation, integration and testing of the system. Monitor and enforce system requirements and specifications. | |
| **SYSTEM COMMISSIONING** | Conduct live testing of the system prior to going live. Actively monitor system during burn in and initial system commissioning periods. | Conduct live testing of the system prior to going live. Actively monitor system during burn in and initial system commissioning periods. | Conduct live testing of the system prior to going live. Actively monitor system during burn in and initial system commissioning periods. | Respond, troubleshoot and correct any deficiencies during the burn in and system commissioning periods. | Conduct live testing of the system prior to going live. Actively monitor system during burn in and initial system commissioning periods. | |
| **OPERATIONS** | Utilize new system for operations. Pull reports and data for on-going transit operations. Oversee contractors utilizing the system. | Work with provider on troubleshooting and repairs of technology components of the system. Maintain the AVL servers and ensure the quality of data. Pull reports and set up and implement new queries as necessary for transit operations monitoring and reporting. | Day-to-day operational use of the system including the dispatch functions. Notify staff when there are issues with the system. Pull reports and data for on-going transit operations. Operate and maintain system elements and work with provider on troubleshooting and repairs. | Responsible for on=going maintenance checks, and troubleshooting. Pending contract terms, provide repairs of the system in a timely manner. | | |

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## 12. Risk Management

The nature of implementing the CAD/AVL system with two separate transit agencies, several contractors, and different systems poses risks in areas of coordination, scheduling, cost, and expectations. Table 4 presents potential high level risks and measures to control those risks.

**Table 4: System Risk Assessment and Control**

| No. | Risk Identification | Risk Control Measures |
|---|---|---|
| 1 | Lack of information on the varied, dissimilar bus environments available to providers prior to bid. | Conduct a pre-bid meeting and site visit to allow providers to inspect each bus type prior and operating environment prior to submitting their bids. |
| 2 | Disruption to service during bus equipment installation. | Schedule installation to include only one bus at a time with multiple people and/or teams working on one bus. Utilize the contingency vehicles when conducting on-board equipment installation. |
| 3 | The available funding is inadequate for the preferred system concept. | Conduct industry scans and develop cost estimates that are based on similar AVL deployments. Require the providers to provide a base system price with a menu of options and combination pricing of menu options. |
| 4 | Agency lacks staff resources to properly maintain the new system. | Execute a maintenance agreement that requires providers to assist with on-going maintenance, troubleshooting and repairs for those elements that will require substantial agency staff resources. |
| 5 | Lack of staff resources to oversee the installation of bus equipment. | Provider to be responsible for entire system installation, integration and testing. Utilize contractors for oversight roles as necessary during the system installation, integration and testing. |
| 6 | Agency lacks current knowledge of how to operate the system | Require initial and on-going training for agency staff and contractors as part of the initial deployment and maintenance agreement. Work with provider to set up a "help desk" for quick and short turnaround requests by agency staff. |
| 7 | The information to be disseminated to transit users is not accurate or useful. | Conduct accuracy checks during the testing and initial system commissioning periods. Conduct on-going performance monitoring of the sub-systems that collect, process and disseminate information to the transit users. |
| 8 | Provider is not familiar with the 511 system. | Provide the 511 system technical documentation including any relevant data interface design documents to all prospective providers. Require for them to include the 511 integration as part of their bid. |
| 9 | System provider goes out of business, or dissolves the CAD/AVL practice. | Place all software and system executables and compilers in an account that can be retrieved by the agency and provided to another provider. Utilize standard interfaces to the extent possible and acquire perpetual licenses where achievable. The agencies can then hire another provider to take over the support of the system. |

## 13. Next Steps

The next step upon acceptance of the Concept of Operations will be to prepare the System Requirements. The System Requirements will be built upon the system concept and will be developed to satisfy the agencies needs outlined in the Needs Assessment.

# APPENDIX B
# TECHNICAL REQUIREMENTS AND SPECIFICATIONS

**APPENDIX B**
**TECHNICAL REQUIREMENTS AND SPECIFICATIONS**

The following is a complete set of technical requirements for the proposed CAD/AVL System. These requirements shall be viewed as the overarching set of requirements for the CAD/AVL and subsets of these requirements are applicable to the three transit agencies which are reflected in the Compliance Matrices (see Appendices C, D and E).

These overall set of requirements are grouped according to the following main areas:

1) Central Systems
2) System Data Communications
3) On-Board Equipment and Systems
4) Dispatch and Data Reporting
5) Scheduling System
6) Data Management
7) Real-Time Passenger Information System
8) Passenger Information Displays
9) Mobile Applications
10) 511 Integration

# 1. CENTRAL SYSTEMS

## 1.1 CAD/AVL System Software

The proposed CAD/AVL System Software shall have been deployed (installed and operational) in at least three (3) similar transit agencies in the United States for a period of not less than three (3) years.

### *1.1.1 Real-Time Graphical Displays*

Real-time Mapping shall display in an easy to use and intuitive graphical user interface that shall provide the following functions:

1.1.1.a Import and display of standard format vector, image, and point-based map layers

1.1.1.b Map layer feature labels provided based upon zoom level or with hover-over by a pointing device

1.1.1.c Continuous refreshed real-time updates of vehicle location and status

1.1.1.d Definition of multiple map views and ability to save them at the user level

1.1.1.e Definition of shared views for use by any dispatcher to be saved in their default set of views

1.1.1.f Zoom, move, center, and fit to window independent within each map view

1.1.1.g Filtered map views based upon parameters such as vehicles by route, login status, fleet, and mechanical status

1.1.1.h Map layer that includes current route traces for each fixed route selected by the operator

1.1.1.i Options to display different vehicle icon labels including vehicle number, adherence, route number, driver ID, and run number per map view

1.1.1.j Vehicle icons that are configurable and contain context sensitive information that includes adherence, login, transfer, and maintenance status

1.1.1.k Query tools to locate vehicle and routes based upon vehicle, route, or intersection variables

1.1.1.l Capability to establish voice/data communication by individual vehicle or by banding a group of vehicles together

1.1.1.m Access to a distance measuring tool

1.1.1.n Print capabilities of any customized map view

1.1.1.o Automated focus and continuous vehicle tracking during Emergency Alarm condition

*1.1.2 Route Playback*

1.1.2.a An historical event display shall playback all pertinent historical messages (e.g., messages sent and received by: vehicle mobile data terminal, operator, dispatch, and garage).

1.1.2.b Playback of these events shall include the ability to perform the following functions:

1.1.2.b.1 The display shall be by a sequence of events on a geographic map.

1.1.2.b.2 Allow selection by vehicle(s), driver(s), route(s), fleet(s), or run(s) for specific time frames through a query action window.

1.1.2.b.3 Configurable speed of replay for moving forward and backward through events

1.1.2.b.4 Graphical representation of event data on a common CAD/AVL map

1.1.2.b.5 Selectable display of map layers including but not limited to stops, streets, routes, points of interest, and geographical attributes

1.1.2.b.6 Text display of attributes of each vehicle event message including messages related to other onboard systems including transit priority requests, farebox alarms, and passenger counts

1.1.2.b.7 Step forward, step backward and pause the historical display of events

1.1.2.b.8 Zoom, move, center, and fit to window views within the map window

1.1.2.b.9 Measuring distance tool

1.1.2.b.10 Vehicle label by number, adherence, route, driver, run, and block

1.1.2.b.11 Vehicle icons that are configurable and display adherence, login status, transfer status, and maintenance status

1.1.2.b.12 Locate vehicles, routes, intersections or objects

1.1.2.b.13 Display route traces

1.1.2.b.14 Date and time messages are logged

1.1.2.b.15 Print the historical display

*1.1.3 Schedule Adherence*

1.1.3.a The CAD/AVL system shall monitor Schedule Adherence by comparing actual vehicle location versus the published schedule for all vehicles.

1.1.3.b Schedule adherence data shall be stored and include parameters for analysis such as, but not limited to, vehicles, routes, timepoints, block/runs, and Operator ID.

1.1.3.c Both the time of arrival and departure at all scheduled timepoints shall be accurately recorded and stored.

1.1.3.d The Agency shall be responsible for providing the schedule data used by the Contractor provided scheduling software interface to the CAD/AVL system. The Agency shall perform any stop and route geo-surveys required using Contractor supplied tools. The Contractor shall provide adequate training prior to the start of this activity in accordance with the project schedule.

1.1.3.e Real-time (predictive to the next timepoint, which shall include all stops) schedule adherence shall be displayed for dispatchers and made available to customer information applications.

1.1.3.f In real-time, the CAD/AVL system shall be capable of identifying vehicles that are predicted to be running early by more than a predefined number of minutes,

or running late by more than a predefined number of minutes at the next scheduled timepoint on both graphical and tabular displays.

1.1.3.g Schedule adherence parameters shall be able to be set differently by route with separate early and late user supplied values.

1.1.3.h If the MDT display is configured in the display mode the schedule adherence display will be shown to the Operator regardless of dispatcher selectable parameters.

1.1.3.i Schedule adherence from the vehicle shall be calculated, transmitted, and stored regardless of the onboard display setting.

*1.1.4 Route Adherence*

1.1.4.a The onboard CAD/AVL equipment shall provide off-route status to the Bus Operator and transmit a notification to be displayed at the dispatch workstation.

1.1.4.b The off-route notification shall identify and display the name of the next stop when a vehicle is further than a pre-defined distance from the assigned defined route.

1.1.4.c The off-route distance value shall be a user definable parameter.

1.1.4.d The Contractor shall identify whether the off-route distance is the total distance traveled from the assigned route or a deviation from the corridor of travel.

## 1.2 CAD/AVL System Hardware

*1.2.1 The central system shall provide all needed functions defined under these specifications, delivered in a turnkey manner where any equipment, software or work needed to create a complete system are part of the Contractor scope even if not explicitly referenced.*

*1.2.2 System hardware shall include at minimum all needed computer processing devices, keyboards and navigation devices, and displays for devices, workstations and servers as well as for all networking and communications equipment.*

*1.2.3 The CAD/AVL system shall also consist of a backup or mirrored server that will take over operations should the main server fail. The mirrored server shall enable failover operations to be carried out in a seamless manner requiring minimal manual intervention.*

*1.2.4 CAD/AVL Servers*

1.2.4.a The Contractor shall submit a complete list of required IT equipment for the CAD/AVL System at the System Design Review stage. These requirements and specifications may be refined and finalized as part of System Design Review. The minimum computer server requirements are provided below:

- Configurable - High Performance Server
- Processors: to be determined by the provider
- Ram: to be determined by the provider
- Hard Drives and controllers to be determined by the provider
- Two Embedded Multifunction Gigabit Network Adapters
- Dual Power Supplies
- Redundant Fans
- DVD-ROM Drive
- Standard Limited Warranty - 3 Years Parts and on-site Labor, Next Business Day
- Preferred configuration:
  - Application servers run in a VMware environment
  - Database server is non-VMware, dedicated hardware server

*1.2.5 CAD/AVL Workstations*

1.2.5.a All workstations shall use Dynamic Host Configuration Protocol (DHCP) for IP address assignment, unless otherwise approved by the Agency.

1.2.5.b The Contractor shall provide and implement hardware for the Agency with capacity adequate to support the Agency's applications and other Contractor applications involved in the solution, maps, data, and associated files required for operation, with 100% expansion capacity of the specified hardware.

1.2.5.c New workstations shall meet or exceed each Agency's current standard workstation specifications.

1.2.5.d Workstations for Petaluma Transit shall be Dell Optiplex 7010, Intel i7, 6GB RAM, 1TB hard drive or approved equivalent.

## 2. SYSTEM DATA COMMUNICATIONS

2.1 The Contractor is responsible for setting up the radio and/or cellular data gateway to allow all incoming and outgoing messages between the system and MDT's to be transmitted using the radio and/or cellular data communications system.

2.2 The system shall allow data packets to be sent over the network from the vehicles to the central system and from the central system to the vehicles anywhere where there is a private radio system or cellular signal present.

*2.2.1 Vehicle location shall be received by the Central CAD/AVL system at least once every 20 seconds (polling rate) for display and storage purposes and every 5 seconds during an Emergency Alarm situation.*

2.3 The contractor is responsible for arranging appropriate communication protocols with the Agency-preferred cellular providers. The cellular providers to be used for the agencies include the following:

- SolTrans – Sprint
- Petaluma Transit – Private Radio Network (400 MHz or 500MHz range/Verizon for redundancy
- Napa VINE – Verizon

## 2.4 Wireless Local Area Network (WLAN)

*2.4.1 The Contractor shall provide bulk data exchange management software for the Agency's network. The application shall use file transfer software to undertake complete or partial bi-directional bulk data transfers with each vehicle while it is connected with the mobile data communications system.*

*2.4.2 The bulk data transfer system shall be capable, at minimum, of the following tasks:*

2.4.2.a Download software updates/patches and configuration data for onboard devices.

2.4.2.b Download all updated schedule and trigger zone locations data required for operation of the VLU firmware.

2.4.2.c Upload vehicle components monitoring configuration data.

2.4.2.d Download updated trigger zones locations and announcement sign messages for automated annunciation systems on-board announcements.

2.4.2.e Upload revenue transactions data from fareboxes.

2.4.2.f Allow for the uploading of other on-board logged data when received.

2.4.2.g The software shall be configurable to determine frequency and types of data transfers.

2.4.2.h The bulk transfer system shall automatically initiate data communications with any VLU within 5 seconds of the vehicle completing its connection with the mobile data communications system, without any system user or vehicle operator interaction being required.

2.4.2.i Once communications is established with the VLU, the bulk data transfer system shall automatically determine which required file transfers remain to be completed and initiate them.

2.4.2.j A validation process shall ensure multiple attempts are made to complete all required file transfers until acknowledgement has been received that the file transfer was successfully completed.

2.4.2.k The system shall be able to complete a file transfer using a sequence of ad-hoc partial file transfers while the VLU is temporarily connected with the mobile data communications system.

2.4.2.l WLAN Access Points

2.4.2.l.1 The Contractor shall provide a WLAN controller. The WLAN controller and wireless APs shall support the following functions:

1. The WLAN controller shall automatically detect and configure the wireless APs.
2. The WLAN controller shall provide full control of the wireless APs.
3. Wireless APs shall monitor radio frequency characteristics including receive signal strength, noise, and interference (from other 802.11 radios) on all channels in its operational frequency band. The data shall be collected and analyzed by the WLAN controller.
4. The WLAN controller shall use the real time radio frequency monitoring information received from the Wireless APs to optimize the WLAN capacity.
5. The WLAN controller shall assign radio channels to each Wireless AP to avoid interference and channel conflicts.
6. The WLAN Controller shall dynamically control the transmit power of each Wireless AP to maximize
7. WLAN coverage and performance while minimizing interference with neighboring Wireless APs in the WLAN system.

2.4.2.l.2 The Contractor shall provide wireless Access Point (AP) coverage at each Agency's Bus Maintenance Facility to enable WLAN connectivity for data exchange between the onboard VLU and the central system via a Bulk Data Transfer

2.4.2.l.3 The WLAN coverage area available for bulk data transfer at each Bus Maintenance Facility shall include the area where the vehicles are to be parked.

2.4.2.l.4 The Contractor shall review the plans for the Bus Maintenance Facility and design the optimal locations for the APs including the orientation of antennas to satisfy all bulk data transfer requirements.

2.4.2.l.5 The VLU shall be able to authenticate automatically when the vehicles enter inside the Wi-Fi accessible zone and shall access the WLAN without needing manual intervention.

2.4.2.l.6 The WLAN equipment shall be rated for outdoor use or be installed in an appropriate weatherized NEMA 4x rated enclosure capable of withstanding direct water spray.

2.4.2.l.7 Lightning arrestors shall be installed to vendor specifications on all exterior APs.

2.4.2.l.8 The WLAN equipment shall be IEEE 802.11i compliant or be Wi-Fi Protected Access 2 (WPA2) certified by the Wi-Fi Alliance with AES encryption.

2.4.2.l.9 Each single AP shall have a minimum 2x3, Dual Frequency, MIMO configuration.

2.4.2.l.10 The APs shall support 2.4GHz and 5.8 GHz (802.11n Wi-Fi) frequencies. The APs shall be capable of supporting multiple SSID's and assign separate SSID's to separate VLANs.

2.4.2.l.11 The APs shall be able to support WMM (Wi-Fi multimedia).

2.4.2.l.12 The Contractor shall coordinate all installation activities for the WLAN at the Bus Maintenance Facility with each Agency's Project Manager. No installation shall occur until the contractor has been given clearance to proceed by the Agency.

2.4.2.m Antennas

2.4.2.m.1 Antenna(s) shall be installed for cell data, GPS and WLAN. The antenna(s) shall support the following frequency ranges:

1. 700MHz, 850MHz, 1710-1755MHz, 2110-2155MHz, and 1900/2100MHz (for Mobile Broadband)

2. 1.5 GHz (GPS)

3. 2.4GHz and 5.8GHz (802.11n Wi-Fi)

2.4.2.m.2 Petaluma Transit will require additional antennas for private radio operating in the 400-500 MHz RF spectrum.

## 2.5 Remote and Mobile Access to Central Software

*2.5.1 Road Supervisors shall be capable of having remote access to the central CAD/AVL system through a mobile workstation (laptop). Relevant real-time information shall be gathered and transmitted to the mobile workstation through the CAD/AVL cellular data network. The mobile station shall be provided with a cellular data card.*

*2.5.2 The laptop shall employ a map-based GUI. The GUI shall support various map views, with full zoom, pan and auto-centering capability.*

*2.5.3 The GUI shall be browser-based, or employ an application installed on the local workstation.*

*2.5.4 The GUI shall be the same as the one used by Dispatchers, but with the ability to limit functionality as defined below.*

*2.5.5 To reduce the amount of cellular data used, the GUI shall be configurable to only show selected vehicles.*

*2.5.6 Vehicles shall be selectable by ID, pre-defined groups, routes, and pre-defined geographic distance.*

*2.5.7 The laptops shall support text messaging to the dispatchers. The Contractor shall provide recommended laptop specifications and the Agency's will provide the hardware.*

*2.5.8 The laptops shall have access to the internet, Microsoft Outlook, and Agency software applications.*

*2.5.9 The laptops shall allow the road personnel to monitor and respond to incidents including covert alarms and file incident reports.*

*2.5.10 The Contractor shall provide sufficient documentation and instructions for installing software such that Agency staff can perform the installation in the event of a laptop replacement or upgrade.*

## 3. ON-BOARD EQUIPMENT AND SYSTEMS

3.1 All onboard equipment shall be designed for use in the transit industry rated to applicable industrial and vehicle standards, with specific attention to ergonomics, reliability, efficiency, and safety for passengers, operators, maintenance personnel and other system users.

3.2 Equipment furnished under these specifications shall be the latest model in current production, as offered to commercial trade, and shall conform to quality workmanship standards and use materials consistent with transit industry requirements.

3.3 The contractor shall represent that all equipment offered under these specifications is new. Used, shopworn, demonstrator, prototype, remanufactured, reconditioned, or discontinued equipment shall not be supplied under this contract. Reuse of existing Agency material, equipment, or software will not be accepted, with the exception of hardware, software, or infrastructure interfaces permitted by this scope of work.

3.4 Contractor shall demonstrate that all makes and models of proposed on-board equipment have been installed and operational for at least three other CAD/AVL systems for a period of not less than three (3) years.

3.5 All equipment shall be constructed in accordance with best commercial practice, with such practices described in the associated design documentation. At a minimum, the design and installation construction shall provide for:

*3.5.1 Reliable and stable operation;*

*3.5.2 Minimum maintenance and alignment procedures, with a minimum of special tools;*

*3.5.3 Minimum number and variety of assemblies and spare parts;*

*3.5.4 Maximum attention to human factors, engineering, and ergonomic design; and*

*3.5.5 Simplified design and rapid fault isolation to reduce the requirement for maintenance personnel.*

*3.5.6 All parts shall be made of corrosive resistant material, such as plastic, stainless steel, anodized aluminum or brass. Protection against galvanic reactions between dissimilar metals shall be provided.*

*3.5.7 All parts shall be constructed with materials and quality suited to the intended use and shall use modular design wherever feasible. Standard, commercially available components shall be used wherever possible.*

*3.5.8 All functionally identical modules and assemblies shall be fully interchangeable between like modules for other units of the same type of equipment.*

*3.5.9 Components with non-identical functions shall not be nor shall they appear to be interchangeable.*

*3.5.10 Unless otherwise approved, all modules and assemblies shall be connected using standardized durable, positive-locking, and indexed quick disconnect fasteners.*

*3.5.11 Equipment, assemblies, and components shall be identified by a part number and/or serial number, permanently and legibly affixed directly to the surface, and this part number shall be durable, and resistant to washing and scrubbing.*

*3.5.12 Features shall be provided to identify the software module versions on each device, and be able to verify that they are the correct or most recent versions for that device.*

*3.5.13 The onboard equipment shall be designed to provide a usable life of not less than 15 years.*

*3.5.14 Onboard equipment shall use (as applicable) microprocessor technology that is current and available in the market.*

*3.5.15 As part of its proposal and Design Documentation, the Contractor shall identify the primary processor chip(s) used in the equipment, and shall discuss how chip end-of-life issues will be managed if additional quantities of onboard equipment are purchased in the future, in order to maintain compatibility with equipment purchased under this Contract.*

*3.5.16 Unless otherwise specified, all onboard equipment shall have a minimum 40,000 hours Mean Time Between Failures (MTBF).*

*3.5.17 Unless otherwise approved, internal (to the onboard equipment) batteries shall not be used to maintain parameter information in onboard equipment when it is in its powered down state. Internal batteries may be used for certain, very limited functions such as maintaining the operation of a real-time clock when the equipment is powered down, provided that power is consumed from the batteries only when the equipment is powered down, and that such batteries have a minimum life of five (5) years when the equipment is stored in inventory, and ten-plus (10+) years of life when the equipment is in operation.*

*3.5.18 The system shall check the battery state and create a warning message if the battery needs to be replaced. Onboard equipment shall be capable of being disassembled to fit through a coach door that is a minimum of 24 inches wide by 60 inches tall.*

*3.5.19 Onboard equipment, including all exterior connectors and exposed ports, shall be rated for IEC 60529, IP-54 for interior equipment, IP-65 for exterior equipment and designed for use in an industrial and mobile environment subjected to dirt, water, oil, and cleaning solvents.*

*3.5.20 In the event that any existing vehicle wiring, switches, or contact points are used, the Contractor shall be responsible for testing and certifying that the wiring, switches, or contact points are in an acceptable state and suitable for reuse. In the event that such wiring, switches or contact points are not suitable for reuse, the Contractor shall immediately upon discovery, notify the Agency that replacement is required.*

*3.5.21 Data transferred from a device shall not be purged or written over until a successful transfer is confirmed.*

*3.5.22 In the event the transfer is not successful and the system is unable to re-attempt a transfer, it shall revert to the previous version of the data automatically and without corruption. Any data transfer failure shall be logged, alerted, and recorded.*

*3.5.23 All devices shall include functionality to extract data directly from the device using a laptop computer or other similar equipment in the event that the device is unable to transfer data through the system due to device damage or communications malfunction. Tools and processes for this shall be described in the design documentation.*

*3.5.24 Equipment shall be properly grounded, with onboard equipment connected as directly as possible to the chassis ground.*

*3.5.25 Onboard equipment shall operate from the vehicle electrical system, between 9 and 35 volts.*

*3.5.26 Onboard equipment shall be securely mounted in the interior of the vehicle, clear of obstructions and interference-generating devices.*

*3.5.27 Customer-facing equipment shall meet or exceed all ADA requirements found in 49CFR Parts 37.167 and 38.35, as well as the requirements of the current version of the ADA Accessibility Guidelines (ADAAG) at the time of implementation. Compliance involving readability distance shall involve the selection of sign face and character features,*

*including background contrast, high character brightness, character font selection, number of pixels per character, character aspect ratio and number of pixels separating characters.*

*3.5.28 Installations shall be performed at specific times during the day and as approved by the agency. The Contractor may be required to perform installations over nights and weekends, and installations may need to be performed at the vehicle's home base.*

*3.5.29 The agencies reserve the right to allow less of its vehicle fleet to be out of service if necessary in order to avoid disruption to revenue service in conjunction with maintenance requirements.*

*3.5.30 The Contractor shall ensure that all vehicles made available for overnight installation work are ready for revenue service by the start of the next service day.*

*3.5.31 Onboard equipment shall not interfere with Petaluma Transit's existing Cradlepoint/Verizon on board passenger wifi systems. (This applies to Petaluma Transit only).*

### 3.6 Vehicle Logic Unit (VLU)

*3.6.1 The CAD/AVL system shall include a VLU as a central processing unit, memory, data storage and vehicle software residing on each vehicle.*

*3.6.2 The VLU shall interface with all of the vehicle's on-board equipment, and to support communications via a mobile wireless communications network with the central servers.*

*3.6.3 The VLU shall meet environmental and vibration standards (MIL-STD-810D, NEMA-4) as well as appropriate electromagnetic immunity standards (SAE 1455 and ESD J1112/13) and protect against surge, and reverse polarity.*

*3.6.4 The VLU shall be of proven design (at least three other similar transit agency deployments for at least three years) and easy to install and replace.*

*3.6.5 The VLU shall be capable of multiple radio control, real time updates and messaging to and from the vehicle.*

*3.6.6 The VLU shall meet communication requirements for leased cellular communications, meshed wireless networks, private radio, as well as interfaces for current and future onboard equipment.*

*3.6.7 Overall system interfaces shall include RS232, RS485 with busy line, TTL, SAE J1708, SAE J1939, USB, Ethernet, TCP/IP, discrete inputs and outputs, odometer, spare I/O pins, audio inputs and outputs, and full IDE capability for PC-type devices.*

*3.6.8 Capability for automatic vehicle monitoring via J1708/1939 provided by the vehicle shall be included.*

*3.6.9 Indication shall be provided for quick inspection of operation to indicate radio keyed, wireless network operating, software operational, proper voltage range, and ignition on.*

*3.6.10 Data storage capacity shall also be sufficient to store at least five operating days worth of passenger counts and all event messages in the case where data communications are disrupted.*

*3.6.11 The VLU shall support functionality of the following data sets, and must have sufficient non-volatile memory to simultaneously store at least the following:*

3.6.11.a Entire set of current schedule data, including school, non-school, and Holiday schedule platforms;

3.6.11.b Twenty (20) weeks of incremental schedule changes, for current schedule;

3.6.11.c Entire set of future schedule data (i.e., next run-board);

3.6.11.d Entire set of required AVA announcements;

3.6.11.e Fifty-two (52) weeks of incremental AVA announcements, for current schedule;

3.6.11.f Five (5) days of Automatic Passenger Count (APC) data records;

3.6.11.g Destination sign errors;

3.6.11.h Current configuration data;

3.6.11.i Future configuration data;

3.6.11.j Current firmware;

3.6.11.k Future firmware;

3.6.11.l Any other data recording needs identified in this RFP;

3.6.11.m 100% memory spare storage for growth, summing above requirements.

*3.6.12 CAD/AVL system configuration settings related specifically to the vehicle shall be stored in the vehicle's configuration module installed in the vehicle such that the VLU unit can be swapped out and the unique vehicle information automatically associated with the replacement VLU.*

*3.6.13 Each VLU shall have a unique IP address for purposes of participating in the wireless network and for remote monitoring.*

*3.6.14 Regardless of whether the Agency elects to purchase any or all CAD/AVL options in, the base VLU shall be capable of accommodating those options. Purchasing any or all of the options shall not require any VLU software, firmware, or hardware upgrades in order for those options to be fully functional.*

*3.6.15 The VLU shall integrate seamlessly with the Mobile Access Router (MAR), including the VLU providing a feed of GPS data to the MAR.*

*3.6.16 The VLU shall act as the central processor, data storage, and device manager for all onboard devices integrated under this Contract.*

*3.6.17 The contractor shall coordinate with the agencies the final location of VLU installation on each different vehicle type and configuration, subject to approval from the agencies.*

*3.6.18 The VLU shall include at minimum the following ports and interfaces:*

3.6.18.a Two (2) opto-isolated SAE J1708: one (1) for transit devices, and one (1) for drivetrain;

3.6.18.b Opto-isolated SAE J1939 for drivetrain;

3.6.18.c Ethernet;

3.6.18.d Universal Serial Bus (USB);

3.6.18.e RS-232 as an additional option to SAE J1708 for communication with the destination signs; and

3.6.18.f Other ports and interfaces as required for specific device-to-device communications.

*3.6.19 The VLU shall manage power to listed onboard devices as follows:*

3.6.19.a The VLU shall have a configurable parameter of 0 to 180 minutes that controls the power down of the VLU, MDT, and MAR after the vehicle master ignition switch is turned to “off”.

3.6.19.b The VLU shall inform all managed devices to initiate a graceful power-down themselves and the MDT (including if necessary automatically logging off the VLU) between 0 to 30 minutes before power-down is activated and shall inform the MAR to do so.

3.6.19.c Upon reaching the power-down threshold, the VLU shall remove power from all connected devices, and itself.

3.6.19.d Upon the vehicle master ignition switch being turned to anything other than “off”, the vehicle shall apply or maintain power to all connected devices, and also reset the timer unless ignition sense is again active.

3.6.19.e If the vehicle operator has not logged off, the system shall automatically log off, prior to power down activation.

*3.6.20 The VLU shall process AVL data and correlate it with operator ID, date, time (both 24 hour system clock and 36 hour service day clock), run, block, route, trip, and location.*

*3.6.21 The VLU shall manage all communications processes and devices on the vehicle, and shall store any accumulated data and logs.*

*3.6.22 The VLU shall reconcile any discrepancies between all the different sensors and position inputs it uses for AVL purposes (e.g., GPS, odometer, gyroscopes) to provide the*

*most accurate vehicle location information Vehicle location information shall be correlated with routes, trips, and stops as provided in the configuration data.*

*3.6.23 The VLU shall process and manage the transmission of data to/from the central* system as follows:

3.6.23.a Routine data including: schedule adherence, vehicle location data, passenger count, peak passenger load, messaging and communications requests, and event information on an event or periodic basis, via the data communications system.

3.6.23.b Priority data including priority messages, and alarms on an immediate basis, via the data communications system.

3.6.23.c Onboard equipment configuration data updates, non-critical logged or accumulated data, and other "batch" data, via the WLAN.

*3.6.24 The VLU shall be responsible for initiating and verifying the successful completion of data transfers, and shall not delete data until a successful transfer has been completed and confirmed.*

*3.6.25 In the event of an uncompleted file transfer, the VLU shall reinitiate the file transfer at the next opportunity, from the point where the previous file transfer ended such that data which had previously been transferred does not need to be retransmitted.*

*3.6.26 The VLU shall manage the downloading of new configuration data that may include schedule updates, AVA announcement updates, firmware/configuration updates, as follows:*

3.6.26.a The VLU shall maintain both the current configuration data as well as one set of future configuration data that will automatically become the current configuration data once the defined activation date has arrived.

3.6.26.b The VLU shall periodically check for configuration updates whenever it is within WLAN coverage.

3.6.26.c If a configuration data update is available, the VLU shall manage the download process and update other onboard equipment (the VLU shall provide a message on the MDT that a download and update is occurring so that the operator is aware).

3.6.26.d The VLU shall automatically install updated firmware or configuration data it has received into the VLU, the destination sign and the AVA system.

3.6.26.e To minimize potential impacts on pull-out, the VLU shall include functionality to download only the schedule information on startup. Functionality shall be provided to manage the download of more voluminous data (such as a firmware or configuration update) so that it is only downloaded and installed on shutdown or during non-operating hours.

3.6.26.f If the VLU is unable to complete the download of configuration data via the WLAN, it shall continue using the previous configuration data.

*3.6.27 The VLU must monitor and log, tagged with time and location, the following existing discrete external circuits:*

3.6.27.a Front door and Rear door, open and close;

3.6.27.b Kneel, and return from kneel (raise);

3.6.27.c Lift or Ramp deploy, and return from deploy (stow);

3.6.27.d "Stop Requested" activation;

3.6.27.e Headlight activation and deactivation;

3.6.27.f Turn Signals, activation and deactivation;

3.6.27.g Hazard Lights, activation and deactivation;

3.6.27.h Master-Run switch, change in status (Off, Day-Run, Night-Run, Park);

3.6.27.i Ignition, activation and deactivation;

3.6.27.j Covert Alarm switch activation;

3.6.27.k Selected dashboard light activations for vehicle maintenance monitoring (e.g. oil pressure, check engine light, tire pressure);

3.6.27.l Motion start;

3.6.27.m Not in motion/idle.

*3.6.28 The VLU shall include functionality and external interfaces to provide location, time, and/or triggering messages to other on-vehicle systems.*

*3.6.29 The VLU shall include functionality to re-transmit data in the event of an unsuccessful transmission.*

*3.6.30 The VLU shall run diagnostics and report any problems with onboard components (including the VLU itself, MDT, voice radio, AVL components, and destination sign).*

*3.6.31 The VLU shall automatically recognize any system process failure or lock-up, log the problem and attempt a restart.*

*3.6.32 If restart of the process fails, notification shall be sent to the operator via the MDT and logged the event in the VLU data for upload at the end of the day.*

*3.6.33 The VLU shall support remote diagnostics that allow central system access to check operations and functionality of the VLU, including the ability for maintenance staff to reset the VLU and operate restricted functions (e.g., resetting parameters such as tone volumes, MDT screen settings).*

*3.6.34 In addition to providing routine position updates, the VLU shall record date, time* and location when the following events occur:

3.6.34.a Arrival into and departure from agency configurable geographic areas that define the stops, timepoints, and pull-out/pull-in locations (for these events the current schedule adherence shall also be recorded);

3.6.34.b Every activation and deactivation of each monitored onboard circuit, including: Door open/close, Kneel/Raise, Lift/Ramp deploy/stow, Stop-Requested light, Turn Signals;

3.6.34.c First stop/timepoint of the first trip; and

3.6.34.d Every toggling of operational conditions, including: operator key- press on MDT, off-route and return-to-route, early/late schedule adherence and return-to-on-time status, operator over-ride of destination sign.

*3.6.35 The VLU shall monitor diagnostic information for the Transit J1708, and log the following statistics upon every change in logon status or ignition status:*

3.6.35.a By Module Identification (MID): Time of last good received packet, Total good received packets, Total good transmitted packets.

3.6.35.b Total bad (collision/checksum) packets received

3.6.35.c Total bad (collision/checksum) packets transmitted.

*3.6.36 The VLU shall monitor diagnostic information for connected onboard systems, and log the following statistics upon every change in logon status or ignition status:*

3.6.36.a Data Communication Statistics (Total: Polls, Transmits, Re- Transmits, Receives, Errors, Fallback, etc);

3.6.36.b Navigation Quality (Time, Duration, Good GPS Navigation, Good Alternate Navigation, Poor Navigation, etc);

3.6.36.c All current VLU configuration data;

3.6.36.d Odometer Statistics, since previous record (total traveled distance, current calibration factor); and

3.6.36.e WLAN Statistics, since previous record (VLU awake time, WLAN coverage time, data packets sent, data packets received, file transmissions/receptions attempted per file, file transmissions/receptions completed per file).

3.6.36.f All received text messages that were displayed to an operator

3.6.36.g All instances of lost data communications coverage exceeding 15 seconds once back in communications for more than ten (10) seconds.

*3.6.37 The VLU schedule data shall include agency configurable geographic areas (i.e., trigger boxes), which may or may not be associated with other schedule points (Stops, Time Points, Trip Start/End) and will initiate special VLU functions.*

3.6.37.a Examples include: Change external destination sign; Initiate Transit Signal Priority (TSP) status change (enable/disable/activate/deactivate); Initiate AVA announcements and/or "clears"; Indicate locations where GPS is known to be degraded.

3.6.37.b The system shall enable the agency to maintain the trigger boxes within the scheduling database, independently without need for any software changes.

3.6.37.c The system shall support the creation, deletion, and relocation of trigger boxes and the designation or adjustment of the VLU action to be taken upon entering or exiting the trigger box.

*3.6.38 The VLU shall use AVL data to determine schedule adherence in real-time on the vehicle, without the need for central computation and communications.*

*3.6.39 The VLU shall be fully operational within 90 seconds of power restoration for warm starts, and 150 seconds for cold starts under the full range of ambient conditions.*

*3.6.40 Logged data shall be stored in non-volatile memory, and shall not become corrupted due to any power condition, including: spike, drop, or loss.*

## 3.7 Mobile Data Terminal

*3.7.1 The MDT shall be a rugged computing device designed for operation in a transit vehicle environment and shall function as the interface between the operator and all onboard components.*

*3.7.2 All storage shall be solid-state. No disks or hard drives shall be permitted, though removable memory cards will be permitted.*

*3.7.3 The MDT shall be equipped with a color, liquid crystal display (LCD) touch-screen that meets the following requirements:*

*3.7.4 Ability to be used by operators wearing gloves.*

*3.7.5 Ability to be readable by operators wearing polarized lenses.*

*3.7.6 The color combination to be used on the MDT terminal shall provide legibility for the color blind.*

*3.7.7 Must be readable in direct sunlight and must offer a low-glare setting for night operation.*

*3.7.8 The MDT touch screen should have a video graphics array (VGA) resolution of 640 x 480 pixels or higher. However, The Contractor may propose a lower resolution screen in its proposal.*

*3.7.9 The MDT shall display vehicle status including data transmission, pending messages, and communication mode.*

*3.7.10.The MDT shall be capable of providing unique aural tones to identify incoming messages to keep the operators attention on the road while driving. The MDT shall be capable of providing onboard information and interface to onboard systems during operation of the vehicle including:*

3.7.10.a Logon

3.7.10.b Emergency Alarm

3.7.10.c Data Messaging

3.7.10.d Transfer Notification

3.7.10.e Schedule Adherence

3.7.10.f Headsigns

3.7.10.g Fare Collection

3.7.10.h Passenger Count

3.7.10.i Maintenance

3.7.10.j Stop Announcement

3.7.10.k Trip/Schedule

3.7.10.l Route

3.7.10.m Direction

*3.7.11 When the power is turned on, the MDT software shall automatically perform a power-on self test, followed by configuring and initializing the MDT to the user-specified default values.*

*3.7.12 The MDT shall be self-restarting and shall not become unresponsive and require manual restarts to continue operations. The MDT shutdown process will be controlled by the MDT software and shall only be possible when the ignition is in the off position.*

*3.7.13 A user specified shutdown delay shall be provided to continue operations and to initiate the shutdown procedure that shall automatically close all files, save values, and send a shutdown message to be recorded in the CAD/AVL system.*

*3.7.14 The onboard system shall include a covert microphone, which can be integrated to the MDT or mounted separately from the MDT. The mounting location, orientation and*

*sensitivity for the covert microphone shall be approved through the design review process, with the covert microphone able to allow a dispatcher listening to the covert audio to understand speech at a normal spoken level from the operator compartment and its immediate vicinity.*

*3.7.15 Wheelchair lifts and ramps shall be monitored and data recorded for each cycle.*

*3.7.16 If a wheelchair lift or ramp is not cycled prior to leaving a garage/storage area at startup then the MDT shall display a warning to the operator and transmit the warning to the central system for storage and display at the dispatcher work station.*

*3.7.17 The MDT shall display a warning if a logon has not occurred after a vehicle is moved a predefined distance (default 1000 FT). This warning shall be transmitted to the central CAD/AVL system for storage and display at the dispatcher work station.*

*3.7.18 A logon process shall be provided for maintenance purposes to enable a vehicle to be moved through-out a facility for servicing and maintenance purposes without triggering alarms.*

*3.7.19 Supervisors shall also be capable of remote log-on/log-off for the MDT via the data communications connection.*

*3.7.20 For driver safety, the MDT shall have the "safe driving" mode enabled when the vehicle is moving above a configurable speed limit (e.g., 5 miles/hour).*

*3.7.21 The safe driving mode shall allow the agency to stop vehicle operators from interacting with MDTs when driving, the MDT shall allow enabling of the following screen configurations under safe driving mode:*

3.7.21.a Blank display on the screen;

3.7.21.b Disabled MDT buttons to stop vehicle operators from performing any actions on the screen; and

3.7.21.c Display of information relevant to vehicle operators when of high priority (e.g., route and schedule adherence status, missed messages or calls from dispatchers).

*3.7.22 Dispatch shall have the ability to remotely change the configurations for the safe driving mode.*

*3.7.23 Dispatch shall be able to change the safe driving mode configurations by vehicle operator login. For example, the safe driving mode could be disabled for maintenance or training purposes.*

*3.7.24 The MDT shall allow two way text messaging between the transit vehicles and dispatch using a set of predefined messages, or free form text messaging.*

*3.7.25 The MDT shall support the display of text messages longer than can fit on one line of the display. A minimum of 40 canned messages shall be supported.*

*3.7.26 The MDT shall store multiple messages received from dispatch and indicate those text messages that are unread.*

### 3.8 Mobile Access Router (MAR)

*3.8.1 The contractor shall supply a MAR supporting both wireless and wired switched Ethernet Local Area Network (LAN) functionality, as well as multiple wireless Wide Area Network (WAN) links and a gateway.*

*3.8.2 The MAR shall be a separate device from the VLU and MDT.*

*3.8.3 The MAR shall be equipped with a minimum of 1 GB of internal data storage capacity.*

*3.8.4 The MAR shall include a minimum of two (2) USB 2.0 connections through which USB enabled devices such as a portable computer or solid state memory can be connected.*

*3.8.5 The MAR shall provide a minimum of eight (8) switched Ethernet ports.*

*3.8.6 The wireless data communications device using a standard form factor approved through the design review process shall be easily replaceable to accommodate potential future adaptation to different wireless WAN link services.*

*3.8.7 The MAR shall incorporate a LAN Ethernet multiport switch capability to interconnect CAD/AVL onboard system components and existing onboard Ethernet enabled equipment.*

*3.8.8 The MAR shall support the following wireless data services:*

3.8.8.a 3G and 4G wireless WAN communications from common carriers through a compatible cellular modem, to include but not be limited to commercially available Long Term Evolution (LTE) services;

3.8.8.b Wireless LAN (WLAN) “WiFi” supporting the 802.11n standard for WAN communications

3.8.8.c Act as a WLAN access point capable of enabling LAN access from public WLAN client devices within the bus interior, supporting the 802.11n WLAN standard and on a separate subnet firewalled from the onboard Ethernet switched LAN.

*3.8.9 The MAR shall be integrated with onboard CAD/AVL components and other existing onboard Ethernet enabled systems to provide an integrated, multi-path WAN gateway for all onboard systems via connection to the Ethernet switched LAN ports.*

*3.8.10 The MAR and all WLAN communications shall support Wi-Fi Protected Access 2 (WPA2) security and communications protocols, or alternate approved through the design review process.*

## 3.9 Global Positioning System (GPS)

*3.9.1 The AVL module shall provide a derived location using an onboard GPS receiver and other location determination devices (gyroscope, odometer, etc.) as required providing accuracy within ten feet of the actual vehicle location. The Contractor shall provide an explanation that specifies the accuracy of the AVL module being offered.*

*3.9.2 Vehicle location shall be determined by a navigation algorithm that collects inputs from multiple sources and calculates a solution based on the reported reliability and weighting of each input device.*

*3.9.3 Other location determination devices other than GPS shall automatically calibrate and require no operator or maintenance personnel intervention for daily usage.*

*3.9.4 Proper operation of the onboard systems relying on location reporting shall not be interrupted for vehicles leaving from an enclosed storage area.*

*3.9.5 The GPS antenna shall be a low-profile unit housed in a rugged and weather tight enclosure. The GPS antenna shall be securely mounted and sealed on the exterior of the vehicle, clear of obstructions, and clear of interference from other generating devices or 91 Radio Frequency interference.*

*3.9.6 The GPS system shall provide a spare NMEA-based GPS output.*

*3.9.7 The GPS system shall have a cold acquisition time of no more than two (2) minutes, warm acquisition time of no more than fifteen (15) seconds and update the current position at least once every five (5) seconds. The GPS system shall include multi-path rejection capabilities to help eliminate inaccurate signals caused by reflections off of buildings or other structures.*

*3.9.8 Vehicle location shall be transmitted at least once every 20 seconds (polling rate) to the central CAD/AVL system for display and storage purposes and every 5 seconds during an Emergency Alarm situation.*

*3.9.9 The AVL shall at all times provide current position information to the VLU, for the purpose of reporting vehicle position in real-time and for recording events.*

*3.9.10 GPS delay time from location acquisition to formatting for transmission shall not exceed one (1) second.*

*3.9.11 The GPS system shall store the most recent location to provide as the "last known good" location in the event that location reporting is interrupted.*

*3.9.12 Location messages transmitted to dispatch shall indicate messages status as current or "last known verified".*

## 3.10 Automatic Passenger Counters

*3.10.1 The APC system shall be integrated with the AVL system to provide the Agency with time, location, and on-off counts.*

*3.10.2 The APC system shall include an option to integrate the electronic farebox to provide the Agency with fare collection information.*

*3.10.3 The APC shall be designed to operate in accordance with these specifications for ambient temperatures from -20 °F to 140°F. The APC system shall be designed to operate in accordance with these specifications for ambient humidity from 10% to 95%, non-condensing internally.*

*3.10.4 Equipment shall withstand without damage being stored for extended periods in ambient temperatures from -40°F (-40°C) to 158°F (+70°C).*

*3.10.5 The APC system devices shall be designed to withstand the vibration and shock forces associated with transit vehicles.*

*3.10.6 The APC system device shall be sealed against dust and water intrusion, certified in compliance with or exceeding the NEMA4x or IP65 standard. Equipment shall be tested and proven capable of withstanding power transients, electromagnetic interference and radio frequency interference without degradation at levels encountered in typical transit operations.*

*3.10.7 Power and communications lines and the chassis may be exposed to electrostatic discharges from personnel, so the units shall be tested and proven resistant through testing in accordance with accepted industry procedures for testing computer equipment.*

*3.10.8 The APC system shall be capable of being locally configured using a laptop computer, portable programming device or wireless device.*

*3.10.9 The chosen method may also be used for performing routine diagnostic maintenance.*

*3.10.10 Each component/module/subsystem distinctly defined in the proposed APC system shall be replaceable as a discrete unit, identified by a unique serial number or other contractor proposed method.*

*3.10.11 The APC system shall also be interfaced with a wheelchair lift sensor and bike rack sensor in order to record the number of wheelchair lift and bike rack operational cycles at each stop.*

*3.10.12 At each stop, a data record shall be created to record the door opening, the number of boarding and alighting passengers for each doorway and the number of wheelchair lift or bicycle rack activations, and door closing.*

*3.10.13 Each data record shall either be in real time, or by post processing match the APC system data to the stop identification, trip number, route pattern, vehicle ID, time and date recorded in the central database.*

*3.10.14 Data records may be stored in either the APC system, integrated vehicle logic unit, with the contractor ensuring sufficient on-board memory capacity to allow for storage of at least 72 hours of APC data.*

*3.10.15 APC data stored on-board should use non-volatile storage so that a power supply is not required to retain the stored APC data records.*

*3.10.16 Utility software shall be provided, for use on a laptop computer connected via a suitable (serial or Ethernet connection) to either the APC system, vehicle logic unit which supports calibration of the doorway sensors and review of stored data records.*

*3.10.17 Activated by the central system, data records shall be uploaded from the APC subsystem via the WLAN bulk data transfer system.*

*3.10.18 The APC subsystem shall not erase or allow the overwriting of data records until confirmation is received from the central system that the data records were successfully received.*

*3.10.19 Equipment shall conform to the Federal Communication Commission (FCC) Part 15 Class A limits for conducted and radiated emissions of electromagnetic interference and radio frequency interference.*

*3.10.20 Onboard equipment shall be specifically designed for the harsh transit environment and shall meet the requirements of this specification under all conditions encountered in typical transit operations. Onboard equipment provided shall operate in accordance with these specifications while withstanding the vibration and shock forces encountered in typical transit operations. Cabling and wiring shall be installed in accordance with these specifications while withstanding the vibration and shock forces encountered in typical transit operations.*

*3.10.21 Napa VINE currently owns and operates UTA APC's on board fixed route and demand response vehicles. The proposed AVL system shall integrate with the existing UTA APC's to provide the Agency with time, location, and on-off counts. See the Napa VINE Compliance Matrix (Appendix E-1).*

### 3.11 Emergency Alarm

*3.11.1 When a covert alarm signal is received from a vehicle, the CAD/AVL software shall display the event in the performance queue to all dispatchers with configurable visual alerting methods.*

*3.11.2 The CAD/AVL software shall provide a configurable visual alert to all dispatchers, road supervisors, and others using the CAD/AVL software.*

*3.11.3 The CAD/AVL software shall also notify the dispatcher in the performance queue that a silent alarm message has been received using an Agency-approved visual notification method.*

*3.11.4 Once a dispatcher selects the covert alarm event, this shall be so indicated to that dispatcher and all others.*

*3.11.5 When acknowledging an alarm the CAD/AVL software shall zoom and center the map display on the alarming vehicle and locate the nearest road supervisor vehicle when selected by a dispatcher. The scale for the zoom shall be configurable by the Agency.*

*3.11.6 The CAD/AVL software shall allow dispatchers to downgrade emergency alarms to a lower message priority, or upgrade lower priority messages to an emergency alarm. The CAD system shall log all alarm status changes (create, upgrade, downgrade, and cancel).*

*3.11.7 Activation of an emergency message shall place the vehicle in a priority status for frequency of location and message updates which will result in vehicle location and status updates at a rate that is configurable by the Agency.*

### 3.12 Automatic Vehicle Announcements (AVA)

*3.12.1 The AVA central software shall be used to generate and manage next stop, customer, and other announcements, manage device configurations, generate reports, and manage device fault reporting and logs.*

*3.12.2 The AVA central software shall meet or exceed requirements of the United States Access Board.*

*3.12.3 The AVA central software shall include functionality to import route and stop data from an external system via Agency file(s) (e.g. Comma Separated Value (CSV), tab delimited).*

*3.12.4 The AVA central software shall include the capability to announce all or only selected stops (e.g., major intersections, near landmarks, at transfer points).*

*3.12.5 Location based stop announcement triggers shall be configurable by the Agency for any stop announcement.*

*3.12.6 Stops to be announced shall be set through system configuration data managed by the Agency.*

*3.12.7 The AVA central software shall include the ability to add announcements for any additional content beyond stop names (e.g., transfers, landmarks) and have the capability to link multiple announcements together into a composite announcement.*

*3.12.8 The content of audio and visual announcement messages shall be configurable by the Agency from the AVA central software, and shall include, at minimum, the ability to announce the following message types:*

3.12.8.a Cross-street only

3.12.8.b Current street and cross-street

3.12.8.c Landmark

3.12.8.d Transfer opportunities

3.12.8.e Bus Stop Name

3.12.8.f Service announcements

*3.12.9 The AVA central software shall include the ability for the Agency to independently configure audio and text messages associated with a specific stop.*

*3.12.10 The AVA central software shall include the ability to append a standard message header (e.g. "the next stop is…") to all messages without the need to recreate the header for each message individually. Different standard headers will be available for different types of announcements. The AVA central software shall support announcements using at minimum English plus any number of additional languages to be selected by the Agency as part of the design review process.*

*3.12.11 The AVA central software shall enable creating audio messages using both text-to-speech synthesized and recorded voice. Recorded voice files shall be created, exchanged (import and export) and stored within the system in MP3 and/or WAV format (or alternate format agreed through the design review process).*

*3.12.12 The AVA central software shall be able to create composite announcements that combine synthesized and recorded announcement segments.*

*3.12.13 The AVA central software speech engine shall be selected as part of the design review process, and shall be a modular component that allows the Agency to independently replace it at a later date without other system changes.*

*3.12.14 The AVA central software shall be configurable by the Agency so that external announcements (i.e., to be played on external speakers) may be set for activation on any route. External announcements content shall be configurable by the Agency to include some or all of the following (at minimum):*

3.12.14.a Route number.

3.12.14.b Route name.

3.12.14.c Destination.

3.12.14.d Direction.

3.12.14.e Branch.

3.12.14.f Route Type.

*3.12.15 The AVA central software shall be configurable so that external announcements can be made less frequently, only at specified stops or not at all.*

*3.12.16 In addition, the AVA central software shall allow specific volume levels to be configured for individual stops, times of day and/or sections of routes.*

*3.12.17 The AVA central software shall be able to configure external announcements to repeat without operator interaction at any or all stops at a time interval configurable by the Agency.*

*3.12.18 The database of announcement messages shall associate stops with message data for each trip pattern.*

*3.12.19 The AVA central software shall enable incremental updates of onboard message data on an as-needed basis.*

*3.12.20 The user interface for entry/deletion/modification of messages shall be easy to use, and shall associate all messages with a trip pattern.*

*3.12.21 The system shall accept the addition, deletion, or movement (from one trip pattern to another) of stop association data.*

*3.12.22 The database shall support direct SQL interfaces.*

*3.12.23 Each message shall have a unique identifier, defined by the Agency.*

*3.12.24 The AVA central software shall include look-up tables to associate messages entered through the workstation with the message identifier.*

*3.12.25 Creation or deletion of a message shall not change the identifiers of the other messages.*

*3.12.26 Provisions shall be included to rebuild the message database and identifiers on a periodic basis. (e.g., after there have been a significant number of message additions and deletions).*

*3.12.27 The AVA central software shall provide means to record and generate announcement audio and to define message-stop associations.*

*3.12.28 The AVA central software shall be installed on a desktop PC or server supplied by the Agency, accessible by multiple clients or workstations if on a server, and configured with required hardware and operating system software.*

*3.12.29 Internal single line LED headsigns shall be provided.*

### 3.13 Single Point Log-on

*3.13.1 The on vehicle logic unit should allow for a single point of logon for all on-board equipment including electronic fare boxes (when applicable), head signs, APC system, the AVA system and other integrated devices.*

*3.13.2 The single point logon shall log onto the other on-board equipment or override the current logon to those other devices.*

*3.13.3 The central system should recognize that the vehicle is ready to commence its assigned work, has started work and completed work for the day.*

*3.13.4 The Agencies understand the importance of operator logon and so is open to alternate approaches which can increase the reliability and accuracy of this function.*

### 3.14 Not Used

*3.14.1 Not Used*

*3.14.2 Not Used*

*3.14.3 Not Used*

*3.14.4 Not Used*

### 3.15 Destination Headsign Interface

*3.15.1 Existing destination signs shall interface with the VLU, which shall automatically provide sign codes for every route and direction change during revenue service.*

*3.15.2 The Contractor shall be entirely responsible for completing this interface, including any firmware updates needed to the destination headsigns and any subcontracting for support services needed from the destination headsign vendor.*

*3.15.3 The MDT shall be capable of changing the destination headsign by the operator and providing codes for the operator to manually determine the selection of destinations and to manually input codes when the CAD/AVL system is down.*

### 3.16 Connection Protection

*3.16.1 The Contractor shall provide an option for the CAD/AVL system to provide and operate in conjunction with the Mobile Data Terminal software to provide Transfer Connection Protection (TCP).*

*3.16.2 TCP shall be triggered when an incoming fixed route operator makes a transfer for a specific outgoing route, which the vehicle operator enters via the Mobile Data Terminal.*

*3.16.3 The system shall, without any need for dispatcher intervention, hold the outgoing vehicle to allow the connection, if it would not need to be held more than a configurable time based on the estimated arrival time of the incoming vehicle. The system shall notify the incoming vehicle via the Mobile Data Terminal whether the outgoing vehicle will be held.*

*3.16.4 The system shall notify the outgoing vehicle via the Mobile Data Terminal if it is to hold, until what time and for what route.*

*3.16.5 The dispatcher shall be able to review current pending transfers, including the incoming and outgoing vehicles involved, and the time the incoming vehicle is expected to arrive at the transfer.*

*3.16.6 The dispatcher shall have the ability to intervene and override as necessary in the operation of transfers.*

### 3.17 Video System Interface

*3.17.1 The VLU shall be interfaced with the existing video system (Seon, Trooper 2 for Petaluma Transit, and REI HD800 DVR for SolTrans) including the digital video recorders (DVR) on-board. The Contractor shall be entirely responsible for developing and integrating this interface.*

*3.17.2 The VLU to DVR interface shall be accessible using the MDT.*

*3.17.3 VLU shall be able to store alarms that are received from the DVR.*

*3.17.4 The VLU shall send an update message to the MDT when there is an alarm received from the DVR.*

*3.17.5 The VLU shall provide a discrete signal to the DVR when an emergency alarm is generated by the operator.*

*3.17.6 The CAD/AVL software shall support the ability to tag an incident record with an index or link to specific video frame(s) in the future.*

*3.17.7 The VLU shall send alert to dispatch and maintenance if the DVR is not functioning properly.*

*3.17.8 The Video System Interface will be an optional item for Napa VINE to be potentially added in the future.*

### 3.18 Farebox Interface

*3.18.1 The VLU shall be interfaced with the existing GenFare Odyssey Fareboxes (for SolTrans and Napa VINE).*

*3.18.2 The Contractor shall be entirely responsible for completing this interface, including any firmware updates needed to the fareboxes and any subcontracting for support services needed from the farebox vendor.*

*3.18.3 The VLU to farebox interface shall support farebox logon using the MDT.*

*3.18.4 MDT logon shall logon to the farebox or override the current logon on the farebox.*

*3.18.5 The VLU shall send an update message to the farebox when there is a change to the block, route, trip, operator, or fareset.*

*3.18.6 Upon receiving a request message from the farebox, the VLU shall send the current location.*

*3.18.7 VLU shall be able to store farebox alarms received from the farebox.*

*3.18.8 Data records transmitted from the farebox to the CAD/AVL system shall use synchronous time and location stamping to support central system reporting functions that combine farebox data with data from other systems (e.g. CAD/AVL, APC) – for example, fares collected by stop location.*

*3.18.9 The farebox interface shall apply only to SolTrans and Napa VINE. Petaluma Transit does not currently have electronic fareboxes, but may add this in the future*

### 3.19 Transit Signal Priority

*3.19.1 The Contractor shall provide an option for future Transit Signal Priority (TSP) integration.*

*3.19.2 The VLU shall be interfaced with the TSP unit via a J1708 cable, J1939 cable or Ethernet to be installed and connected to the TSP unit by the Contractor. The Contractor shall be entirely responsible for completing this interface, including any firmware updates needed to the TSP emitter and any subcontracting for support services needed from the TSP emitter vendor.*

*3.19.3 The VLU shall be able to activate and deactivate a third party TSP emitter device using a J1708 or J1939 connection.*

*3.19.4 The VLU shall be able to activate and deactivate the TSP unit based on schedule adherence, on a command from the central system, or by pre-defined trigger points set in the GIS data.*

*3.19.5 The VLU shall log all TSP emitter activations/deactivations on-board the vehicle, including data, time, GPS location, route, vehicle ID, and direction. These logs shall be available either through a system reporting function or through the WLAN communications with the vehicle.*

*3.19.6 The VLU shall only enable Transit Signal Priority functionality when the vehicle is logged into revenue service, with on-route status, and within a defined geographic area.*

*3.19.7 Central system shall allow for a valid TSP polygon area to be defined, updated, and downloaded to each vehicle VLU through the WLAN.*

*3.19.8 This item is optional for consideration by Petaluma Transit.*

### 3.20 Transit Automatic Vehicle Monitoring

*3.20.1 The Contractor shall include, as an option, the Automatic Vehicle Monitoring (AVM) System.*

*3.20.2 Automatic Vehicle Monitoring (AVM) shall collect data on revenue-vehicle drive-train performance, CAD/AVL subsystem health warnings, pre run checklist completion, and discrete alarms in order to identify problems, improve maintenance, and reduce vehicle breakdowns.*

*3.20.3 AVM data triggered by operating conditions beyond pre-defined threshold shall be reported in real-time to the CAD/AVL system and stored for reporting purposes.*

*3.20.4 Standard AVM reports and user query tools shall be supplied for easy access to the stored data.*

*3.20.5 AVM drive-train data and mechanical alarms shall be collected from the installed Engine Control Module provided by the vehicle's manufacturer and/or the installed Multiplexer I/O system.*

*3.20.6 Alarms shall be transmitted via the CAD/AVL cellular/radio frequency for real-time display to maintenance users.*

*3.20.7 The AVM data messages and alarms shall be stored for analysis and interface to the Agency's Vehicle Maintenance System.*

*3.20.8 Up to twelve (12) user defined discrete inputs shall be provided to monitor mechanical alarms.*

*3.20.9 The Agencies intend to monitor, in addition to wheelchair lift/ramp deployment and the Emergency Alarm, low oil pressure, hot engine, and low air pressure.*

*3.20.10 The Contractor shall permit the Agency to define and connect unused discrete inputs for future requirements.*

## 4. DISPATCH AND DATA REPORTING

### 4.1 Text Messaging

*4.1.1 Messages shall be capable of being grouped into categories for quick selection.*

*4.1.2 Canned message categories and message text shall be user definable.*

*4.1.3 The operator and dispatcher shall be able to reply to a message in the queue in either a canned response or free-form text message.*

*4.1.4 A text message shall support an acknowledgement message back to dispatch once the driver has viewed a message flagged by dispatch as requiring acknowledgement.*

*4.1.6 Text messages shall be either deleted or saved by the Operator after viewing. Storage for saved text messages shall handle a minimum of eight messages.*

### 4.2 Automated Recording and Archiving

*4.2.1 The CAD/AVL system will store the position and tracking of the transit vehicles in some form of database. This valuable information allows transit managers to process and analyze routes based on actual and real time data. The analysis of the actual data becomes the basis for route analysis and performance measurements, such as schedule adherence and others.*

*4.2.2 Ability to query the data with different parameters enables the transit managers to make sound decisions toward improving the future performance and safety of the transit system operation.*

*4.2.3 CAD/AVL data would be stored in a database for planning and evaluation purposes. The specific requirements will be decided by the Agency and should include an assessment of the following:*

4.2.3.a Length of time AVL data is to be stored.

4.2.3.b The sampling rate AVL data is to be stored (i.e. at every minute, at every stop).

### 4.3 Real-time, Reporting, and Archival Data

*4.3.1 The Agency shall have the right to access, use, and distribute data to create interfaces to the CAD/AVL system, export data to other agencies and third party licensed systems, generate reports, and for other Agency purposes.*

*4.3.2 Access to real-time operating data shall not be affected by the Agencies reporting and data access by user groups other than dispatchers and supervisors.*

*4.3.3 Proper safeguards shall also be enabled to ensure dispatcher and supervisors cannot overload the primary database server with faulty or ill-designed queries.*

*4.3.4 If required, a secondary database server that takes the processing load off of the primary real time database shall be provided for the purpose of data retrieval for reporting and data analysis.*

*4.3.5 Enough online data storage shall be provided to keep at least three (3) years of historical data.*

*4.3.6 The historical data shall be accessible by the Contractor provided applications and tools.*

*4.3.7 Provisions shall be provided to save data and database schema more than three years old to long term storage media such as magnetic tape, CD, DVD, etc. and delete the archived data from the main or secondary database(s).*

*4.3.8 Provisions shall be provided to restore data by copying archived data from long term storage to either a stand-alone database machine or onto the current database(s).*

*4.3.9 Either activity shall be possible by either a graphical user interface or via the command line for automating tasks.*

### 4.4 Daily Schedules

*4.4.1 The CAD/AVL system shall automatically load the daily schedule of blocks, runs, driver/operator assignments, and vehicle assignments.*

*4.4.2 The CAD/AVL system shall support an overlap of daily schedules for service that continues past midnight.*

*4.4.3 The CAD/AVL system shall support multiple service types such as school in, school out, weekday, Saturday, Sunday, and holiday to accommodate service variations at the route and trip level.*

*4.4.4 Each schedule day shall permit assignment of multiple service types.*

### 4.5 Incident Reports

*4.5.1 The CAD/AVL system shall provide an integrated Incident Reporting subsystem that allows for the entry and storage of information relevant to a situation using a screen template or "form" associated with each incident type. An incident type is defined as a collection of distinct data messages sent by the vehicles and displayed on the dispatcher workstation.*

*4.5.2 Incident types and the association of data messages to incident types shall be user definable.*

*4.5.3 A form creation editor shall be provided that provides the CAD/AVL System Administrator the capability to create property-specific customized incident forms that are accessible to dispatchers and other users of the CAD/AVL system.*

*4.5.4 Forms shall be created and associated with incident types.*

*4.5.5 Every new Incident Report shall be uniquely identified and the associated Incident Report form displayed for completion.*

*4.5.6 Incident forms shall include data fields supported and populated by the CAD/AVL system as well as user defined fields.*

*4.5.7 User definable fields shall be implemented such that custom fields do not inhibit upgrades to software.*

*4.5.8 Incident forms shall include a combination of automatically filled in data fields and manually entered data fields. Upon creation of an incident report all known CAD/AVL data shall be "pre-populated" or automatically entered into the configured incident form fields. Examples of automatically filled in data fields include, but are not limited to, Vehicle ID, Block/Run ID, Operator ID, Operator Name, Dispatcher ID, Creation Time, Route, Direction, Location and Schedule Adherence Status.*

*4.5.9 An open Incident Report Queue shall be provided for each dispatcher logged into the CAD/AVL system. The queue shall provide indication of all open Incident Reports that he/she is responsible. All Incident Reports must be closed or responsibility transferred prior to the dispatcher logging off.*

*4.5.10 The current date, time, and user ID shall be stamped to indicate information that is added to an Incident Report after the original owner of the Incident Form has closed the incident.*

*4.5.11 Incident Reports shall provide the following capabilities:*

4.5.11.a Incident Forms shall have the option to be required for specific incident types. Emergency Alarm is an example of a required incident type.

4.5.11.b If a message requiring an Incident Form is deleted the CAD/AVL system shall generate the form and mark it as CAD/AVL generated.

4.5.11.c Incident Reports shall provide access to a spell checker.

4.5.11.d Incident Reports shall be capable of being forwarded to individuals or groups of individual electronically.

4.5.11.e Incident reports shall have the capability to be displayed online for at least twelve months for any new, open, or closed Incident Report.

4.5.11.f Incident Reports shall be able to be queried based upon CAD/AVL variables such as open/closed status, date range, incident type, dispatcher ID, Operator ID, Route, or vehicle ID.

4.5.11.g Mechanical, breakdown, and vehicle switch out Incident Reports shall provide an interface to the Maintenance system to document the incident for maintenance action.

## 5. SCHEDULING SYSTEM

5.1 The Contractor shall convert the existing route and stop databases from each of the agencies to import that data in the proposed schedule software database.

5.2 The scheduling system shall also have the ability to import stop data from an external system in excel or comma separated value (CSV) file format to incorporate any addition of stops by the agencies to the system in the future.

5.3 The scheduling system or CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) using a GTFS feed.

5.4 The system shall have the capability to create and define an unlimited number of bus stops and nodes.

5.5 The system shall be able to create new routes and update exiting routes.

5.6 The system shall be able to create new patterns and update existing patterns, including time points and stops.

5.7 The system shall permit the user to define bus stops using a variety of methods, including direct entry of GPS determined coordinates, and setting the stop location with a mouse click.

5.8 The system shall be capable of allowing stops to be properly positioned at intersections.

5.9 The system shall be capable of allowing the user to assign stop amenities (e.g., bench, shelter, etc.) to each stop and other supplemental data.

5.10 The system shall allow any number of trip patterns to be defined as distinct bus stop sequences, including the designation of selected stops in each trip pattern as schedule timepoints and whether a trip pattern is inbound or outbound.

5.11 The system shall be capable of displaying all trip patterns, or fixed portions of flexible trip patterns, on a map for visual display.

5.12 The system shall be capable of calculating distances for deadhead route segments, entire trip patterns, and selected trip pattern segments defined by the user.

5.13 The system shall allow the definition of average running speeds, for various days and time periods, for deadhead segments and between designated pairs of stops along each trip pattern.

5.14 The system shall be able to generate a list of turning movements for an entire trip pattern.

5.15 The system shall allow routes to be defined as a sequence of trips using selected trip patterns during defined time periods.

**5.16 System Viewing**

*5.16.1 The system shall allow the viewing of pattern statistics, including distance, drive time, hold time, number of time points, and number of stops and locations of action-point triggers.*

*5.16.2 View a pattern's route adherence along a route or corridor.*

### 5.17 Creation of Timetables

*5.17.1 The system shall be capable of rotating the extra board automatically.*

*5.17.2 The system shall be capable of calculating the running time between any pair of timepoints on any trip pattern, taking into account running speeds. The system shall also allow running times to be manually input if needed, such as for deviated/flexible route segments.*

*5.17.3 The system shall be capable of automatic or manual trip building for each route, using the designated sequence of trip patterns. The system shall build trips based on user-specified headways or user-specified trip start/end times. The system shall allow for defining exceptions to the daily operating schedules.*

*5.17.4 The system shall permit users to automatically or manually assign trip numbers.*

*5.17.5 The system shall allow for modifying built trips, based on modifying a single trip pattern, all trips in a single direction or a combination of the above.*

*5.17.6 The system shall permit authorized users to assign specific vehicle types to trips.*

*5.17.7 The system shall be capable of computing deadhead time, including the effect of varying running speed in various time periods.*

*5.17.8 The system shall provide summary data on trips and running times, including total trip length, total deadhead time, number of stops and service start/end times.*

### 5.18 Vehicle Assignment

*5.18.1 The system shall be capable of either automatic or manual vehicle block development based on user-defined variables, with checks to ensure that all trips have been assigned. The system shall be capable of blocking trips based on an assigned vehicle type.*

*5.18.2 The system shall allow users to automatically or manually assign block numbers.*

*5.18.3 The system shall be capable of developing potential interline relationships for the entire service or based on the user selecting specific routes or trips.*

### 5.19 Runcutting

*5.19.1 The system shall be capable of cutting single-piece or multi-piece work assignment runs. The multi-piece work assignment runs shall consist of a sequence of route trips from a particular block.*

*5.19.2 The system shall allow users to automatically or manually assign run numbers.*

*5.19.3 The system shall generate runs that incorporate all applicable agency labor agreement provisions.*

*5.19.4 The system shall generate runs that incorporate agency management rules.*

*5.19.5 The system shall provide a notification flag when a manual or automatically generated runcut violates a management rule or labor agreement provision.*

*5.19.6 The system shall allow for the development of alternative runcut scenarios, allowing agency users to compare resulting costs for each scenario. Results shall be at least as cost effective as those currently produced manually for an equivalent scenario.*

*5.19.7 The system shall allow the shifting of trip relief times (stated in block tables) to optimize runcuts.*

*5.19.8 The system shall allow the user to specify compressed work weeks (e.g., 4 day work weeks, 10 hour days).*

*5.19.9 The system shall permit the agency to manually cut some or all of the blocks.*

### 5.20 Rostering and Bid Management

*5.20.1 The system shall support both roster and cafeteria style bids.*

*5.20.2 The system shall be able to create and maintain rosters including the extra board.*

*5.20.3 The system shall be capable of building bid rosters automatically.*

*5.20.4 The system shall permit users to automatically or manually assign roster numbers.*

*5.20.5 The system shall have the capability to take into account special service in effect for selected dates (e.g., holidays).*

*5.20.6 The system shall allow agency staff to establish rules on which rostering suggested by the system will be based.*

*5.20.7 The system shall have the capability to create separate rosters for various groups of vehicle operators (e.g., part-time rosters).*

*5.20.8 The system shall have the capability to validate the transitions between rosters for two consecutive bid periods.*

*5.20.9 The system shall have the capability to automatically generate one roster at a time or all rosters.*

*5.20.10 The system shall allow agency staff to access human resources information that has been imported into the system for any bus driver (optional).*

*5.20.11 The system shall validate driver choices to determine whether each driver meets minimum rest time requirements between runs.*

*5.20.12 The system shall validate driver choices to determine whether each driver meets requirements for minimum/maximum assigned work load.*

*5.20.13 The system shall be able to associate a driver to a specific roster or rosters.*

*5.20.14 The system shall generate work on a nightly basis from the schedule's bids.*

*5.20.15 The nightly generation shall generate work a user-defined number of days into the future.*

*5.20.16 Extra board items shall be included.*

*5.20.17 Report Generation errors or rule violations that occur during schedule generation shall be identified.*

### 5.21 Schedule Validation

*5.21.1 Schedule Validation must allow the user to review different aspects of the schedule and validate the schedule against a set of rules.*

*5.21.2 All additions, omissions, time modifications, conflicts and errors shall be propagated through the rest of the schedule and be validated against a set of rules developed by the agency.*

*5.21.3 Conflicts or errors associated with the changes must be highlighted in the application and noted to the agency.*

## 6. DATA MANAGEMENT

6.1 The CAD/AVL system should include data management software to manage the entry, and manipulation of data and automate reporting for performance monitoring.

6.2 The data management system should integrate with the Contractor's proposed scheduling software and facilitate easy National Transit Database (NTD) reporting.

6.3 The system shall be capable of establishing automatic daily, weekly, monthly, quarterly ` to produce and email standard PDF reports to defined user groups.

6.4 Standard reports to be provided shall be developed through the design review process, and shall include at minimum:

*6.4.1 Schedule Adherence (by stop or timepoint)*

*6.4.2 Passenger Loadings and Alightings (by stop and capacity)*

*6.4.3 Daily Revenue*

*6.4.4 Missed Trips*

*6.4.5 Stop Time Analysis*

*6.4.6 Electronic Farebox vs. APC validation*

*6.4.7 Layover/Recovery*

*6.4.8 In-service hours*

*6.4.9 Actual hour and actual miles*

*6.4.10 Route deviation*

*6.4.11 Travel time and average speeds*

*6.4.12 Driver Log ins (by bus and route)*

*6.4.13 Origin and Destination Information*

*6.4.15 Dashboard*

*6.4.15 Wheelchair Lift Use (by stop)*

*6.4.16 Bike Rack Use (by stop)*

*6.4.17 Luggage Bay Use (by stop)*

*6.4.18 Incidents*

*6.4.19 Bus Change-off*

*6.4.20 Collisions*

*6.4.21 General Delay*

*6.4.22 Trip Delays*

*6.4.23 Trip Cancellation*

*6.4.24 Equipment Issues*

*6.4.25 Vehicle Locations*

*6.4.26 Vehicle Speeds*

*6.4.27 Vehicle Performance*

*6.4.28 Communications Status*

*6.4.29 Emergency Alarm*

*6.4.30 Driver Incident (incapacitated, Sick, Performance)*

*6.4.31 System Diagnostics*

*6.4.32 Maintenance (for preventative maintenance, include for identification of component parts on each vehicle, triggered alarms, mileage, total idle time and idle fuel usage, as well as fuel rate).*

*6.4.33 On Peak Loading by Route, Trip and Stop*

6.5 All reports shall have the capability to export information into a common analysis and text editing office software such as Microsoft Excel and Word.

## 7. REAL TIME PASSENGER INFORMATION

7.1 The system shall generate real-time arrival/departure predictions for all vehicles that are integrated in the proposed CAD/AVL system.

7.2 The real-time arrival predictions shall report predicted arrival times based on actual arrivals and not based on scheduled arrivals.

7.3 The CAD/AVL system shall be able to interface with field equipment including passenger information displays, agency websites and mobile applications to provide and display real-time arrival/departure data for fixed-route and demand-response vehicles.

7.4 The data required to be provided to the field equipment, agency websites and mobile applications includes current bus schedules, bus schedule adherence status, and estimated (predicted) arrival/departure times of transit vehicles at designated bus stops and transit centers.

7.5 The real-time arrival predictions shall meet or exceed the following performance criteria:

*7.5.1 For predictions between one and ten minutes, the prediction accuracy shall be three minutes or less for 90% of the generated predictions.*

*7.5.2 For predictions between 11 and 25 minutes, the prediction accuracy shall be four minutes or less for 85% of the generated predictions.*

*7.5.3 For predictions more than 25 minutes, the prediction accuracy shall be six minutes or less for 85% of the generated predictions.*

## 8. PASSENGER INFORMATION DISPLAYS

8.1 The Contractor shall provide passenger information signs that display, at the stop level, the estimated count-down arrival time and/or departure time of the next buses at the stop within a defined time interval.

8.2 Both scheduled and dynamic text message capabilities shall be provided to either individual or groups of signs.

8.3 A user interface shall provide easy setup, configuration, diagnostic, and messaging status at all sign locations.

8.4 The displays shall be able to display multiple routes, system time, ad hoc messages, and scheduled messages.

8.5 Physical design of the sign shall be modular for easy maintenance, vandal resistant, and suitable for an outdoor environment.

8.6 Solar power, high brightness LED displays, and multi-line displays shall be available where required by operational needs.

8.7 The final location of the Contractor supplied bus stop and shelter passenger information displays will be determined prior to the final design approval.

8.8 The Contractor shall assist the Agency in acquiring necessary permits.

8.9 Outdated information for a transit vehicle on the display shall be cleared within a maximum of fifteen (15) seconds of the transit vehicle departing the stop or station.

8.10 Proposers shall indicate what means (wired or wireless) shall or can be used to connect to the passenger information displays.

## 9. MOBILE APPLICATIONS (APPS)

9.1 The CAD/AVL system shall generate and disseminate real-time transit traveler information to the regional 511 system, agency-owned infrastructure, and web/mobile services.

9.2 The system shall update real-time arrival predictions and generate service alerts to mobile applications based upon real time service adjustments and measures implemented by the agency dispatchers including:

*9.2.1 Cancelled Service;*

*9.2.2 Detours (planned and ad hoc);*

*9.2.3 Drop off only;*

*9.2.4 Additional of supplemental service ('trippers') in addition to scheduled trips.*

9.3 It is desired that the Contractor develop a mobile app to allow transit riders to communicate with Dispatch or other Operations staff to report suspicious activity, crime, or quality of life problems at a transit station or on a bus.

## 10. 511 INTEGRATION

The San Francisco Bay Area 511 system is a free phone, website and passenger information display service that consolidates Bay Area transportation information, including route, schedule, and fare information, and real-time transit information for the Bay Area's public transportation services. The 511.org web site is the Bay Area Traveler Information Web Portal and features the 511 Transit page that provides links to transit agency schedules and real-time departure information.

10.1 The CAD/AVL system shall support the exchange of data with the Bay Area 511 System operated by the Metropolitan Transportation Commission (MTC) using the latest data exchange protocols established for that program

10.2 Data exchange with 511 shall consist of the following:

*10.1.1 Export of static configuration data*

*10.1.2 Export of real-time arrival information*

*10.2.3 Export of CAD/AVL system status information to 511*

*10.2.4 The latest requirements and specifications for the 511 integration shall be gathered from the Metropolitan Transportation Commission (MTC).*

10.3 The CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) and other types of static and real-time information using GTFS.

# APPENDIX C-1 – SOLTRANS COMPLIANCE MATRIX

## APPENDIX C1 – SOLTRANS COMPLIANCE MATRIX

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.** | **Central Systems** | | | | |
| **1.1** | **CAD/AVL System Software -** The proposed CAD/AVL System Software shall have been deployed (installed and operational) in at least three (3) similar transit agencies in the United States for a period of not less than three (3) years. | **M** | | | |
| **1.1.1** | **Real-Time Graphical Displays** - System shall include a real-time graphical display for user and dispatch use. | **M** | | | |
| **1.1.1.a** | Import and display of standard format vector, image, and point-based map layers. | **M** | | | |
| **1.1.1.b** | Map layer feature labels provided based upon zoom level or with hover-over by a pointing device. | **M** | | | |
| **1.1.1.c** | Continuous refreshed real-time updates of vehicle location and status. | **M** | | | |
| **1.1.1.d** | Definition of multiple map views and ability to save them at the user level. | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | | | | | |
| **1.1.1.e** | Definition of shared views for use by any dispatcher to be saved in their default set of views. | **M** | | | |
| **1.1.1.f** | Zoom, move, center, and fit to window independent within each map view. | **M** | | | |
| **1.1.1.g** | Filtered map views based upon parameters such as vehicles by route, login status, fleet, and mechanical status. | **M** | | | |
| **1.1.1.h** | Map layer that includes current route traces for each fixed route selected by the operator. | **M** | | | |
| **1.1.1.i** | Options to display different vehicle icon labels per technical requirements. | **M** | | | |
| **1.1.1.j** | Vehicle icons that are configurable and contain context sensitive information. | **M** | | | |
| **1.1.1.k** | Query tools to locate vehicle and routes based upon vehicle, route, or intersection variables. | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.1.1.l** | Capability to establish voice/data communication by individual vehicle or by banding a group of vehicles together. | **M** | | | |
| **1.1.1.m** | Access to a distance measuring tool. | **M** | | | |
| **1.1.1.n** | Print capabilities of any customized map view. | **M** | | | |
| **1.1.1.o** | Automated focus and continuous vehicle tracking during Emergency Alarm condition. | **M** | | | |
| **1.1.2** | **Route Playback** | | | | |
| **1.1.2.a** | Historical event display shall play back all pertinent historical messages, per technical requirements. | **M** | | | |
| **1.1.2.b** | Playback of these events shall include the ability to perform the following functions: | **M** | | | |
| **1.1.2.b.1** | The display shall be by a sequence of events on a geographic map. | **M** | | | |
| **1.1.2.b.2** | Allow selection by vehicle(s), driver(s), route(s), fleet(s), or run(s) | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | for specific time frames through a query action window. | | | | |
| **1.1.2.b.3** | Configurable speed of replay for moving forward and backward through events. | **M** | | | |
| **1.1.2.b.4** | Graphical representation of event data on a common CAD/AVL map. | **M** | | | |
| **1.1.2.b.5** | Selectable display of map layers including but not limited to stops, streets, routes, points of interest, and geographical attributes. | **M** | | | |
| **1.1.2.b.6** | Text display of attributes of each vehicle event message including messages related to other onboard systems including transit priority requests, farebox alarms, and passenger counts. | **M** | | | |
| **1.1.2.b.7** | Step forward, step backward and pause the historical display of events. | **M** | | | |
| **1.1.2.b.8** | Zoom, move, center, and fit to window views within the map window. | **M** | | | |

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| **1.1.2.b.9** | Measuring distance tool. | **M** | | | |
| **1.1.2.b.10** | Vehicle label by number, adherence, route, driver, run, and block. | **M** | | | |
| **1.1.2.b.11** | Vehicle icons that are configurable and display adherence, login status, transfer status, and maintenance status. | **M** | | | |
| **1.1.2.b.12** | Locate vehicles, routes, intersections or objects. | **M** | | | |
| **1.1.2.b.13** | Display route traces. | **M** | | | |
| **1.1.2.b.14** | Date and time messages are logged. | **M** | | | |
| **1.1.2.b.15** | Print the historical display. | **M** | | | |
| **1.1.3** | **Schedule Adherence** | | | | |
| **1.1.3.a** | System shall monitor adherence by comparing current location versus the published schedule for all vehicles. | **M** | | | |
| **1.1.3.b** | Schedule adherence data shall be stored and include parameters for analysis as specified in the technical requirements. | **M** | | | |
| **1.1.3.c** | Both the time of arrival and | **M** | | | |

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| | departure at all scheduled timepoints shall be accurately recorded and stored. | | | | |
| **1.1.3.d** | The Agency shall be responsible for providing the schedule data used by the Contractor provided scheduling software interface to the CAD/AVL system. The Agency shall perform any stop and route geo-surveys required using Contractor supplied tools. The Contractor shall provide adequate training prior to the start of this activity in accordance with the project schedule. | **M** | | | |
| **1.1.3.e** | Real-time (predictive to the next time point) schedule adherence shall be displayed for dispatchers and made available to customer information applications. | **M** | | | |
| **1.1.3.f** | System shall identify vehicles predicted to be running early or late by predefined time parameters and shall report on both graphical and tabular displays. | **M** | | | |
| **1.1.3.g** | Schedule adherence parameters shall be able to be set differently by route | **M** | | | |

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| | with separate early and late user supplied values. | | | | |
| **1.1.3.h** | Schedule adherence display will be shown to the Operator regardless of dispatcher selectable parameters. | **M** | | | |
| **1.1.3.i** | Schedule adherence from the vehicle shall be calculated, transmitted, and stored regardless of the onboard display setting. | **M** | | | |
| **1.1.4** | **Route Adherence** | | | | |
| **1.1.4.a** | Provide off-route status to the Bus Operator and transmit a notification to be displayed at the dispatch workstation. | **M** | | | |
| **1.1.4.b** | The off-route notification displays shall display next stop when vehicle is off-route. | **M** | | | |
| **1.1.4.c** | The off-route distance value shall be a user definable parameter. | **M** | | | |
| **1.1.4.d** | System shall identify off-route distance from assigned route or deviation from corridor of travel. | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.2** | **CAD/AVL System Hardware** | | | | |
| **1.2.1** | Contractor shall provide a turnkey, central system including all necessary hardware – see technical requirements. | **M** | | | |
| **1.2.2** | Contractor shall supply all hardware required for networking and communications for the system – see technical requirements. | **M** | | | |
| **1.2.3** | The CAD/AVL system shall also consist of a backup or mirrored server that will take over operations should the main server fail. The mirrored server shall enable failover operations to be carried out in a seamless manner requiring minimal manual intervention. | **M** | | | |
| **1.2.4** | **CAD/AVL Servers** | | | | |
| **1.2.4.a** | The Contractor shall submit a complete list of required IT equipment for the CAD/AVL System at the System Design Review stage. These requirements and specifications may be refined and finalized as part of System Design Review. The minimum computer server requirements are | **M** | | | |

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| | identified in the technical requirements. | | | | |
| **1.2.5** | **CAD/AVL Workstations** | | | | |
| **1.2.5.a** | All workstations shall use Dynamic Host Configuration Protocol (DHCP) for IP address assignment, unless otherwise approved by the Agency. | **M** | | | |
| **1.2.5.b** | The Contractor shall provide and implement hardware for the Agency with capacity adequate to support the Agency's applications and other Contractor applications involved in the solution, maps, data, and associated files required for operation, with 100% expansion capacity of the specified hardware. | **M** | | | |
| **1.2.5.c** | New workstations shall meet or exceed each Agency's current standard workstation specifications. | **M** | | | |
| **2.** | **System Data Communications** | | | | |
| **2.1** | Set up radio/cellular data gateway to allow incoming and outgoing messages between the system and MDT's to be transmitted using the | **M** | | | |

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| | Agency-specific radio/cellular data communications system. | | | | |
| **2.2** | The system shall allow data packets to be sent over the network from the vehicles to the central system and from the central system to the vehicles anywhere where there is a private radio system or cellular signal present. | **M** | | | |
| **2.2.1** | Vehicle location shall be received by the Central CAD/AVL system at least once every 20 seconds (polling rate) for display and storage purposes and every 5 seconds during an Emergency Alarm situation. | | | | |
| **2.3** | The contractor is responsible for arranging appropriate communication protocols with the Agency-preferred cellular providers. The cellular provider to be used for SolTrans is Sprint. | **M** | | | |
| **2.4** | **Wireless Local Area Network (WLAN)** | | | | |
| **2.4.1** | Complete or bi-directional bulk data transfer software is provided for transfer of data between vehicles on | **M** | | | |

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| | mobile data system and the central system. | | | | |
| **2.4.2** | The bulk data transfer system shall be capable, at minimum, of the following tasks: | **M** | | | |
| **2.4.2.a** | Downloading software updates/patches and configuration data for onboard devices. | **M** | | | |
| **2.4.2.b** | Downloading all updated schedule and trigger zone locations data required for operation of the VLU firmware. | **M** | | | |
| **2.4.2.c** | Uploading vehicle components monitoring configuration data. | **M** | | | |
| **2.4.2.d** | Downloading updated trigger zones locations and announcement sign messages for automated annunciation systems on-board announcements. | **M** | | | |
| **2.4.2.e** | Uploading revenue transactions data from fareboxes. | **M** | | | |
| **2.4.2.f** | Allowing for the uploading of other | **M** | | | |

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| | on-board logged data when received. | | | | |
| **2.4.2.g** | The software shall be configurable to determine frequency and types of data transfers. | **M** | | | |
| **2.4.2.h** | Automated system bulk transfers shall occur and be validated automatically – see technical requirements for specifics. | **M** | | | |
| **2.4.2.i** | Once communications is established with the VLU, the bulk data transfer system shall automatically determine which required file transfers remain to be completed and initiate them. | **M** | | | |
| **2.4.2.j** | A validation process shall ensure multiple attempts are made to complete all required file transfers until the file transfer is successfully completed. | **M** | | | |
| **2.4.2.k** | The system shall be able to complete a file transfer using a sequence of ad-hoc partial file transfers while the VLU is temporarily connected with the mobile data communications system. | **M** | | | |

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| | | | | | |
| **2.4.2.l** | **WLAN Access Points** | | | | |
| **2.4.2.l.1** | The Contractor shall provide a WLAN controller. The WLAN controller and wireless APs shall support the functions outlined in the technical requirements | **M** | | | |
| **2.4.2.l.2** | The contractor shall provide wireless Access Point coverage at each Agency's bus maintenance facilities to enable WLAN connectivity for data exchange between the VLU and central system via a Bulk Data Transfer. | **M** | | | |
| **2.4.2.l.3** | The WLAN coverage area available for bulk data transfer at each Bus Maintenance Facility shall include the area where the vehicles are to be parked. | **M** | | | |
| **2.4.2.l.4** | The Contractor shall review the plans for the Bus Maintenance Facility and design the optimal locations for the APs including the orientation of antennas to satisfy all bulk data transfer requirements. | **M** | | | |

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| **2.4.2.l.5** | The VLU shall authenticate and connect automatically when vehicles enter Wi-Fi zone. | **M** | | | |
| **2.4.2.l.6** | WLAN equipment shall be outdoor-rated. See technical requirements for specific code requirements. | **M** | | | |
| **2.4.2.l.7** | Lightning arrestors shall be installed to vendor specifications on all exterior APs. | **M** | | | |
| **2.4.2.l.8** | The WLAN equipment shall be IEEE 802.11i compliant or be Wi-Fi Protected Access 2 (WPA2) certified by the Wi-Fi Alliance with AES encryption. | **M** | | | |
| **2.4.2.l.9** | Each single AP shall have a minimum 2x3, Dual Frequency, MIMO configuration. | **M** | | | |
| **2.4.2.l.10** | The APs shall support 5.0 GHz frequencies. The APs shall be capable of supporting multiple SSID's and assign separate SSID's to separate VLANs. | **M** | | | |
| **2.4.2.l.11** | The APs shall be able to support WMM (Wi-Fi multimedia). | **M** | | | |

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| | | | | | |
| **2.4.2.l.12** | Installation shall be coordinated with Agency project manager with Agency clearance. | **M** | | | |
| **2.4.2.m** | **Antennas** | | | | |
| **2.4.2.m.1** | Antenna(s) shall be installed for cell data, GPS and WLAN. The antenna(s) shall support the ranges identified in the technical requirements. | **M** | | | |
| **2.5** | **Remote and Mobile Access to Central Software** | | | | |
| **2.5.1** | Road Supervisors shall be capable of having remote access to the central CAD/AVL system through a mobile workstation (laptop). Relevant real-time information shall be gathered and transmitted to the mobile workstation through the CAD/AVL cellular data network. The mobile station shall be provided with a cellular data card. | **M** | | | |
| **2.5.2** | Provide map-based GUI for remote/mobile access per the technical requirements. | **M** | | | |
| **2.5.3** | The GUI shall be browser-based, or | **M** | | | |

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| | employ an application installed on the local workstation. | | | | |
| **2.5.4** | The GUI shall be the same as the one used by Dispatchers, but with the ability to limit functionality as defined below. | **M** | | | |
| **2.5.5** | To reduce the amount of cellular data used, the GUI shall be configurable to only show selected vehicles. | **M** | | | |
| **2.5.6** | Vehicles shall be selectable by ID, pre-defined groups, routes, and pre-defined geographic distance. | **M** | | | |
| **2.5.7** | The laptops shall support text messaging to the dispatchers. The Contractor shall provide recommended laptop specifications and the Agency's will provide the hardware. | **M** | | | |
| **2.5.8** | The laptops shall have access to the internet, Microsoft Outlook, and Agency software applications. | **M** | | | |
| **2.5.9** | The laptops shall allow the road personnel to monitor and respond to | **M** | | | |

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| | incidents including covert alarms and file incident reports. | | | | |
| **2.5.10** | The Contractor shall provide sufficient documentation and instructions for installing software such that Agency staff can perform the installation in the event of a laptop replacement or upgrade. | **M** | | | |
| **3** | **On-board Equipment and Systems** | | | | |
| **3.1** | All on-board equipment shall be new and designed for use in the transit industry rated to applicable industrial and vehicle standards. See technical requirements. | **M** | | | |
| **3.2** | Equipment shall be the latest model in current production, as offered to commercial trade, and shall conform to transit industry requirements. | **M** | | | |
| **3.3** | The contractor shall represent that all equipment offered under these specifications is new. | **M** | | | |
| **3.4** | Contractor shall demonstrate that all equipment has been installed and operational for at least three other | **M** | | | |

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| | CAD/AVL systems for a period of not less than three (3) years. | | | | |
| **3.5** | All equipment shall be constructed in accordance with best commercial practice, with such practices described in the associated design documentation. At a minimum, the design and installation construction shall provide for: | **M** | | | |
| **3.5.1** | Reliable and stable operation; | **M** | | | |
| **3.5.2** | Minimum maintenance and alignment procedures, with a minimum of special tools; | **M** | | | |
| **3.5.3** | Minimum number and variety of assemblies and spare parts; | **M** | | | |
| **3.5.4** | Maximum attention to human factors, engineering, and ergonomic design; and | **M** | | | |
| **3.5.5** | Simplified design and rapid fault isolation to reduce the requirement for maintenance personnel. | **M** | | | |
| **3.5.6** | All parts shall be made of corrosive resistant material. | **M** | | | |

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| | | | | | |
| **3.5.7** | All parts shall be constructed with materials and quality suited to the intended use and shall use modular design wherever feasible | **M** | | | |
| **3.5.8** | Functionally identical modules and assemblies shall be interchangeable per the technical requirements. | **M** | | | |
| **3.5.9** | Functionally non-identical modules shall not be and shall not appear to be interchangeable. | **M** | | | |
| **3.5.10** | All modules and assemblies shall be connected using standardized durable, positive-locking, and indexed quick disconnect fasteners. | **M** | | | |
| **3.5.11** | Equipment, assemblies, and components shall be identified by a permanently affixed part number and/or serial number. | **M** | | | |
| **3.5.12** | Features identifying software module version within that device shall be provided on each device. | **M** | | | |
| **3.5.13** | All equipment shall provide a usable life of not less than 15 years. | **M** | | | |

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| | | | | | |
| **3.5.14** | Onboard equipment shall utilize most current microprocessor technology. | **M** | | | |
| **3.5.15** | Compatibility between current and future on-board equipment systems shall be maintained, including due to chip end-of-life issues. | **M** | | | |
| **3.5.16** | All on-board equipment shall have a minimum 40,000 hours Mean Time Between Failures (MTBF). | **M** | | | |
| **3.5.17** | Internal (to the onboard equipment) batteries shall not be used to maintain parameter information in onboard equipment when it is in its powered down state. See technical requirements for real-time clock exception. | **M** | | | |
| **3.5.18** | The system shall check the battery state and create a warning message if the battery needs to be replaced. Onboard equipment shall be capable of being disassembled to fit through a coach door that is a minimum of 24 inches wide by 60 inches tall. | **M** | | | |

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| **3.5.19** | Onboard equipment, including all exterior connectors and exposed ports, shall be rated for International Electrotechnical Commission (IEC) standard 60529, IP 54 for interior equipment, IP 65 for exterior equipment and designed for use in an industrial and mobile environment subjected to dirt, water, oil, and cleaning solvents. | **M** | | | |
| **3.5.20** | If existing vehicle wiring, switches, or contact points are used, testing shall occur to certify that the wiring, switches, or contact points are in an acceptable state and suitable for reuse. | **M** | | | |
| **3.5.21** | Data transferred from a device shall not be purged or written over until a successful transfer is confirmed. | **M** | | | |
| **3.5.22** | In the event the transfer is not successful and the system is unable to re-attempt a transfer, it shall revert to the previous version of the data automatically and without corruption. Any data transfer failure shall be logged, alerted, and | **M** | | | |

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| | recorded. | | | | |
| **3.5.23** | Devices shall include functionality to extract data directly from the device using a laptop computer in the event of a transfer failure (for any reason). Tools and processes shall be provided. | **M** | | | |
| **3.5.24** | Equipment shall be properly grounded, with onboard equipment connected as directly as possible to the chassis ground. | **M** | | | |
| **3.5.25** | Onboard equipment shall operate from the vehicle electrical system, between 9 and 35 volts. | **M** | | | |
| **3.5.26** | Onboard equipment shall be securely mounted in the interior of the vehicle, clear of obstructions and interference-generating devices. | **M** | | | |
| **3.5.27** | Customer-facing equipment shall meet or exceed all ADA requirements per technical requirements. | **M** | | | |
| **3.5.28** | Installations shall be performed at specific times as approved by the Agency. | **M** | | | |

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| | | | | | |
| **3.5.29** | The agencies reserve the right to allow less of its vehicle fleet to be out of service if necessary in order to avoid disruption to revenue service in conjunction with maintenance requirements. | **M** | | | |
| **3.5.30** | The Contractor shall ensure that all vehicles made available for overnight installation work are ready for revenue service by the start of the next service day. | **M** | | | |
| **3.6** | **Vehicle Logic Unit (VLU)** | | | | |
| **3.6.1** | The CAD/AVL system shall include a VLU on each vehicle to serve as a central processing unit, memory, data storage, and vehicle software. | **M** | | | |
| **3.6.2** | VLU shall interface with vehicle's on-board equipment and support communications via a mobile wireless communications network with the central servers. | **M** | | | |
| **3.6.3** | The VLU shall meet environmental and vibration standards (MIL-STD-810D, NEMA-4) as well as appropriate electromagnetic immunity standards (SAE 1455 and | **M** | | | |

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| | ESD J1112/13) and protect against surge, and reverse polarity. | | | | |
| **3.6.4** | The VLU shall be of proven design (at least three other similar transit agency deployments for at least three years) and easy to install and replace. | **M** | | | |
| **3.6.5** | The VLU shall be capable of multiple radio control, real time updates and messaging to and from the vehicle. | **M** | | | |
| **3.6.6** | The VLU shall meet communication requirements for leased cellular communications, meshed wireless networks, private radio, as well as interfaces for current and future onboard equipment. | **M** | | | |
| **3.6.7** | Overall system interfaces shall include RS232, RS485 with busy line, TTL, SAE J1708, SAE J1939, USB, Ethernet, TCP/IP, discrete inputs and outputs, odometer, spare I/O pins, audio inputs and outputs, and full IDE capability for PC-type devices. | **M** | | | |

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| **3.6.8** | Capability for automatic vehicle monitoring via J1708/1939 provided by the vehicle shall be included. | **M** | | | |
| **3.6.9** | Indication shall be provided for quick inspection of operation to indicate radio keyed, wireless network operating, software operational, proper voltage range, and ignition on. | **M** | | | |
| **3.6.10** | Data storage capacity shall also be sufficient to store at least five operating days worth of passenger counts and all event messages in the case where data communications are disrupted. | **M** | | | |
| **3.6.11** | The VLU shall support functionality of the following data sets, and must have sufficient non-volatile memory to simultaneously store at least the following: | **M** | | | |
| **3.6.11.a** | Entire set of current schedule data, including school, non-school, and Holiday schedule platforms; | **M** | | | |
| **3.6.11.b** | Twenty (20) weeks of incremental | **M** | | | |

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| | schedule changes, for current schedule; | | | | |
| **3.6.11.c** | Entire set of future schedule data (i.e., next run-board); | **M** | | | |
| **3.6.11.d** | Entire set of required AVA announcements; | **M** | | | |
| **3.6.11.e** | Fifty-two (52) weeks of incremental AVA announcements, for current schedule; | **M** | | | |
| **3.6.11.f** | Five (5) days of Automatic Passenger Count (APC) data records; | **M** | | | |
| **3.6.11.g** | Destination sign errors; | **M** | | | |
| **3.6.11.h** | Current configuration data; | **M** | | | |
| **3.6.11.i** | Future configuration data; | **M** | | | |
| **3.6.11.j** | Current firmware; | **M** | | | |
| **3.6.11.k** | Future firmware; | **M** | | | |
| **3.6.11.l** | Any other data recording needs identified in this RFP; | **M** | | | |

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| **3.6.11.m** | 100% memory spare storage for growth, summing above requirements. | **M** | | | |
| **3.6.12** | CAD/AVL system configuration settings related specifically to the vehicle shall be stored in the vehicle's configuration module. See technical requirements for functionality. | **M** | | | |
| **3.6.13** | Each VLU shall have a unique IP address for purposes of participating in the wireless network and for remote monitoring. | **M** | | | |
| **3.6.14** | VLU shall be compatible with all on-board equipment options. | **M** | | | |
| **3.6.15** | The VLU shall integrate seamlessly with the Mobile Access Router (MAR), including the VLU providing a feed of GPS data to the MAR. | **M** | | | |
| **3.6.16** | The VLU shall act as the central processor, data storage, and device manager for all onboard devices integrated under this Contract. | **M** | | | |

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| **3.6.17** | The contractor shall coordinate with the agencies the final location of VLU installation on each different vehicle type and configuration, subject to approval from the agencies. | **M** | | | |
| **3.6.18** | The VLU shall include at minimum the following ports and interfaces: | **M** | | | |
| **3.6.18.a** | Two (2) opto-isolated SAE J1708: one (1) for transit devices, and one (1) for drivetrain; | **M** | | | |
| **3.6.18.b** | Opto-isolated SAE J1939 for drivetrain; | **M** | | | |
| **3.6.18.c** | Ethernet; | **M** | | | |
| **3.6.18.d** | Universal Serial Bus (USB); | **M** | | | |
| **3.6.18.e** | RS-232 as an additional option to SAE J1708 for communication with the destination signs; and | **M** | | | |
| **3.6.18.f** | Other ports and interfaces as required for specific device-to-device communications. | **M** | | | |

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| **3.6.19** | The VLU shall manage power to listed onboard devices as follows: | **M** | | | |
| **3.6.19.a** | The VLU shall have a configurable parameter of 0 to 180 minutes that controls the power down of the VLU, MDT, and MAR after the vehicle master ignition switch is turned to "off". | **M** | | | |
| **3.6.19.b** | The VLU shall inform all managed devices to initiate a graceful power-down themselves and the MDT (including if necessary automatically logging off the VLU) between 0 to 30 minutes before power-down is activated and shall inform the MAR to do so. | **M** | | | |
| **3.6.19.c** | Upon reaching the power-down threshold, the VLU shall remove power from all connected devices, and itself. | **M** | | | |
| **3.6.19.d** | Upon the vehicle master ignition switch being turned to anything other than "off", the vehicle shall apply or maintain power to all connected devices, and also reset the timer unless ignition sense is again | **M** | | | |

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| | active. | | | | |
| **3.6.19.e** | If the vehicle operator has not logged off, the system shall automatically log off, prior to power down activation. | **M** | | | |
| **3.6.20** | The VLU shall process AVL data and correlate it with operator ID, date, time (both 24 hour system clock and 36 hour service day clock), run, block, route, trip, and location. | **M** | | | |
| **3.6.21** | The VLU shall manage all communications processes and devices on the vehicle, and shall store any accumulated data and logs. | **M** | | | |
| **3.6.22** | The VLU shall reconcile any discrepancies between all the different sensors and position inputs it uses for AVL purposes – see technical requirements. | **M** | | | |
| **3.6.23** | The VLU shall process and manage the transmission of data to/from the central system as follows: | **M** | | | |
| **3.6.23.a** | Routine data including: schedule | **M** | | | |

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| | adherence, vehicle location data, passenger count, peak passenger load, messaging and communications requests, and event information on an event or periodic basis, via the data communications system. | | | | |
| **3.6.23.b** | Priority data including priority messages, and alarms on an immediate basis, via the data communications system. | **M** | | | |
| **3.6.23.c** | Onboard equipment configuration data updates, non-critical logged or accumulated data, and other "batch" data, via the WLAN. | **M** | | | |
| **3.6.24** | The VLU shall be responsible for initiating and verifying the successful completion of data transfers, and shall not delete data until a successful transfer has been completed and confirmed. | **M** | | | |
| **3.6.25** | In the event of an uncompleted file transfer, the VLU shall reinitiate the file transfer in accordance with the technical requirements. | **M** | | | |

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| **3.6.26** | The VLU shall manage the downloading of new configuration data that may include schedule updates, AVA announcement updates, firmware/configuration updates, as follows: | **M** | | | |
| **3.6.26.a** | The VLU shall maintain current and one set of future configuration data that will automatically become the current configuration data once the defined activation date has arrived. | **M** | | | |
| **3.6.26.b** | The VLU shall periodically check for configuration updates whenever it is within WLAN coverage. | **M** | | | |
| **3.6.26.c** | If a configuration data update is available, the VLU shall manage the download process and update other onboard equipment (the VLU shall provide a message on the MDT that a download and update is occurring so that the operator is aware). | **M** | | | |
| **3.6.26.d** | The VLU shall automatically install updated firmware or configuration data it has received into the VLU, the destination sign and the AVA system. | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.26.e** | To minimize potential impacts on pull-out, the VLU shall include functionality to download only the schedule information on startup. Functionality shall be provided to manage the download of more voluminous data (such as a firmware or configuration update) so that it is only downloaded and installed on shutdown or during non-operating hours. | **M** | | | |
| **3.6.26.f** | If the VLU is unable to complete the download of configuration data via the WLAN, it shall continue using the previous configuration data. | **M** | | | |
| **3.6.27** | The VLU must monitor and log, tagged with time and location, the following existing discrete external circuits: | **M** | | | |
| **3.6.27.a** | Front door and Rear door, open and close; | **M** | | | |
| **3.6.27.b** | Kneel, and return from kneel (raise); | **M** | | | |
| **3.6.27.c** | Lift or Ramp deploy, and return from deploy (stow); | **M** | | | |

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| **3.6.27.d** | "Stop Requested" activation; | **M** | | | |
| **3.6.27.e** | Headlight activation and deactivation; | **M** | | | |
| **3.6.27.f** | Turn Signals, activation and deactivation; | **M** | | | |
| **3.6.27.g** | Hazard Lights, activation and deactivation; | **M** | | | |
| **3.6.27.h** | Master-Run switch, change in status (Off, Day-Run, Night-Run, Park); | **M** | | | |
| **3.6.27.i** | Ignition, activation and deactivation; | **M** | | | |
| **3.6.27.k** | Covert Alarm switch activation; | **M** | | | |
| **3.6.27.l** | Selected dashboard light activations for vehicle maintenance monitoring (e.g. oil pressure, check engine light, tire pressure); | **M** | | | |
| **3.6.27.m** | Motion start; | **M** | | | |
| **3.6.27.n** | Not in motion/idle. | **M** | | | |
| **3.6.28** | The VLU shall include functionality and external interfaces to provide location, time, and/or triggering | **M** | | | |

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| | messages to other on-vehicle systems. | | | | |
| **3.6.29** | The VLU shall include functionality to re-transmit data in the event of an unsuccessful transmission. | **M** | | | |
| **3.6.30** | The VLU shall run diagnostics and report any problems with onboard components (including the VLU itself, MDT, voice radio, AVL components, and destination sign). | **M** | | | |
| **3.6.31** | The VLU shall automatically recognize any system process failure or lock-up, log the problem and attempt a restart. | **M** | | | |
| **3.6.32** | If restart of the process fails, notification shall be sent to the operator via the MDT and logged the event in the VLU data for upload at the end of the day. | **M** | | | |
| **3.6.33** | The VLU shall support remote diagnostics that allow central system access to check operations and functionality of the VLU. See technical requirements. | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.34** | In addition to providing routine position updates, the VLU shall record date, time and location when the following events occur: | **M** | | | |
| **3.6.24.a** | Arrival into and departure from agency configurable geographic areas that define the stops, timepoints, and pull-out/pull-in locations (for these events the current schedule adherence shall also be recorded); | **M** | | | |
| **3.6.24.b** | Every activation and deactivation of each monitored onboard circuit, including: Door open/close, Kneel/Raise, Lift/Ramp deploy/stow, Stop-Requested light, Turn Signals; | **M** | | | |
| **3.6.24.c** | First stop/timepoint of the first trip; and | **M** | | | |
| **3.6.24.d** | Every toggling of operational conditions, including: operator key-press on MDT, off-route and return-to-route, early/late schedule adherence and return-to-on-time status, operator over-ride of destination sign. | **M** | | | |

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| | | | | | |
| **3.6.35** | The VLU shall monitor diagnostic information for the Transit J1708, and log the following statistics upon every change in logon status or ignition status: | **M** | | | |
| **3.6.35.a** | By Module Identification (MID): Time of last good received packet, Total good received packets, Total good transmitted packets. | **M** | | | |
| **3.6.35.b** | Total bad (collision/checksum) packets received. | **M** | | | |
| **3.6.25.c** | Total bad (collision/checksum) packets transmitted. | **M** | | | |
| **3.6.36** | The VLU shall monitor diagnostic information for connected onboard systems, and log the following statistics upon every change in logon status or ignition status: | **M** | | | |
| **3.6.36.a** | Data Communication Statistics (Total: Polls, Transmits, Re-Transmits, Receives, Errors, Fallback, etc); | **M** | | | |
| **3.6.36.b** | Navigation Quality (Time, Duration, Good GPS Navigation, Good | **M** | | | |

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| | Alternate Navigation, Poor Navigation, etc); | | | | |
| **3.6.36.c** | All current VLU configuration data; | **M** | | | |
| **3.6.36.d** | Odometer Statistics, since previous record (total traveled distance, current calibration factor); and | **M** | | | |
| **3.6.36.e** | WLAN Statistics, since previous record (VLU awake time, WLAN coverage time, data packets sent, data packets received, file transmissions/receptions attempted per file, file transmissions/receptions completed per file). | **M** | | | |
| **3.6.36.f** | All received text messages that were displayed to an operator | **M** | | | |
| **3.6.36.g** | All instances of lost data communications coverage exceeding 15 seconds once back in communications for more than ten (10) seconds. | **M** | | | |
| **3.6.37** | The VLU schedule data shall include agency configurable geographic areas (i.e., trigger boxes), and will initiate special VLU | **M** | | | |

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| | functions. | | | | |
| **3.6.37.a** | Examples include: Change external destination sign; Initiate Transit Signal Priority (TSP) status change (enable/disable/activate/deactivate); Initiate AVA announcements and/or "clears"; Indicate locations where GPS is known to be degraded. | **M** | | | |
| **3.6.37.b** | The system shall enable the agency to maintain the trigger boxes within the scheduling database, independently without need for any software changes. | **M** | | | |
| **3.6.37.c** | The system shall support the creation, deletion, and relocation of trigger boxes and the designation or adjustment of the VLU action to be taken upon entering or exiting the trigger box. | **M** | | | |
| **3.6.38** | The VLU shall use AVL data to determine schedule adherence in real-time on the vehicle, without the need for central computation and communications. | **M** | | | |

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| **3.6.39** | The VLU shall be fully operational within 90 seconds of power restoration for warm starts, and 150 seconds for cold starts under the full range of ambient conditions. | **M** | | | |
| **3.6.40** | Logged data shall be stored in non-volatile memory, and shall not become corrupted due to any power condition, including: spike, drop, or loss. | **M** | | | |
| **3.7** | **Mobile Data Terminal** | | | | |
| **3.7.1** | The MDT shall be a rugged computing device designed for operation in a transit environment and shall function as the interface between the operator and all onboard components. | **M** | | | |
| **3.7.2** | MDT data storage shall be solid state. | **M** | | | |
| **3.7.3** | MDT shall have a color liquid crystal display (LCD) touch-screen. | **M** | | | |
| **3.7.4** | MDT shall be operable while wearing gloves. | **M** | | | |

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| **3.7.5** | MDT shall be readable by operators wearing polarized lenses. | **M** | | | |
| **3.7.6** | The MDT shall be legible for the color blind. | **M** | | | |
| **3.7.7** | MDT shall be readable in direct sunlight and must offer low-glare setting for night operation. | **M** | | | |
| **3.7.8** | MDT touch-screen shall have a video graphics array (VGA) resolution of at least 640 x 480 pixels. | **M** | | | |
| **3.7.9** | MDT shall display vehicle status including data transmission, pending messages, and communication mode. | **M** | | | |
| **3.7.10** | MDT shall be capable of providing aural tones to indicate incoming messages to operators while keeping operator attention on the road. | **M** | | | |
| **3.7.10.a** | Logon | **M** | | | |
| **3.7.10.b** | Emergency Alarm | **M** | | | |
| **3.7.10.c** | Data Messaging | **M** | | | |

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| **3.7.10.d** | Transfer Notification | **M** | | | |
| **3.7.10.e** | Schedule Adherence | **M** | | | |
| **3.7.10.f** | Headsigns | **M** | | | |
| **3.7.10.g** | Fare Collection | **M** | | | |
| **3.7.10.h** | Passenger Count | **M** | | | |
| **3.7.10.i** | Maintenance | **M** | | | |
| **3.7.10.j** | Stop Announcement | **M** | | | |
| **3.7.10.k** | Trip/Schedule | **M** | | | |
| **3.7.10.l** | Route | **M** | | | |
| **3.7.10.m** | Direction | **M** | | | |
| **3.7.11** | When the power is turned on, the MDT software shall automatically perform a power-on self-test, followed by configuring and initializing the MDT to the user-specified default values. | **M** | | | |
| **3.7.12** | The MDT shall be self-restarting and shall not become unresponsive and require manual restarts to | **M** | | | |

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| | continue operations. The MDT shutdown process will be controlled by the MDT software and shall only be possible when the ignition is in the off position. | | | | |
| **3.7.13** | A user specified shutdown delay shall be provided to continue operations and to initiate the shutdown procedure that shall automatically close all files, save values, and send a shutdown message to be recorded in the CAD/AVL system. | **M** | | | |
| **3.7.14** | An on-board covert microphone shall be included for communication between dispatcher and operator – refer to technical requirements for location requirements. | **M** | | | |
| **3.7.15** | Wheelchairs lifts and ramps shall be monitored and data shall be recorded for each cycle. | **M** | | | |
| **3.7.16** | MDT shall display warning to operator and dispatcher workstation and shall transmit to central system if wheelchair lift was not cycled prior to leaving garage. All | **M** | | | |

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| | messages and warning shall be stored. | | | | |
| **3.7.17** | MDT shall display a warning if logon has not occurred following vehicle movement of predefined distance per technical requirements. Warning shall be transmitted to CAD/AVL system for storage and display at dispatcher station. | **M** | | | |
| **3.7.18** | A logon process shall be provided for maintenance purposes to enable a vehicle to be moved through-out a facility for servicing and maintenance purposes without triggering alarms. | **M** | | | |
| **3.7.19** | MDTs shall be capable of remote log-on/log-off via the data communications connection. | **M** | | | |
| **3.7.20** | MDT shall have the “safe driving” mode enabled when the vehicle is moving above a configurable speed limit. | **M** | | | |
| **3.7.21** | The safe driving mode shall allow the agency to stop vehicle operators from interacting with MDTs when | **M** | | | |

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| | driving, the MDT shall allow enabling of the following screen configurations under safe driving mode: | | | | |
| **3.7.21.a** | Blank display on the screen; | **M** | | | |
| **3.7.21.b** | Disabled MDT buttons to stop vehicle operators from performing any actions on the screen; and | **M** | | | |
| **3.7.21.c** | Display of information relevant to vehicle operators when of high priority (e.g., route and schedule adherence status, missed messages or calls from dispatchers). | **M** | | | |
| **3.7.22** | Dispatch shall have the ability to remotely change the configurations for the safe driving mode. | **M** | | | |
| **3.7.23** | Dispatch shall be able to change the safe driving mode configurations by vehicle operator login. For example, the safe driving mode could be disabled for maintenance or training purposes. | **M** | | | |
| **3.7.24** | The MDT shall allow two way text messaging between the transit | **M** | | | |

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| | vehicles and dispatch using a set of predefined messages, or free form text messaging. | | | | |
| **3.7.25** | The MDT shall support the display of text messages longer than can fit on one line of the display. A minimum of 40 canned messages shall be supported. | **M** | | | |
| **3.7.26** | The MDT shall store multiple messages received from dispatch and indicate those text messages that are unread. | **M** | | | |
| **3.8** | **Mobile Access Router (MAR)** | **M** | | | |
| **3.8.1** | Shall support both wireless and wired switched Ethernet Local Area Network (LAN) functionality, as well as multiple wireless Wide Area Network (WAN) links and a gateway. | **M** | | | |
| **3.8.2** | MAR shall be a separate device from the VLU and MDT. | **M** | | | |
| **3.8.3** | MAR shall be equipped with a minimum of 1 GB of internal data storage capacity. | **M** | | | |

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| **3.8.4** | MAR shall include a minimum of two (2) USB 2.0 connections through which USB enabled devices such as a portable computer or solid state memory can be connected. | **M** | | | |
| **3.8.5** | MAR shall include a minimum of eight (8) switched Ethernet ports. | **M** | | | |
| **3.8.6** | The wireless data communications device shall be easily replaceable to accommodate potential future adaptation to different wireless WAN link services. | **M** | | | |
| **3.8.7** | MAR shall incorporate a LAN Ethernet multiport switch capability to interconnect CAD/AVL onboard system components and existing onboard Ethernet enabled equipment. | **M** | | | |
| **3.8.8** | MAR shall support the following wireless data services: | **M** | | | |
| **3.8.8.a** | 3G and 4G WAN, including LTE | **M** | | | |
| **3.8.8.b** | 802.11n Wi-Fi WLAN | **M** | | | |
| **3.8.8.c** | Act as a WLAN access point | **M** | | | |

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| | capable of enabling LAN access from public WLAN client devices within the bus interior, supporting the 802.11n WLAN standard and on a separate subnet firewalled from the onboard Ethernet switched LAN. | | | | |
| **3.8.9** | The MAR shall be integrated with onboard CAD/AVL components and other existing onboard Ethernet enabled systems per technical requirements. | **M** | | | |
| **3.8.10** | The MAR and all WLAN communications shall support Wi-Fi Protected Access 2 (WPA2) security and communications protocols, or alternate approved through the design review process. | **M** | | | |
| **3.9** | **Global Positioning System (GPS)** | | | | |
| **3.9.1** | AVL module shall provide a derived location using an onboard GPS receiver and other location determination devices (gyroscope, odometer, etc.) per technical requirements. | **M** | | | |
| **3.9.2** | Vehicle location shall be determined by a navigation algorithm – refer to | **M** | | | |

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| | technical requirements. | | | | |
| **3.9.3** | Other location determination devices other than GPS shall automatically calibrate and require no operator or maintenance personnel intervention for daily usage. | **M** | | | |
| **3.9.4** | Proper operation of the onboard systems relying on location reporting shall not be interrupted for vehicles leaving from an enclosed storage area. | **M** | | | |
| **3.9.5** | The GPS antenna shall be a low-profile unit housed in a rugged and weather tight enclosure. The GPS antenna shall be securely mounted and sealed on the exterior of the vehicle, clear of obstructions, and clear of interference from other generating devices or 91 Radio Frequency interference. | **M** | | | |
| **3.9.6** | The GPS system shall provide a spare NMEA-based GPS output. | **M** | | | |
| **3.9.7** | GPS system shall meet cold and warm acquisition and current position update times per technical | **M** | | | |

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| | requirements. The GPS system shall include multi-path rejection capabilities to help eliminate inaccurate signals caused by reflections off of buildings or other structures. | | | | |
| **3.9.8** | Vehicle location shall be transmitted at least once every 20 seconds (polling rate) to the central CAD/AVL system for display and storage purposes and every 5 seconds during an Emergency Alarm situation. | **M** | | | |
| **3.9.9** | The AVL shall at all times provide current position information to the VLU per technical requirements. | **M** | | | |
| **3.9.10** | GPS delay time from location acquisition to formatting for transmission shall not exceed one (1) second. | **M** | | | |
| **3.9.11** | The GPS system shall store the most recent location to provide as the "last known good" location in the event that location reporting is interrupted. | **M** | | | |

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| **3.9.12** | Location messages transmitted to dispatch shall indicate messages status as current or "last known verified". | **M** | | | |
| **3.10** | **Automatic Passenger Counters** | | | | |
| **3.10.1** | The APC system shall be integrated with the AVL system to provide the Agency with time, location, and on-off counts. | **M** | | | |
| **3.10.2** | The APC system shall include an option to integrate the electronic farebox to provide the Agency with fare collection information. | **M** | | | |
| **3.10.3** | The APC shall be designed to operate in accordance with these specifications for ambient temperatures from -20 °F to 140°F. | **M** | | | |
| **3.10.4** | Equipment shall withstand without damage being stored for extended periods in ambient temperatures from -40°F (-40°C) to 158°F (+70°C). | **M** | | | |
| **3.10.5** | The APC system devices shall be designed to withstand the vibration | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | and shock forces associated with transit vehicles. | | | | |
| **3.10.6** | The APC system device shall be sealed against dust and water intrusion, certified in compliance with or exceeding the NEMA4x or IP65 standard. Equipment shall be tested and proven capable of withstanding power transients, electromagnetic interference and radio frequency interference without degradation at levels encountered in typical transit operations. | **M** | | | |
| **3.10.7** | Power and communications lines and the chassis the units shall be tested and proven resistant to electrostatic discharges from personnel in accordance with accepted industry procedures for testing computer equipment. | **M** | | | |
| **3.10.8** | The APC system shall be capable of being locally configured using a laptop computer, portable programming device or wireless device. | **M** | | | |
| **3.10.9** | The chosen method may also be | **M** | | | |

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| | used for performing routine diagnostic maintenance. | | | | |
| **3.10.10** | Each component/module/subsystem distinctly defined in the proposed APC system shall be replaceable as a discrete unit, identified by a unique serial number or other contractor proposed method. | **M** | | | |
| **3.10.11** | The APC system shall be interfaced with a wheelchair lift sensor and bike rack sensor in order to record the number of wheelchair lift and bike rack operational cycles at each stop. | **M** | | | |
| **3.10.12** | APC shall record the door opening, the number of boarding and alighting passengers for each doorway and the number of wheelchair lift or bicycle rack activations, and door closing at each stop. Refer to technical requirements for methods. | **M** | | | |
| **3.10.13** | Each data record shall either be in real time, or by post processing match the APC system data to the stop identification, trip number, route pattern, vehicle ID, time and | **M** | | | |

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| | date recorded in the central database. | | | | |
| **3.10.14** | APC system shall accommodate at least 72 hours of APC data. | **M** | | | |
| **3.10.15** | APC data stored on board shall use non-volatile storage so that a power supply is not required to retain the data. | **M** | | | |
| **3.10.16** | Utility software shall be provided, for use on a laptop computer connected via a suitable (serial or Ethernet connection) to either the APC system, vehicle logic unit which supports calibration of the doorway sensors and review of stored data records. | **M** | | | |
| **3.10.17** | APC data shall be uploaded as initiated by central system via the WLAN bulk data transfer system. | **M** | | | |
| **3.10.18** | The APC subsystem shall not erase or allow the overwriting of data records until confirmation is received from the central system that the data records were successfully received. | **M** | | | |

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| **3.10.19** | Equipment shall conform to the Federal Communication Commission (FCC) Part 15 Class A limits for conducted and radiated emissions of electromagnetic interference and radio frequency interference. | **M** | | | |
| **3.10.20** | Equipment shall withstand shock and vibration forces typical to transit operations. | **M** | | | |
| **3.11** | **Emergency Alarms** | | | | |
| **3.11.1** | When a covert alarm signal is received from a vehicle, the CAD/AVL software shall display the event in the performance queue to all dispatchers with configurable visual alerting methods. | **M** | | | |
| **3.11.2** | The CAD/AVL software shall provide a configurable audible and visual alert to all dispatchers, road supervisors, and others using the CAD/AVL software. | **M** | | | |
| **3.11.3** | The CAD/AVL software shall notify the dispatcher in the performance queue that a silent alarm message has been received using an Agency-approved visual notification method. | **M** | | | |

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| | | | | | |
| **3.11.4** | Once a dispatcher selects the covert alarm event, this shall be so indicated to that dispatcher and all others. | **M** | | | |
| **3.11.5** | When acknowledging an alarm the CAD/AVL software shall zoom and center the map display on the alarming vehicle and locate the nearest road supervisor vehicle when selected by a dispatcher. The scale for the zoom shall be configurable by the Agency. | **M** | | | |
| **3.11.6** | The CAD/AVL software shall allow dispatchers to downgrade emergency alarms to a lower message priority, or upgrade lower priority messages to an emergency alarm. The CAD system shall log all alarm status changes (create, upgrade, downgrade, and cancel). | **M** | | | |
| **3.11.7** | Activation of an emergency message shall place the vehicle in a priority status for frequency of location and message updates which will result in vehicle location and status updates at a rate that is configurable by the | **M** | | | |

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| | Agency. | | | | |
| **3.12** | **Automatic Vehicle Announcements (AVA)** | | | | |
| **3.12.1** | The AVL central software shall be used to generate and manage next stop, customer, and other announcements, manage device configurations, generate reports, and manage device fault reporting and logs. | **M** | | | |
| **3.12.2** | The AVA central software shall meet or exceed requirements of the United States Access Board. | **M** | | | |
| **3.12.3** | The AVA central software shall include functionality to import route and stop data from an external system via Agency file(s) per technical requirements. | **M** | | | |
| **3.12.4** | The AVA central software shall include the capability to announce all or only selected stops per technical requirements. | **M** | | | |
| **3.12.5** | Location based stop announcement triggers shall be configurable by the Agency for any stop announcement. | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.12.6** | Stops to be announced shall be set through system configuration data managed by the Agency. | **M** | | | |
| **3.12.7** | The AVA central software shall include the ability to customize announcements per technical requirements (i.e. add, link, etc.). | **M** | | | |
| **3.12.8** | Content of the AVA announcements shall be configurable and shall include the minimum messages types: | **M** | | | |
| **3.12.8.a** | Cross-street only | **M** | | | |
| **3.12.8.b** | Current street and cross-street | **M** | | | |
| **3.12.8.c** | Landmark | **M** | | | |
| **3.12.8.d** | Transfer opportunities | **M** | | | |
| **3.12.8.e** | Bus Stop Name | **M** | | | |
| **3.12.8.f** | Service announcements | **M** | | | |
| **3.12.9** | The AVA central software shall include the ability for the Agency to independently configure audio and text messages associated with a | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | specific stop. | | | | |
| **3.12.10** | The AVA central software shall include the ability to append a standard message header to all messages per technical requirements. Different headers shall be available for different types of announcements. The AVA central software shall support English at a minimum plus any other languages as required by the Agency. | **M** | | | |
| **3.12.11** | The AVA central software shall enable creating audio messages using both text-to-speech synthesized and recorded voice. Voice files shall be MP3 or WAV format as required by technical requirements. | **M** | | | |
| **3.12.12** | The AVA central software shall be able to create composite announcements that combine synthesized and recorded announcement segments. | **M** | | | |
| **3.12.13** | The AVA central software speech engine shall be a modular component that allows the Agency to independently replace it at a later | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | date without other system changes. | | | | |
| **3.12.14** | The AVA central software shall be configurable by the Agency so that external announcements may be set for activation on any route. External announcements shall include at minimum: | **M** | | | |
| **3.12.14.a** | Route number. | **M** | | | |
| **3.12.14.b** | Route name. | **M** | | | |
| **3.12.14.c** | Destination. | **M** | | | |
| **3.12.14.d** | Direction. | **M** | | | |
| **3.12.14.e** | Branch. | **M** | | | |
| **3.12.14.f** | Route Type. | **M** | | | |
| **3.12.15** | The AVA central software shall be configurable so that external announcements can be made less frequently, only at specified stops or not at all. | **M** | | | |
| **3.12.16** | The AVA central software shall allow specific volume levels to be configured for individual stops, | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | times of day and/or sections of routes. | | | | |
| **3.12.17** | The AVA central software shall be able to configure external announcements to repeat without operator interaction at any or all stops at a time interval configurable by the Agency. | **M** | | | |
| **3.12.18** | The database of announcement messages shall associate stops with message data for each trip pattern. | **M** | | | |
| **3.12.19** | The AVA central software shall enable incremental updates of onboard message data on an as-needed basis. | **M** | | | |
| **3.12.20** | The user interface for entry/deletion/modification of messages shall be easy to use, and shall associate all messages with a trip pattern. | **M** | | | |
| **3.12.21** | The system shall accept the addition, deletion, or movement (from one trip pattern to another) of stop association data. | **M** | | | |

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| **3.12.22** | The database shall support direct SQL interfaces. | **M** | | | |
| **3.12.23** | Each message shall have a unique identifier, defined by the Agency. | **M** | | | |
| **3.12.24** | The AVA central software shall include look-up tables to associate messages entered through the workstation with the message identifier. | **M** | | | |
| **3.12.25** | Creation or deletion of a message shall not change the identifiers of the other messages. | **M** | | | |
| **3.12.26** | Provisions shall be included to rebuild the message database and identifiers on a periodic basis. (e.g., after there have been a significant number of message additions and deletions). | **M** | | | |
| **3.12.27** | The AVA central software shall provide means to record and generate announcement audio and to define message-stop associations. | **M** | | | |
| **3.12.28** | The AVA central software shall be installed on a desktop PC or server supplied by the Agency, accessible | **M** | | | |

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| | by multiple clients or workstations if on a server, and configured with required hardware and operating system software. | | | | |
| **3.12.29** | Internal single line LED headsigns shall be provided. | | | | |
| **3.13** | **Single Point Log-On** | | | | |
| **3.13.1** | Vehicle logic unit should allow for single point of logon for all onboard equipment including electronic fareboxes, headsigns, APC system, the AVA system, and other integrated devices. | **M** | | | |
| **3.13.2** | The single point logon shall log onto the other on-board equipment or override the current logon to those other devices. | **M** | | | |
| **3.13.3** | The central system should recognize that the vehicle is ready to commence its assigned work, has started work and completed work for the day. | **M** | | | |
| **3.14** | **Not Used** | | | | |
| **3.14.1** | Not Used | | | | |

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| **3.14.2** | Not Used | | | | |
| **3.14.3** | Not Used | | | | |
| **3.14.4** | Not Used | | | | |
| **3.15** | **Destination Headsigns Interface** | | | | |
| **3.15.1** | Existing destination signs shall interface with the VLU, which shall automatically provide sign codes for every route and direction change during revenue service. | **M** | | | |
| **3.15.2** | Firmware updates needed to the destination headsigns and any subcontracting for support services needed from the destination headsign vendor shall occur during interfacing of this system. | **M** | | | |
| **3.15.3** | The MDT shall be capable of changing the destination headsign and providing codes for the operator to manually determine the selection of destinations and to manually input codes when the CAD/AVL system is down. | **M** | | | |
| **3.16** | **Connection Protection** | | | | |

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| **3.16.1** | The Contractor shall provide an option for the CAD/AVL system to provide and operate in conjunction with the Mobile Data Terminal software to provide Transfer Connection Protection (TCP). | **M** | | | |
| **3.16.2** | TCP shall be triggered when an incoming fixed route operator makes a transfer for a specific outgoing route, which the vehicle operator enters via the Mobile Data Terminal. | **M** | | | |
| **3.16.3** | The system shall, without any need for dispatcher intervention, hold the outgoing vehicle to allow the connection, if it would not need to be held more than a configurable time based on the estimated arrival time of the incoming vehicle. | **M** | | | |
| **3.16.4** | The system shall notify the outgoing vehicle via the Mobile Data Terminal if it is to hold, until what time and for what route. | **M** | | | |
| **3.16.5** | The dispatcher shall be able to review current pending transfers, including the incoming and outgoing vehicles involved, and the time the | **M** | | | |

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| | incoming vehicle is expected to arrive at the transfer. | | | | |
| **3.16.6** | The dispatcher shall have the ability to intervene and override as necessary in the operation of transfers. | **M** | | | |
| **3.17** | **Video System Interface** | | | | |
| **3.17.1** | The VLU shall be interfaced with the existing video system (REI HD800 DVR) including the digital video recorders (DVR) on-board. The Contractor shall be entirely responsible for developing and integrating this interface. | **M** | | | |
| **3.17.2** | The VLU to DVR interface shall be accessible using the MDT | **M** | | | |
| **3.17.3** | VLU shall be able to store alarms that are received from the DVR. | **M** | | | |
| **3.17.4** | The VLU shall send an update message to the MDT when there is an alarm received from the DVR. | **M** | | | |
| **3.17.5** | The VLU shall provide a discrete signal to the DVR when an emergency alarm is generated by the operator. | **M** | | | |

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| | | | | | |
| **3.17.6** | The CAD/AVL software shall support the ability to tag an incident record with an index or link to specific video frame(s)/snippets in the future. | **M** | | | |
| **3.17.7** | The VLU shall send alert to dispatch and maintenance if the DVR is not functioning properly. | **M** | | | |
| **3.18** | **Farebox Interface** | | | | |
| **3.18.1** | The VLU shall be interfaced with the existing GenFare Fareboxes. | **M** | | | |
| **3.18.2** | Interface completion shall include any firmware updates needed to the fareboxes and any subcontracting for support services needed from the farebox vendor. | **M** | | | |
| **3.18.3** | The VLU to farebox interface shall support farebox logon using the MDT. | **M** | | | |
| **3.18.4** | MDT logon shall logon to the farebox or override the current logon on the farebox. | **M** | | | |

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| **3.18.5** | The VLU shall send an update message to the farebox when there is a change to the block, route, trip, operator, or fareset. | **M** | | | |
| **3.18.6** | VLU shall send the current location upon request message from the farebox. | **M** | | | |
| **3.18.7** | VLU shall be able to store farebox alarms received from the farebox. | **M** | | | |
| **3.18.8** | Data records transmitted from the farebox to the CAD/AVL system shall use synchronous time and location stamping to support central system reporting functions that combine farebox data with data from other systems (e.g. CAD/AVL, APC) – for example, fares collected by stop location. | **M** | | | |
| **3.20** | **Transit Automatic Vehicle Monitoring** | | | | |
| **3.20.1** | Automatic Vehicle Monitoring (AVM) System shall be included as an option. | **O** | | | |
| **3.20.2** | Automatic Vehicle Monitoring (AVM) shall collect data on | **O** | | | |

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| | revenue-vehicle drive-train performance, CAD/AVL subsystem health warnings, pre run checklist completion, and discrete alarms in order to identify problems, improve maintenance, and reduce vehicle breakdowns. | | | | |
| **3.20.3** | AVM data triggered by operating conditions beyond pre-defined threshold shall be reported in real-time to the CAD/AVL system and stored for reporting purposes. | **O** | | | |
| **3.20.4** | Standard AVM reports and user query tools shall be supplied for easy access to the stored data. | **O** | | | |
| **3.20.5** | AVM drive-train data and mechanical alarms shall be collected from the installed Engine Control Module provided by the vehicle's manufacturer and/or the installed Multiplexer I/O system. | **O** | | | |
| **3.20.6** | Alarms shall be transmitted over the CAD/AVL cellular for real-time display to maintenance users. | **O** | | | |
| **3.20.7** | The AVM data messages and alarms | **O** | | | |

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| | shall be stored for analysis and interface to the Agency's Vehicle Maintenance System. | | | | |
| **3.20.8** | Up to twelve (12) user defined discrete inputs shall be provided to monitor mechanical alarms. | **O** | | | |
| **3.20.9** | System shall monitor the Emergency Alarm, low oil pressure, hot engine, and low air pressure. | **O** | | | |
| **3.20.10** | System shall allow user/Agency to define and connect unused discrete inputs for future requirements. | **O** | | | |
| **4.** | **Dispatch and Data Reporting** | | | | |
| **4.1** | **Text Messaging** | | | | |
| **4.1.1** | Messages shall be capable of being grouped into categories for quick selection. | **M** | | | |
| **4.1.2** | Canned message categories and message text shall be user definable. | **M** | | | |
| **4.1.3** | The operator and dispatcher shall be able to reply to a message in the queue in either a canned response or free-form text message. | **M** | | | |

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| | | | | | |
| **4.1.4** | A text message shall support an acknowledgement message back to dispatch once the driver has viewed a message flagged by dispatch as requiring acknowledgement. | **M** | | | |
| **4.1.5** | Text messages shall be either deleted or saved by the Operator after viewing. Storage for saved text messages shall handle a minimum of eight messages. | **M** | | | |
| **4.2** | **Automated Recording and Archiving** | | | | |
| **4.2.1** | The CAD/AVL system shall store the position and tracking of the transit vehicles in some form of database. | **M** | | | |
| **4.2.2** | Database shall include ability to query the data with different parameters for performance and safety improvements. | **M** | | | |
| **4.2.3** | Data shall be stored in a database for planning and evaluation purposes. The specific requirements shall be decided by the Agency and should include an assessment of the | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | following: | | | | |
| **4.2.3.a** | Length of time AVL data is to be stored | **M** | | | |
| **4.2.3.b** | The sampling rate AVL data is to be stored (i.e. at every minute, at every stop). | **M** | | | |
| **4.3** | **Real-time, Reporting, and Archival Data** | | | | |
| **4.3.1** | System shall provide the Agency the right to access, use, and distribute data to create interfaces to the CAD/AVL system, export data to other agencies and third party licensed systems, generate reports, and for other Agency purposes. | **M** | | | |
| **4.3.2** | Access to real-time operating data shall not be affected by the Agencies reporting and data access by user groups other than dispatchers and supervisors. | **M** | | | |
| **4.3.3** | Proper safeguards shall also be enabled to ensure dispatcher and supervisors cannot overload the primary database server with faulty or ill-designed queries. | **M** | | | |

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| | | | | | |
| **4.3.4** | If required, a secondary database server that takes the processing load off of the primary real time database shall be provided for the purpose of data retrieval for reporting and data analysis. | **M** | | | |
| **4.3.5** | Enough online data storage shall be provided to keep at least three (3) years of historical data. | **M** | | | |
| **4.3.6** | Applications and tools shall be provided for historical data access. | **M** | | | |
| **4.3.7** | Provisions shall be provided to save data and database schema more than three years old to long term storage media such as magnetic tape, CD, DVD, etc. and delete the archived data from the main or secondary database(s). | **M** | | | |
| **4.3.8** | Provisions shall be provided to restore data by copying archived data from long term storage to either a stand-alone database machine or onto the current database(s). | **M** | | | |
| **4.3.9** | Archiving data shall be possible by either a graphical user interface or | **M** | | | |

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| | via the command line for automating tasks. | | | | |
| **4.4** | **Daily Schedules** | | | | |
| **4.4.1** | The CAD/AVL system shall automatically load the daily schedule of blocks, runs, driver/operator assignments, and vehicle assignments. | **M** | | | |
| **4.4.2** | The CAD/AVL system shall support an overlap of daily schedules for service that continues past midnight. | **M** | | | |
| **4.4.3** | The CAD/AVL system shall support multiple service types to accommodate service variations at the route and trip level per technical requirements. | **M** | | | |
| **4.4.4** | Each schedule day shall permit assignment of multiple service types. | **M** | | | |
| **4.5** | **Incident Reports** | | | | |
| **4.5.1** | The CAD/AVL system shall provide an integrated Incident Reporting subsystem per technical | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | requirements. | | | | |
| **4.5.2** | Incident types and the association of data messages to incident types shall be user definable. | **M** | | | |
| **4.5.3** | A form creation editor shall be provided that provides the CAD/AVL System Administrator the capability to create property-specific customized incident forms that are accessible to dispatchers and other users of the CAD/AVL system. | **M** | | | |
| **4.5.4** | Forms shall be created and associated with incident types. | **M** | | | |
| **4.5.5** | Every new Incident Report shall be uniquely identified and the associated Incident Report form displayed for completion. | **M** | | | |
| **4.5.6** | Incident forms shall include data fields supported and auto-populated by the CAD/AVL system as well as user defined fields per the technical requirements. | **M** | | | |
| **4.5.7** | User definable fields shall be | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | implemented such that custom fields do not inhibit upgrades to software. | | | | |
| **4.5.8** | Incident forms shall include a combination of automatically filled in data fields and manually entered data fields. Upon creation of an incident report all known CAD/AVL data shall be "pre-populated" or automatically entered into the configured incident form fields. | **M** | | | |
| **4.5.9** | An open Incident Report Queue shall be provided for each dispatcher logged into the CAD/AVL system along with information about dispatcher responsibility. All Incident Reports must be closed or responsibility transferred prior to the dispatcher logging off. | **M** | | | |
| **4.5.10** | The current date, time, and user ID shall be stamped to indicate information that is added to an Incident Report after the original owner of the Incident Form has closed the incident. | **M** | | | |
| **4.5.11** | Incident Reports shall provide the following capabilities: | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | | | | | |
| **4.5.11.a** | Incident Forms shall have the option to be required for specific incident types. | **M** | | | |
| **4.5.11.b** | If a message requiring an Incident Form is deleted the CAD/AVL system shall generate the form and mark it as CAD/AVL generated. | **M** | | | |
| **4.5.11.c** | Incident Reports shall provide access to a spell checker. | **M** | | | |
| **4.5.11.d** | Incident Reports shall be capable of being forwarded to individuals or groups of individual electronically. | **M** | | | |
| **4.5.11.e** | Incident reports shall have the capability to be displayed online for at least twelve months for any new, open, or closed Incident Report. | **M** | | | |
| **4.5.11.f** | Incident Reports shall be able to be queried based upon CAD/AVL variables such as open/closed status, date range, incident type, dispatcher ID, Operator ID, Route, or vehicle ID. | **M** | | | |
| **4.5.11.g** | Mechanical, breakdown, and vehicle | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | switch out Incident Reports shall provide an interface to the Maintenance system to document the incident for maintenance action. | | | | |
| **5** | **Scheduling System** | | | | |
| **5.1** | The Contractor shall convert the existing route and stop databases from each of the agencies to import that data in the proposed schedule software database. | **M** | | | |
| **5.2** | The scheduling system shall also have the ability to import stop data from an external system in excel or comma separated value (CSV) file format | **M** | | | |
| **5.3** | The scheduling system or CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) using a GTFS feed. | **M** | | | |
| **5.4** | The system shall have the capability to create and define an unlimited number of bus stops and nodes. | **M** | | | |
| **5.5** | The system shall be able to create new routes and update exiting | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | routes. | | | | |
| **5.6** | The system shall be able to create new patterns and update existing patterns, including time points and stops. | **M** | | | |
| **5.7** | The system shall permit the user to define bus stops using a variety of methods, as identified in the technical requirements. | **M** | | | |
| **5.8** | The system shall be capable of allowing stops to be properly positioned at intersections. | **M** | | | |
| **5.9** | The system shall be capable of allowing the user to assign stop amenities (e.g., bench, shelter, etc.) to each stop and other supplemental data. | **M** | | | |
| **5.10** | The system shall allow any number of trip patterns to be defined as distinct bus stop sequences, as identified in the technical requirements. | **M** | | | |
| **5.11** | The system shall be capable of displaying all trip patterns, or fixed | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | portions of flexible trip patterns, on a map for visual display. | | | | |
| **5.12** | The system shall be capable of calculating distances for deadhead route segments, entire trip patterns, and selected trip pattern segments defined by the user. | **M** | | | |
| **5.13** | The system shall allow the definition of average running speeds, for various days and time periods, for deadhead segments and between designated pairs of stops along each trip pattern. | **M** | | | |
| **5.14** | The system shall be able to generate a list of turning movements for an entire trip pattern. | **M** | | | |
| **5.15** | The system shall allow routes to be defined as a sequence of trips using selected trip patterns during defined time periods. | **M** | | | |
| **5.16** | **System Viewing** | | | | |
| **5.16.1** | The system shall allow the viewing of pattern statistics, as identified in the technical requirements. | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **5.16.2** | View a pattern's route adherence along a route or corridor. | **M** | | | |
| **5.17** | **Creation of Timetables** | | | | |
| **5.17.1** | The system shall be capable of rotating the extra board automatically. | **M** | | | |
| **5.17.2** | The system shall be capable of calculating the running time between any pair of timepoints on any trip pattern, taking into account running speeds. The system shall also allow running times to be manually input if needed, such as for deviated/flexible route segments. | **M** | | | |
| **5.17.3** | The system shall be capable of automatic or manual trip building for each route, using the designated sequence of trip patterns, per the technical requirements. | **M** | | | |
| **5.17.4** | The system shall permit users to automatically or manually assign trip numbers. | **M** | | | |
| **5.17.5** | The system shall allow for modifying built trips, based on | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | modifying a single trip pattern, all trips in a single direction or a combination of the above. | | | | |
| **5.17.6** | The system shall permit authorized users to assign specific vehicle types to trips. | **M** | | | |
| **5.17.7** | The system shall be capable of computing deadhead time, including the effect of varying running speed in various time periods. | **M** | | | |
| **5.17.8** | The system shall provide summary data on trips and running times, per the technical requirements. | **M** | | | |
| **5.18** | **Vehicle Assignment** | | | | |
| **5.18.1** | The system shall be capable of either automatic or manual vehicle block development based on user-defined variables, per the technical requirements. | **M** | | | |
| **5.18.2** | The system shall allow users to automatically or manually assign block numbers. | **M** | | | |
| **5.18.3** | The system shall be capable of | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | developing potential interline relationships for the entire service or based on the user selecting specific routes or trips. | | | | |
| **5.19** | **Runcutting** | | | | |
| **5.19.1** | The system shall be capable of cutting single-piece or multi-piece work assignment runs, per the technical requirements. | **M** | | | |
| **5.19.2** | The system shall allow users to automatically or manually assign run numbers. | **M** | | | |
| **5.19.3** | The system shall generate runs that incorporate all applicable agency labor agreement provisions. | **M** | | | |
| **5.19.4** | The system shall generate runs that incorporate agency management rules. | **M** | | | |
| **5.19.5** | The system shall provide a notification flag when a manual or automatically generated runcut violates a management rule or labor agreement provision. | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **5.19.6** | The system shall allow for the development of alternative runcut scenarios, per the technical requirements. | **M** | | | |
| **5.19.7** | The system shall allow the shifting of trip relief times (stated in block tables) to optimize runcuts. | **M** | | | |
| **5.19.8** | The system shall allow the user to specify compressed work weeks (e.g., 4 day work weeks, 10 hour days). | **M** | | | |
| **5.19.9** | The system shall permit the agency to manually cut some or all of the blocks. | **M** | | | |
| **5.20** | **Rostering and Bid Management** | | | | |
| **5.20.1** | The system shall support both roster and cafeteria style bids. | **M** | | | |
| **5.20.2** | The system shall be able to create and maintain rosters including the extra board. | **M** | | | |
| **5.20.3** | The system shall be capable of building bid rosters automatically. | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **5.20.4** | The system shall permit users to automatically or manually assign roster numbers. | **M** | | | |
| **5.20.5** | The system shall have the capability to take into account special service in effect for selected dates (e.g., holidays). | **M** | | | |
| **5.20.6** | The system shall allow agency staff to establish rules on which rostering suggested by the system will be based. | **M** | | | |
| **5.20.7** | The system shall have the capability to create separate rosters for various groups of vehicle operators (e.g., part-time rosters). | **M** | | | |
| **5.20.8** | The system shall have the capability to validate the transitions between rosters for two consecutive bid periods. | **M** | | | |
| **5.20.9** | The system shall have the capability to automatically generate one roster at a time or all rosters. | **M** | | | |
| **5.20.10** | The system shall allow agency staff to access human resources | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | information that has been imported into the system for any bus driver (optional). | | | | |
| **5.20.11** | The system shall validate driver choices to determine whether each driver meets minimum rest time requirements between runs. | **M** | | | |
| **5.20.12** | The system shall validate driver choices to determine whether each driver meets requirements for minimum/maximum assigned work load. | **M** | | | |
| **5.20.13** | The system shall be able to associate a driver to a specific roster or rosters. | **M** | | | |
| **5.20.14** | The system shall generate work on a nightly basis from the schedule's bids. | **M** | | | |
| **5.20.15** | The nightly generation shall generate work a user-defined number of days into the future. | **M** | | | |
| **5.20.16** | Extra board items shall be included. | **M** | | | |
| **5.20.17** | Report Generation errors or rule | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | violations that occur during schedule generation shall be identified. | | | | |
| **5.21** | **Schedule Validation** | | | | |
| **5.21.1** | Schedule Validation must allow the user to review different aspects of the schedule and validate the schedule against a set of rules. | **M** | | | |
| **5.21.2** | All additions, omissions, time modifications, conflicts and errors shall be propagated through the rest of the schedule and be validated against a set of rules developed by the agency. | **M** | | | |
| **5.21.3** | Conflicts or errors associated with the changes must be highlighted in the application and noted to the agency. | **M** | | | |
| **6** | **Data Management** | | | | |
| **6.1** | The CAD/AVL system should include data management software to manage the entry, and manipulation of data and automate reporting for performance monitoring. | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **6.2** | The data management system should integrate with the scheduling software and facilitate easy National Transit Database (NTD) reporting. | **M** | | | |
| **6.3** | The system shall be capable of establishing automatic daily, weekly, monthly, quarterly routines to produce and email standard PDF reports to defined user groups. | **M** | | | |
| **6.4** | Standard reports shall be developed through the design review process, and shall include at minimum: | **M** | | | |
| **6.4.1** | Schedule Adherence (by stop or timepoint) | **M** | | | |
| **6.4.2** | Passenger Loadings and Alightings (by stop and capacity) | **M** | | | |
| **6.4.3** | Daily Revenue | **M** | | | |
| **6.4.4** | Missed Trips | **M** | | | |
| **6.4.5** | Stop Time Analysis | **M** | | | |
| **6.4.6** | Farebox vs. APC validation | **M** | | | |
| **6.4.7** | Layover/Recovery | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **6.4.8** | In-service hours | **M** | | | |
| **6.4.9** | Actual hour and actual miles | **M** | | | |
| **6.4.10** | Route deviation | **M** | | | |
| **6.4.11** | Travel time and average speeds | **M** | | | |
| **6.4.12** | Driver Log ins (by bus and route) | **M** | | | |
| **6.4.13** | Origin and Destination Information | **M** | | | |
| **6.4.14** | Dashboard | **M** | | | |
| **6.4.15** | Wheelchair Lift Use (by stop) | **M** | | | |
| **6.4.16** | Bike Rack Use (by stop) | **M** | | | |
| **6.4.17** | Luggage Bay Use (by stop) | **M** | | | |
| **6.4.18** | Incidents | **M** | | | |
| **6.4.19** | Bus Change-off | **M** | | | |
| **6.4.20** | Collisions | **M** | | | |
| **6.4.21** | General Delay | **M** | | | |
| **6.4.22** | Trip Delays | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **6.4.23** | Trip Cancellation | **M** | | | |
| **6.4.24** | Equipment Issues | **M** | | | |
| **6.4.25** | Vehicle Locations | **M** | | | |
| **6.4.26** | Vehicle Speeds | **M** | | | |
| **6.4.27** | Vehicle Performance | **M** | | | |
| **6.4.28** | Communications Status | **M** | | | |
| **6.4.29** | Emergency Alarm | **M** | | | |
| **6.4.30** | Driver Incident (incapacitated, sick, performance) | **M** | | | |
| **6.4.31** | System Diagnostics | **M** | | | |
| **6.4.32** | Maintenance | **M** | | | |
| **6.4.33** | On Peak Loading by Route, Trip and Stop | **M** | | | |
| **6.5** | All reports shall have the capability to export information into a common analysis and text editing office software such as Microsoft Excel and Word. | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **7.** | **Real Time Passenger Information** | | | | |
| **7.1** | The system shall generate real-time arrival/departure predictions for all vehicles that are integrated in the proposed CAD/AVL system. | **M** | | | |
| **7.2** | The real-time arrival predictions shall report predicted arrival times based on actual arrivals and not based on scheduled arrivals. | **M** | | | |
| **7.3** | The CAD/AVL system shall be able to interface with field equipment including passenger information displays, agency websites and mobile applications to provide and display real-time arrival/departure data for fixed-route and demand-response vehicles. | **M** | | | |
| **7.4** | The data required to be provided to the field equipment, agency websites and mobile applications includes current bus schedules, bus schedule adherence status, and estimated (predicted) arrival/departure times of transit vehicles at designated bus stops and transit centers. | **M** | | | |
| **7.5** | The real-time arrival predictions | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | shall meet or exceed the following performance criteria: | | | | |
| **7.5.1** | For predictions between one and ten minutes, the prediction accuracy shall be three minutes or less for 90% of the generated predictions. | **M** | | | |
| **7.5.2** | For predictions between 11 and 25 minutes, the prediction accuracy shall be four minutes or less for 85% of the generated predictions. | **M** | | | |
| **7.5.3** | For predictions more than 25 minutes, the prediction accuracy shall be six minutes or less for 85% of the generated predictions. | **M** | | | |
| **8.** | **Passenger Information Displays** | | | | |
| **8.1** | The Contractor shall provide passenger information signs that display, at the stop level, the estimated count-down arrival time and/or departure time of the next buses at the stop within a defined time interval. | **M** | | | |
| **8.2** | Both scheduled and dynamic text message capabilities shall be provided to either individual or | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | groups of signs. | | | | |
| **8.3** | A user interface shall provide easy setup, configuration, diagnostic, and messaging status at all sign locations. | **M** | | | |
| **8.4** | The displays shall be able to display multiple routes, CAD/AVL system time, ad hoc messages, and scheduled messages. | **M** | | | |
| **8.5** | Physical design of the sign shall be modular for easy maintenance, vandal resistant, and suitable for an outdoor environment. | **M** | | | |
| **8.6** | Solar power, high brightness LED displays, and multi-line displays shall be available where required by operational needs. | **M** | | | |
| **8.7** | The final location of the Contractor supplied bus stop and shelter passenger information displays shall be determined prior to the final design approval. | **M** | | | |
| **8.8** | Assistance shall be provided to the Agency in acquiring necessary | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | permits. | | | | |
| **8.9** | Outdated information for a transit vehicle on the display shall be cleared within a maximum of fifteen (15) seconds of the transit vehicle departing the stop or station. | **M** | | | |
| **8.10** | Proposers shall indicate what means (wired or wireless) shall or can be used to connect to the passenger information displays. | **M** | | | |
| **9.** | **Mobile Applications (Apps)** | | | | |
| **9.1** | The CAD/AVL system shall generate and disseminate real-time transit traveler information to the regional 511 system, agency-owned infrastructure, and web/mobile services. | **M** | | | |
| **9.2** | The system shall update real-time arrival predictions and generate service alerts to mobile applications based upon real time service adjustments and measures implemented by the agency dispatchers including: | **M** | | | |
| **9.2.1** | Cancelled Service; | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **9.2.2** | Detours (planned or ad hoc); | **M** | | | |
| **9.2.3** | Drop off only; | **M** | | | |
| **9.2.4** | Additional of supplemental service (‘trippers’) in addition to scheduled trips. | **M** | | | |
| **9.3** | It is desired that the Contractor develop a mobile app to allow transit riders to communicate with Dispatch or other Operations staff to report suspicious activity, crime, or quality of life problems at a transit station or on a bus. | **O** | | | |
| **10.** | **511 Integration** | | | | |
| **10.1** | The CAD/AVL system shall support the exchange of data with the Bay Area’s regional 511 traveler information system operated by the Metropolitan Transportation Commission (MTC). | **M** | | | |
| **10.2** | Data exchange with 511 shall consist of the following: | **M** | | | |
| **10.2.1** | Export of static configuration data. | **M** | | | |

| SolTrans Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **10.2.2** | Export of real-time arrival information. | **M** | | | |
| **10.2.3** | Export of CAD/AVL system status information to 511. | **M** | | | |
| **10.2.4** | The latest requirements and specifications for the 511 integration shall be gathered from the Metropolitan Transportation Commission (MTC). | **M** | | | |
| **10.3** | The CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) and other types of static and real-time information using GTFS. | **M** | | | |

# APPENDIX C-2 – SOLTRANS FLEET DETAILS

## APPENDIX C-2 – SOLTRANS FLEET DETAILS

**SolTrans Fixed Route Fleet**

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Intercity, Local FR, Paratransit |
|---|---|---|---|---|---|---|
| 4411 | 1VH5H3H2616501628 | Orion | Orion V High Floor | 44 | 2 | Local |
| 4412 | 1VH5H3H2816501629 | Orion | Orion V High Floor | 44 | 2 | Local |
| 4417 | 1VH5H3H2116501634 | Orion | Orion V High Floor | 44 | 2 | Local |
| BL07 | 1M8PDMPA63P055607 | MCI | D4500 | 57 | 2 | Intercity |
| BL08 | 1M8PDMPA83P055608 | MCI | D4500 | 57 | 2 | Intercity |
| BL09 | 1M8PDMPAX3P055609 | MCI | D4500 | 57 | 2 | Intercity |
| BL10 | 1M8PDMPA63P055610 | MCI | D4500 | 57 | 2 | Intercity |
| BL12 | 1M8PDMPAX3P055612 | MCI | D4500 | 57 | 2 | Intercity |
| BL13 | 1M8PDMPA13P055613 | MCI | D4500 | 57 | 2 | Intercity |
| BL16 | 1M8PDMPA73P055616 | MCI | D4500 | 57 | 2 | Intercity |
| BL18 | 1M8PDMPA03P055618 | MCI | D4500 | 57 | 2 | Intercity |
| BL19 | 1M8PDMPA03P055619 | MCI | D4500 | 57 | 2 | Intercity |
| BL20 | 1M8PDMPA03P055620 | MCI | D4500 | 57 | 2 | Intercity |
| BL21 | 1M8PDMPA03P055621 | MCI | D4500 | 57 | 2 | Intercity |
| BL23 | 1M8PDMPA43P055623 | MCI | D4500 | 57 | 2 | Intercity |
| BL25 | *1M8PDMPA83P055625* | MCI | D4500 | 57 | 2 | Intercity |
| BL26 | 1M8PDMPAX3P055626 | MCI | D4500 | 57 | 2 | Intercity |
| BL29 | *1M8PDMPA53P055629* | MCI | D4500 | 57 | 2 | Intercity |
| BL32 | *1M8PDMPA53P055632* | MCI | D4500 | 57 | 2 | Intercity |
| 3901 | 15GGD3010B1180275 | Gillig | Low Floor | 39 | 2 | Local |
| 3902 | 15GGD3012B1180276 | Gillig | Low Floor | 39 | 2 | Local |
| 3903 | 15GGD3014B1180277 | Gillig | Low Floor | 39 | 2 | Local |
| 3904 | 15GGD3016B1180278 | Gillig | Low Floor | 39 | 2 | Local |
| 3905 | ***15GGD3018B1180279*** | Gillig | Low Floor | 39 | 2 | Local |
| 3906 | ***15GGD3014B1180280*** | Gillig | Low Floor | 39 | 2 | Local |
| 3907 | ***15GGD3016B1180281*** | Gillig | Low Floor | 39 | 2 | Local |
| 3908 | ***15GGD3018B1180282*** | Gillig | Low Floor | 39 | 2 | Local |
| 3909 | ***15GGD301XB1180283*** | Gillig | Low Floor | 39 | 2 | Local |
| 3910 | ***15GGD3011B1180284*** | Gillig | Low Floor | 39 | 2 | Local |
| 3911 | ***15GGD3013B1180285*** | Gillig | Low Floor | 39 | 2 | Local |

## APPENDIX C-2 – SOLTRANS FLEET DETAILS

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Intercity, Local FR, Paratransit |
|---|---|---|---|---|---|---|
| 3912 | ***15GGD3015B1180286*** | Gillig | Low Floor | 39 | 2 | Local |
| 3913 | ***15GGD3017B1180287*** | Gillig | Low Floor | 39 | 2 | Local |
| 3914 | ***15GGD3019B1180288*** | Gillig | Low Floor | 39 | 2 | Local |
| 3915 | ***15GGD3010B1180289*** | Gillig | Low Floor | 39 | 2 | Local |
| 3916 | ***15GGD3017B1180290*** | Gillig | Low Floor | 39 | 2 | Local |
| 3917 | ***15GGD3019B1180291*** | Gillig | Low Floor | 39 | 2 | Local |
| 3918 | ***15GGD3010B1180292*** | Gillig | Low Floor | 39 | 2 | Local |
| 3919 | ***15GGD3012B1180293*** | Gillig | Low Floor | 39 | 2 | Local |
| 3920 | ***15GGD3014B1180294*** | Gillig | Low Floor | 39 | 2 | Local |
| 3921 | ***15GGD3016B1180295*** | Gillig | Low Floor | 39 | 2 | Local |

**SolTrans Paratransit Fleet**

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Intercity, Local FR, Paratransit |
|---|---|---|---|---|---|---|
| 1801 | 1FDFE4FS9BDA63472 | Ford | E450 El Dorado | 16 | 4 | Paratransit |
| 1802 | 1FDFE4FS6BDA63476 | Ford | E450 El Dorado | 16 | 4 | Paratransit |
| 1803 | 1FDFE4FS8BDA63477 | Ford | E450 El Dorado | 16 | 4 | Paratransit |
| 1804 | 1FDFE4FSXBDA63478 | Ford | E450 El Dorado | 16 | 4 | Paratransit |
| 1805 | 1FDFE4FS8BDA63480 | Ford | E450 El Dorado | 16 | 4 | Paratransit |
| 1806 | 1FDFE4FSXBDA63481 | Ford | E450 El Dorado | 16 | 4 | Paratransit |
| 1807 | 1FDFE4FS5BDA63484 | Ford | E450 El Dorado | 16 | 4 | Paratransit |
| 2008 | 1FDXE45S26DB18808 | Ford | E-450 | 16 | 4 | Paratransit |
| 2013 | 1FD4E45S68DA18541 | Ford | E-450 | 16 | 4 | Paratransit |
| 2014 | 1FDXE45S37DB47610 | Ford | E-450 | 16 | 4 | Paratransit |
| 2015 | 1FDXE45S47DB47616 | Ford | E-450 | 16 | 4 | Paratransit |
| 2016 | 1FDFE4FS6CDA52544 | Ford | E-450 | 16 | 4 | Paratransit |

## APPENDIX C-2 – SOLTRANS FLEET DETAILS

### SolTrans Contingency Fleet

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Intercity, Local FR, Paratransit |
|---|---|---|---|---|---|---|
| 4413 | 1VH5H3H2416501630 | Orion | Orion V High Floor | 44 | 2 | Local |
| 4415 | 1VH5H3H2816501632 | Orion | Orion V High Floor | 44 | 2 | Local |
| BL11 | 1M8PDMPA83P055611 | MCI | D4500 | 57 | 2 | Intercity |
| BL15 | 1M8PDMPA53P055615 | MCI | D4500 | 57 | 2 | Intercity |
| BL22 | 1M8PDMPA53P055622 | MCI | D4500 | 57 | | |
| BL34 | 1M8PDMPA23P055634 | MCI | D4500 | 57 | 2 | Intercity |
| BL35 | 1M8PDMPA93P055635 | MCI | D4500 | 57 | 2 | Intercity |

### SolTrans Support Vehicles

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Intercity, Local FR, Paratransit |
|---|---|---|---|---|---|---|
| 107 | 1FTCR10TXLUC29270 | Ford | Ford Ranger | | 0 | Maintenance |
| 118 | 1FDUF5GY7CEA71496 | Ford | FORD F-550 | | 0 | Maintenance |
| 113 | 1FAFP55U01G173966 | Ford | Ford Taurus | | 0 | Supervisor Vehicles |
| 116-33 | 1GNDX03E71D157787 | Chevy | Venture | | 1 | Supervisor Vehicles |
| TBD | Currently procuring | Braun/Chrysler | RT ADA Entervans | | 2 total (1 middle, 1 front) | Supervisor Vehicles |
| TBD | Currently procuring | Braun/Chrysler | RT ADA Entervans | | 2 total (1 middle, 1 front) | Supervisor Vehicles |
| TBD | Currently procuring | Braun/Chrysler | RT ADA Entervans | | 2 total (1 middle, 1 front) | Supervisor Vehicles |
| TBD | Currently procuring | Braun/Chrysler | RT ADA Entervans | | 2 total (1 middle, 1 front) | Supervisor Vehicles |
| TBD | Currently procuring | Braun/Chrysler | RT ADA Entervans | | 2 total (1 middle, 1 front) | Supervisor Vehicles |

**APPENDIX C-3 – SOLTRANS PRICE PROPOSAL**

## APPENDIX C-3 – SOLTRANS PRICE PROPOSAL

| NO. | ITEM DESCRIPTION | UNIT | QTY. | UNIT PRICE | EXTENDED PRICE |
|---|---|---|---|---|---|
| **BASE PRICE ITEMS** | | | | | |
| 1 | System Design | LS | 1 | | |
| 2 | CAD/AVL System Software and Licensing | LS | 1 | | |
| 3 | Servers at Dispatch | LS | 1 | | |
| 4 | Workstations at Dispatch and Administrative offices | EA | 5 | | |
| 5 | Scheduling Software | EA | 1 | | |
| 6 | On Board Equipment (Fixed Route) | EA | 40 | | |
| 7 | On Board Equipment (Paratransit) | EA | 12 | | |
| 8 | On Board Equipment (Supervisor Vehicles) | EA | 7 | | |
| 9 | Communications System for Mobile Devices – at Dispatch | LS | 1 | | |
| 10 | Mobile Communications Equipment - fixed, paratransit, supervisor vehicles | EA | 59 | | |
| 11 | Cellular (3G/4G) Service (5 years) | LS | 1 | | |
| 12 | Testing | LS | 1 | | |
| 13 | Maintenance Service Agreement (5 years) | LS | 5 | | |
| 14 | Training | LS | 1 | | |
| 15 | 511 Integration | LS | 1 | | |
| 16 | Connection Protection | EA | 40 | | |
| 17 | Video System Integration | EA | 1 | | |
| 18 | Data Management System | LS | 1 | | |
| 19 | Farebox Integration | EA | 40 | | |
| 20 | Mobile Work Stations for Supervisors | EA | 7 | | |
| 21 | Spare VLU | EA | 5 | | |
| 22 | Spare GPS receiver | EA | 5 | | |
| 23 | Spare Antenna | EA | 5 | | |
| 24 | Spare MDT | EA | 5 | | |
| 25 | Spare MAR | EA | 5 | | |
| 26 | Spare Cellular Router (3G/4G) and WLAN communications card | EA | 5 | | |
| 27 | Spare APC | EA | 5 | | |
| 28 | Spare AVA | EA | 5 | | |
| | | | | **TOTAL BASE PRICE:** | |
| **ADD ALTERNATE PRICE ITEMS** | | | | | |
| A1 | Automatic Vehicle Monitoring | EA | 59 | | |

## APPENDIX C-3 – SOLTRANS PRICE PROPOSAL

SolTrans reserves right to reject all proposals. SolTrans will negotiate with the highest-rated proposer for final items, pricing and quantities.

All prices shall include furnishing and delivery, installation, and integration of all materials and associated equipment (mounting, cable, connectors, etc) necessary for a complete and functioning system.

The Unit Prices for the Base Price and Add Alternate Price Items shall be fixed for up to one (1) year after the submission of the Price Proposal. Unit prices shall be fixed for adjustments to quantities of 25% above and below the item quantity. Quantity adjustments shall be at SolTrans sole discretion.

Exercise of the Add Alternate Price Items shall be exercised at Soltrans sole discretion. Soltrans reserves the right not to exercise any Add Alternate Price Items, and Soltrans shall have up to one (1) year after submission of Price Proposal to provide notice-to-proceed for exercising any Add Alternate Price items.

System Design Documents will be paid based on completion of each stage, i.e., Preliminary Design (30%), Draft Final Design (30%) and Final Design (40%).

CAD/AVL System Software and Licensing will be paid based on the delivery and installation of the system software in the CAD/AVL servers at the agency dispatch centers.

CAD/AVL Servers will be paid based on the delivery and installation of the servers to the agency's facilities.

CAD/AVL Workstations will be paid based on the delivery, installation and integration of each workstation with the CAD/AVL server for the agency

Communication System for Mobile Devices at Dispatch will be paid based on delivery, installation, and integration of communications equipment at SolTrans Dispatch for functioning communications to all SolTrans mobile vehicles.

On Board Equipment will be paid based on the completion of testing of each vehicle with all required equipment hardware and software interfaces as outlined in the Compliance Matrix.

Mobile Communications Equipment for mobile vehicles will be paid based on the completion of testing and functioning communications to Dispatch of each vehicle.

Cellular Service shall cover mobile communications costs for the entire system and will be paid based on commissioning of the system.

Testing will be paid based on the successful completion of the FAT testing (30%), Pilot Fleet testing (30%) and SAT testing (40%).

Spare equipment will be paid based on delivery of equipment to SolTrans Dispatch.

Training will be paid upon completion of all training sessions.

Data Management Software will be paid based on the delivery and installation of the software on agency servers.

Automatic Vehicle Monitoring will be paid based on completion of integration and testing of each vehicle.

Connection Protection will be paid based on the delivery and installation of the feature into the system software in the CAD/AVL servers at the agency dispatch centers.

# APPENDIX C4 - SOLTRANS TERMS AND CONDITIONS

1. **Project Description: [Enter Solicitation Title]**

2. **This Contract is entered into between the Solano County Transit (SolTrans) and the Contractor named below:**

   **Contractor's Name: [successful proposer]** **Business Form: [org form]**

3. **The Term of this Contract is: From date of execution of contract to [termination date].**

4. **The maximum amount of this Contract is: [Not to Exceed Amount]**

5. **The CONTRCTOR agrees to comply with the terms and conditions of the following exhibits which are by this reference made a part of this Contract and incorporated herein as though set forth in full:**
   - **Exhibit A – Scope of Work**
   - **Exhibit B – Budget Detail and Payment Provisions**
   - **Exhibit C – General Terms and Conditions**
   - **Exhibit D – Special Terms and Conditions (Caltrans/State Funds)**
   - **Exhibit E – Special Terms and Conditions (Federal Funds-Transit)**
   - **Exhibit F – Special Terms and Conditions (DBE Provisions and Reporting Forms)**

**IN CONSIDERATION OF THE MUTUAL PROMISES CONTAINED IN THIS CONTRACT, THE PARTIES HAVE EXECUTED THIS CONTRACT ON THE ___ DAY OF _____, 201_.**

**SOLANO COUNTY TRANSIT** **CONTRACTOR**

**By _____** **By _____**
**MONA A. BABAUTA, Executive Director** **[Company signature authority], [title]**

**Approved as to form:**

**By: _____**
**BERNADETTE CURRY, SolTrans Legal Counsel**

**SolTrans Contact Information**
Mona Babauta, Executive Director
SolTrans
311 Sacramento St.
Vallejo, CA 94590
Attn: [ENTER PROJECT MANAGER]
Telephone: (707) 648-4070

**Contractor Contact Information**
[contractor project manager]
[Company Contact Phone]
[Company Contact City], [Company Contact State]
[Company Contact ZIP]
[Company Contact Phone]
[Company Contact Email]

***CONTRACT MUST BE EXECUTED BEFORE WORK CAN COMMENCE***



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# EXHIBIT A

# SCOPE OF WORK

**1. Specified Documents.**

Contractor shall perform those services specified in detail here. Contractor's services are described in various attachments and exhibits, each of which is incorporated into this Contract by this reference which define and describe the Project to be undertaken by Contractor. SolTrans has materially relied upon the representations of Contractor as may have been made in SolTrans' selection of Contractor for this Project. Contractor agrees to perform or secure the performance of all specified services in their entirety within the maximum payment specified herein. Said Scope of Services consists of, and includes, the following documents:

a. SolTrans Staff Report to SolTrans Board Dated [staff report date], and approved by SolTrans Board on [Board Action];
b. SolTrans' Solicitation: Enter Solicitation Number- [Enter Solicitation Title];
c. Contractor's written response to the Solicitation dated [Date of accepted proposal];
d. Contractor's Cost Proposal; and, further all statements and representations of Contractor made during their presentation to SolTrans' selection board and thereafter to the officers and employees of SolTrans who have participated in the determination to contract with Contractor for this Project. Those documents, presentations and discussions are material representations upon which SolTrans has relied in selecting and contracting with Contractor and shall be utilized in any matter in which interpretation of this Contract is required.

**2. General Scope of Work**

General Scope of the RFP

**3. Tasks**

**4. Deliverables**

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# EXHIBIT B

## BUDGET DETAIL AND PAYMENT PROVISIONS

**A. Compensation**. This is a "not to exceed" contract. Contractor shall be paid, as full compensation for the satisfactory completion of the work, in amount not to exceed [Not to Exceed Amount], as set forth on Contractor's "Cost/Fee Proposal" which includes all applicable surcharges such as taxes, insurance, and fringe benefits, as well as indirect costs, overhead and profit allowance, subcontractor's costs, travel, materials and supplies.

**B. Progress Payments**. Payment for Contractor's services shall be due in the amounts agreed upon, if any, upon acceptance by Project Manager of those deliverables marking completion of a particular portion or period of the Project and as invoiced in accordance with Contractor's proposal.

**C. Maximum Payment.** Subject only to duly executed amendments, it is expressly understood and agreed that in no event will the total compensation to be paid Contractor under this Contract exceed the sums set forth herein unless pursuant to written amendment of this Contract approved by SolTrans Board.

D. **Method of Payment.** Contractor shall submit an invoice identifying the Project deliverable or milestone, along with a brief status statement of the Study's progress to date for which payment is sought, no later than thirty days after SolTrans' acceptance of such deliverable/milestone. SolTrans shall endeavor to make payments within thirty (30) days of receipt of an acceptable invoice, approved by the Project Manager or a designated representative. All invoices shall be made in writing and delivered or mailed to the SolTrans Project Manager as follows:

Accounts Payable
SolTrans
311 Sacramento St.
Vallejo, CA 94590
Attn: [ENTER PROJECT MANAGER]

**E**. **Cost/Fee Proposal** If Contractor has submitted a written Cost/Fee Proposal or Summary, that document is attached as Attachment 1 to Exhibit B and incorporated into this Exhibit as though set forth in full.

Unless Milestone payments are established in the Contractors Cost/Fee Proposal or Summary, Contractor shall invoice no more often than every month, and shall set forth in the invoice the hours worked, progress made, and provide adequate documentation regarding materials utilized during performance of the work.

Travel time to any SolTrans worksite in the Cities of Vallejo and Benicia will not be paid to the Contractor, and any related overhead should be figured into the total hourly rate. Mileage (at the then current IRS rate) and travel time and reasonable expenses will be paid for any travel agreed to in advance by SolTrans, and should be included in the invoice.

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# EXHIBIT C

## GENERAL TERMS AND CONDITIONS

**1. Conflict With Caltrans Or Federal Provisions**

In those circumstances where Caltrans or Federal funds are involved, those Caltrans or Federal provisions shall control over a General Term or Condition.

**2. Closing out**

SolTrans will pay Contractor's final invoice for payment providing Contractor has completed all obligations undertaken pursuant to this Contract. Contractor is responsible for SolTrans' receipt of a final invoice for payment 60 days after termination or completion of this Contract.

**3. Time**

Time is of the essence in all terms and conditions of this Contract.

**4. Time of Performance**

Work will not begin, nor claims paid for services under this Contract until all Certificates of Insurance, business and professional licenses/certificates, IRS ID number, signed W-9 form, or other applicable licenses or certificates are on file with SolTrans' Contract Manager.

**5. Termination**

A. This Contract may be terminated by SolTrans or Contractor, at any time, with or without cause, upon 30 days written notice from one to the other, unless otherwise provided for in Exhibit D.

B. SolTrans may terminate this Contract immediately upon notice of Contractor's malfeasance.

C. Following termination, SolTrans will reimburse Contractor for all expenditures made in good faith that are unpaid at the time of termination not to exceed the maximum amount payable under this Contract unless Contractor is in default of the Contract.

**6. Signature Authority**

The parties executing this Contract certify that they have the proper authority to bind their respective entities to all terms and conditions set forth in this Contract.

**7. Warranty**

A. SolTrans relies upon Contractor's professional ability and training as a material inducement to enter into this Contract. Contractor warrants that Contractor will perform the work according to generally accepted professional practices and standards and the requirements of applicable federal, state and local laws. SolTrans' acceptance of Contractor's work shall not constitute a waiver or release of Contractor from professional responsibility.

B. Contractor further warrants that Contractor possesses current valid appropriate licensure, including, but not limited to, drivers license, professional license, certificate of tax-exempt status, or permits, required to perform the work under this Contract.



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**8. Best Efforts**

Contractor warrants that Contractor will, at all times, faithfully, industriously and to the best of his/her/its ability, experience and talent, perform to SolTrans' reasonable satisfaction.

**9. Default**

A. If Contractor defaults in Contractor's performance, SolTrans shall promptly notify Contractor in writing. If Contractor fails to cure a default within 30 days after notification, unless otherwise specified in Exhibit D, or if the default requires more than 30 days to cure and Contractor fails to commence to cure the default within 30 days after notification, then Contractor's failure shall terminate this Contract.

B. If Contractor fails to cure default within the specified period of time, SolTrans may elect to cure the default and any expense incurred shall be payable by Contractor to SolTrans.

C. If SolTrans serves Contractor with a notice of default and Contractor fails to cure the default, Contractor waives any further notice of termination of this Contract.

D. If this Contract is terminated because of Contractor's default, SolTrans shall be entitled to recover from Contractor all damages allowed by law.

**10. Indemnification**

Contractor shall indemnify and hold harmless SolTrans, its officers, officials, employees and volunteers from and against all actions, causes of actions, damages, costs, liabilities, claims, losses, judgments, penalties and expenses of every type and description, including without limitation any fees and/or costs reasonably incurred by SolTrans' staff attorneys or contract attorneys and any and all costs, fees and expenses incurred in enforcing this provision (hereafter collectively referred to as "liabilities"), arising out of or in connection with any negligent act or omission, misconduct or other legal fault of Contractor, its officers, employees, sub-contractors, subcontractors or agents in connection with the performance or nonperformance of this Contract, whether or not SolTrans accepted or approved any service or work product performed or provided by Contractor hereunder, and whether or not such liabilities are litigated, settled or reduced to judgment. In the event that a final decision or judgment allocates liability by determining that any portion of damages awarded is attributable to SolTrans' negligence or willful misconduct, SolTrans shall pay the portion of damages which is allocated to SolTrans' negligence or willful misconduct, provided that SolTrans shall not be liable for any passive negligence of SolTrans, its officers, officials, employees and volunteers in reviewing, accepting or approving any service or work product performed or provided by Contractor.

Contractor shall, upon SolTrans' request, defend with counsel approved by SolTrans (which approval shall not be unreasonably withheld), at Contractor's sole cost and expense, any action, claim, suit, cause of action or portion thereof which asserts or alleges liabilities resulting from any allegedly negligent act, omission, misconduct or other legal fault of Contractor, its officers, employees, sub-contractors, subcontractors or agents in connection with the performance or nonperformance of this Contract, whether or not such action, claim, suit, cause of action or portion thereof is well founded or lacking in merit.

Acceptance of insurance certificates or endorsements required under Exhibit E of this Contract does not relieve Contractor from liability under this Section 10 and shall apply to all damages and claims of every kind suffered, or alleged to have been suffered, by reason of Contractor's negligence, misconduct, or other legal fault regardless of whether or not such insurance policies shall have been

determined to be applicable to any of such damages or claims for damages. The provisions of this Section shall survive any termination of this Contract.

**11. Insurance Requirements**

Contractor shall procure and maintain for the duration of this Contract the following insurance:

**Minimum Scope of Insurance:**

Coverage shall be at least as broad as:

1. Insurance Services Office Commercial General Liability coverage ("occurrence" form CG 0001).
2. Insurance Services Office form number CA 0001 (Ed. 1/87) covering Automobile Liability, code 1 (any auto). If Contractor owns no vehicles, this requirement may be satisfied by a non-owned auto endorsement to the general liability policy described above. If Contractor or Contractor's employees will use personal autos in any way on this project, Contractor shall obtain evidence of personal auto liability coverage for each person.
3. Workers' Compensation insurance as required by the State of California and Employer's Liability insurance.
4. Errors and Omissions liability insurance appropriate to the Contractor's profession. Architect's and engineers' coverage is to be endorsed to include contractual liability.

**Minimum Limits of Insurance:**

CONTRACTOR shall maintain limits no less than:

1. General Liability: $2,000,000 per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this location or the general aggregate limit shall be twice the required occurrence limit.
2. Automobile Liability: $2,000,000 per accident for bodily injury and property damage, combined single limit.
3. Employer's Liability: $2,000,000 per accident for bodily injury or disease, and in the aggregate.
4. Errors and Omissions Liability: $1,000,000 on a claims made basis.

**Deductibles and Self-Insurance Retentions:**

Any deductibles or self-insured retentions exceeding $50,000 must be declared to and approved by SolTrans. At the option of SolTrans, either: the Contractor shall reduce or eliminate such deductibles or self-insured retentions with respect to SolTrans, its officers, officials, employees and volunteers; or Contractor shall provide a financial guarantee satisfactory to SolTrans guaranteeing payment of losses and related investigations, claim administration and defense expenses.

**Other Insurance Provisions:**

The general liability and automobile liability policies are to contain, or be endorsed to contain, the following provisions:

1. SolTrans, its officers, officials, employees and volunteers are to be covered as insureds with respect to the liability arising out of automobiles owned, leased, hired or borrowed by or on behalf of the Contractor, and with respect to liability arising out of work or operations by or on behalf of the Contractor including materials, parts or equipment furnished in connection with such work or operations. General liability coverage can be provided in the form of an endorsement to the Contractor's insurance or as a separate owner's policy.

2. For any claims related to this project, the Contractor's insurance coverage shall be primary insurance as respects SolTrans, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by SolTrans, its officers, officials, employees and volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

3. Should the above described policies be cancelled prior to the policies' expiration date, Contractor agrees that notice of cancellation will be delivered under the policy provisions.

**Acceptability of Insurers:**

Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII, unless otherwise acceptable to SolTrans.

**Verification of Coverage:**

Contractor shall furnish SolTrans with original certificate and amendatory endorsements effecting coverage required by this clause. The endorsements should be on forms provided by SolTrans or on other than SolTrans' forms, provided those endorsements or policies conform to the requirements stated in this clause. All certificates and endorsements are required to be received and approved by SolTrans before work commences. SolTrans reserves the right to require complete, certified copies of all required insurance policies, including endorsements effecting coverage required by these specifications at any time.

**All insurance documents are to be sent to:**

SolTrans
Attn: SolTrans Legal Counsel
311 Sacramento St.
Vallejo, CA 94590

**Sub-Contractors:**

Contractor shall include all sub-contractors as insureds under its policies or shall furnish separate certificates and endorsements for each sub-contractor. All coverages for sub-contractors shall be subject to all of the requirements stated above unless specifically waived by SolTrans in writing.

**Forms of Endorsement:**

Endorsements shall include the following provisions. SolTrans understands and agrees that variations in language may occur:

THIS ENDORSEMENT, EFFECTIVE _____A.M. _____, 201__, FOR POLICY NUMBER _____, IS ISSUED TO THE SOLANO COUNTY TRANSIT BY _____ FOR (PROJECT DESCRIPTION OR TITLE)_____.

ADDITIONAL INSURED

IT IS UNDERSTOOD AND AGREED THAT SOLTRANS, ITS OFFICERS, OFFICIALS, EMPLOYEES AND VOLUNTEERS ARE NAMED AS ADDITIONAL INSUREDS ON THE GENERAL AND AUTOMOTIVE LIABILITY INSURANCES.

PRIMARY INSURANCE

IT IS FURTHER UNDERSTOOD AND AGREED THAT THE INSURANCE AFFORDED BY THIS POLICY SHALL BE CONSIDERED PRIMARY INSURANCE AS RESPECTS ANY OTHER VALID AND COLLECTIBLE INSURANCE SOLTRANS MAY POSSESS, INCLUDING ANY SELF INSURED RETENTION SOLTRANS MAY HAVE, AND ANY OTHER INSURANCE SOLTRANS DOES POSSESS SHALL BE CONSIDERED EXCESS INSURANCE ONLY.

CANCELLATION CLAUSE

WRITTEN NOTICE OF CANCELLATION SHALL BE GIVEN TO SOLTRANS IN THE EVENT OF CANCELLATION AND/OR REDUCTION IN COVERAGE OF ANY NATURE. SUCH NOTICE SHALL BE SENT TO:

SolTrans
Attn: SolTrans Legal Counsel
311 Sacramento St.
Vallejo, CA 94590

THIS PARAGRAPH SUPERSEDES THE CANCELLATION CLAUSE IN THE CERTIFICATE OF INSURANCE.

ALL OTHER TERMS AND CONDITIONS OF THIS POLICY REMAIN UNCHANGED.

_____
Authorized Representative

**12. Independent Contractor**

A. Contractor is an independent contractor and not an agent, officer or employee of SolTrans. The parties mutually understand that this Contract is by and between two independent contractors and is not intended to and shall not be construed to create the relationship of agent, servant, employee,

partnership, joint venture or association.

B. Contractor shall have no claim against SolTrans for employee rights or benefits including, but not limited to, seniority, vacation time, vacation pay, sick leave, personal time off, overtime, medical, dental or hospital benefits, retirement benefits, Social Security, disability, Workers' Compensation, unemployment insurance benefits, civil service protection, disability retirement benefits, paid holidays or other paid leaves of absence.

C. Contractor is solely obligated to pay all applicable taxes, deductions and other obligations including, but not limited to, federal and state income taxes, withholding, Social Security, unemployment, disability insurance, Workers' Compensation and Medicare payments. Contractor shall indemnify and hold SolTrans harmless from any liability which SolTrans may incur because of Contractor's failure to pay such obligations.

D. As an independent contractor, Contractor is not subject to the direction and control of SolTrans except as to the final result contracted for under this Contract. SolTrans may not require Contractor to change Contractor's manner of doing business, but may require redirection of efforts to fulfill this Contract.

E. Contractor may provide services to others during the same period Contractor provides service to SolTrans under this Contract.

F. Any third persons employed by Contractor shall be under Contractor's exclusive direction, supervision and control. Contractor shall determine all conditions of employment including hours, wages, working conditions, discipline, hiring and discharging or any other condition of employment.

G. As an independent contractor, Contractor shall indemnify and hold SolTrans harmless from any claims that may be made against SolTrans based on any contention by a third party that an employer-employee relationship exists under this Contract.

H. Contractor, with full knowledge and understanding of the foregoing, freely, knowingly, willingly and voluntarily waives the right to assert any claim to any right or benefit or term or condition of employment insofar as they may be related to or arise from compensation paid hereunder.

**13. Commitment Of Key Contractor Personnel**

In recognition of the special skill of Contractor's proposed "Project Team", if such a team has been proposed, SolTrans has relied upon the commitment by Contractor of certain key personnel assigned to this work by Contractor as well as an estimate of the commitment of their time to this Project, all as set forth in Contractor's Proposal found in Exhibit B. Substitution of any key personnel named in Exhibit A or a decrease in the commitment of time to be provided to the Project by such personnel of more than 10% requires the prior written approval of SolTrans. Contractor shall maintain records documenting compliance with this Article, which shall be subject to the audit requirements herein.

**14. Responsibilities of Contractor**

A. The parties understand and agree that Contractor possesses the requisite skills necessary to perform the work under this Contract and SolTrans relies upon such skills. Contractor pledges to perform the work skillfully and professionally. SolTrans' acceptance of Contractor's work does not constitute a release of Contractor from professional responsibility.

B. Contractor verifies that Contractor has reviewed the scope of work to be performed under this Contract and agrees that in Contractor's professional judgment, the work can and shall be completed for costs within the maximum amount set forth in this Contract.

C. To fully comply with the terms and conditions of this Contract, Contractor shall:

1. Establish and maintain a system of accounts for budgeted funds that complies with generally accepted accounting principles for government agencies;
2. Document all costs by maintaining complete and accurate records of all financial transactions associated with this Contract, including, but not limited to, invoices and other official documentation that sufficiently support all charges under this Contract;
3. Submit monthly reimbursement claims for expenditures that directly benefit SolTrans;
4. Along with monthly reimbursement claims contractor will submit their listing of subcontractors identifying the subtotaled portion of the claim that will be sent to each subcontractor and a running total of the total amounts paid to date to each subcontractor.
5. Be liable for repayment of any disallowed costs identified through quarterly reports, audits, monitoring or other sources; and
6. Retain financial, programmatic, client data and other service records for 4 years from the date of the end of the contract award or for 4 years from the date of termination, whichever is later.

**15. Compliance with Law**

A. Contractor shall comply with all federal, state and local laws and regulations applicable to Contractor's performance, including, but not limited to, licensing, employment and purchasing practices, wages, hours and conditions of employment.

B. Contractor warrants that all Contractor claims for payment or reimbursement by SolTrans will comply with the applicable Office of Management and Budget Circulars, particularly with respect to 2 CFR Part 225 and 2 CFR Part 230, as currently enacted or as may be amended throughout the term of this Contract.

**16. Confidentiality**

A. Contractor shall prevent unauthorized disclosure of names and other SolTrans-identifying information, except for statistical information not identifying a particular project.

B. Contractor shall not use SolTrans-specific information for any purpose other than carrying out Contractor's obligations under this Contract.

C. Contractor shall promptly transmit to SolTrans all requests for disclosure of confidential information.

D. Except as otherwise permitted by this Contract or authorized by SolTrans, Contractor shall not disclose any confidential information to anyone other than the State without prior written authorization from SolTrans.

E. For purposes of this section, identity shall include, but not be limited to, name, identifying number, symbol or other client identifying particulars, such as fingerprints, voice print or photograph.

**17. Conflict of Interest**

A. Contractor warrants that Contractor and/or Contractor's employees and/or their immediate families and/or Board of Directors and/or officers have no interest, including, but not limited to, other projects or independent contracts, and shall not acquire any interest, direct or indirect, including separate contracts for the work to be performed hereunder, which conflicts with the rendering of services under this Contract. Contractor shall employ or retain no such person while rendering services under this Contract. Services rendered by Contractor's associates or employees shall not relieve Contractor from personal responsibility under this clause.

B. Contractor has an affirmative duty to disclose to SolTrans in writing the name(s) of any person(s) who have an actual, potential or apparent conflict of interest.

**18. Drug Free Workplace**

Contractor warrants that Contractor is knowledgeable of Government Code section 8350 et seq., regarding a drug free workplace and shall abide by and implement its statutory requirements.

**19. Health and Safety Standards**

Contractor shall abide by all health and safety standards set forth by the State of California and/or the SolTrans pursuant to the Injury and Illness Prevention Program. If applicable, Contractor must receive all health and safety information and training.

**20. Audits and Inspection of Record**

A. Contractor shall permit SolTrans and its/their authorized representatives to have access to Contractor's books, records, accounts, and any and all work products, materials, and other data relevant to this Contract, including Contractor's place of business, for the purpose of making an audit, examination, excerpt and transcription during the term of this Contract and for a period of four (4) years thereafter. Contractor shall in no event dispose of, destroy, alter, or mutilate said books, records, accounts, work products, materials and data for that period of time.

B. Contractor further agrees to include in all its subcontracts hereunder a provision to the effect that the subcontractor agrees that SolTrans or any of its/their duly authorized representatives shall have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor for the term of this Contract.

**C.** The State, the State Auditor, SolTrans, Federal Highway Administration (FHWA), or any duly authorized representative of the federal government shall have access to any books, records and documents of the Contractor that are pertinent to the contract for audit, examination, excerpts, and transactions, and copies thereof shall be furnished if requested. This provision shall be applicable to subcontractors.

**21. Nondiscrimination**

A. In rendering services under this Contract, Contractor shall comply with all applicable federal, state and local laws, rules and regulations and shall not discriminate based on age, ancestry, color, gender, marital status, medical condition, national origin, physical or mental disability, race, religion, sexual orientation, or other protected status.

B. Further, Contractor shall not discriminate against its employees, which includes, but is not limited to, employment upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or

termination, rates of pay or other forms of compensation and selection for training, including apprenticeship.

**22. Subcontractor and Assignment**

A. Services under this Contract are deemed to be personal services.

B. Contractor shall not subcontract any work under this Contract nor assign this Contract or monies due without the prior written consent of SolTrans' Contract Manager, subject to any required state or federal approval.

C. If SolTrans consents to the use of Subcontractors, Contractor shall require and verify that its subcontractors maintain insurance meeting all the requirements stated in Section 11 above.

D. Assignment by Contractor of any monies due shall not constitute an assignment of the Contract.

**23. Unforeseen Circumstances**

Contractor is not responsible for any delay caused by natural disaster, war, civil disturbance, labor dispute or other cause beyond Contractor's reasonable control, provided Contractor gives written notice to SolTrans of the cause of the delay within 10 days of the start of the delay.

**24. Ownership of Documents**

A. SolTrans shall be the owner of and shall be entitled to possession of any computations, plans, correspondence or other pertinent data and information gathered by or computed by Contractor prior to termination of this Contract by SolTrans or upon completion of the work pursuant to this Contract.

B. No material prepared in connection with the project shall be subject to copyright in the United States or in any other country.

**25. Notice**

A. Any notice necessary to the performance of this Contract shall be given in writing by personal delivery or by prepaid first-class mail addressed as stated on the first page of this Contract.

B. If notice is given by personal delivery, notice is effective as of the date of personal delivery. If notice is given by mail, notice is effective as of the day following the date of mailing or the date of delivery reflected upon a return receipt, whichever occurs first.

**26. Nonrenewal**

Contractor acknowledges that there is no guarantee that SolTrans will renew Contractor's services under a new contract following expiration or termination of this Contract. Contractor waives all rights to notice of non-renewal of Contractor's services.

**27. SolTrans' Obligation Subject to Availability of Funds**

A. SolTrans' obligation under this Contract is subject to the availability of authorized funds. SolTrans may terminate the Contract, or any part of the Contract work, without prejudice to any right or

remedy of SolTrans, for lack of appropriation of funds. If expected or actual funding is withdrawn, reduced or limited in any way prior to the expiration date set forth in this Contract, or any subsequent Amendment, SolTrans may, upon written Notice to the Contractor, terminate this Contract in whole or in part.

B. Payment shall not exceed the amount allowable for appropriation by the SolTrans Board. If the Contract is terminated for non-appropriation:

i. SolTrans will be liable only for payment in accordance with the terms of this Contract for services rendered prior to the effective date of termination; and
ii. The Contractor shall be released from any obligation to provide further services pursuant to this Contract that are affected by the termination.

C. Funding for this Contract beyond the current appropriation year is conditional upon appropriation by the SolTrans Board of sufficient funds to support the activities described in this Contract. Should such an appropriation not be approved, this Contract will terminate at the close of the current Appropriation Year.

D. This Contract is void and unenforceable if all or part of federal or State funds applicable to this Contract are not available to SolTrans. If applicable funding is reduced, SolTrans may either:

(1) Cancel this Contract; or,
(2) Offer a contract amendment reflecting the reduced funding.

**28. Changes and Amendments**

A. SolTrans may request changes in Contractor's scope of services. Any mutually agreed upon changes, including any increase or decrease in the amount of Contractor's compensation, shall be effective when incorporated in written amendments to this Contract.

B. The party desiring the revision shall request amendments to the terms and conditions of this Contract in writing. Any adjustment to this Contract shall be effective only upon the parties' mutual execution of an amendment in writing.

C. No verbal Contracts or conversations prior to execution of this Contract or requested Amendment shall affect or modify any of the terms or conditions of this Contract unless reduced to writing according to the applicable provisions of this Contract.

**29. Choice of Law**

The parties have executed and delivered this Contract in the County of Solano, State of California. The laws of the State of California shall govern the validity, enforceability or interpretation of this Contract. Solano County shall be the venue for any action or proceeding, in law or equity that may be brought in connection with this Contract.

**30. Waiver**

Any failure of a party to assert any right under this Contract shall not constitute a waiver or a termination of that right, under this Contract or any provision of this Contract.

**31. Conflicts in the Contract Documents**

The Contract documents are intended to be complementary and interpreted in harmony so as to avoid conflict. In the event of conflict in the Contract documents, the parties agree that the document providing the highest quality and level of service to SolTrans shall supersede any

inconsistent term in these documents.

**32. Disbarment or Suspension of Contractor**

A. Contractor warrants that its officers, directors and employees (i) are not currently excluded, debarred, or otherwise ineligible to participate in state or federal transportation related projects and programs; (ii) have not been convicted of a criminal offense related to the provision of consultant services but have not yet been excluded, debarred, or otherwise declared ineligible to participate in state or federal transportation related programs or projects, and (iii) are not, to the best of its knowledge, under investigation or otherwise aware of any circumstances which may result in Contractor being excluded from participation in state or federal transportation related projects or programs.

B. This representation and warranty shall be an ongoing representation and warranty during the term of this Contract and Contractor must immediately notify SolTrans of any change in the status of the representations and warranty set forth in this section.

**33. Execution in Counterparts; Signatures by Facsimile or PDF**

This Contract may be executed in duplicate originals, each of which is deemed to be an original, but when taken together shall constitute one instrument. Facsimile copies or copies delivered via e-mail as a portable document format (pdf) file shall be deemed to be original copies.

**34. Entire Contract**

This Contract, including any exhibits referenced, constitutes the entire agreement between the parties and there are no inducements, promises, terms, conditions or obligations made or entered into by SolTrans or Contractor other than those contained.

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# EXHIBIT D

# CALTRANS/STATE FUNDING CONTRACT PROVISIONS

1. **DATA FURNISHED BY SOLTRANS; CONFIDENTIALITY OF DATA**

All data, reports, surveys, studies, drawings, software (object or source code), electronic databases, and any other information, documents or materials ("SolTrans Data") made available to Contractor by SolTrans for use by Contractor in the performance of its services under this Contract shall remain the property of SolTrans and shall be returned to SolTrans at the completion or termination of this Contract. No license to such SolTrans Data, outside of the Scope of Work of the Project, is conferred or implied by Contractor's use or possession of such SolTrans Data. Any updates, revisions, additions or enhancements to such SolTrans Data made by Contractor in the context of the Project shall be the property of SolTrans and subject to the provisions of this Contract.

All financial, statistical, personnel, technical, or other data and information relative to SolTrans' operations, and designated confidential by SolTrans and made available to the Contractor in order to carry out this contract, shall be protected by the Contractor from unauthorized use and disclosure. Permission to disclose information on one occasion, or at a public hearing held by SolTrans and relating to the contract, shall not authorize Contractor to further disclose such information, or disseminate the same on any other occasion.

The Contractor shall not comment publicly to the press or any other media regarding the contract or SolTrans' actions on the same, except to SolTrans' staff, Contractor's own personnel involved in the performance of the contract, at public hearings or in response to questions from a Legislative Committee. The Contractor shall not issue any news release or public relations item of any nature whatsoever regarding the work performed or to be performed under this Contract without prior review of the contents thereof by SolTrans and receipt of SolTrans' written permission.

Any subcontract entered into as a result of this contract shall be subject to all the provisions of this Section.

2. **OWNERSHIP OF WORK PRODUCTS**

All drawings, designs, specifications, manuals, reports, studies, surveys, models, software, source code and source code documentation, documentation or system architecture and any other documents, materials, data and products (all of which are hereinafter referred to as "Work Products") prepared or assembled and furnished to SolTrans by CONTRACTOR or its subcontractors pursuant to this Contract shall be the property of SolTrans, and copies shall be delivered to SolTrans promptly upon completion of the work or upon an earlier termination of this Contract. CONTRACTOR hereby assigns to SolTrans ownership of all right, title and interest in and to such Work Products, including ownership of the entire copyright in the Work Products. CONTRACTOR also agrees to execute all papers necessary for SolTrans to perfect its ownership of the entire copyright in the Work Products. CONTRACTOR shall be responsible for the preservation of any and all such Work Products prior to transmittal to SolTrans, and CONTRACTOR shall replace any such Work Products as are lost, destroyed, or damaged while in its possession without additional cost to SolTrans.

3. **EQUIPMENT PURCHASES**

To the extent this Contract provides for the purchase of equipment, Contractor agrees to abide by the following:

a. Prior authorization in writing by SolTrans shall be required before the CONTRACTOR enters into any unbudgeted or additional contract, purchase order or subcontract exceeding $5,000, for supplies, equipment or additional Contractor services beyond those contained in the scope of work and cost proposal, if any, and, further, CONTRACTOR shall provide an evaluation to SolTrans of the necessity or desirability or incurring such costs prior to any approval by SolTrans for the additional expenditure(s).

b. For purchase of any item, service or consulting work not covered by CONTRACTOR'S Cost Proposal for which CONTRACTOR seeks reimbursement beyond the Cost Proposal, and which exceed $5,000.00, the CONTRACTOR shall both receive prior authorization from SolTrans including submission of three competitive quotations or adequate justification presented for any absence of such quotations. Any equipment purchased as a result of this contract is subject to the following provision:

> The CONTRACTOR shall maintain an inventory of all nonexpendable property. Nonexpendable property is defined as having a useful life of at least two years and an acquisition cost of $5,000 or more. If the purchased equipment needs replacement and is sold or traded in, SolTrans shall receive proper refund or credit at the conclusion of the contract, or if the contract is terminated, the CONTRACTOR may either keep the equipment and credit SolTrans in an amount to the fair market value, or sell such equipment at the best price obtainable at a public or private sale, in accordance with established SolTrans procedures; and credit SolTrans in an amount equal to the sales price. If the CONTRACTOR elects to keep the equipment, fair market value shall be determined at the CONTRACTOR'S expense, on the basis of a competent independent appraisal of such equipment. Appraisals shall be obtained from an appraiser mutually agreeable to by SolTrans and the CONTRACTOR. If it is determined to sell the equipment, the terms and conditions of such sale must be approved in advance by SolTrans.

4. **SOLICITATION OF CONTRACT**

Contractor warrants that it has not employed or retained any company or persons, other than a bona fide employee working solely for Contractor, to solicit or secure this Contract, and that it has not paid or agreed to pay any company or person other than bona fide employees working solely for Contractor, any fee, commission, percentage, brokerage fee, gift, or any other consideration contingent upon or resulting from the award or making of the Contract. For breach or violation of this warranty, SolTrans shall have the right to terminate the Contract without liability or, at its discretion, the right to deduct from Contractor's maximum payment the full amount of such fee, commission, percentage, brokerage fee, gift or contingent consideration.

# EXHIBIT E

## SPECIAL PROVISIONS RELATED TO FEDERAL FUNDING

(may be altered according to Federal Funding provisions in the RFP)

1. **Energy Conservation** - The contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

2. **Access to Records -** The following access to records requirements apply to this Contract:

   Contractor agrees to provide SolTrans, the FTA Administrator, the Comptroller General of the United States or any of their authorized representatives access to any books, documents, papers and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions. Contractor also agrees, pursuant to 49 C.F.R. 633.17 to provide the FTA Administrator or his authorized representatives including any PMO Contractor access to Contractor's records and construction sites pertaining to a major capital project, defined at 49 U.S.C. 5302(a)1, which is receiving federal financial assistance through the programs described at 49 U.S.C. 5307, 5309 or 5311.

   The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

   The Contractor agrees to maintain all books, records, accounts and reports required under this contract for a period of not less than three years after the date of termination or expiration of this contract, except in the event of litigation or settlement of claims arising from the performance of this contract, in which case Contractor agrees to maintain same until SolTrans, the FTA Administrator, the Comptroller General, or any of their duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto. Reference 49 CFR 18.39(i)(11).

   FTA does not require the inclusion of these requirements in subcontracts.

3. **Federal Changes -** Contractor shall at all times comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Master Agreement between SolTrans and FTA, as they may be amended or promulgated from time to time during the term of this contract. Contractor's failure to so comply shall constitute a material breach of this contract.

4. **No Obligation by the Federal Government -** SolTrans and Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to SolTrans, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

   The Contractor agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

5. **Program Fraud and False or Fraudulent Statements or Related Acts** - The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 et seq. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract or the FTA assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that

if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.

The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a contract connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. § 5307, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5307(n)(1) on the Contractor, to the extent the Federal Government deems appropriate.

The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

6. **Termination -** The following Termination Clauses apply to this contract

Termination for Convenience: SolTrans may terminate this contract, in whole or in part, at any time by written notice to the Contractor when it is in SolTrans' best interest. The Contractor shall be paid its costs, including contract close-out costs, and profit on work performed up to the time of termination. The Contractor shall promptly submit its termination claim to SolTrans to be paid the Contractor. If the Contractor has any property in its possession belonging to SolTrans, the Contractor will account for the same, and dispose of it in the manner SolTrans directs.

Termination for Default: If the Contractor does not deliver supplies in accordance with the contract delivery schedule, or, if the contract is for services, the Contractor fails to perform in the manner called for in the contract, or if the Contractor fails to comply with any other provisions of the contract, SolTrans may terminate this contract for default. Termination shall be effected by serving a notice of termination on the contractor setting forth the manner in which the Contractor is in default. The contractor will only be paid the contract price for supplies delivered and accepted, or services performed in accordance with the manner of performance set forth in the contract.

If it is later determined by SolTrans that the Contractor had an excusable reason for not performing, such as a strike, fire, or flood, events which are not the fault of or are beyond the control of the Contractor, the SolTrans, after setting up a new delivery of performance schedule, may allow the Contractor to continue work, or treat the termination as a termination for convenience.

Opportunity to Cure: The SolTrans in its sole discretion may, in the case of a termination for breach or default, allow the Contractor ten (10) days in which to cure the defect. In such case, the notice of termination will state the time period in which cure is permitted and other appropriate conditions

If Contractor fails to remedy to SolTrans' satisfaction the breach or default of any of the terms, covenants, or conditions of this Contract within ten (10) days after receipt by Contractor of written notice from SolTrans setting forth the nature of said breach or default, SolTrans shall have the right to terminate the Contract without any further obligation to Contractor. Any such termination for default shall not in any way operate to preclude SolTrans from also pursuing all available remedies against Contractor and its sureties for said breach or default.

d. Waiver of Remedies for any Breach In the event that SolTrans elects to waive its remedies for any breach by Contractor of any covenant, term or condition of this Contract, such waiver by SolTrans shall not limit SolTrans' remedies for any succeeding breach of that or of any other term, covenant, or condition of this Contract.

7. **Civil Rights** - The following requirements apply to the underlying contract:

(1) Nondiscrimination - In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 U.S.C. § 12132, and Federal transit law at 49 U.S.C. § 5332, the Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, creed, national origin, sex, age, or disability. In addition, the Contractor agrees to comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.

(2) Equal Employment Opportunity - The following equal employment opportunity requirements apply to the underlying contract:

(a) Race, Color, Creed, National Origin, Sex - In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e, and Federal transit laws at 49 U.S.C. § 5332, the Contractor agrees to comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. Parts 60 et seq., (which implement Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note), and with any applicable Federal statutes, executive orders, regulations, and Federal policies that may in the future affect construction activities undertaken in the course of the Project. The Contractor agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, creed, national origin, sex, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

(b) Age - In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. §§ 623 and Federal transit law at 49 U.S.C. § 5332, the Contractor agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

(c) Disabilities - In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. § 12112, the Contractor agrees that it will comply with the requirements of U.S. Equal Employment Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 C.F.R. Part 1630, pertaining to employment of persons with disabilities. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

(3) The Contractor also agrees to include these requirements in each subcontract financed in whole or in part with Federal assistance provided by FTA, modified only if necessary to identify the affected parties.

8. **Incorporation of Federal Transit Administration (FTA) Terms** - The preceding provisions include, in part, certain Standard Terms and Conditions required by DOT, whether or not expressly set forth in the preceding contract provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1F, are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The Contractor shall not perform any act, fail to perform any act, or refuse to comply with any SolTrans requests which would cause (name of grantee) to be in violation of the FTA terms and conditions.

9. **Disadvantaged Business Enterprises -** This contract is subject to the requirements of Title 49, Code of Federal Regulations, Part 26, *Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs.* The national goal for participation of Disadvantaged

Business Enterprises (DBE) is 10%. SolTrans' overall goal for DBE participation is 2.05 %. A separate contract goal has not been established for this procurement.

The contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this DOT-assisted contract. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as SolTrans deems appropriate. Each subcontract the contractor signs with a subcontractor must include the assurance in this paragraph (*see* 49 CFR 26.13(b)).

The successful bidder/offeror will be required to report its DBE participation obtained through race-neutral means throughout the period of performance.

10. **Subcontractors** The contractor is required to pay its subcontractors performing work related to this contract for satisfactory performance of that work no later than 30 days after the contractor's receipt of payment for that work from SolTrans. In addition, the contractor is required to return any retainage payments to those subcontractors within 30 days after incremental acceptance of the subcontractor's work by SolTrans and contractor's receipt of the partial retainage payment related to the subcontractor's work.

    The contractor must promptly notify SolTrans, whenever a listed subcontractor performing work related to this contract is terminated or fails to complete its work. The contractor may not terminate any listed subcontractor and perform that work through its own forces or those of an affiliate without prior written consent of SolTrans.

11. **Suspension and Debarment -** This contract is a covered transaction for purposes of 49 CFR Part 29. As such, the contractor is required to verify that none of the contractor, its principals, as defined at 49 CFR 29.995, or affiliates, as defined at 49 CFR 29.905, are excluded or disqualified as defined at 49 CFR 29.940 and 29.945.

    The contractor is required to comply with 49 CFR 29, Subpart C and must include the requirement to comply with 49 CFR 29, Subpart C in any lower tier covered transaction it enters into.

    By signing and submitting its bid or proposal, the bidder or proposer certifies as follows:

    The certification in this clause is a material representation of fact relied upon by SolTrans. If it is later determined that the bidder or proposer knowingly rendered an erroneous certification, in addition to remedies available to SolTrans, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment. The bidder or proposer agrees to comply with the requirements of 49 CFR 29, Subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

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# EXHIBIT F

## SOLTRANS/STATE/CALTRANS DBE PROVISIONS

Contractor agrees to include the following requirements in all sub-contracts associated with this Project and to the extent applicable, abide by these reequirements:

**1. Subcontractors**

A. Nothing contained in this Contract or otherwise, shall create any contractual relation between the Agency and any subcontractors, and no subcontract shall relieve the Contractor of his/her responsibilities and obligations hereunder. The Contractor agrees to be as fully responsible to the Agency for the acts and omissions of its subcontractors and of persons either directly or indirectly employed by any of them as it is for the acts and omissions of persons directly employed by the Contractor. The Contractor's obligation to pay its subcontractors is an independent obligation from the Agency's obligation to make payments to the Contractor.

B. Contractor shall pay its subcontractors within ten (10) calendar days from receipt of each payment made to the Contractor by the Agency.

C. Any substitution of subcontractors must be approved in writing by the Agency's Contract Manager in advance of assigning work to a substitute subcontractor.

**2. Disadvantaged Business Enterprise (DBE) Participation (Without Availability Advisory Percentage)**

A. The Agency has not established a DBE Availability Advisory Percentage for this Contract. This Contract is subject to Title 49, Part 26 of the Code of Federal Regulations entitled "Participation By Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs." Bidders who obtain DBE participation on this contract will assist Caltrans in meeting its federally mandated statewide overall DBE goal.

B. DBE and other small businesses (SB), as defined in Title 49 CFR, Part 26 are encouraged to participate in the performance of agreements financed in whole or in part with federal funds. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The contractor shall carry out applicable requirements of 49 CFR, Part 26 in the award and administration of US DOT-assisted agreements. Failure by the contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy as the recipient deems appropriate.

**3. Performance of DBE Contractors, and other DBE Subcontractors/Suppliers**

A. A DBE performs a commercially useful function when it is responsible for execution of the work of the Contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE must also be responsible with respect to materials and supplies used on the Contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, evaluate the amount of work subcontracted, industry practices; whether the amount the firm is to be paid under the Contract is commensurate with the work it is actually performing, and other relevant factors.

B. A DBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, Contract, or Project through which funds are passed in order to obtain the appearance of DBE participation. In determining whether a DBE is such an extra participant, examine similar transactions, particularly those in which DBEs do not participate.

C. If a DBE does not perform or exercise responsibility for at least thirty percent of the total cost of its Contract with its own work force, or the DBE subcontracts a greater portion of the work of the Contract than would be expected on the basis of normal industry practice for the type of work involved, it will be presumed that it is not performing a commercially useful function.

**4. Prompt Payment of Funds Withheld to Subcontractors**

No retainage will be held by the Agency from progress payments due the prime contractor. Any retainage held by the prime contractors or subcontractors from progress payments due subcontractors shall be promptly paid in full to subcontractors within 30 days after the subcontractor's work is satisfactorily completed. Federal law (49 CFR 26.29) requires that any delay or postponement of payment over the 30 days may take place only for good cause and with the agency's prior written approval. Any violation of this provision shall subject the violating prime contractor or subcontractor to the penalties, sanctions and other remedies specified in Section 7108.5 of the Business and Professions Code. These requirements shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise, available to the prime Contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontract performance, or noncompliance by a subcontractor. This provision applies to both DBE and non-DBE prime contractors and subcontractors.

**5. DBE Records**

A. The Contractor shall maintain records of materials purchased and/or supplied from all subcontracts, including those entered into with certified DBEs. The records shall show the name and business address of each subcontractor, DBE or vendor and the total dollar amount actually paid each Subcontractor, DBE or vendor, regardless of tier. The records shall show the date of payment and the total dollar figure paid to all firms. DBE prime contractors shall also show the date of work performed by their own forces along with the corresponding dollar value of the work.

B. Upon completion of the Contract, a summary of these records shall be prepared and submitted on the form entitled, "Final Report-Utilization of Disadvantaged Business Enterprises (DBE)," CEM-2402F (Exhibit 17-F in Chapter 17 of the LAPM), certified correct by the Contractor or the Contractor's authorized representative and shall be furnished to the Contract Manager with the final invoice. Failure to provide the summary of DBE payments with the final invoice will result in twenty-five percent (25%) of the dollar value of the invoice being withheld from payment until the form is submitted. The amount will be returned to the Contractor when a satisfactory "Final Report Utilization of Disadvantaged Business Enterprises (DBE)" is submitted to the Contract Manager.

a. Prior to the fifteenth of each month, the Contractor shall submit documentation to the Agency's Contract Manager showing the amount paid to DBE trucking companies. The Contractor shall also obtain and submit documentation to the Agency's Contract Manager showing the amount paid by DBE trucking companies to all firms, including owner-operators, for the leasing of trucks. If the DBE leases trucks from a non-DBE, the Contractor may count only the fee or commission the DBE receives as a result of the lease arrangement.

b. The Contractor shall also submit to the Agency's Contract Manager documentation showing the truck number, name of owner, California Highway Patrol CA number, and if applicable, the DBE certification number of the truck owner for all trucks used during that month. This documentation shall be submitted on the Caltrans "Monthly DBE Trucking Verification," CEM-2404(F) form provided to the Contractor by the Agency's Contract Manager.

**6. DBE Certification and De-certification Status**

If a DBE subcontractor is decertified during the life of the Contract, the decertified subcontractor shall notify the Contractor in writing with the date of de-certification. If a subcontractor becomes a certified DBE during the life of the Contract, the subcontractor shall notify the Contractor in writing with the date of certification. Any changes should be reported to the Agency's Contract Manager within 30 days.

**When Reporting DBE Participation, Material or Supplies purchased from DBEs may count as follows:**

A. If the materials or supplies are obtained from a DBE manufacturer, 100% of the cost of the materials or supplies will count toward the DBE participation. A DBE manufacturer is a firm that operates or maintains a factory or establishment that produces on the premises, the materials, supplies, articles, or equipment required under the Contract and of the general character described by the specifications.

B. If the materials or supplies are purchased from a DBE regular dealer, count 60% of the cost of the materials or supplies toward DBE goals. A DBE regular dealer is a firm that owns, operates or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the Contract, are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. To be a DBE regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question. A person may be a DBE regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone or asphalt without owning, operating or maintaining a place of business provided in this section.

C. If the person both owns and operates distribution equipment for the products, any supplementing of regular dealers' own distribution equipment shall be by a long-term lease agreement and not an ad hoc or Agreement-by-Agreement basis. Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not DBE regular dealers within the meaning of this section.

D. Materials or supplies purchased from a DBE, which is neither a manufacturer nor a regular dealer, will be limited to the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on the job site, provided the fees are reasonable and not excessive as compared with fees charged for similar services.

**When Reporting DBE Participation, Participation of DBE trucking companies may count as follows:**

A. The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible.

B. The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the Contract.

C. The DBE receives credit for the total value of the transportation services it provides on the Contract using trucks it owns, insures, and operates using drivers it employs.

D. The DBE may lease trucks from another DBE firm including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the Contract.

E. The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by the DBE.

F. For the purposes of this section, a lease must indicate that the DBE has exclusive use and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, as long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

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**ATTACHMENT (ii) TO EXHIBIT G**

**SolTrans Proposer/Bidder-DBE (Contractor Contract) Information**

***This information shall be provided by the successful Proposer/Bidder with the award document.***

**Solano County Transit - SolTrans**
**Standard Professional Services Contract**
**Project: [Enter Solicitation Title]**

☐ **Preliminary Engr. Studies** ☐ **Environmental Document** ☐ **Prelim Design**

☐ **Final Design Right of Way** ☐ **Right of Way Engineering** ☐ **Right of Way Utility Relocation**

☐ **Construction Manag 33ement** ☐ **Construction Engineering** ☐ **Construction**

AGENCY:
LOCATION:
PROJECT DESCRIPTION:
CONTRACT NUMBER:
FEDERAL-AID PROJECT NUMBER:
TOTAL CONTRACT AMOUNT: $
FEDERAL SHARE (For SolTrans to complete) : $
PROPOSAL/BID DATE:
PROPOSER'S/BIDDER'S NAME:
ADVERTISED DBE CONTRACT "Availability Advisory Percentage":

| CONTRACT ITEM NO. | ITEM OF WORK AND DESCRIPTION OR SERVICES TO BE SUBCONTRACTED OR MATERIALS TO BE PROVIDED[2] | DBE Cert. No. AND EXPIRATION DATE | NAME OF DBEs[1] (Must be certified on the date bids are opened - include DBE address and phone number) | DOLLAR AMOUNT DBE |
|---|---|---|---|---|
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| IMPORTANT: Identify all DBE firms being claimed for credit, regardless of tier. Copies of the DBE quotes are helpful. Names of the First-Tier DBE Subcontractors and their respective item(s) of work listed above shall be consistent with the names and items of work in the "List of Subcontractors" submitted with your bid pursuant to the Subcontractors Listing Law and the Special Provisions. | | | Total Claimed Participation | $_____ _____% |

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| | | |
|---|---|---|
| 1. Enter DBE prime and subcontractor's certification number. Prime contractors shall indicate all work to be performed by DBEs including work performed by its own DBE forces.<br><br>2. If 100% of item is not to be performed or furnished by DBE, describe exact portion of item to be performed or furnished by DBE. | | |
| | Signature of Proposer/Bidder | |
| | Date | (Area Code) Tel. No. |
| | Person to Contact | (Please Type or Print) |

CT Bidder - DBE Information (Rev 4/28/06)

Distribution:
(1) Copy - Fax immediately to the Caltrans District Local Assistance Engineer (DLAE) upon award.
(2) Copy - Include in award package to Caltrans District Local Assistance
(3) Original – SolTrans files

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# APPENDIX D1 – PETALUMA TRANSIT COMPLIANCE MATRIX

## APPENDIX D1 – PETALUMA TRANSIT COMPLIANCE MATRIX

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.** | **Central Systems** | | | | |
| **1.1** | **CAD/AVL System Software -** The proposed CAD/AVL System Software shall have been deployed (installed and operational) in at least three (3) similar transit agencies in the United States for a period of not less than three (3) years. | **M** | | | |
| **1.1.1** | **Real-Time Graphical Displays** - System shall include a real-time graphical display for user and dispatch use. | **M** | | | |
| **1.1.1.a** | Import and display of standard format vector, image, and point-based map layers. | **M** | | | |
| **1.1.1.b** | Map layer feature labels provided based upon zoom level or with hover-over by a pointing device. | **M** | | | |
| **1.1.1.c** | Continuous refreshed real-time updates of vehicle location and status. | **M** | | | |
| **1.1.1.d** | Definition of multiple map views and ability to save them at the user | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | level. | | | | |
| **1.1.1.e** | Definition of shared views for use by any dispatcher to be saved in their default set of views. | **M** | | | |
| **1.1.1.f** | Zoom, move, center, and fit to window independent within each map view. | **M** | | | |
| **1.1.1.g** | Filtered map views based upon parameters such as vehicles by route, login status, fleet, and mechanical status. | **M** | | | |
| **1.1.1.h** | Map layer that includes current route traces for each fixed route selected by the operator. | **M** | | | |
| **1.1.1.i** | Options to display different vehicle icon labels per technical requirements. | **M** | | | |
| **1.1.1.j** | Vehicle icons that are configurable and contain context sensitive information. | **M** | | | |
| **1.1.1.k** | Query tools to locate vehicle and routes based upon vehicle, route, or | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | intersection variables. | | | | |
| **1.1.1.l** | Capability to establish voice/data communication by individual vehicle or by banding a group of vehicles together. | **M** | | | |
| **1.1.1.m** | Access to a distance measuring tool. | **M** | | | |
| **1.1.1.n** | Print capabilities of any customized map view. | **M** | | | |
| **1.1.1.o** | Automated focus and continuous vehicle tracking during Emergency Alarm condition. | **M** | | | |
| **1.1.2** | **Route Playback** | | | | |
| **1.1.2.a** | Historical event display shall play back all pertinent historical messages, per technical requirements. | **M** | | | |
| **1.1.2.b** | Playback of these events shall include the ability to perform the following functions: | **M** | | | |
| **1.1.2.b.1** | The display shall be by a sequence of events on a geographic map. | | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.1.2.b.2** | Allow selection by vehicle(s), driver(s), route(s), fleet(s), or run(s) for specific time frames through a query action window. | **M** | | | |
| **1.1.2.b.3** | Configurable speed of replay for moving forward and backward through events. | **M** | | | |
| **1.1.2.b.4** | Graphical representation of event data on a common CAD/AVL map. | **M** | | | |
| **1.1.2.b.5** | Selectable display of map layers including but not limited to stops, streets, routes, points of interest, and geographical attributes. | **M** | | | |
| **1.1.2.b.6** | Text display of attributes of each vehicle event message including messages related to other onboard systems including transit priority requests, farebox alarms, and passenger counts. | **M** | | | |
| **1.1.2.b.7** | Step forward, step backward and pause the historical display of events. | **M** | | | |
| **1.1.2.b.8** | Zoom, move, center, and fit to window views within the map | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | window. | | | | |
| **1.1.2.b.9** | Measuring distance tool. | **M** | | | |
| **1.1.2.b.10** | Vehicle label by number, adherence, route, driver, run, and block. | **M** | | | |
| **1.1.2.b.11** | Vehicle icons that are configurable and display adherence, login status, transfer status, and maintenance status. | **M** | | | |
| **1.1.2.b.12** | Locate vehicles, routes, intersections or objects. | **M** | | | |
| **1.1.2.b.13** | Display route traces. | **M** | | | |
| **1.1.2.b.14** | Date and time messages are logged. | **M** | | | |
| **1.1.2.b.15** | Print the historical display. | **M** | | | |
| **1.1.3** | **Schedule Adherence** | | | | |
| **1.1.3.a** | System shall monitor adherence by comparing current location versus the published schedule for all vehicles. | **M** | | | |
| **1.1.3.b** | Schedule adherence data shall be stored and include parameters for | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | analysis as specified in the technical requirements. | | | | |
| **1.1.3.c** | Both the time of arrival and departure at all scheduled timepoints shall be accurately recorded and stored. | **M** | | | |
| **1.1.3.d** | The Agency shall be responsible for providing the schedule data used by the Contractor provided scheduling software interface to the CAD/AVL system. The Agency shall perform any stop and route geo-surveys required using Contractor supplied tools. The Contractor shall provide adequate training prior to the start of this activity in accordance with the project schedule. | **M** | | | |
| **1.1.3.e** | Real-time (predictive to the next time point, which shall include all stops) schedule adherence shall be displayed for dispatchers and made available to customer information applications. | **M** | | | |
| **1.1.3.f** | System shall identify vehicles predicted to be running early or late by predefined time parameters and | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | shall report on both graphical and tabular displays. | | | | |
| **1.1.3.g** | Schedule adherence parameters shall be able to be set differently by route with separate early and late user supplied values. | **M** | | | |
| **1.1.3.h** | Schedule adherence display will be shown to the Operator regardless of dispatcher selectable parameters. | **M** | | | |
| **1.1.3.i** | Schedule adherence from the vehicle shall be calculated, transmitted, and stored regardless of the onboard display setting. | **M** | | | |
| **1.1.4** | **Route Adherence** | | | | |
| **1.1.4.a** | Provide off-route status to the Operator and transmit a notification to be displayed at the dispatch workstation. | **M** | | | |
| **1.1.4.b** | The off-route notification displays shall display next stop when vehicle is off-route. | **M** | | | |
| **1.1.4.c** | The off-route distance value shall be | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | a user definable parameter. | | | | |
| **1.1.4.d** | System shall identify off-route distance from assigned route or deviation from corridor of travel. | **M** | | | |
| **1.2** | **CAD/AVL System Hardware** | | | | |
| **1.2.1** | Contractor shall provide a turnkey, central system including all necessary hardware – see technical requirements. | **M** | | | |
| **1.2.2** | Contractor shall supply all hardware required for networking and communications for the system – see technical requirements. | **M** | | | |
| **1.2.3** | The CAD/AVL system shall also consist of a backup or mirrored server that will take over operations should the main server fail. The mirrored server shall enable failover operations to be carried out in a seamless manner requiring minimal manual intervention. | **M** | | | |
| **1.2.4** | **CAD/AVL Servers** | | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.2.4.a** | The Contractor shall submit a complete list of required IT equipment for the CAD/AVL System at the System Design Review stage. These requirements and specifications may be refined and finalized as part of System Design Review. The minimum computer server requirements are identified in the technical requirements. | **M** | | | |
| **1.2.5** | **CAD/AVL Workstations** | | | | |
| **1.2.5.a** | All workstations shall use Dynamic Host Configuration Protocol (DHCP) for IP address assignment, unless otherwise approved by the Agency. | **M** | | | |
| **1.2.5.b** | The Contractor shall provide and implement hardware for the Agency with capacity adequate to support the Agency's applications and other Contractor applications involved in the solution, maps, data, and associated files required for operation, with 100% expansion capacity of the specified hardware. | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.2.5.c** | New workstations shall meet or exceed each Agency's current standard workstation specifications. | **M** | | | |
| **1.2.5.d** | Workstations for Petaluma Transit shall be Dell Optiplex 7010, Intel i7, 6GB RAM, 1TB hard drive or approved equivalent. | | | | |
| **2.** | **System Data Communications** | | | | |
| **2.1** | Set up radio/cellular data gateway to allow incoming and outgoing messages between the system and MDT's to be transmitted using the Agency-specific radio/cellular data communications system. | **M** | | | |
| **2.2** | The system shall allow data packets to be sent over the network from the vehicles to the central system and from the central system to the vehicles anywhere where there is a private radio system or cellular signal present. | **M** | | | |
| **2.2.1** | Vehicle location shall be received by the Central CAD/AVL system at least once every 20 seconds (polling rate) for display and storage | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | purposes and every 5 seconds during an Emergency Alarm situation. | | | | |
| **2.3** | The contractor is responsible for arranging appropriate communication protocols with the Agency-preferred cellular providers. Petaluma Transit is using their Private Radio Network and Verizon for redundancy. | **M** | | | |
| **2.4** | **Wireless Local Area Network (WLAN)** | | | | |
| **2.4.1** | Complete or bi-directional bulk data transfer software is provided for transfer of data between vehicles on mobile data system and the central system. | **M** | | | |
| **2.4.2** | The bulk data transfer system shall be capable, at minimum, of the following tasks: | **M** | | | |
| **2.4.2.a** | Downloading software updates/patches and configuration data for onboard devices. | **M** | | | |
| **2.4.2.b** | Downloading all updated schedule and trigger zone locations data required for operation of the VLU | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | firmware. | | | | |
| **2.4.2.c** | Uploading vehicle components monitoring configuration data. | **M** | | | |
| **2.4.2.d** | Downloading updated trigger zones locations and announcement sign messages for automated annunciation systems on-board announcements. | **M** | | | |
| **2.4.2.e** | Uploading revenue transactions data from fareboxes. | **O** | | | |
| **2.4.2.f** | Allowing for the uploading of other on-board logged data when received. | **M** | | | |
| **2.4.2.g** | The software shall be configurable to determine frequency and types of data transfers. | **M** | | | |
| **2.4.2.h** | Automated system bulk transfers shall occur and be validated automatically – see technical requirements for specifics. | **M** | | | |
| **2.4.2.i** | Once communications is established with the VLU, the bulk data transfer system shall automatically determine which required file transfers remain | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | to be completed and initiate them. | | | | |
| **2.4.2.j** | A validation process shall ensure multiple attempts are made to complete all required file transfers until the file transfer is successfully completed. | **M** | | | |
| **2.4.2.k** | The system shall be able to complete a file transfer using a sequence of ad-hoc partial file transfers while the VLU is temporarily connected with the mobile data communications system. | **M** | | | |
| **2.4.2.l** | **WLAN Access Points** | | | | |
| **2.4.2.l.1** | The Contractor shall provide a WLAN controller. The WLAN controller and wireless APs shall support the functions outlined in the technical requirements | **M** | | | |
| **2.4.2.l.2** | The contractor shall provide wireless Access Point coverage at each Agency's bus maintenance facilities to enable WLAN connectivity for data exchange between the VLU and central system via a Bulk Data | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | Transfer. | | | | |
| **2.4.2.l.3** | The WLAN coverage area available for bulk data transfer at each Bus Maintenance Facility shall include the area where the vehicles are to be parked. | **M** | | | |
| **2.4.2.l.4** | The Contractor shall review the plans for the Bus Maintenance Facility and design the optimal locations for the APs including the orientation of antennas to satisfy all bulk data transfer requirements. | **M** | | | |
| **2.4.2.l.5** | The VLU shall authenticate and connect automatically when vehicles enter Wi-Fi zone. | **M** | | | |
| **2.4.2.l.6** | WLAN equipment shall be outdoor-rated. See technical requirements for specific code requirements. | **M** | | | |
| **2.4.2.l.7** | Lightning arrestors shall be installed to vendor specifications on all exterior APs. | **M** | | | |
| **2.4.2.l.8** | The WLAN equipment shall be IEEE 802.11i compliant or be Wi-Fi Protected Access 2 (WPA2) certified | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | by the Wi-Fi Alliance with AES encryption. | | | | |
| **2.4.2.l.9** | Each single AP shall have a minimum 2x3, Dual Frequency, MIMO configuration. | **M** | | | |
| **2.4.2.l.10** | The APs shall support 5.0 GHz frequencies. The APs shall be capable of supporting multiple SSID's and assign separate SSID's to separate VLANs. | **M** | | | |
| **2.4.2.l.11** | The APs shall be able to support WMM (Wi-Fi multimedia). | **M** | | | |
| **2.4.2.l.12** | Installation shall be coordinated with Agency project manager with Agency clearance. | **M** | | | |
| **2.4.2.m** | **Antennas** | | | | |
| **2.4.2.m.1** | Antenna(s) shall be installed for cell data, GPS and WLAN. The antenna(s) shall support the ranges identified in the technical requirements. | **M** | | | |
| **2.4.2.m.2** | Petaluma Transit will require additional antennas for private radio | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | operating in the 400 or 500 MHz range. | | | | |
| **2.5** | **Remote and Mobile Access to Central Software** | | | | |
| **2.5.1** | Road Supervisors shall be capable of having remote access to the central CAD/AVL system through a mobile workstation (laptop). Relevant real-time information shall be gathered and transmitted to the mobile workstation through the CAD/AVL cellular data network. The mobile station shall be provided with a cellular data card. | **M** | | | |
| **2.5.2** | Provide map-based GUI for remote/mobile access per the technical requirements. | **M** | | | |
| **2.5.3** | The GUI shall be browser-based, or employ an application installed on the local workstation. | **M** | | | |
| **2.5.4** | The GUI shall be the same as the one used by Dispatchers, but with the ability to limit functionality as defined below. | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **2.5.5** | To reduce the amount of cellular data used, the GUI shall be configurable to only show selected vehicles. | **M** | | | |
| **2.5.6** | Vehicles shall be selectable by ID, pre-defined groups, routes, and pre-defined geographic distance. | **M** | | | |
| **2.5.7** | The laptops shall support text messaging to the dispatchers. The Contractor shall provide recommended laptop specifications and the Agency's will provide the hardware. | **M** | | | |
| **2.5.8** | The laptops shall have access to the internet, Microsoft Outlook, and Agency software applications. | **M** | | | |
| **2.5.9** | The laptops shall allow the road personnel to monitor and respond to incidents including covert alarms and file incident reports. | **M** | | | |
| **2.5.10** | The Contractor shall provide sufficient documentation and instructions for installing software such that Agency staff can perform the installation in the event of a | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | laptop replacement or upgrade. | | | | |
| **3** | **On-board Equipment and Systems** | | | | |
| **3.1** | All on-board equipment shall be new and designed for use in the transit industry rated to applicable industrial and vehicle standards. See technical requirements. | **M** | | | |
| **3.2** | Equipment shall be the latest model in current production, as offered to commercial trade, and shall conform to transit industry requirements. | **M** | | | |
| **3.3** | The contractor shall represent that all equipment offered under these specifications is new. | **M** | | | |
| **3.4** | Contractor shall demonstrate that all equipment has been installed and operational for at least three other CAD/AVL systems for a period of not less than three (3) years. | **M** | | | |
| **3.5** | All equipment shall be constructed in accordance with best commercial practice, with such practices described in the associated design documentation. At a minimum, the | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | design and installation construction shall provide for: | | | | |
| **3.5.1** | Reliable and stable operation; | **M** | | | |
| **3.5.2** | Minimum maintenance and alignment procedures, with a minimum of special tools; | **M** | | | |
| **3.5.3** | Minimum number and variety of assemblies and spare parts; | **M** | | | |
| **3.5.4** | Maximum attention to human factors, engineering, and ergonomic design; and | **M** | | | |
| **3.5.5** | Simplified design and rapid fault isolation to reduce the requirement for maintenance personnel. | **M** | | | |
| **3.5.6** | All parts shall be made of corrosive resistant material. | **M** | | | |
| **3.5.7** | All parts shall be constructed with materials and quality suited to the intended use and shall use modular design wherever feasible | **M** | | | |
| **3.5.8** | Functionally identical modules and assemblies shall be interchangeable | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | per the technical requirements. | | | | |
| **3.5.9** | Functionally non-identical modules shall not be and shall not appear to be interchangeable. | **M** | | | |
| **3.5.10** | All modules and assemblies shall be connected using standardized durable, positive-locking, and indexed quick disconnect fasteners. | **M** | | | |
| **3.5.11** | Equipment, assemblies, and components shall be identified by a permanently affixed part number and/or serial number. | **M** | | | |
| **3.5.12** | Features identifying software module version within that device shall be provided on each device. | **M** | | | |
| **3.5.13** | All equipment shall provide a usable life of not less than 15 years. | **M** | | | |
| **3.5.14** | Onboard equipment shall utilize most current microprocessor technology. | **M** | | | |
| **3.5.15** | Compatibility between current and future on-board equipment systems shall be maintained, including due to | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | chip end-of-life issues. | | | | |
| **3.5.16** | All on-board equipment shall have a minimum 40,000 hours Mean Time Between Failures (MTBF). | **M** | | | |
| **3.5.17** | Internal (to the onboard equipment) batteries shall not be used to maintain parameter information in onboard equipment when it is in its powered down state. See technical requirements for real-time clock exception. | **M** | | | |
| **3.5.18** | The system shall check the battery state and create a warning message if the battery needs to be replaced. Onboard equipment shall be capable of being disassembled to fit through a coach door that is a minimum of 24 inches wide by 60 inches tall. | **M** | | | |
| **3.5.19** | Onboard equipment, including all exterior connectors and exposed ports, shall be rated for International Electrotechnical Commission (IEC) standard 60529, IP 54 for interior equipment, IP 65 for exterior equipment and designed for use in an industrial and mobile environment | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | subjected to dirt, water, oil, and cleaning solvents. | | | | |
| **3.5.20** | If existing vehicle wiring, switches, or contact points are used, testing shall occur to certify that the wiring, switches, or contact points are in an acceptable state and suitable for reuse. | **M** | | | |
| **3.5.21** | Data transferred from a device shall not be purged or written over until a successful transfer is confirmed. | **M** | | | |
| **3.5.22** | In the event the transfer is not successful and the system is unable to re-attempt a transfer, it shall revert to the previous version of the data automatically and without corruption. Any data transfer failure shall be logged, alerted, and recorded. | **M** | | | |
| **3.5.23** | Devices shall include functionality to extract data directly from the device using a laptop computer in the event of a transfer failure (for any reason). Tools and processes shall be provided. | **M** | | | |

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| **3.5.24** | Equipment shall be properly grounded, with onboard equipment connected as directly as possible to the chassis ground. | **M** | | | |
| **3.5.25** | Onboard equipment shall operate from the vehicle electrical system, between 9 and 35 volts. | **M** | | | |
| **3.5.26** | Onboard equipment shall be securely mounted in the interior of the vehicle, clear of obstructions and interference-generating devices. | **M** | | | |
| **3.5.27** | Customer-facing equipment shall meet or exceed all ADA requirements per technical requirements. | **M** | | | |
| **3.5.28** | Installations shall be performed at specific times as approved by the Agency. | **M** | | | |
| **3.5.29** | The agencies reserve the right to allow less of its vehicle fleet to be out of service if necessary in order to avoid disruption to revenue service in conjunction with maintenance requirements. | **M** | | | |

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| **3.5.30** | The Contractor shall ensure that all vehicles made available for overnight installation work are ready for revenue service by the start of the next service day. | **M** | | | |
| **3.5.31** | Onboard equipment shall not interfere with Petaluma Transit's existing Cradlepoint/Verizon on board passenger wifi systems. | **M** | | | |
| **3.6** | **Vehicle Logic Unit (VLU)** | | | | |
| **3.6.1** | The CAD/AVL system shall include a VLU on each vehicle to serve as a central processing unit, memory, data storage, and vehicle software. | **M** | | | |
| **3.6.2** | VLU shall interface with vehicle's on-board equipment and support communications via a mobile wireless communications network with the central servers. | **M** | | | |
| **3.6.3** | The VLU shall meet environmental and vibration standards (MIL-STD-810D, NEMA-4) as well as appropriate electromagnetic immunity standards (SAE 1455 and ESD J1112/13) and protect against | **M** | | | |

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| | surge, and reverse polarity. | | | | |
| **3.6.4** | The VLU shall be of proven design (at least three other similar transit agency deployments for at least three years) and easy to install and replace. | **M** | | | |
| **3.6.5** | The VLU shall be capable of multiple radio control, real time updates and messaging to and from the vehicle. | **M** | | | |
| **3.6.6** | The VLU shall meet communication requirements for leased cellular communications, meshed wireless networks, private radio, as well as interfaces for current and future onboard equipment. | **M** | | | |
| **3.6.7** | Overall system interfaces shall include RS232, RS485 with busy line, TTL, SAE J1708, SAE J1939, USB, Ethernet, TCP/IP, discrete inputs and outputs, odometer, spare I/O pins, audio inputs and outputs, and full IDE capability for PC-type devices. | **M** | | | |

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| **3.6.8** | Capability for automatic vehicle monitoring via J1708/1939 provided by the vehicle shall be included. | **M** | | | |
| **3.6.9** | Indication shall be provided for quick inspection of operation to indicate radio keyed, wireless network operating, software operational, proper voltage range, and ignition on. | **M** | | | |
| **3.6.10** | Data storage capacity shall also be sufficient to store at least five operating days worth of passenger counts and all event messages in the case where data communications are disrupted. | **M** | | | |
| **3.6.11** | The VLU shall support functionality of the following data sets, and must have sufficient non-volatile memory to simultaneously store at least the following: | **M** | | | |
| **3.6.11.a** | Entire set of current schedule data, including school, non-school, and Holiday schedule platforms; | **M** | | | |
| **3.6.11.b** | Twenty (20) weeks of incremental schedule changes, for current | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | schedule; | | | | |
| **3.6.11.c** | Entire set of future schedule data (i.e., next run-board); | **M** | | | |
| **3.6.11.d** | Entire set of required AVA announcements; | **M** | | | |
| **3.6.11.e** | Fifty-two (52) weeks of incremental AVA announcements, for current schedule; | **M** | | | |
| **3.6.11.f** | Five (5) days of Automatic Passenger Count (APC) data records; | **M** | | | |
| **3.6.11.g** | Destination sign errors; | **M** | | | |
| **3.6.11.h** | Current configuration data; | **M** | | | |
| **3.6.11.i** | Future configuration data; | **M** | | | |
| **3.6.11.j** | Current firmware; | **M** | | | |
| **3.6.11.k** | Future firmware; | **M** | | | |
| **3.6.11.l** | Any other data recording needs identified in this RFP; | **M** | | | |

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| **3.6.11.m** | 100% memory spare storage for growth, summing above requirements. | **M** | | | |
| **3.6.12** | CAD/AVL system configuration settings related specifically to the vehicle shall be stored in the vehicle's configuration module. See technical requirements for functionality. | **M** | | | |
| **3.6.13** | Each VLU shall have a unique IP address for purposes of participating in the wireless network and for remote monitoring. | **M** | | | |
| **3.6.14** | VLU shall be compatible with all on-board equipment options. | **M** | | | |
| **3.6.15** | The VLU shall integrate seamlessly with the Mobile Access Router (MAR), including the VLU providing a feed of GPS data to the MAR. | **M** | | | |
| **3.6.16** | The VLU shall act as the central processor, data storage, and device manager for all onboard devices integrated under this Contract. | **M** | | | |

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| **3.6.17** | The contractor shall coordinate with the agencies the final location of VLU installation on each different vehicle type and configuration, subject to approval from the agencies. | **M** | | | |
| **3.6.18** | The VLU shall include at minimum the following ports and interfaces: | **M** | | | |
| **3.6.18.a** | Two (2) opto-isolated SAE J1708: one (1) for transit devices, and one (1) for drivetrain; | **M** | | | |
| **3.6.18.b** | Opto-isolated SAE J1939 for drivetrain; | **M** | | | |
| **3.6.18.c** | Ethernet; | **M** | | | |
| **3.6.18.d** | Universal Serial Bus (USB); | **M** | | | |
| **3.6.18.e** | RS-232 as an additional option to SAE J1708 for communication with the destination signs; and | **M** | | | |
| **3.6.18.f** | Other ports and interfaces as required for specific device-to-device communications. | **M** | | | |

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| **3.6.19** | The VLU shall manage power to listed onboard devices as follows: | **M** | | | |
| **3.6.19.a** | The VLU shall have a configurable parameter of 0 to 180 minutes that controls the power down of the VLU, MDT, and MAR after the vehicle master ignition switch is turned to "off". | **M** | | | |
| **3.6.19.b** | The VLU shall inform all managed devices to initiate a graceful power-down ofself and the MDT (including if necessary automatically logging off the VLU) between 0 to 30 minutes before power-down is activated and shall inform the MAR to do so. | **M** | | | |
| **3.6.19.c** | Upon reaching the power-down threshold, the VLU shall remove power from all connected devices, and itself. | **M** | | | |
| **3.6.19.d** | Upon the vehicle master ignition switch being turned to anything other than "off", the vehicle shall apply or maintain power to all connected devices, and also reset the timer unless ignition sense is again | **M** | | | |

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| | active. | | | | |
| **3.6.19.e** | If the vehicle operator has not logged off, the system shall automatically log off, prior to power down activation. | **M** | | | |
| **3.6.20** | The VLU shall process AVL data and correlate it with operator ID, date, time (both 24 hour system clock and 36 hour service day clock), run, block, route, trip, and location. | **M** | | | |
| **3.6.21** | The VLU shall manage all communications processes and devices on the vehicle, and shall store any accumulated data and logs. | **M** | | | |
| **3.6.22** | The VLU shall reconcile any discrepancies between all the different sensors and position inputs it uses for AVL purposes – see technical requirements. | **M** | | | |
| **3.6.23** | The VLU shall process and manage the transmission of data to/from the central system as follows: | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.23.a** | Routine data including: schedule adherence, vehicle location data, passenger count, peak passenger load, messaging and communications requests, and event information on an event or periodic basis, via the data communications system. | **M** | | | |
| **3.6.23.b** | Priority data including priority messages, and alarms on an immediate basis, via the data communications system. | **M** | | | |
| **3.6.23.c** | Onboard equipment configuration data updates, non-critical logged or accumulated data, and other "batch" data, via the WLAN. | **M** | | | |
| **3.6.24** | The VLU shall be responsible for initiating and verifying the successful completion of data transfers, and shall not delete data until a successful transfer has been completed and confirmed. | **M** | | | |
| **3.6.25** | In the event of an uncompleted file transfer, the VLU shall reinitiate the file transfer in accordance with the | **M** | | | |

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| | technical requirements. | | | | |
| **3.6.26** | The VLU shall manage the downloading of new configuration data that may include schedule updates, AVA announcement updates, firmware/configuration updates, as follows: | **M** | | | |
| **3.6.26.a** | The VLU shall maintain current and one set of future configuration data that will automatically become the current configuration data once the defined activation date has arrived. | **M** | | | |
| **3.6.26.b** | The VLU shall periodically check for configuration updates whenever it is within WLAN coverage. | **M** | | | |
| **3.6.26.c** | If a configuration data update is available, the VLU shall manage the download process and update other onboard equipment (the VLU shall provide a message on the MDT that a download and update is occurring so that the operator is aware). | **M** | | | |
| **3.6.26.d** | The VLU shall automatically install updated firmware or configuration data it has received into the VLU, | **M** | | | |

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| | the destination sign and the AVA system. | | | | |
| **3.6.26.e** | To minimize potential impacts on pull-out, the VLU shall include functionality to download only the schedule information on startup. Functionality shall be provided to manage the download of more voluminous data (such as a firmware or configuration update) so that it is only downloaded and installed on shutdown or during non-operating hours. | **M** | | | |
| **3.6.26.f** | If the VLU is unable to complete the download of configuration data via the WLAN, it shall continue using the previous configuration data. | **M** | | | |
| **3.6.27** | The VLU must monitor and log, tagged with time and location, the following existing discrete external circuits: | **M** | | | |
| **3.6.27.a** | Front door and Rear door, open and close; | **M** | | | |
| **3.6.27.b** | Kneel, and return from kneel (raise); | **M** | | | |

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| **3.6.27.c** | Lift or Ramp deploy, and return from deploy (stow); | **M** | | | |
| **3.6.27.d** | "Stop Requested" activation; | **M** | | | |
| **3.6.27.e** | Headlight activation and deactivation; | **M** | | | |
| **3.6.27.f** | Turn Signals, activation and deactivation; | **M** | | | |
| **3.6.27.g** | Hazard Lights, activation and deactivation; | **M** | | | |
| **3.6.27.h** | Master-Run switch, change in status (Off, Day-Run, Night-Run, Park); | **M** | | | |
| **3.6.27.i** | Ignition, activation and deactivation; | **M** | | | |
| **3.6.27.k** | Covert Alarm switch activation; | **M** | | | |
| **3.6.27.l** | Selected dashboard light activations for vehicle maintenance monitoring (e.g. oil pressure, check engine light, tire pressure); | **M** | | | |
| **3.6.27.m** | Motion start; | **M** | | | |
| **3.6.27.n** | Not in motion/idle. | **M** | | | |

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| **3.6.28** | The VLU shall include functionality and external interfaces to provide location, time, and/or triggering messages to other on-vehicle systems. | **M** | | | |
| **3.6.29** | The VLU shall include functionality to re-transmit data in the event of an unsuccessful transmission. | **M** | | | |
| **3.6.30** | The VLU shall run diagnostics and report any problems with onboard components (including the VLU itself, MDT, voice radio, AVL components, and destination sign). | **M** | | | |
| **3.6.31** | The VLU shall automatically recognize any system process failure or lock-up, log the problem and attempt a restart. | **M** | | | |
| **3.6.32** | If restart of the process fails, notification shall be sent to the operator via the MDT and logged the event in the VLU data for upload at the end of the day. | **M** | | | |
| **3.6.33** | The VLU shall support remote diagnostics that allow central system access to check operations and | **M** | | | |

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| | functionality of the VLU. See technical requirements. | | | | |
| **3.6.34** | In addition to providing routine position updates, the VLU shall record date, time and location when the following events occur: | **M** | | | |
| **3.6.24.a** | Arrival into and departure from agency configurable geographic areas that define the stops, timepoints, and pull-out/pull-in locations (for these events the current schedule adherence shall also be recorded); | **M** | | | |
| **3.6.24.b** | Every activation and deactivation of each monitored onboard circuit, including: Door open/close, Kneel/Raise, Lift/Ramp deploy/stow, Stop-Requested light, Turn Signals; | **M** | | | |
| **3.6.24.c** | First stop/timepoint of the first trip; and | **M** | | | |
| **3.6.24.d** | Every toggling of operational conditions, including: operator key-press on MDT, off-route and return-to-route, early/late schedule adherence and return-to-on-time | **M** | | | |

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| | status, operator over-ride of destination sign. | | | | |
| **3.6.35** | The VLU shall monitor diagnostic information for the Transit J1708, and log the following statistics upon every change in logon status or ignition status: | **M** | | | |
| **3.6.35.a** | By Module Identification (MID): Time of last good received packet, Total good received packets, Total good transmitted packets. | **M** | | | |
| **3.6.35.b** | Total bad (collision/checksum) packets received. | **M** | | | |
| **3.6.25.c** | Total bad (collision/checksum) packets transmitted. | **M** | | | |
| **3.6.36** | The VLU shall monitor diagnostic information for connected onboard systems, and log the following statistics upon every change in logon status or ignition status: | **M** | | | |
| **3.6.36.a** | Data Communication Statistics (Total: Polls, Transmits, Re-Transmits, Receives, Errors, | **M** | | | |

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| | Fallback, etc); | | | | |
| **3.6.36.b** | Navigation Quality (Time, Duration, Good GPS Navigation, Good Alternate Navigation, Poor Navigation, etc); | **M** | | | |
| **3.6.36.c** | All current VLU configuration data; | **M** | | | |
| **3.6.36.d** | Odometer Statistics, since previous record (total traveled distance, current calibration factor); and | **M** | | | |
| **3.6.36.e** | WLAN Statistics, since previous record (VLU awake time, WLAN coverage time, data packets sent, data packets received, file transmissions/receptions attempted per file, file transmissions/receptions completed per file). | **M** | | | |
| **3.6.36.f** | All received text messages that were displayed to an operator | **M** | | | |
| **3.6.36.g** | All instances of lost data communications coverage exceeding 15 seconds once back in communications for more than ten (10) seconds. | **M** | | | |

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| **3.6.37** | The VLU schedule data shall include agency configurable geographic areas (i.e., trigger boxes), and will initiate special VLU functions. | **M** | | | |
| **3.6.37.a** | Examples include: Change external destination sign; Initiate Transit Signal Priority (TSP) status change (enable/disable/activate/deactivate); Initiate AVA announcements and/or "clears"; Indicate locations where GPS is known to be degraded. | **M** | | | |
| **3.6.37.b** | The system shall enable the agency to maintain the trigger boxes within the scheduling database, independently without need for any software changes. | **M** | | | |
| **3.6.37.c** | The system shall support the creation, deletion, and relocation of trigger boxes and the designation or adjustment of the VLU action to be taken upon entering or exiting the trigger box. | **M** | | | |
| **3.6.38** | The VLU shall use AVL data to determine schedule adherence in real-time on the vehicle, without the need for central computation and | **M** | | | |

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| | communications. | | | | |
| **3.6.39** | The VLU shall be fully operational within 90 seconds of power restoration for warm starts, and 150 seconds for cold starts under the full range of ambient conditions. | **M** | | | |
| **3.6.40** | Logged data shall be stored in non-volatile memory, and shall not become corrupted due to any power condition, including: spike, drop, or loss. | **M** | | | |
| **3.7** | **Mobile Data Terminal** | | | | |
| **3.7.1** | The MDT shall be a rugged computing device designed for operation in a transit environment and shall function as the interface between the operator and all onboard components. | **M** | | | |
| **3.7.2** | MDT data storage shall be solid state. | **M** | | | |
| **3.7.3** | MDT shall have a color liquid crystal display (LCD) touch-screen. | **M** | | | |

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| **3.7.4** | MDT shall be operable while wearing gloves. | **M** | | | |
| **3.7.5** | MDT shall be readable by operators wearing polarized lenses. | **M** | | | |
| **3.7.6** | The MDT shall be legible for the color blind. | **M** | | | |
| **3.7.7** | MDT shall be readable in direct sunlight and must offer low-glare setting for night operation. | **M** | | | |
| **3.7.8** | MDT touch-screen shall have a video graphics array (VGA) resolution of at least 640 x 480 pixels. | **M** | | | |
| **3.7.9** | MDT shall display vehicle status including data transmission, pending messages, and communication mode. | **M** | | | |
| **3.7.10** | MDT shall be capable of providing aural tones to indicate incoming messages to operators while keeping operator attention on the road. | **M** | | | |
| **3.7.10.a** | Logon | **M** | | | |

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| **3.7.10.b** | Emergency Alarm | **M** | | | |
| **3.7.10.c** | Data Messaging | **M** | | | |
| **3.7.10.d** | Transfer Notification | **M** | | | |
| **3.7.10.e** | Schedule Adherence | **M** | | | |
| **3.7.10.f** | Headsigns | **M** | | | |
| **3.7.10.g** | Fare Collection | **M** | | | |
| **3.7.10.h** | Passenger Count | **M** | | | |
| **3.7.10.i** | Maintenance | **M** | | | |
| **3.7.10.j** | Stop Announcement | **M** | | | |
| **3.7.10.k** | Trip/Schedule | **M** | | | |
| **3.7.10.l** | Route | **M** | | | |
| **3.7.10.m** | Direction | **M** | | | |
| **3.7.11** | When the power is turned on, the MDT software shall automatically perform a power-on self-test, followed by configuring and initializing the MDT to the user- | **M** | | | |

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| | specified default values. | | | | |
| **3.7.12** | The MDT shall be self-restarting and shall not become unresponsive and require manual restarts to continue operations. The MDT shutdown process will be controlled by the MDT software and shall only be possible when the ignition is in the off position. | **M** | | | |
| **3.7.13** | A user specified shutdown delay shall be provided to continue operations and to initiate the shutdown procedure that shall automatically close all files, save values, and send a shutdown message to be recorded in the CAD/AVL system. | **M** | | | |
| **3.7.14** | An on-board covert microphone shall be included for communication between dispatcher and operator – refer to technical requirements for location requirements. | **M** | | | |
| **3.7.15** | Wheelchairs lifts and ramps shall be monitored and data shall be recorded for each cycle. | **M** | | | |

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| **3.7.16** | MDT shall display warning to operator and dispatcher workstation and shall transmit to central system if wheelchair lift was not cycled prior to leaving garage. All messages and warning shall be stored. | **M** | | | |
| **3.7.17** | MDT shall display a warning if logon has not occurred following vehicle movement of predefined distance per technical requirements. Warning shall be transmitted to CAD/AVL system for storage and display at dispatcher station. | **M** | | | |
| **3.7.18** | A logon process shall be provided for maintenance purposes to enable a vehicle to be moved through-out a facility for servicing and maintenance purposes without triggering alarms. | **M** | | | |
| **3.7.19** | MDTs shall be capable of remote log-on/log-off via the data communications connection. | **M** | | | |
| **3.7.20** | MDT shall have the “safe driving” mode enabled when the vehicle is moving above a configurable speed | **M** | | | |

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| | limit. | | | | |
| **3.7.21** | The safe driving mode shall allow the agency to stop vehicle operators from interacting with MDTs when driving, the MDT shall allow enabling of the following screen configurations under safe driving mode: | **M** | | | |
| **3.7.21.a** | Blank display on the screen; | **M** | | | |
| **3.7.21.b** | Disabled MDT buttons to stop vehicle operators from performing any actions on the screen; and | **M** | | | |
| **3.7.21.c** | Display of information relevant to vehicle operators when of high priority (e.g., route and schedule adherence status, missed messages or calls from dispatchers). | **M** | | | |
| **3.7.22** | Dispatch shall have the ability to remotely change the configurations for the safe driving mode. | **M** | | | |
| **3.7.23** | Dispatch shall be able to change the safe driving mode configurations by vehicle operator login. For example, the safe driving mode could be | **M** | | | |

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| | disabled for maintenance or training purposes. | | | | |
| **3.7.24** | The MDT shall allow two way text messaging between the transit vehicles and dispatch using a set of predefined messages, or free form text messaging. | **M** | | | |
| **3.7.25** | The MDT shall support the display of text messages longer than can fit on one line of the display. A minimum of 40 canned messages shall be supported. | **M** | | | |
| **3.7.26** | The MDT shall store multiple messages received from dispatch and indicate those text messages that are unread. | **M** | | | |
| **3.8** | **Mobile Access Router (MAR)** | | | | |
| **3.8.1** | Shall support both wireless and wired switched Ethernet Local Area Network (LAN) functionality, as well as multiple wireless Wide Area Network (WAN) links and a gateway. | **M** | | | |

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| **3.8.2** | MAR shall be a separate device from the VLU and MDT. | **M** | | | |
| **3.8.3** | MAR shall be equipped with a minimum of 1 GB of internal data storage capacity. | **M** | | | |
| **3.8.4** | MAR shall include a minimum of two (2) USB 2.0 connections through which USB enabled devices such as a portable computer or solid state memory can be connected. | **M** | | | |
| **3.8.5** | MAR shall include a minimum of eight (8) switched Ethernet ports. | **M** | | | |
| **3.8.6** | The wireless data communications device shall be easily replaceable to accommodate potential future adaptation to different wireless WAN link services. | **M** | | | |
| **3.8.7** | MAR shall incorporate a LAN Ethernet multiport switch capability to interconnect CAD/AVL onboard system components and existing onboard Ethernet enabled equipment. | **M** | | | |

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| **3.8.8** | MAR shall support the following wireless data services: | **M** | | | |
| **3.8.8.a** | 3G and 4G WAN, including LTE | **M** | | | |
| **3.8.8.b** | 802.11n Wi-Fi WLAN | **M** | | | |
| **3.8.8.c** | Act as a WLAN access point capable of enabling LAN access from public WLAN client devices within the bus interior, supporting the 802.11n WLAN standard and on a separate subnet firewalled from the onboard Ethernet switched LAN. | **M** | | | |
| **3.8.9** | The MAR shall be integrated with onboard CAD/AVL components and other existing onboard Ethernet enabled systems per technical requirements. | **M** | | | |
| **3.8.10** | The MAR and all WLAN communications shall support Wi-Fi Protected Access 2 (WPA2) security and communications protocols, or alternate approved through the design review process. | **M** | | | |
| **3.9** | **Global Positioning System (GPS)** | | | | |

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| **3.9.1** | AVL module shall provide a derived location using an onboard GPS receiver and other location determination devices (gyroscope, odometer, etc.) per technical requirements. | **M** | | | |
| **3.9.2** | Vehicle location shall be determined by a navigation algorithm – refer to technical requirements. | **M** | | | |
| **3.9.3** | Other location determination devices other than GPS shall automatically calibrate and require no operator or maintenance personnel intervention for daily usage. | **M** | | | |
| **3.9.4** | Proper operation of the onboard systems relying on location reporting shall not be interrupted for vehicles leaving from an enclosed storage area. | **M** | | | |
| **3.9.5** | The GPS antenna shall be a low-profile unit housed in a rugged and weather tight enclosure. The GPS antenna shall be securely mounted and sealed on the exterior of the vehicle, clear of obstructions, and clear of interference from other | **M** | | | |

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| | generating devices or 91 Radio Frequency interference. | | | | |
| **3.9.6** | The GPS system shall provide a spare NMEA-based GPS output. | **M** | | | |
| **3.9.7** | GPS system shall meet cold and warm acquisition and current position update times per technical requirements. The GPS system shall include multi-path rejection capabilities to help eliminate inaccurate signals caused by reflections off of buildings or other structures. | **M** | | | |
| **3.9.8** | Vehicle location shall be transmitted at least once every 20 seconds (polling rate) to the central CAD/AVL system for display and storage purposes and every 5 seconds during an Emergency Alarm situation. | **M** | | | |
| **3.9.9** | The AVL shall at all times provide current position information to the VLU per technical requirements. | **M** | | | |
| **3.9.10** | GPS delay time from location acquisition to formatting for | **M** | | | |

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| | transmission shall not exceed one (1) second. | | | | |
| **3.9.11** | The GPS system shall store the most recent location to provide as the "last known good" location in the event that location reporting is interrupted. | **M** | | | |
| **3.9.12** | Location messages transmitted to dispatch shall indicate messages status as current or "last known verified". | **M** | | | |
| **3.10** | **Automatic Passenger Counters** | | | | |
| **3.10.1** | The APC system shall be integrated with the AVL system to provide the Agency with time, location, and on-off counts. | **M** | | | |
| **3.10.3** | The APC shall be designed to operate in accordance with these specifications for ambient temperatures from -20 °F to 140°F. | **M** | | | |
| **3.10.4** | Equipment shall withstand without damage being stored for extended periods in ambient temperatures from -40°F (-40°C) to 158°F | **M** | | | |

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| | (+70°C). | | | | |
| **3.10.5** | The APC system devices shall be designed to withstand the vibration and shock forces associated with transit vehicles. | **M** | | | |
| **3.10.6** | The APC system device shall be sealed against dust and water intrusion, certified in compliance with or exceeding the NEMA4x or IP65 standard. Equipment shall be tested and proven capable of withstanding power transients, electromagnetic interference and radio frequency interference without degradation at levels encountered in typical transit operations. | **M** | | | |
| **3.10.7** | Power and communications lines and the chassis the units shall be tested and proven resistant to electrostatic discharges from personnel in accordance with accepted industry procedures for testing computer equipment. | **M** | | | |
| **3.10.8** | The APC system shall be capable of being locally configured using a laptop computer, portable | **M** | | | |

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| | programming device or wireless device. | | | | |
| **3.10.9** | The chosen method may also be used for performing routine diagnostic maintenance. | **M** | | | |
| **3.10.10** | Each component/module/subsystem distinctly defined in the proposed APC system shall be replaceable as a discrete unit, identified by a unique serial number or other contractor proposed method. | **M** | | | |
| **3.10.11** | The APC system shall be interfaced with a wheelchair lift sensor and bike rack sensor in order to record the number of wheelchair lift and bike rack operational cycles at each stop. | **M** | | | |
| **3.10.12** | APC shall record the door opening, the number of boarding and alighting passengers for each doorway and the number of wheelchair lift or bicycle rack activations, and door closing at each stop. Refer to technical requirements for methods. | **M** | | | |

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| **3.10.13** | Each data record shall either be in real time, or by post processing match the APC system data to the stop identification, trip number, route pattern, vehicle ID, time and date recorded in the central database. | **M** | | | |
| **3.10.14** | APC system shall accommodate at least 72 hours of APC data. | **M** | | | |
| **3.10.15** | APC data stored on board shall use non-volatile storage so that a power supply is not required to retain the data. | **M** | | | |
| **3.10.16** | Utility software shall be provided, for use on a laptop computer connected via a suitable (serial or Ethernet connection) to either the APC system, vehicle logic unit which supports calibration of the doorway sensors and review of stored data records. | **M** | | | |
| **3.10.17** | APC data shall be uploaded as initiated by central system via the WLAN bulk data transfer system. | **M** | | | |
| **3.10.18** | The APC subsystem shall not erase or allow the overwriting of data | **M** | | | |

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| | records until confirmation is received from the central system that the data records were successfully received. | | | | |
| **3.10.19** | Equipment shall conform to the Federal Communication Commission (FCC) Part 15 Class A limits for conducted and radiated emissions of electromagnetic interference and radio frequency interference. | **M** | | | |
| **3.10.20** | Equipment shall withstand shock and vibration forces typical to transit operations. | **M** | | | |
| **3.11** | **Emergency Alarms** | | | | |
| **3.11.1** | When a covert alarm signal is received from a vehicle, the CAD/AVL software shall display the event in the performance queue to all dispatchers with configurable visual alerting methods. | **M** | | | |
| **3.11.2** | The CAD/AVL software shall provide a configurable audible and visual alert to all dispatchers, road supervisors, and others using the | **M** | | | |

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| | CAD/AVL software. | | | | |
| **3.11.3** | The CAD/AVL software shall notify the dispatcher in the performance queue that a silent alarm message has been received using an Agency-approved visual notification method. | **M** | | | |
| **3.11.4** | Once a dispatcher selects the covert alarm event, this shall be so indicated to that dispatcher and all others. | **M** | | | |
| **3.11.5** | When acknowledging an alarm the CAD/AVL software shall zoom and center the map display on the alarming vehicle and locate the nearest road supervisor vehicle when selected by a dispatcher. The scale for the zoom shall be configurable by the Agency. | **M** | | | |
| **3.11.6** | The CAD/AVL software shall allow dispatchers to downgrade emergency alarms to a lower message priority, or upgrade lower priority messages to an emergency alarm. The CAD system shall log all alarm status changes (create, upgrade, | **M** | | | |

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| | downgrade, and cancel). | | | | |
| **3.11.7** | Activation of an emergency message shall place the vehicle in a priority status for frequency of location and message updates which will result in vehicle location and status updates at a rate that is configurable by the Agency. | **M** | | | |
| **3.12** | **Automatic Vehicle Announcements (AVA)** | | | | |
| **3.12.1** | The AVL central software shall be used to generate and manage next stop, customer, and other announcements, manage device configurations, generate reports, and manage device fault reporting and logs. | **M** | | | |
| **3.12.2** | The AVA central software shall meet or exceed requirements of the United States Access Board. | **M** | | | |
| **3.12.3** | The AVA central software shall include functionality to import route and stop data from an external system via Agency file(s) per technical requirements. | **M** | | | |

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| **3.12.4** | The AVA central software shall include the capability to announce all or only selected stops per technical requirements. | **M** | | | |
| **3.12.5** | Location based stop announcement triggers shall be configurable by the Agency for any stop announcement. | **M** | | | |
| **3.12.6** | Stops to be announced shall be set through system configuration data managed by the Agency. | **M** | | | |
| **3.12.7** | The AVA central software shall include the ability to customize announcements per technical requirements (i.e. add, link, etc.). | **M** | | | |
| **3.12.8** | Content of the AVA announcements shall be configurable and shall include the minimum messages types: | **M** | | | |
| **3.12.8.a** | Cross-street only | **M** | | | |
| **3.12.8.b** | Current street and cross-street | **M** | | | |
| **3.12.8.c** | Landmark | **M** | | | |

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| **3.12.8.d** | Transfer opportunities | **M** | | | |
| **3.12.8.e** | Bus Stop Name | **M** | | | |
| **3.12.8.f** | Service announcements | **M** | | | |
| **3.12.9** | The AVA central software shall include the ability for the Agency to independently configure audio and text messages associated with a specific stop. | **M** | | | |
| **3.12.10** | The AVA central software shall include the ability to append a standard message header to all messages per technical requirements. Different headers shall be available for different types of announcements. The AVA central software shall support English at a minimum plus any other languages as required by the Agency. | **M** | | | |
| **3.12.11** | The AVA central software shall enable creating audio messages using both text-to-speech synthesized and recorded voice. Voice files shall be MP3 or WAV format as required by technical | **M** | | | |

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| | requirements. | | | | |
| **3.12.12** | The AVA central software shall be able to create composite announcements that combine synthesized and recorded announcement segments. | **M** | | | |
| **3.12.13** | The AVA central software speech engine shall be a modular component that allows the Agency to independently replace it at a later date without other system changes. | **M** | | | |
| **3.12.14** | The AVA central software shall be configurable by the Agency so that external announcements may be set for activation on any route. External announcements shall include at minimum: | **M** | | | |
| **3.12.14.a** | Route number. | **M** | | | |
| **3.12.14.b** | Route name. | **M** | | | |
| **3.12.14.c** | Destination. | **M** | | | |
| **3.12.14.d** | Direction. | **M** | | | |

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| **3.12.14.e** | Branch. | **M** | | | |
| **3.12.14.f** | Route Type. | **M** | | | |
| **3.12.15** | The AVA central software shall be configurable so that external announcements can be made less frequently, only at specified stops or not at all. | **M** | | | |
| **3.12.16** | The AVA central software shall allow specific volume levels to be configured for individual stops, times of day and/or sections of routes. | **M** | | | |
| **3.12.17** | The AVA central software shall be able to configure external announcements to repeat without operator interaction at any or all stops at a time interval configurable by the Agency. | **M** | | | |
| **3.12.18** | The database of announcement messages shall associate stops with message data for each trip pattern. | **M** | | | |
| **3.12.19** | The AVA central software shall enable incremental updates of onboard message data on an as- | **M** | | | |

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| | needed basis. | | | | |
| **3.12.20** | The user interface for entry/deletion/modification of messages shall be easy to use, and shall associate all messages with a trip pattern. | **M** | | | |
| **3.12.21** | The system shall accept the addition, deletion, or movement (from one trip pattern to another) of stop association data. | **M** | | | |
| **3.12.22** | The database shall support direct SQL interfaces. | **M** | | | |
| **3.12.23** | Each message shall have a unique identifier, defined by the Agency. | **M** | | | |
| **3.12.24** | The AVA central software shall include look-up tables to associate messages entered through the workstation with the message identifier. | **M** | | | |
| **3.12.25** | Creation or deletion of a message shall not change the identifiers of the other messages. | **M** | | | |

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| **3.12.26** | Provisions shall be included to rebuild the message database and identifiers on a periodic basis. (e.g., after there have been a significant number of message additions and deletions). | **M** | | | |
| **3.12.27** | The AVA central software shall provide means to record and generate announcement audio and to define message-stop associations. | **M** | | | |
| **3.12.28** | The AVA central software shall be installed on a desktop PC or server supplied by the Agency, accessible by multiple clients or workstations if on a server, and configured with required hardware and operating system software. | **M** | | | |
| **3.12.29** | Internal single line LED headsigns shall be provided | **M** | | | |
| **3.13** | **Single Point Log-On** | | | | |
| **3.13.1** | Vehicle logic unit should allow for single point of logon for all onboard equipment including headsigns, APC system, the AVA system, and other | **M** | | | |

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| | integrated devices. | | | | |
| **3.13.2** | The single point logon shall log onto the other on-board equipment or override the current logon to those other devices. | **M** | | | |
| **3.13.3** | The central system should recognize that the vehicle is ready to commence its assigned work, has started work and completed work for the day. | **M** | | | |
| **3.14** | **Not Used** | | | | |
| **3.14.1** | Not Used | | | | |
| **3.14.2** | Not Used | | | | |
| **3.14.3** | Not Used | | | | |
| **3.14.4** | Not Used | | | | |
| **3.15** | **Destination Headsign Interface** | | | | |
| **3.15.1** | Existing destination signs shall interface with the VLU, which shall automatically provide sign codes for every route and direction change | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | during revenue service. | | | | |
| **3.15.2** | Firmware updates needed to the destination headsigns and any subcontracting for support services needed from the destination headsign vendor shall occur during interfacing of this system. | **M** | | | |
| **3.15.3** | The MDT shall be capable of changing the destination headsign and providing codes for the operator to manually determine the selection of destinations and to manually input codes when the CAD/AVL system is down. | **M** | | | |
| **3.16** | **Connection Protection** | | | | |
| **3.16.1** | The Contractor shall provide an option for the CAD/AVL system to provide and operate in conjunction with the Mobile Data Terminal software to provide Transfer Connection Protection (TCP). | **M** | | | |
| **3.16.2** | TCP shall be triggered when an incoming fixed route operator makes a transfer for a specific outgoing route, which the vehicle operator | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | enters via the Mobile Data Terminal. | | | | |
| **3.16.3** | The system shall, without any need for dispatcher intervention, hold the outgoing vehicle to allow the connection, if it would not need to be held more than a configurable time based on the estimated arrival time of the incoming vehicle. | **M** | | | |
| **3.16.4** | The system shall notify the outgoing vehicle via the Mobile Data Terminal if it is to hold, until what time and for what route. | **M** | | | |
| **3.16.5** | The dispatcher shall be able to review current pending transfers, including the incoming and outgoing vehicles involved, and the time the incoming vehicle is expected to arrive at the transfer. | **M** | | | |
| **3.16.6** | The dispatcher shall have the ability to intervene and override as necessary in the operation of transfers. | **M** | | | |
| **3.17** | **Video System Interface** | | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.17.1** | The VLU shall be interfaced with the existing video system (Seon, Trooper 2 Generation) including the digital video recorders (DVR) on-board. The Contractor shall be entirely responsible for developing and integrating this interface. | **M** | | | |
| **3.17.2** | The VLU to DVR interface shall be accessible using the MDT. | **M** | | | |
| **3.17.3** | VLU shall be able to store alarms that are received from the DVR. | **M** | | | |
| **3.17.4** | The VLU shall send an update message to the MDT when there is an alarm received from the DVR. | **M** | | | |
| **3.17.5** | The VLU shall provide a discrete signal to the DVR when an emergency alarm is generated by the operator. | **M** | | | |
| **3.17.6** | The CAD/AVL software shall support the ability to tag an incident record with an index or link to specific video frame(s)/snippets in the future. | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.17.7** | The VLU shall send alert to dispatch and maintenance if the DVR is not functioning properly. | **M** | | | |
| **3.18** | **Farebox Interface** | | | | |
| **3.18.1** | The VLU shall be interfaced with the existing GFI Fareboxes. | **O** | | | |
| **3.18.2** | Interface completion shall include any firmware updates needed to the fareboxes and any subcontracting for support services needed from the farebox vendor. | **O** | | | |
| **3.18.3** | The VLU to farebox interface shall support farebox logon using the MDT. | **O** | | | |
| **3.18.4** | MDT logon shall logon to the farebox or override the current logon on the farebox. | **O** | | | |
| **3.18.5** | The VLU shall send an update message to the farebox when there is a change to the block, route, trip, operator, or fareset. | **O** | | | |
| **3.18.6** | VLU shall send the current location upon request message from the | **O** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | farebox. | | | | |
| **3.18.7** | VLU shall be able to store farebox alarms received from the farebox. | **O** | | | |
| **3.18.8** | Data records transmitted from the farebox to the CAD/AVL system shall use synchronous time and location stamping to support central system reporting functions that combine farebox data with data from other systems (e.g. CAD/AVL, APC) – for example, fares collected by stop location. | **O** | | | |
| **3.19** | **Transit Signal Priority** | | | | |
| **3.19.1** | The Contractor shall provide an option for future Transit Signal Priority (TSP) integration. | **O** | | | |
| **3.19.2** | The VLU shall be interfaced with the TSP unit via a J1708 cable, J1939 cable or Ethernet to be installed and connected to the TSP unit by the Contractor. The Contractor shall be entirely responsible for completing this interface, including any firmware updates needed to the TSP emitter and any subcontracting for | **O** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | support services needed from the TSP emitter vendor. (Option) | | | | |
| **3.19.3** | The VLU shall be able to activate and deactivate a third party TSP emitter device using a J1708 or J1939 connection. (Option) | **O** | | | |
| **3.19.4** | The VLU shall be able to activate and deactivate the TSP unit based on schedule adherence, on a command from the central system, or by pre-defined trigger points set in the GIS data. (Option) | **O** | | | |
| **3.19.5** | The VLU shall log all TSP emitter activations/deactivations on-board the vehicle, including data, time, GPS location, route, vehicle ID, and direction. These logs shall be available either through a system reporting function or through the WLAN communications with the vehicle. (Option) | **O** | | | |
| **3.19.6** | The VLU shall only enable Transit Signal Priority functionality when the vehicle is logged into revenue service, with on-route status, and within a defined geographic area. | **O** | | | |

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| | (Option) | | | | |
| **3.19.7** | Central system shall allow for a valid TSP polygon area to be defined, updated, and downloaded to each vehicle VLU through the WLAN. (Option) | **O** | | | |
| **3.20** | **Transit Automatic Vehicle Monitoring** - | | | | |
| **3.20.1** | Automatic Vehicle Monitoring (AVM) System shall be included as an option. | **O** | | | |
| **3.20.2** | Automatic Vehicle Monitoring (AVM) shall collect data on revenue-vehicle drive-train performance, CAD/AVL subsystem health warnings, pre run checklist completion, and discrete alarms in order to identify problems, improve maintenance, and reduce vehicle breakdowns. | **O** | | | |
| **3.20.3** | AVM data triggered by operating conditions beyond pre-defined threshold shall be reported in real-time to the CAD/AVL system and | **O** | | | |

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| | stored for reporting purposes. | | | | |
| **3.20.4** | Standard AVM reports and user query tools shall be supplied for easy access to the stored data. | **O** | | | |
| **3.20.5** | AVM drive-train data and mechanical alarms shall be collected from the installed Engine Control Module provided by the vehicle's manufacturer and/or the installed Multiplexer I/O system. | **O** | | | |
| **3.20.6** | Alarms shall be transmitted over the CAD/AVL data radio for real-time display to maintenance users. | **O** | | | |
| **3.20.7** | The AVM data messages and alarms shall be stored for analysis and interface to the Agency's Vehicle Maintenance System. | **O** | | | |
| **3.20.8** | Up to twelve (12) user defined discrete inputs shall be provided to monitor mechanical alarms. | **O** | | | |
| **3.20.9** | System shall monitor the Emergency Alarm, low oil pressure, hot engine, and low air pressure. | **O** | | | |

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| **3.20.10** | System shall allow user/Agency to define and connect unused discrete inputs for future requirements. | **O** | | | |
| **4.** | **Dispatch and Data Reporting** | | | | |
| **4.1** | **Text Messaging** | | | | |
| **4.1.1** | Messages shall be capable of being grouped into categories for quick selection. | **M** | | | |
| **4.1.2** | Canned message categories and message text shall be user definable. | **M** | | | |
| **4.1.3** | The operator and dispatcher shall be able to reply to a message in the queue in either a canned response or free-form text message. | **M** | | | |
| **4.1.4** | A text message shall support an acknowledgement message back to dispatch once the driver has viewed a message flagged by dispatch as requiring acknowledgement. | **M** | | | |
| **4.1.5** | Text messages shall be either deleted or saved by the Operator after viewing. Storage for saved text messages shall handle a minimum of | **M** | | | |

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| | eight messages. | | | | |
| **4.2** | **Automated Recording and Archiving** | | | | |
| **4.2.1** | The CAD/AVL system shall store the position and tracking of the transit vehicles in some form of database. | **M** | | | |
| **4.2.2** | Database shall include ability to query the data with different parameters for performance and safety improvements. | **M** | | | |
| **4.2.3** | Data shall be stored in a database for planning and evaluation purposes. The specific requirements shall be decided by the Agency and should include an assessment of the following: | **M** | | | |
| **4.2.3.a** | Length of time AVL data is to be stored | **M** | | | |
| **4.2.3.b** | The sampling rate AVL data is to be stored (i.e. at every minute, at every stop). | **M** | | | |
| **4.3** | **Real-time, Reporting, and Archival Data** | | | | |

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| **4.3.1** | System shall provide the Agency the right to access, use, and distribute data to create interfaces to the CAD/AVL system, export data to other agencies and third party licensed systems, generate reports, and for other Agency purposes. | **M** | | | |
| **4.3.2** | Access to real-time operating data shall not be affected by the Agencies reporting and data access by user groups other than dispatchers and supervisors. | **M** | | | |
| **4.3.3** | Proper safeguards shall also be enabled to ensure dispatcher and supervisors cannot overload the primary database server with faulty or ill-designed queries. | **M** | | | |
| **4.3.4** | If required, a secondary database server that takes the processing load off of the primary real time database shall be provided for the purpose of data retrieval for reporting and data analysis. | **M** | | | |
| **4.3.5** | Enough online data storage shall be provided to keep at least three (3) | **M** | | | |

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| | years of historical data. | | | | |
| **4.3.6** | Applications and tools shall be provided for historical data access. | **M** | | | |
| **4.3.7** | Provisions shall be provided to save data and database schema more than three years old to long term storage media such as magnetic tape, CD, DVD, etc. and delete the archived data from the main or secondary database(s). | **M** | | | |
| **4.3.8** | Provisions shall be provided to restore data by copying archived data from long term storage to either a stand-alone database machine or onto the current database(s). | **M** | | | |
| **4.3.9** | Archiving data shall be possible by either a graphical user interface or via the command line for automating tasks. | **M** | | | |
| **4.4** | **Daily Schedules** | | | | |
| **4.4.1** | The CAD/AVL system shall automatically load the daily schedule of blocks, runs, driver/operator assignments, and vehicle | **M** | | | |

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| | assignments. | | | | |
| **4.4.2** | The CAD/AVL system shall support an overlap of daily schedules for service that continues past midnight. | **M** | | | |
| **4.4.3** | The CAD/AVL system shall support multiple service types to accommodate service variations at the route and trip level per technical requirements. | **M** | | | |
| **4.4.4** | Each schedule day shall permit assignment of multiple service types. | **M** | | | |
| **4.5** | **Incident Reports** | | | | |
| **4.5.1** | The CAD/AVL system shall provide an integrated Incident Reporting subsystem per technical requirements. | **M** | | | |
| **4.5.2** | Incident types and the association of data messages to incident types shall be user definable. | **M** | | | |
| **4.5.3** | A form creation editor shall be provided that provides the CAD/AVL System Administrator the capability to create property- | **M** | | | |

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| | specific customized incident forms that are accessible to dispatchers and other users of the CAD/AVL system. | | | | |
| **4.5.4** | Forms shall be created and associated with incident types. | **M** | | | |
| **4.5.5** | Every new Incident Report shall be uniquely identified and the associated Incident Report form displayed for completion. | **M** | | | |
| **4.5.6** | Incident forms shall include data fields supported and auto-populated by the CAD/AVL system as well as user defined fields per the technical requirements. | **M** | | | |
| **4.5.7** | User definable fields shall be implemented such that custom fields do not inhibit upgrades to software. | **M** | | | |
| **4.5.8** | Incident forms shall include a combination of automatically filled in data fields and manually entered data fields. Upon creation of an incident report all known CAD/AVL data shall be "pre-populated" or automatically entered into the | **M** | | | |

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| | configured incident form fields. | | | | |
| **4.5.9** | An open Incident Report Queue shall be provided for each dispatcher logged into the CAD/AVL system along with information about dispatcher responsibility. All Incident Reports must be closed or responsibility transferred prior to the dispatcher logging off. | **M** | | | |
| **4.5.10** | The current date, time, and user ID shall be stamped to indicate information that is added to an Incident Report after the original owner of the Incident Form has closed the incident. | **M** | | | |
| **4.5.11** | Incident Reports shall provide the following capabilities: | **M** | | | |
| **4.5.11.a** | Incident Forms shall have the option to be required for specific incident types. | **M** | | | |
| **4.5.11.b** | If a message requiring an Incident Form is deleted the CAD/AVL system shall generate the form and mark it as CAD/AVL generated. | **M** | | | |

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| **4.5.11.c** | Incident Reports shall provide access to a spell checker. | **M** | | | |
| **4.5.11.d** | Incident Reports shall be capable of being forwarded to individuals or groups of individual electronically. | **M** | | | |
| **4.5.11.e** | Incident reports shall have the capability to be displayed online for at least twelve months for any new, open, or closed Incident Report. | **M** | | | |
| **4.5.11.f** | Incident Reports shall be able to be queried based upon CAD/AVL variables such as open/closed status, date range, incident type, dispatcher ID, Operator ID, Route, or vehicle ID. | **M** | | | |
| **4.5.11.g** | Mechanical, breakdown, and vehicle switch out Incident Reports shall provide an interface to the Maintenance system to document the incident for maintenance action. | **M** | | | |
| **5** | **Scheduling System** | | | | |
| **5.1** | The Contractor shall convert the existing route and stop databases from each of the agencies to import | **M** | | | |

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| | that data in the proposed schedule software database. | | | | |
| **5.2** | The scheduling system shall also have the ability to import stop data from an external system in excel or comma separated value (CSV) file format | **M** | | | |
| **5.3** | The scheduling system or CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) using a GTFS feed. | **M** | | | |
| **5.4** | The system shall have the capability to create and define an unlimited number of bus stops and nodes. | **M** | | | |
| **5.5** | The system shall be able to create new routes and update exiting routes. | **M** | | | |
| **5.6** | The system shall be able to create new patterns and update existing patterns, including time points and stops. | **M** | | | |
| **5.7** | The system shall permit the user to define bus stops using a variety of methods, as identified in the | **M** | | | |

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| | technical requirements. | | | | |
| **5.8** | The system shall be capable of allowing stops to be properly positioned at intersections. | **M** | | | |
| **5.9** | The system shall be capable of allowing the user to assign stop amenities (e.g., bench, shelter, etc.) to each stop and other supplemental data. | **M** | | | |
| **5.10** | The system shall allow any number of trip patterns to be defined as distinct bus stop sequences, as identified in the technical requirements. | **M** | | | |
| **5.11** | The system shall be capable of displaying all trip patterns, or fixed portions of flexible trip patterns, on a map for visual display. | **M** | | | |
| **5.12** | The system shall be capable of calculating distances for deadhead route segments, entire trip patterns, and selected trip pattern segments defined by the user. | **M** | | | |

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| **5.13** | The system shall allow the definition of average running speeds, for various days and time periods, for deadhead segments and between designated pairs of stops along each trip pattern. | **M** | | | |
| **5.14** | The system shall be able to generate a list of turning movements for an entire trip pattern. | **M** | | | |
| **5.15** | The system shall allow routes to be defined as a sequence of trips using selected trip patterns during defined time periods. | **M** | | | |
| **5.16** | **System Viewing** | | | | |
| **5.16.1** | The system shall allow the viewing of pattern statistics, as identified in the technical requirements. | **M** | | | |
| **5.16.2** | View a pattern's route adherence along a route or corridor. | **M** | | | |
| **5.17** | **Creation of Timetables** | | | | |
| **5.17.1** | The system shall be capable of rotating the extra board | **M** | | | |

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| | automatically. | | | | |
| **5.17.2** | The system shall be capable of calculating the running time between any pair of timepoints on any trip pattern, taking into account running speeds. The system shall also allow running times to be manually input if needed, such as for deviated/flexible route segments. | **M** | | | |
| **5.17.3** | The system shall be capable of automatic or manual trip building for each route, using the designated sequence of trip patterns, per the technical requirements. | **M** | | | |
| **5.17.4** | The system shall permit users to automatically or manually assign trip numbers. | **M** | | | |
| **5.17.5** | The system shall allow for modifying built trips, based on modifying a single trip pattern, all trips in a single direction or a combination of the above. | **M** | | | |
| **5.17.6** | The system shall permit authorized users to assign specific vehicle types | **M** | | | |

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| | to trips. | | | | |
| **5.17.7** | The system shall be capable of computing deadhead time, including the effect of varying running speed in various time periods. | **M** | | | |
| **5.17.8** | The system shall provide summary data on trips and running times, per the technical requirements. | **M** | | | |
| **5.18** | **Vehicle Assignment** | | | | |
| **5.18.1** | The system shall be capable of either automatic or manual vehicle block development based on user-defined variables, per the technical requirements. | **M** | | | |
| **5.18.2** | The system shall allow users to automatically or manually assign block numbers. | **M** | | | |
| **5.18.3** | The system shall be capable of developing potential interline relationships for the entire service or based on the user selecting specific routes or trips. | **M** | | | |

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| **5.19** | **Runcutting** | | | | |
| **5.19.1** | The system shall be capable of cutting single-piece or multi-piece work assignment runs, per the technical requirements. | **M** | | | |
| **5.19.2** | The system shall allow users to automatically or manually assign run numbers. | **M** | | | |
| **5.19.3** | The system shall generate runs that incorporate all applicable agency labor agreement provisions. | **M** | | | |
| **5.19.4** | The system shall generate runs that incorporate agency management rules. | **M** | | | |
| **5.19.5** | The system shall provide a notification flag when a manual or automatically generated runcut violates a management rule or labor agreement provision. | **M** | | | |
| **5.19.6** | The system shall allow for the development of alternative runcut scenarios, per the technical requirements. | **M** | | | |

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| **5.19.7** | The system shall allow the shifting of trip relief times (stated in block tables) to optimize runcuts. | **M** | | | |
| **5.19.8** | The system shall allow the user to specify compressed work weeks (e.g., 4 day work weeks, 10 hour days). | **M** | | | |
| **5.19.9** | The system shall permit the agency to manually cut some or all of the blocks. | **M** | | | |
| **5.20** | **Rostering and Bid Management** | | | | |
| **5.20.1** | The system shall support both roster and cafeteria style bids. | **M** | | | |
| **5.20.2** | The system shall be able to create and maintain rosters including the extra board. | **M** | | | |
| **5.20.3** | The system shall be capable of building bid rosters automatically. | **M** | | | |
| **5.20.4** | The system shall permit users to automatically or manually assign roster numbers. | **M** | | | |

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| **5.20.5** | The system shall have the capability to take into account special service in effect for selected dates (e.g., holidays). | **M** | | | |
| **5.20.6** | The system shall allow agency staff to establish rules on which rostering suggested by the system will be based. | **M** | | | |
| **5.20.7** | The system shall have the capability to create separate rosters for various groups of vehicle operators (e.g., part-time rosters). | **M** | | | |
| **5.20.8** | The system shall have the capability to validate the transitions between rosters for two consecutive bid periods. | **M** | | | |
| **5.20.9** | The system shall have the capability to automatically generate one roster at a time or all rosters. | **M** | | | |
| **5.20.10** | The system shall allow agency staff to access human resources information that has been imported into the system for any bus driver (optional). | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **5.20.11** | The system shall validate driver choices to determine whether each driver meets minimum rest time requirements between runs. | **M** | | | |
| **5.20.12** | The system shall validate driver choices to determine whether each driver meets requirements for minimum/maximum assigned work load. | **M** | | | |
| **5.20.13** | The system shall be able to associate a driver to a specific roster or rosters. | **M** | | | |
| **5.20.14** | The system shall generate work on a nightly basis from the schedule's bids. | **M** | | | |
| **5.20.15** | The nightly generation shall generate work a user-defined number of days into the future. | **M** | | | |
| **5.20.16** | Extra board items shall be included. | **M** | | | |
| **5.20.17** | Report Generation errors or rule violations that occur during schedule generation shall be identified. | **M** | | | |
| **5.21** | **Schedule Validation** | | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **5.21.1** | Schedule Validation must allow the user to review different aspects of the schedule and validate the schedule against a set of rules. | **M** | | | |
| **5.21.2** | All additions, omissions, time modifications, conflicts and errors shall be propagated through the rest of the schedule and be validated against a set of rules developed by the agency. | **M** | | | |
| **5.21.3** | Conflicts or errors associated with the changes must be highlighted in the application and noted to the agency. | **M** | | | |
| **6** | **Data Management** | | | | |
| **6.1** | The CAD/AVL system should include data management software to manage the entry, and manipulation of data and automate reporting for performance monitoring. | **M** | | | |
| **6.2** | The data management system should integrate with the scheduling software and facilitate easy National Transit Database (NTD) reporting. | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **6.3** | The system shall be capable of establishing automatic daily, weekly, monthly, quarterly routines to produce and email standard PDF reports to defined user groups. | **M** | | | |
| **6.4** | Standard reports shall be developed through the design review process, and shall include at minimum: | **M** | | | |
| **6.4.1** | Schedule Adherence (by stop or timepoint) | **M** | | | |
| **6.4.2** | Passenger Loadings and Alightings (by stop and capacity) | **M** | | | |
| **6.4.3** | Daily Revenue | **M** | | | |
| **6.4.4** | Missed Trips | **M** | | | |
| **6.4.5** | Stop Time Analysis | **M** | | | |
| **6.4.7** | Layover/Recovery | **M** | | | |
| **6.4.8** | In-service hours | **M** | | | |
| **6.4.9** | Actual hour and actual miles | **M** | | | |
| **6.4.10** | Route deviation | **M** | | | |

## APPENDIX D1 – PETALUMA TRANSIT COMPLIANCE MATRIX

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **6.4.11** | Travel time and average speeds | **M** | | | |
| **6.4.12** | Driver Log ins (by bus and route) | **M** | | | |
| **6.4.13** | Origin and Destination Information | **M** | | | |
| **6.4.14** | Dashboard | **M** | | | |
| **6.4.15** | Wheelchair Lift Use (by stop) | **M** | | | |
| **6.4.16** | Bike Rack Use (by stop) | **M** | | | |
| **6.4.17** | Luggage Bay Use (by stop) | **M** | | | |
| **6.4.18** | Incidents | **M** | | | |
| **6.4.19** | Bus Change-off | **M** | | | |
| **6.4.20** | Collisions | **M** | | | |
| **6.4.21** | General Delay | **M** | | | |
| **6.4.22** | Trip Delays | **M** | | | |
| **6.4.23** | Trip Cancellation | **M** | | | |
| **6.4.24** | Equipment Issues | **M** | | | |
| **6.4.25** | Vehicle Locations | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **6.4.26** | Vehicle Speeds | **M** | | | |
| **6.4.27** | Vehicle Performance | **M** | | | |
| **6.4.28** | Communications Status | **M** | | | |
| **6.4.29** | Emergency Alarm | **M** | | | |
| **6.4.30** | Driver Incident (incapacitated, sick, performance) | **M** | | | |
| **6.4.31** | System Diagnostics | **M** | | | |
| **6.4.32** | Maintenance | **M** | | | |
| **6.4.33** | On Peak Loading by Route, Trip and Stop | **M** | | | |
| **6.5** | All reports shall have the capability to export information into a common analysis and text editing office software such as Microsoft Excel and Word. | **M** | | | |
| **7.** | **Real Time Passenger Information** | | | | |
| **7.1** | The system shall generate real-time arrival/departure predictions for all vehicles that are integrated in the | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | proposed CAD/AVL system. | | | | |
| **7.2** | The real-time arrival predictions shall report predicted arrival times based on actual arrivals and not based on scheduled arrivals. | **M** | | | |
| **7.3** | The CAD/AVL system shall be able to interface with field equipment including passenger information displays, agency websites and mobile applications to provide and display real-time arrival/departure data for fixed-route and demand-response vehicles. | **M** | | | |
| **7.4** | The data required to be provided to the field equipment, agency websites and mobile applications includes current bus schedules, bus schedule adherence status, and estimated (predicted) arrival/departure times of transit vehicles at designated bus stops and transit centers. | **M** | | | |
| **7.5** | The real-time arrival predictions shall meet or exceed the following performance criteria: | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **7.5.1** | For predictions between one and ten minutes, the prediction accuracy shall be three minutes or less for 90% of the generated predictions. | **M** | | | |
| **7.5.2** | For predictions between 11 and 25 minutes, the prediction accuracy shall be four minutes or less for 85% of the generated predictions. | **M** | | | |
| **7.5.3** | For predictions more than 25 minutes, the prediction accuracy shall be six minutes or less for 85% of the generated predictions. | **M** | | | |
| **8.** | **Passenger Information Displays** | | | | |
| **8.1** | The Contractor shall provide passenger information signs that display, at the stop level, the estimated count-down arrival time and/or departure time of the next buses at the stop within a defined time interval. | **M** | | | |
| **8.2** | Both scheduled and dynamic text message capabilities shall be provided to either individual or groups of signs. | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | | | | | |
| **8.3** | A user interface shall provide easy setup, configuration, diagnostic, and messaging status at all sign locations. | **M** | | | |
| **8.4** | The displays shall be able to display multiple routes, CAD/AVL system time, ad hoc messages, and scheduled messages. | **M** | | | |
| **8.5** | Physical design of the sign shall be modular for easy maintenance, vandal resistant, and suitable for an outdoor environment. | **M** | | | |
| **8.6** | Solar power, high brightness LED displays, and multi-line displays shall be available where required by operational needs. | **M** | | | |
| **8.7** | The final location of the Contractor supplied bus stop and shelter passenger information displays shall be determined prior to the final design approval. | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **8.8** | Assistance shall be provided to the Agency in acquiring necessary permits. | **M** | | | |
| **8.9** | Outdated information for a transit vehicle on the display shall be cleared within a maximum of fifteen (15) seconds of the transit vehicle departing the stop or station. | **M** | | | |
| **8.10** | Proposers shall indicate what means (wired or wireless) shall or can be used to connect to the passenger information displays. | **M** | | | |
| **9.** | **Mobile Applications (Apps)** | | | | |
| **9.1** | The CAD/AVL system shall generate and disseminate real-time transit traveler information to the regional 511 system, agency-owned infrastructure, and web/mobile services. | **M** | | | |
| **9.2** | The system shall update real-time arrival predictions and generate service alerts to mobile applications based upon real time service adjustments and measures implemented by the agency | **M** | | | |

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | dispatchers including: | | | | |
| **9.2.1** | Cancelled Service; | **M** | | | |
| **9.2.2** | Detours (planned or ad hoc); | **M** | | | |
| **9.2.3** | Drop off only; | **M** | | | |
| **9.2.4** | Additional of supplemental service ('trippers') in addition to scheduled trips. | **M** | | | |
| **9.3** | It is desired that the Contractor develop a mobile app to allow transit riders to communicate with Dispatch or other Operations staff to report suspicious activity, crime, or quality of life problems at a transit station or on a bus. | **O** | | | |
| **10.** | **511 Integration** | | | | |
| **10.1** | The CAD/AVL system shall support the exchange of data with the Bay Area's regional 511 traveler information system operated by the Metropolitan Transportation Commission (MTC). | **M** | | | |

## APPENDIX D1 – PETALUMA TRANSIT COMPLIANCE MATRIX

| Petaluma Transit Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **10.2** | Data exchange with 511 shall consist of the following: | **M** | | | |
| **10.2.1** | Export of static configuration data. | **M** | | | |
| **10.2.2** | Export of real-time arrival information. | **M** | | | |
| **10.2.3** | Export of CAD/AVL system status information to 511. | **M** | | | |
| **10.2.4** | The latest requirements and specifications for the 511 integration shall be gathered from the Metropolitan Transportation Commission (MTC). | **M** | | | |
| **10.3** | The CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) and other types of static and real-time information using GTFS. | **M** | | | |

# APPENDIX D-2 PETALUMA TRANSIT FLEET DETAILS

## APPENDIX D-2 PETALUMA TRANSIT FLEET DETAILS

### Petaluma Transit Fixed Route Vehicles

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions |
|---|---|---|---|---|---|
| 37 | 15GGE2718B1092152 | Gillig | Gillig LF | 23 | 2 |
| 38 | 15GGE271XB1092153 | Gillig | Gillig LF | 23 | 2 |
| 39 | 15GGE2711B1092154 | Gillig | Gillig LF | 23 | 2 |
| 40 | 15GGE2713B1092155 | Gillig | Gillig LF | 23 | 2 |
| 33 | 15GGB271971077482 | Gillig | Gillig LF | 34 | 2 |
| 34 | 15GGB271071077483 | Gillig | Gillig LF | 34 | 2 |
| 35 | 15GGB271271077484 | Gillig | Gillig LF | 34 | 2 |
| 36 | 15GGB271471077485 | Gillig | Gillig LF | 34 | 2 |
| 41 | 5FYD2LL04WU019306 | New Flyer | DLF-40 | 38 | 2 |
| 42 | 5FYD2LL05WU019301 | New Flyer | DLF-40 | 38 | 2 |
| 43 | 5FYD2LL03WU019300 | New Flyer | DLF-40 | 38 | 2 |

### Petaluma Transit Support Vehicles

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions |
|---|---|---|---|---|---|
| 420 | 1FAFP53274G153266 | Ford | Taurus | 5 | 0 |
| 421 | 1FTYR14034PB60530 | Ford | Ranger | 2 | 0 |
| 756 | 2FAFP72W13X139890 | Ford | Crown Vic | 5 | 0 |
| 987 | 1FAFP55U64G131919 | Ford | Taurus | 5 | 0 |

**APPENDIX D-3: PETALUMA TRANSIT PRICE PROPOSAL**

## APPENDIX D-3 – PETALUMA TRANSIT PRICE PROPOSAL

| NO. | ITEM DESCRIPTION | UNIT | QTY. | UNIT PRICE | EXTENDED PRICE |
|---|---|---|---|---|---|
| **BASE BID ITEMS** | | | | | |
| 1 | System Design | LS | 1 | | |
| 2 | CAD/AVL System Software and Licensing | LS | 1 | | |
| 3 | Servers at Dispatch | LS | 1 | | |
| 4 | Workstations at Dispatch and Administrative offices | EA | 3 | | |
| 5 | Scheduling Software | EA | 1 | | |
| 7 | On Board Equipment (Fixed Route) | EA | 11 | | |
| 8 | On Board Equipment (Support Vehicles) | EA | 4 | | |
| 9 | Communications System for Mobile Devices – at Dispatch | LS | 1 | | |
| 10 | Mobile Communications Equipment – fixed route, support vehicles | EA | 15 | | |
| 11 | Cellular (3G/4G) Service (5 years) | LS | 1 | | |
| 12 | Testing | LS | 1 | | |
| 13 | Maintenance Service Agreement (5 years) | LS | 5 | | |
| 14 | Training | LS | 1 | | |
| 15 | 511 Integration | LS | 1 | | |
| 16 | Connection Protection | LS | 1 | | |
| 17 | Video System Integration | EA | 11 | | |
| 18 | Data Management System | EA | 1 | | |
| 19 | Mobile Work Stations for Supervisors | EA | 4 | | |
| 20 | Spare VLU | EA | 2 | | |
| 21 | Spare GPS receiver | EA | 2 | | |
| 22 | Spare Antenna | EA | 2 | | |
| 23 | Spare MDT | EA | 2 | | |
| 24 | Spare MAR | EA | 2 | | |
| 25 | Spare Cellular Router (3G/4G) and WLAN communications card | EA | 2 | | |
| 26 | Spare APC | EA | 2 | | |
| 27 | Spare AVA | EA | 2 | | |
| | | | | **TOTAL BASE PRICE:** | |
| | **ADD ALTERNATE BID ITEMS** | | | | |
| A1 | Transit Signal Priority Integration | EA | 11 | | |
| A2 | Farebox Integration | EA | 11 | | |
| A3 | Automatic Vehicle Monitoring | EA | 15 | | |

## APPENDIX D-3 – PETALUMA TRANSIT PRICE PROPOSAL

Petaluma Transit reserves right to reject all proposals. Petaluma Transit will negotiate with the highest-rated proposer for final items, pricing and quantities.

All prices shall include furnishing and delivery, installation, and integration of all materials and associated equipment (mounting, cable, connectors, etc) necessary for a complete and functioning system.

The Unit Prices for the Base Price and Add Alternate Price Items shall be fixed for up to one (1) year after the submission of the Price Proposal. Unit prices shall be fixed for adjustments to quantities of 25% above and below the item quantity. Quantity adjustments shall be at Petaluma Transit's sole discretion.

Exercise of Add Alternate Price Items shall be exercised at Petaluma Transit's sole discretion. Petaluma Transit reserves the right not to exercise any Add Alternate Price Items. Petaluma Transit has up to one year after submission of Price Proposal to provide notice-to-proceed for exercising Add Alternate Price Items.

System Design Documents will be paid based on completion of each stage, i.e., Preliminary Design (30%), Draft Final Design (30%) and Final Design (40%).

CAD/AVL System Software and Licensing will be paid based on the delivery and installation of the system software in the CAD/AVL servers at the agency dispatch centers.

CAD/AVL Servers will be paid based on the delivery and installation of the servers to the agency's facilities.

CAD/AVL Workstations will be paid based on the delivery, installation and integration of each workstation with the CAD/AVL server for the agency

Communication System for Mobile Devices at Dispatch will be paid based on delivery, installation, and integration of communications equipment at Petaluma Transit Dispatch for functioning communications to all Petaluma Transit mobile vehicles.

On Board Equipment will be paid based on the completion of testing of each vehicle.

Mobile Communications Equipment for mobile vehicles will be paid based on the completion of testing and functioning communications to Dispatch of each vehicle.

Cellular Service shall cover mobile communications costs for the entire system and will be paid based on commissioning of the system.

Testing will be paid based on the successful completion of the FAT testing (30%), Pilot Fleet testing (30%) and SAT testing (40%).

Spare equipment will be paid based on delivery of equipment to Petaluma Transit.

Training will be paid upon completion of all training sessions.

Transit Signal Priority Integration will be paid based on completion of integration and testing of each vehicle.

Farebox Integration will be paid based on completion of integration and testing of each vehicle.

Automatic Vehicle Monitoring will be paid based on completion of integration and testing of each vehicle.

Connection Protection will be paid based on the delivery and installation of the feature into the system software in the CAD/AVL servers at the agency dispatch centers.

**APPENDIX D4 – PETALUMA TRANSIT TERMS AND CONDITIONS**

# PROFESSIONAL SERVICES AGREEMENT

_____
(Title of Project)

FY _____ Fund # _____ Cost Center _____ Object Code _____ Project # _____ Amount $_____

For multi-year contracts or contracts with multiple accounts:

FY _____ Fund # _____ Cost Center _____ Object Code _____ Project # _____ Amount $_____
FY _____ Fund # _____ Cost Center _____ Object Code _____ Project # _____ Amount $_____
FY _____ Fund # _____ Cost Center _____ Object Code _____ Project # _____ Amount $_____
FY _____ Fund # _____ Cost Center _____ Object Code _____ Project # _____ Amount $_____
FY _____ Fund # _____ Cost Center _____ Object Code _____ Project # _____ Amount $_____

THIS PROFESSIONAL SERVICES AGREEMENT ("Agreement") is entered into and effective as of _____, 20____ ("Effective Date"), by and between the City of Petaluma, a municipal corporation and a charter city ("City") and _____, a _____ ("Consultant") (collectively, the "Parties").

WHEREAS, the Parties enter into this Agreement for the purpose of Consultant providing professional services to City under the terms and conditions set forth herein.

THEREFORE, in consideration of the mutual covenants contained in this Agreement, the Parties agree as follows:

1. **Services.** Consultant shall provide the services as described in and in accordance with the schedule set forth in Exhibit "A" attached hereto and incorporated herein ("Services").

2. **Compensation; Business Tax Certificate.**

   A. For the full performance of the Services as described herein, City shall compensate Consultant in accordance with the rates specified in Exhibit A.

   B. Consultant shall submit detailed monthly invoices reflecting all services performed during the preceding month, and including a revised schedule for performance and additional documentation requested by City, as applicable.

   C. Consultant shall be compensated for services in addition to those described in Exhibit A, only if Consultant and City execute a written amendment to this Agreement describing the additional services to be performed and the compensation to be paid for such services. In no case shall the total compensation under this Agreement exceed $_____ without prior written authorization of the City Manager. Further, no compensation for a section or work program component attached with a specific budget shall be exceeded without prior written authorization of the City Manager.

   D. Notwithstanding any provision herein, Consultant shall not be paid any compensation until such time as Consultant has on file with the City Finance Department a current W-9 form available from the IRS website (www.irs.gov) and has obtained a currently valid Petaluma business tax certificate.

E. City's obligation to pay compensation to Consultant as provided herein is contingent upon Consultant's performance of the Services pursuant to the terms and conditions of this Agreement and any amendments thereto.

3. **Term.** The term of this Agreement commences on the Effective Date, and terminates on _____, unless sooner terminated in accordance with Section 4. Upon termination, any and all of City's documents or materials provided to Consultant and any and all of the documents or materials prepared for City or relating to the performance of the Services, shall be delivered to the City as soon as possible, but not later than fourteen (14) days after termination of the Agreement.

4. **Termination.** City may terminate this Agreement without cause upon ten (10) days' written notice. City may immediately terminate or suspend this Agreement for cause. Cause for immediate termination or suspension shall include, but not be limited to, any breach of this Agreement by Consultant or Consultant's bankruptcy or insolvency. Upon receipt of notice of termination or suspension for cause, Consultant shall immediately stop all work in progress under this Agreement. In the event of early termination of this Agreement by City, Consultant shall be entitled to payment for all Services performed to the date of termination to the extent such Services were performed to the satisfaction of City in accordance with the terms and conditions of this Agreement. If City terminates this Agreement for cause, Consultant shall be liable to City for any excess cost City incurs for completion of the Services.

5. **Consultant's Representation; Independent Contractor.** Consultant represents that Consultant possesses distinct professional skills in performing the Services. City has relied upon said representation as a material inducement to enter into this Agreement. Consultant shall, therefore, provide properly skilled professional and technical personnel to perform all Services under this Agreement. It is expressly understood that Consultant and its agents and employees, shall act in an independent capacity and as an independent contractor and not as officers, employees or agents of City. This Agreement shall not be construed as an agreement for employment.

6. **Facilities and Equipment.** Consultant shall, at its sole cost and expense, furnish all facilities and equipment that may be required for furnishing Services pursuant to this Agreement. City shall furnish to Consultant no facilities or equipment, unless the City otherwise agrees in writing to provide the same.

7. **Licenses, Permits, Etc.** Consultant shall, at Consultant's sole cost and expense, keep in effect at all times during the term of this Agreement any licenses, permits or other such approvals which are legally required for performing the Services.

8. **Time.** Consultant shall devote such time to the performance of the Services as may be reasonably necessary for satisfactory performance of Consultant's obligations pursuant to this Agreement.

9. **Inspection.** Consultant shall provide the City every reasonable opportunity to ascertain that the Services are being performed in accordance with the requirements and intentions of this Agreement. All work done and materials furnished, if any, shall be subject to

inspection and approval by the City. The inspection of such work shall not relieve Consultant of any of its obligations pursuant to this Agreement.

10. **Progress Reports.** Upon the City's request, Consultant shall provide, in a form acceptable to City, written progress reports of all oral and written observations, opinions, recommendations, analyses, progress and conclusions related to Consultant's performance of the Services.

11. **Confidentiality.** In the course of Consultant's employment, Consultant may have access to trade secrets and confidential information, disclosure of which is protected or limited by law. Consultant shall not directly or indirectly disclose or use any such confidential information, except as required for the performance of the Services.

12. **Conflict of Interest.** Consultant represents that it presently has no interest, and covenants that it shall not acquire any interest, direct or indirect, financial or otherwise, which would conflict in any manner or degree with the performance of the Services hereunder. Consultant further covenants that, in the performance of this Agreement, it shall not employ any subcontractor or person having such a conflict of interest. Consultant represents that no one who has or will have any financial interest under the Agreement is an officer or employee of City. If such conflict of interest arises during this Agreement or any extension, Consultant will immediately advise City and City may, at its sole discretion, immediately terminate this Agreement. Certain Consultants are subject to the requirements, including the disclosure and reporting requirements, of the City's Conflict of Interest Code adopted pursuant to the Political Reform Act. Such Consultants subject to the City's Conflict of Interest Code include those whose work may involve: making government decisions regarding approval or adoption of rates, rules, or regulations, action on permits or other applications, authorization to enter into or modify contracts, or approval of plans, designs, reports, or studies. Consultant agrees to comply fully with all such requirements to the extent they apply to Consultant's performance of the Services.

13. **Consultant No Agent.** Except as City may specify in writing, Consultant shall have no authority, express or implied, to act on behalf of City in any capacity whatsoever as an agent. Consultant shall have no authority, express or implied, pursuant to this Agreement to bind City to any obligation whatsoever.

14. **Standard of Performance.** Consultant shall perform all the Services in a manner consistent with the standards of Consultant's profession. All instruments of service of whatsoever nature, which Consultant delivers to City pursuant to this Agreement, shall be prepared in a substantial, workmanlike manner and conform to the standards of Consultant's profession. All such instruments of service shall become the sole and exclusive property of City upon delivery of the same.

15. **Assignment/Transfer.** No assignment or transfer in whole or in part of this Agreement shall be made without the prior written consent of City.

16. **Subcontractors.** Consultant shall directly perform all Services, and shall not subcontract any portion of performance of the Services without the prior written consent of City. Any such subcontractors shall be required to comply, to the full extent applicable, with

the terms and conditions of this Agreement, including but not limited to, procuring and maintaining insurance coverage as required herein and which shall name City as an additional insured.

17. **Compliance With All Laws.** Consultant shall fully comply with all applicable local, state and federal rules, laws, regulations and ordinances pertaining to the performance of the Services required hereunder, including but not limited to, the California Building Standards Code as in effect in the City, the Americans with Disabilities Act, and any laws and regulations related to any copyright, patent, trademark or other intellectual property right involved in performance of the Services. Consultant's failure to comply with any law(s) or regulation(s) applicable to the performance of the Services hereunder shall constitute a material breach of this Agreement. To the extent that any other government agency or entity provides compensation for any Services, Consultant shall comply with all rules and regulations applicable to such fiscal assistance.

18. **Living Wage Ordinance.** Without limiting the foregoing Section 17, Consultant shall comply fully with all applicable requirements of Petaluma Municipal Code, Chapter 8.36, Living Wage (the "Living Wage Ordinance"), as the same may be amended from time to time. Upon the City's request Consultant shall promptly provide to the City documents and information verifying Consultant's compliance with the requirements of the Living Wage Ordinance, and shall within fifteen (15) calendar days of the Effective Date of this Agreement, notify each of its affected employees as to the amount of wages and time off that are required to be provided to them pursuant to the Living Wage Ordinance. The Acknowledgement and Certification Pursuant to City of Petaluma Living Wage Ordinance, attached to this Agreement as Exhibit _____, shall be a part of this Agreement for all purposes, and Consultants that are subject to Living Wage Ordinance requirements, as determined by the City, must provide a properly completed Exhibit _____ in accordance with the requirements of the Living Wage Ordinance. Consultant's noncompliance with the applicable requirements of the Living Wage Ordinance shall constitute cause for City's termination of this Agreement pursuant to Section 4 hereof.

19. **Discrimination.** During the performance of this Agreement, Consultant shall not discriminate against any employee or applicant for employment because of race, religion, creed, color, national origin, ancestry, gender, sexual orientation, age or physical or mental disability in violation of any applicable law.

20. **Notice.** Except as otherwise specified in this Agreement, all notices to be sent pursuant to this Agreement shall be made in writing, and sent to the Parties at their respective addresses specified below or to such other address as a Party may designate by written notice delivered to the other Party in accordance with this Section. All such notices shall be sent by:

    (i) personal delivery, in which case notice is effective upon delivery;

    (ii) certified or registered mail, return receipt requested, in which case notice shall be deemed delivered on receipt if delivery is confirmed by a return receipt;

    (iii) nationally recognized overnight courier, with charges prepaid or charged to the sender's account, in which case notice is effective on delivery if delivery is confirmed by the delivery service; or

(iv) facsimile transmission, in which case notice shall be deemed delivered upon transmittal, provided that (a) a duplicate copy of the notice is promptly delivered by first-class or certified mail or by overnight delivery, or (b) a transmission report is generated reflecting the accurate transmission thereof. Any notice given by facsimile shall be considered to have been received on the next business day if it is received after 5:00 p.m. recipient's time or on a nonbusiness day.

City:
City Clerk
City of Petaluma
Post Office Box 61
Petaluma, California 94953
Phone: (707) 778-4360
Fax: (707) 778-4554
Email: cityclerk@ci.petaluma.ca.us

And:

_____
_____
_____
_____
Phone: _____
Fax: _____
Email: _____

Consultant:
_____
_____
_____
_____
Phone: _____
Fax: _____
Email: _____

21. **Ownership of Documents.** All original papers, documents or computer material on disk or microfilm, and copies thereof, produced as a result of this Agreement, shall be the property of City and may not be used by Consultant without the written consent of City. Copies of such documents or papers shall not be disclosed to others without the written consent of the City Manager or his or her designated representative.

22. **Indemnification.** To the maximum extent permitted by law, Consultant shall, at its own expense, indemnify, defend with counsel acceptable to the City, (which acceptance will not be unreasonably withheld), and hold harmless City and its officers, officials, employees, agents and volunteers ("Indemnitees") from and against any and all liability, loss, damage, claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, civil penalties and fines, expenses and costs (including, without limitation, claims expenses, attorney's fees and costs and fees of litigation) (collectively, "Liability") of every nature, whether actual, alleged or threatened, arising out of or in connection with the Services or Consultant's failure to comply with any of the terms of this Agreement, regardless of any fault or alleged fault of the Indemnitees.

The Consultant's obligation to indemnify, defend and hold harmless under this provision shall not be excused because of the Consultant's inability to evaluate Liability, or because the Consultant evaluates Liability and determines that the Consultant is not or may not be liable. The Consultant must respond within 30 calendar days to any tender for defense and indemnity by the City, unless the time for responding has been extended by an authorized representative of the City in writing. If the Consultant fails to accept tender of defense and indemnity within 30 calendar days, in addition to any other remedies authorized by law, so much of the money due or that may become due the Consultant under this Agreement as shall reasonably be considered necessary by the City, may be retained by the City until disposition has been made of the matter subject to tender, or until the Consultant accepts the tender, whichever occurs first. In the event that the City must file responsive documents in a matter tendered to Consultant prior to Consultant's acceptance of tender, Consultant agrees to fully reimburse all costs, including but not limited to attorney's fees and costs and fees of litigation, incurred by the City in filing such responsive documents.

The Consultant waives any and all rights to express or implied indemnity against the Indemnitees concerning any Liability of the Consultant arising out of or in connection with the Services or Consultant's failure to comply with any of the terms of this Agreement.

Notwithstanding the foregoing, to the extent this Agreement is a "construction contract" as defined by California Civil Code Section 2783, as may be amended from time to time, Consultant's duty to indemnify under this provision shall not apply when to do so would be prohibited by California Civil Code Section 2782, as may be amended from time to time.

Notwithstanding the foregoing, to the extent that the Services include design professional services subject to California Civil Code Section 2782.8, as may be amended from time to time, Consultant's duty to indemnify shall only be to the maximum extent permitted by California Civil Code Section 2782.8.

23. **Insurance.** Consultant shall comply with the "Insurance Requirements for Consultants" in Exhibit B-_____, attached hereto and incorporated herein by reference. [*Indicate attached exhibit, e.g., "B-1," "B-2," "B-3," or "B-4."*]

24. **Amendment.** This Agreement may be amended only by a written instrument executed by both Parties.

25. **Litigation.** If litigation ensues which pertains to the subject matter of Consultant's services hereunder, Consultant, upon request from City, agrees to testify therein at a reasonable and customary fee.

26. **Construction.** This Agreement is the product of negotiation and compromise on the part of both Parties and that the Parties agree that, notwithstanding Civil Code Section 1654, any uncertainty in the Agreement shall not be construed against the drafter of the Agreement.

27. **Governing Law; Venue.** This Agreement shall be enforced and interpreted under the laws of the State of California and the City of Petaluma. Any action arising from or brought in connection with this Agreement shall be venued in a court of competent jurisdiction in the County of Sonoma, State of California.

28. **Non-Waiver.** The City's failure to enforce any provision of this Agreement or the waiver thereof in a particular instance shall not be construed as a general waiver of any part of such provision. The provision shall remain in full force and effect.

29. **Severability.** If any term or portion of this Agreement is held to be invalid, illegal, or otherwise unenforceable by a court of competent jurisdiction, the remaining provisions of this Agreement shall continue in full force and effect.

30. **No Third Party Beneficiaries.** The Parties do not intend to create, and nothing in this Agreement shall be construed to create any benefit or right in any third party.

31. **Mediation.** The Parties agree to make a good faith attempt to resolve any dispute arising out of this Agreement through mediation prior to commencing litigation. The Parties shall mutually agree upon the mediator and shall divide the costs of mediation equally.

32. **Consultant's Books and Records.**

A. Consultant shall maintain any and all ledgers, books of accounts, invoices, vouchers, canceled checks, and other records or documents evidencing or relating to charges for services, or expenditures and disbursements charged to the City for a minimum period of three (3) years or for any longer period required by law, from the date of final payment to Consultant pursuant to this Agreement.

B. Consultant shall maintain all documents and records which demonstrate performance under this Agreement for a minimum period of three (3) years or for any longer period required by law, from the date of termination or completion of this Agreement.

C. Any records or documents required to be maintained pursuant to this Agreement shall be made available for inspection or audit, at any time during regular business hours, upon written request by the City Manager, City Attorney, City Finance Director, or a designated representative of these officers. Copies of such documents shall be provided to the City for inspection at Petaluma City Hall when it is practical to do so. Otherwise, unless an alternative is mutually agreed upon, the records shall be available at Consultant's address indicated for receipt of notices in this Agreement.

D. Where City has reason to believe that such records or documents may be lost or discarded due to dissolution, disbandment or termination of Consultant's business, City may, by written request by any of the above-named officers, require that custody of the records be given to the City and that the records and documents be maintained in Petaluma City Hall. Access to such records and documents shall be granted to any party authorized by Consultant, Consultant's representatives, or Consultant's successor in interest.

33. **Headings.** The headings used in this Agreement are for convenience only and are not intended to affect the interpretation or construction of any provisions herein.

34. **Survival.** All obligations arising prior to the termination or expiration of this Agreement and all provisions of this Agreement allocating liability between City and Consultant shall survive the termination or expiration of this Agreement.

35. **Entire Agreement.** This Agreement, including the exhibits attached hereto and incorporated herein, constitutes the entire agreement between the Parties with respect to the Services, and supersedes all prior agreements or understandings, oral or written, between the Parties in this regard.

IN WITNESS WHEREOF, the parties hereto have executed this document the day, month and year first above written.

CITY OF PETALUMA

_____
City Manager

ATTEST:

_____
City Clerk

APPROVED AS TO FORM:

_____
City Attorney

APPROVED:

_____
Department Director

APPROVED:

_____
Risk Manager

APPROVED:

_____
Finance Director

file name:

CONSULTANT

By_____
Name

_____
Title

_____
Address

_____
City State Zip

_____
Taxpayer I.D. Number

_____
Petaluma Business Tax Certificate Number

# APPENDIX E-1 NAPA VINE COMPLIANCE MATRIX

## APPENDIX E-1 NAPA VINE COMPLIANCE MATRIX

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.** | **Central Systems** | | | | |
| **1.1** | **CAD/AVL System Software -** The proposed CAD/AVL System Software shall have been deployed (installed and operational) in at least three (3) similar transit agencies in the United States for a period of not less than three (3) years. | **M** | | | |
| **1.1.1** | **Real-Time Graphical Displays** - System shall include a real-time graphical display for user and dispatch use. | **M** | | | |
| **1.1.1.a** | Import and display of standard format vector, image, and point-based map layers. | **M** | | | |
| **1.1.1.b** | Map layer feature labels provided based upon zoom level or with hover-over by a pointing device. | **M** | | | |
| **1.1.1.c** | Continuous refreshed real-time updates of vehicle location and status. | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.1.1.d** | Definition of multiple map views and ability to save them at the user level. | **M** | | | |
| **1.1.1.e** | Definition of shared views for use by any dispatcher to be saved in their default set of views. | **M** | | | |
| **1.1.1.f** | Zoom, move, center, and fit to window independent within each map view. | **M** | | | |
| **1.1.1.g** | Filtered map views based upon parameters such as vehicles by route, login status, fleet, and mechanical status. | **M** | | | |
| **1.1.1.h** | Map layer that includes current route traces for each fixed route selected by the operator. | **M** | | | |
| **1.1.1.i** | Options to display different vehicle icon labels per technical requirements. | **M** | | | |
| **1.1.1.j** | Vehicle icons that are configurable and contain context sensitive information. | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.1.1.k** | Query tools to locate vehicle and routes based upon vehicle, route, or intersection variables. | **M** | | | |
| **1.1.1.l** | Capability to establish voice/data communication by individual vehicle or by banding a group of vehicles together. | **M** | | | |
| **1.1.1.m** | Access to a distance measuring tool. | **M** | | | |
| **1.1.1.n** | Print capabilities of any customized map view. | **M** | | | |
| **1.1.1.o** | Automated focus and continuous vehicle tracking during Emergency Alarm condition. | **M** | | | |
| **1.1.2** | **Route Playback** | | | | |
| **1.1.2.a** | Historical event display shall play back all pertinent historical messages, per technical requirements. | **M** | | | |
| **1.1.2.b** | Playback of these events shall include the ability to perform the following functions: | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.1.2.b.1** | The display shall be by a sequence of events on a geographic map. | **M** | | | |
| **1.1.2.b.2** | Allow selection by vehicle(s), driver(s), route(s), fleet(s), or run(s) for specific time frames through a query action window. | **M** | | | |
| **1.1.2.b.3** | Configurable speed of replay for moving forward and backward through events. | **M** | | | |
| **1.1.2.b.4** | Graphical representation of event data on a common CAD/AVL map. | **M** | | | |
| **1.1.2.b.5** | Selectable display of map layers including but not limited to stops, streets, routes, points of interest, and geographical attributes. | **M** | | | |
| **1.1.2.b.6** | Text display of attributes of each vehicle event message including messages related to other onboard systems including transit priority requests, farebox alarms, and passenger counts. | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.1.2.b.7** | Step forward, step backward and pause the historical display of events. | **M** | | | |
| **1.1.2.b.8** | Zoom, move, center, and fit to window views within the map window. | **M** | | | |
| **1.1.2.b.9** | Measuring distance tool. | **M** | | | |
| **1.1.2.b.10** | Vehicle label by number, adherence, route, driver, run, and block. | **M** | | | |
| **1.1.2.b.11** | Vehicle icons that are configurable and display adherence, login status, transfer status, and maintenance status. | **M** | | | |
| **1.1.2.b.12** | Locate vehicles, routes, intersections or objects. | **M** | | | |
| **1.1.2.b.13** | Display route traces. | **M** | | | |
| **1.1.2.b.14** | Date and time messages are logged. | **M** | | | |
| **1.1.2.b.15** | Print the historical display. | **M** | | | |
| **1.1.3** | **Schedule Adherence** | | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.1.3.a** | System shall monitor adherence by comparing current location versus the published schedule for all vehicles. | **M** | | | |
| **1.1.3.b** | Schedule adherence data shall be stored and include parameters for analysis as specified in the technical requirements. | **M** | | | |
| **1.1.3.c** | Both the time of arrival and departure at all scheduled timepoints shall be accurately recorded and stored. | **M** | | | |
| **1.1.3.d** | The Agency shall be responsible for providing the schedule data used by the Contractor provided scheduling software interface to the CAD/AVL system. The Agency shall perform any stop and route geo-surveys required using Contractor supplied tools. The Contractor shall provide adequate training prior to the start of this activity in accordance with the project schedule. | **M** | | | |
| **1.1.3.e** | Real-time (predictive to the next timepoint, which shall include all stops) schedule adherence shall be | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | displayed for dispatchers and made available to customer information applications. | | | | |
| **1.1.3.f** | System shall identify vehicles predicted to be running early or late by predefined time parameters and shall report on both graphical and tabular displays. | **M** | | | |
| **1.1.3.g** | Schedule adherence parameters shall be able to be set differently by route with separate early and late user supplied values. | **M** | | | |
| **1.1.3.h** | Schedule adherence display will be shown to the Operator regardless of dispatcher selectable parameters. | **M** | | | |
| **1.1.3.i** | Schedule adherence from the vehicle shall be calculated, transmitted, and stored regardless of the onboard display setting. | **M** | | | |
| **1.1.4** | **Route Adherence** | | | | |
| **1.1.4.a** | Provide off-route status to the Operator and transmit a notification | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | to be displayed at the dispatch workstation. | | | | |
| **1.1.4.b** | The off-route notification displays shall display next stop when vehicle is off-route. | **M** | | | |
| **1.1.4.c** | The off-route distance value shall be a user definable parameter. | **M** | | | |
| **1.1.4.d** | System shall identify off-route distance from assigned route or deviation from corridor of travel. | **M** | | | |
| **1.2** | **CAD/AVL System Hardware** | | | | |
| **1.2.1** | Contractor shall provide a turnkey, central system including all necessary hardware – see technical requirements. | **M** | | | |
| **1.2.2** | Contractor shall supply all hardware required for networking and communications for the system – see technical requirements. | **M** | | | |
| **1.2.3** | The CAD/AVL system shall also consist of a backup or mirrored | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | server that will take over operations should the main server fail. The mirrored server shall enable failover operations to be carried out in a seamless manner requiring minimal manual intervention. | | | | |
| **1.2.4** | **CAD/AVL Servers** | | | | |
| **1.2.4.a** | The Contractor shall submit a complete list of required IT equipment for the CAD/AVL System at the System Design Review stage. These requirements and specifications may be refined and finalized as part of System Design Review. The minimum computer server requirements are identified in the technical requirements. | **M** | | | |
| **1.2.5** | **CAD/AVL Workstations** | | | | |
| **1.2.5.a** | All workstations shall use Dynamic Host Configuration Protocol (DHCP) for IP address assignment, unless otherwise approved by the Agency. | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **1.2.5.b** | The Contractor shall provide and implement hardware for the Agency with capacity adequate to support the Agency's applications and other Contractor applications involved in the solution, maps, data, and associated files required for operation, with 100% expansion capacity of the specified hardware. | **M** | | | |
| **1.2.5.c** | New workstations shall meet or exceed each Agency's current standard workstation specifications. | **M** | | | |
| **2.** | **System Data Communications** | | | | |
| **2.1** | Set up radio/cellular data gateway to allow incoming and outgoing messages between the system and MDT's to be transmitted using the Agency-specific radio/cellular data communications system. | **M** | | | |
| **2.2** | The system shall allow data packets to be sent over the network from the vehicles to the central system and from the central system to the vehicles anywhere where there is a | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | private radio system or cellular signal present. | | | | |
| **2.2.1** | Vehicle location shall be received by the Central CAD/AVL system at least once every 20 seconds (polling rate) for display and storage purposes and every 5 seconds during an Emergency Alarm situation. | **M** | | | |
| **2.3** | The contractor is responsible for arranging appropriate communication protocols with the Agency-preferred cellular providers. The cellular provider to be used for Napa VINE is Verizon. | **M** | | | |
| **2.4** | **Wireless Local Area Network (WLAN)** | | | | |
| **2.4.1** | Complete or bi-directional bulk data transfer software is provided for transfer of data between vehicles on mobile data system and the central system. | **M** | | | |
| **2.4.2** | The bulk data transfer system shall be capable, at minimum, of the | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | following tasks: | | | | |
| **2.4.2.a** | Downloading software updates/patches and configuration data for onboard devices. | **M** | | | |
| **2.4.2.b** | Downloading all updated schedule and trigger zone locations data required for operation of the VLU firmware. | **M** | | | |
| **2.4.2.c** | Uploading vehicle components monitoring configuration data. | **M** | | | |
| **2.4.2.d** | Downloading updated trigger zones locations and announcement sign messages for automated annunciation systems on-board announcements. | **M** | | | |
| **2.4.2.e** | Uploading revenue transactions data from fareboxes. | **M** | | | |
| **2.4.2.f** | Allowing for the uploading of other on-board logged data when received. | **M** | | | |
| **2.4.2.g** | The software shall be configurable to determine frequency and types of | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | data transfers. | | | | |
| **2.4.2.h** | Automated system bulk transfers shall occur and be validated automatically – see technical requirements for specifics. | **M** | | | |
| **2.4.2.i** | Once communications is established with the VLU, the bulk data transfer system shall automatically determine which required file transfers remain to be completed and initiate them. | **M** | | | |
| **2.4.2.j** | A validation process shall ensure multiple attempts are made to complete all required file transfers until the file transfer is successfully completed. | **M** | | | |
| **2.4.2.k** | The system shall be able to complete a file transfer using a sequence of ad-hoc partial file transfers while the VLU is temporarily connected with the mobile data communications system. | **M** | | | |
| **2.4.2.l** | **WLAN Access Points** | | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **2.4.2.l.1** | The Contractor shall provide a WLAN controller. The WLAN controller and wireless APs shall support the functions outlined in the technical requirements | **M** | | | |
| **2.4.2.l.2** | The contractor shall provide wireless Access Point coverage at each Agency's bus maintenance facilities to enable WLAN connectivity for data exchange between the VLU and central system via a Bulk Data Transfer. | **M** | | | |
| **2.4.2.l.3** | The WLAN coverage area available for bulk data transfer at each Bus Maintenance Facility shall include the area where the vehicles are to be parked. | **M** | | | |
| **2.4.2.l.4** | The Contractor shall review the plans for the Bus Maintenance Facility and design the optimal locations for the APs including the orientation of antennas to satisfy all bulk data transfer requirements. | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **2.4.2.l.5** | The VLU shall authenticate and connect automatically when vehicles enter Wi-Fi zone. | **M** | | | |
| **2.4.2.l.6** | WLAN equipment shall be outdoor-rated. See technical requirements for specific code requirements. | **M** | | | |
| **2.4.2.l.7** | Lightning arrestors shall be installed to vendor specifications on all exterior APs. | **M** | | | |
| **2.4.2.l.8** | The WLAN equipment shall be IEEE 802.11i compliant or be Wi-Fi Protected Access 2 (WPA2) certified by the Wi-Fi Alliance with AES encryption. | **M** | | | |
| **2.4.2.l.9** | Each single AP shall have a minimum 2x3, Dual Frequency, MIMO configuration. | **M** | | | |
| **2.4.2.l.10** | The APs shall support 5.0 GHz frequencies. The APs shall be capable of supporting multiple SSID's and assign separate SSID's to separate VLANs. | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **2.4.2.l.11** | The APs shall be able to support WMM (Wi-Fi multimedia). | **M** | | | |
| **2.4.2.l.12** | Installation shall be coordinated with Agency project manager with Agency clearance. | **M** | | | |
| **2.4.2.m** | **Antennas** | | | | |
| **2.4.2.m.1** | Antenna(s) shall be installed for cell data, GPS and WLAN. The antenna(s) shall support the ranges identified in the technical requirements. | **M** | | | |
| **2.5** | **Remote and Mobile Access to Central Software** | | | | |
| **2.5.1** | Road Supervisors shall be capable of having remote access to the central CAD/AVL system through a mobile workstation (laptop). Relevant real-time information shall be gathered and transmitted to the mobile workstation through the CAD/AVL cellular data network. The mobile station shall be provided with a cellular data card. | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **2.5.2** | Provide map-based GUI for remote/mobile access per the technical requirements. | **M** | | | |
| **2.5.3** | The GUI shall be browser-based, or employ an application installed on the local workstation. | **M** | | | |
| **2.5.4** | The GUI shall be the same as the one used by Dispatchers, but with the ability to limit functionality as defined below. | **M** | | | |
| **2.5.5** | To reduce the amount of cellular data used, the GUI shall be configurable to only show selected vehicles. | **M** | | | |
| **2.5.6** | Vehicles shall be selectable by ID, pre-defined groups, routes, and pre-defined geographic distance. | **M** | | | |
| **2.5.7** | The laptops shall support text messaging to the dispatchers. The Contractor shall provide recommended laptop specifications and the Agency's will provide the hardware. | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| **2.5.8** | The laptops shall have access to the internet, Microsoft Outlook, and Agency software applications. | **M** | | | |
| **2.5.9** | The laptops shall allow the road personnel to monitor and respond to incidents including covert alarms and file incident reports. | **M** | | | |
| **2.5.10** | The Contractor shall provide sufficient documentation and instructions for installing software such that Agency staff can perform the installation in the event of a laptop replacement or upgrade. | **M** | | | |
| **3** | **On-board Equipment and Systems** | | | | |
| **3.1** | All on-board equipment shall be new and designed for use in the transit industry rated to applicable industrial and vehicle standards. See technical requirements. | **M** | | | |
| **3.2** | Equipment shall be the latest model in current production, as offered to commercial trade, and shall conform | **M** | | | |

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| | to transit industry requirements. | | | | |
| **3.3** | The contractor shall represent that all equipment offered under these specifications is new. | **M** | | | |
| **3.4** | Contractor shall demonstrate that all equipment has been installed and operational for at least three other CAD/AVL systems for a period of not less than three (3) years. | **M** | | | |
| **3.5** | All equipment shall be constructed in accordance with best commercial practice, with such practices described in the associated design documentation. At a minimum, the design and installation construction shall provide for: | **M** | | | |
| **3.5.1** | Reliable and stable operation; | **M** | | | |
| **3.5.2** | Minimum maintenance and alignment procedures, with a minimum of special tools; | **M** | | | |
| **3.5.3** | Minimum number and variety of | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | assemblies and spare parts; | | | | |
| **3.5.4** | Maximum attention to human factors, engineering, and ergonomic design; and | **M** | | | |
| **3.5.5** | Simplified design and rapid fault isolation to reduce the requirement for maintenance personnel. | **M** | | | |
| **3.5.6** | All parts shall be made of corrosive resistant material. | **M** | | | |
| **3.5.7** | All parts shall be constructed with materials and quality suited to the intended use and shall use modular design wherever feasible | **M** | | | |
| **3.5.8** | Functionally identical modules and assemblies shall be interchangeable per the technical requirements. | **M** | | | |
| **3.5.9** | Functionally non-identical modules shall not be and shall not appear to be interchangeable. | **M** | | | |
| **3.5.10** | All modules and assemblies shall be connected using standardized | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | durable, positive-locking, and indexed quick disconnect fasteners. | | | | |
| **3.5.11** | Equipment, assemblies, and components shall be identified by a permanently affixed part number and/or serial number. | **M** | | | |
| **3.5.12** | Features identifying software module version within that device shall be provided on each device. | **M** | | | |
| **3.5.13** | All equipment shall provide a usable life of not less than 15 years. | **M** | | | |
| **3.5.14** | Onboard equipment shall utilize most current microprocessor technology. | **M** | | | |
| **3.5.15** | Compatibility between current and future on-board equipment systems shall be maintained, including due to chip end-of-life issues. | **M** | | | |
| **3.5.16** | All on-board equipment shall have a minimum 40,000 hours Mean Time Between Failures (MTBF). | **M** | | | |

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| **3.5.17** | Internal (to the onboard equipment) batteries shall not be used to maintain parameter information in onboard equipment when it is in its powered down state. See technical requirements for real-time clock exception. | **M** | | | |
| **3.5.18** | The system shall check the battery state and create a warning message if the battery needs to be replaced. Onboard equipment shall be capable of being disassembled to fit through a coach door that is a minimum of 24 inches wide by 60 inches tall. | **M** | | | |
| **3.5.19** | Onboard equipment, including all exterior connectors and exposed ports, shall be rated for International Electrotechnical Commission (IEC) standard 60529, IP 54 for interior equipment, IP 65 for exterior equipment and designed for use in an industrial and mobile environment subjected to dirt, water, oil, and cleaning solvents. | **M** | | | |

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| **3.5.20** | If existing vehicle wiring, switches, or contact points are used, testing shall occur to certify that the wiring, switches, or contact points are in an acceptable state and suitable for reuse. | **M** | | | |
| **3.5.21** | Data transferred from a device shall not be purged or written over until a successful transfer is confirmed. | **M** | | | |
| **3.5.22** | In the event the transfer is not successful and the system is unable to re-attempt a transfer, it shall revert to the previous version of the data automatically and without corruption. Any data transfer failure shall be logged, alerted, and recorded. | **M** | | | |
| **3.5.23** | Devices shall include functionality to extract data directly from the device using a laptop computer in the event of a transfer failure (for any reason). Tools and processes shall be provided. | **M** | | | |
| **3.5.24** | Equipment shall be properly grounded, with onboard equipment | **M** | | | |

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| | connected as directly as possible to the chassis ground. | | | | |
| **3.5.25** | Onboard equipment shall operate from the vehicle electrical system, between 9 and 35 volts. | **M** | | | |
| **3.5.26** | Onboard equipment shall be securely mounted in the interior of the vehicle, clear of obstructions and interference-generating devices. | **M** | | | |
| **3.5.27** | Customer-facing equipment shall meet or exceed all ADA requirements per technical requirements. | **M** | | | |
| **3.5.28** | Installations shall be performed at specific times as approved by the Agency. | **M** | | | |
| **3.5.29** | The agencies reserve the right to allow less of its vehicle fleet to be out of service if necessary in order to avoid disruption to revenue service in conjunction with maintenance requirements. | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.5.30** | The Contractor shall ensure that all vehicles made available for overnight installation work are ready for revenue service by the start of the next service day. | **M** | | | |
| **3.6** | **Vehicle Logic Unit (VLU)** | | | | |
| **3.6.1** | The CAD/AVL system shall include a VLU on each vehicle to serve as a central processing unit, memory, data storage, and vehicle software. | **M** | | | |
| **3.6.2** | VLU shall interface with vehicle's on-board equipment and support communications via a mobile wireless communications network with the central servers. | **M** | | | |
| **3.6.3** | The VLU shall meet environmental and vibration standards (MIL-STD-810D, NEMA-4) as well as appropriate electromagnetic immunity standards (SAE 1455 and ESD J1112/13) and protect against surge, and reverse polarity. | **M** | | | |

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| **3.6.4** | The VLU shall be of proven design (at least three other similar transit agency deployments for at least three years) and easy to install and replace. | **M** | | | |
| **3.6.5** | The VLU shall be capable of multiple radio control, real time updates and messaging to and from the vehicle. | **M** | | | |
| **3.6.6** | The VLU shall meet communication requirements for leased cellular communications, meshed wireless networks, private radio, as well as interfaces for current and future onboard equipment. | **M** | | | |
| **3.6.7** | Overall system interfaces shall include RS232, RS485 with busy line, TTL, SAE J1708, SAE J1939, USB, Ethernet, TCP/IP, discrete inputs and outputs, odometer, spare I/O pins, audio inputs and outputs, and full IDE capability for PC-type devices. | **M** | | | |
| **3.6.8** | Capability for automatic vehicle monitoring via J1708/1939 provided | **M** | | | |

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| | by the vehicle shall be included. | | | | |
| **3.6.9** | Indication shall be provided for quick inspection of operation to indicate radio keyed, wireless network operating, software operational, proper voltage range, and ignition on. | **M** | | | |
| **3.6.10** | Data storage capacity shall also be sufficient to store at least five operating days worth of passenger counts and all event messages in the case where data communications are disrupted. | **M** | | | |
| **3.6.11** | The VLU shall support functionality of the following data sets, and must have sufficient non-volatile memory to simultaneously store at least the following: | **M** | | | |
| **3.6.11.a** | Entire set of current schedule data, including school, non-school, and Holiday schedule platforms; | **M** | | | |
| **3.6.11.b** | Twenty (20) weeks of incremental schedule changes, for current | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| | schedule; | | | | |
| **3.6.11.c** | Entire set of future schedule data (i.e., next run-board); | **M** | | | |
| **3.6.11.d** | Entire set of required AVA announcements; | **M** | | | |
| **3.6.11.e** | Fifty-two (52) weeks of incremental AVA announcements, for current schedule; | **M** | | | |
| **3.6.11.f** | Five (5) days of Automatic Passenger Count (APC) data records; | **M** | | | |
| **3.6.11.g** | Destination sign errors; | **M** | | | |
| **3.6.11.h** | Current configuration data; | **M** | | | |
| **3.6.11.i** | Future configuration data; | **M** | | | |
| **3.6.11.j** | Current firmware; | **M** | | | |
| **3.6.11.k** | Future firmware; | **M** | | | |
| **3.6.11.l** | Any other data recording needs identified in this RFP; | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.6.11.m** | 100% memory spare storage for growth, summing above requirements. | **M** | | | |
| **3.6.12** | CAD/AVL system configuration settings related specifically to the vehicle shall be stored in the vehicle's configuration module. See technical requirements for functionality. | **M** | | | |
| **3.6.13** | Each VLU shall have a unique IP address for purposes of participating in the wireless network and for remote monitoring. | **M** | | | |
| **3.6.14** | VLU shall be compatible with all on-board equipment options. | **M** | | | |
| **3.6.15** | The VLU shall integrate seamlessly with the Mobile Access Router (MAR), including the VLU providing a feed of GPS data to the MAR. | **M** | | | |
| **3.6.16** | The VLU shall act as the central processor, data storage, and device manager for all onboard devices | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | integrated under this Contract. | | | | |
| **3.6.17** | The contractor shall coordinate with the agencies the final location of VLU installation on each different vehicle type and configuration, subject to approval from the agencies. | **M** | | | |
| **3.6.18** | The VLU shall include at minimum the following ports and interfaces: | **M** | | | |
| **3.6.18.a** | Two (2) opto-isolated SAE J1708: one (1) for transit devices, and one (1) for drivetrain; | **M** | | | |
| **3.6.18.b** | Opto-isolated SAE J1939 for drivetrain; | **M** | | | |
| **3.6.18.c** | Ethernet; | **M** | | | |
| **3.6.18.d** | Universal Serial Bus (USB); | **M** | | | |
| **3.6.18.e** | RS-232 as an additional option to SAE J1708 for communication with the destination signs; and | **M** | | | |

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| **3.6.18.f** | Other ports and interfaces as required for specific device-to-device communications. | **M** | | | |
| **3.6.19** | The VLU shall manage power to listed onboard devices as follows: | **M** | | | |
| **3.6.19.a** | The VLU shall have a configurable parameter of 0 to 180 minutes that controls the power down of the VLU, MDT, and MAR after the vehicle master ignition switch is turned to "off". | **M** | | | |
| **3.6.19.b** | The VLU shall inform all managed devices to initiate a graceful power-down ofself and the MDT (including if necessary automatically logging off the VLU) between 0 to 30 minutes before power-down is activated and shall inform the MAR to do so. | **M** | | | |
| **3.6.19.c** | Upon reaching the power-down threshold, the VLU shall remove power from all connected devices, and itself. | **M** | | | |

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| **3.6.19.d** | Upon the vehicle master ignition switch being turned to anything other than "off", the vehicle shall apply or maintain power to all connected devices, and also reset the timer unless ignition sense is again active. | **M** | | | |
| **3.6.19.e** | If the vehicle operator has not logged off, the system shall automatically log off, prior to power down activation. | **M** | | | |
| **3.6.20** | The VLU shall process AVL data and correlate it with operator ID, date, time (both 24 hour system clock and 36 hour service day clock), run, block, route, trip, and location. | **M** | | | |
| **3.6.21** | The VLU shall manage all communications processes and devices on the vehicle, and shall store any accumulated data and logs. | **M** | | | |
| **3.6.22** | The VLU shall reconcile any discrepancies between all the different sensors and position inputs it uses for AVL purposes – see | **M** | | | |

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| | technical requirements. | | | | |
| **3.6.23** | The VLU shall process and manage the transmission of data to/from the central system as follows: | **M** | | | |
| **3.6.23.a** | Routine data including: schedule adherence, vehicle location data, passenger count, peak passenger load, messaging and communications requests, and event information on an event or periodic basis, via the data communications system. | **M** | | | |
| **3.6.23.b** | Priority data including priority messages, and alarms on an immediate basis, via the data communications system. | **M** | | | |
| **3.6.23.c** | Onboard equipment configuration data updates, non-critical logged or accumulated data, and other "batch" data, via the WLAN. | **M** | | | |
| **3.6.24** | The VLU shall be responsible for initiating and verifying the successful completion of data transfers, and shall not delete data until a successful | **M** | | | |

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| | transfer has been completed and confirmed. | | | | |
| **3.6.25** | In the event of an uncompleted file transfer, the VLU shall reinitiate the file transfer in accordance with the technical requirements. | **M** | | | |
| **3.6.26** | The VLU shall manage the downloading of new configuration data that may include schedule updates, AVA announcement updates, firmware/configuration updates, as follows: | **M** | | | |
| **3.6.26.a** | The VLU shall maintain current and one set of future configuration data that will automatically become the current configuration data once the defined activation date has arrived. | **M** | | | |
| **3.6.26.b** | The VLU shall periodically check for configuration updates whenever it is within WLAN coverage. | **M** | | | |
| **3.6.26.c** | If a configuration data update is available, the VLU shall manage the download process and update other | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | onboard equipment (the VLU shall provide a message on the MDT that a download and update is occurring so that the operator is aware). | | | | |
| **3.6.26.d** | The VLU shall automatically install updated firmware or configuration data it has received into the VLU, the destination sign and the AVA system. | **M** | | | |
| **3.6.26.e** | To minimize potential impacts on pull-out, the VLU shall include functionality to download only the schedule information on startup. Functionality shall be provided to manage the download of more voluminous data (such as a firmware or configuration update) so that it is only downloaded and installed on shutdown or during non-operating hours. | **M** | | | |
| **3.6.26.f** | If the VLU is unable to complete the download of configuration data via the WLAN, it shall continue using the previous configuration data. | **M** | | | |

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| **3.6.27** | The VLU must monitor and log, tagged with time and location, the following existing discrete external circuits: | **M** | | | |
| **3.6.27.a** | Front door and Rear door, open and close; | **M** | | | |
| **3.6.27.b** | Kneel, and return from kneel (raise); | **M** | | | |
| **3.6.27.c** | Lift or Ramp deploy, and return from deploy (stow); | **M** | | | |
| **3.6.27.d** | "Stop Requested" activation; | **M** | | | |
| **3.6.27.e** | Headlight activation and deactivation; | **M** | | | |
| **3.6.27.f** | Turn Signals, activation and deactivation; | **M** | | | |
| **3.6.27.g** | Hazard Lights, activation and deactivation; | **M** | | | |
| **3.6.27.h** | Master-Run switch, change in status (Off, Day-Run, Night-Run, Park); | **M** | | | |

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| **3.6.27.i** | Ignition, activation and deactivation; | **M** | | | |
| **3.6.27.k** | Covert Alarm switch activation; | **M** | | | |
| **3.6.27.l** | Selected dashboard light activations for vehicle maintenance monitoring (e.g. oil pressure, check engine light, tire pressure); | **M** | | | |
| **3.6.27.m** | Motion start; | **M** | | | |
| **3.6.27.n** | Not in motion/idle. | **M** | | | |
| **3.6.28** | The VLU shall include functionality and external interfaces to provide location, time, and/or triggering messages to other on-vehicle systems. | **M** | | | |
| **3.6.29** | The VLU shall include functionality to re-transmit data in the event of an unsuccessful transmission. | **M** | | | |
| **3.6.30** | The VLU shall run diagnostics and report any problems with onboard components (including the VLU itself, MDT, voice radio, AVL | **M** | | | |

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| | components, and destination sign). | | | | |
| **3.6.31** | The VLU shall automatically recognize any system process failure or lock-up, log the problem and attempt a restart. | **M** | | | |
| **3.6.32** | If restart of the process fails, notification shall be sent to the operator via the MDT and logged the event in the VLU data for upload at the end of the day. | **M** | | | |
| **3.6.33** | The VLU shall support remote diagnostics that allow central system access to check operations and functionality of the VLU. See technical requirements. | **M** | | | |
| **3.6.34** | In addition to providing routine position updates, the VLU shall record date, time and location when the following events occur: | **M** | | | |
| **3.6.24.a** | Arrival into and departure from agency configurable geographic areas that define the stops, timepoints, and pull-out/pull-in locations (for these | **M** | | | |

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| | events the current schedule adherence shall also be recorded); | | | | |
| **3.6.24.b** | Every activation and deactivation of each monitored onboard circuit, including: Door open/close, Kneel/Raise, Lift/Ramp deploy/stow, Stop-Requested light, Turn Signals; | **M** | | | |
| **3.6.24.c** | First stop/timepoint of the first trip; and | **M** | | | |
| **3.6.24.d** | Every toggling of operational conditions, including: operator key-press on MDT, off-route and return-to-route, early/late schedule adherence and return-to-on-time status, operator over-ride of destination sign. | **M** | | | |
| **3.6.35** | The VLU shall monitor diagnostic information for the Transit J1708, and log the following statistics upon every change in logon status or ignition status: | **M** | | | |
| **3.6.35.a** | By Module Identification (MID): Time of last good received packet, | **M** | | | |

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| | Total good received packets, Total good transmitted packets. | | | | |
| **3.6.35.b** | Total bad (collision/checksum) packets received. | **M** | | | |
| **3.6.25.c** | Total bad (collision/checksum) packets transmitted. | **M** | | | |
| **3.6.36** | The VLU shall monitor diagnostic information for connected onboard systems, and log the following statistics upon every change in logon status or ignition status: | **M** | | | |
| **3.6.36.a** | Data Communication Statistics (Total: Polls, Transmits, Re-Transmits, Receives, Errors, Fallback, etc); | **M** | | | |
| **3.6.36.b** | Navigation Quality (Time, Duration, Good GPS Navigation, Good Alternate Navigation, Poor Navigation, etc); | **M** | | | |
| **3.6.36.c** | All current VLU configuration data; | **M** | | | |

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| **3.6.36.d** | Odometer Statistics, since previous record (total traveled distance, current calibration factor); and | **M** | | | |
| **3.6.36.e** | WLAN Statistics, since previous record (VLU awake time, WLAN coverage time, data packets sent, data packets received, file transmissions/receptions attempted per file, file transmissions/receptions completed per file). | **M** | | | |
| **3.6.36.f** | All received text messages that were displayed to an operator | **M** | | | |
| **3.6.36.g** | All instances of lost data communications coverage exceeding 15 seconds once back in communications for more than ten (10) seconds. | **M** | | | |
| **3.6.37** | The VLU schedule data shall include agency configurable geographic areas (i.e., trigger boxes), and will initiate special VLU functions. | **M** | | | |
| **3.6.37.a** | Examples include: Change external destination sign; Initiate Transit | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | Signal Priority (TSP) status change (enable/disable/activate/deactivate); Initiate AVA announcements and/or "clears"; Indicate locations where GPS is known to be degraded. | | | | |
| **3.6.37.b** | The system shall enable the agency to maintain the trigger boxes within the scheduling database, independently without need for any software changes. | **M** | | | |
| **3.6.37.c** | The system shall support the creation, deletion, and relocation of trigger boxes and the designation or adjustment of the VLU action to be taken upon entering or exiting the trigger box. | **M** | | | |
| **3.6.38** | The VLU shall use AVL data to determine schedule adherence in real-time on the vehicle, without the need for central computation and communications. | **M** | | | |
| **3.6.39** | The VLU shall be fully operational within 90 seconds of power restoration for warm starts, and 150 | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| | seconds for cold starts under the full range of ambient conditions. | | | | |
| **3.6.40** | Logged data shall be stored in non-volatile memory, and shall not become corrupted due to any power condition, including: spike, drop, or loss. | **M** | | | |
| **3.7** | **Mobile Data Terminal** | | | | |
| **3.7.1** | The MDT shall be a rugged computing device designed for operation in a transit environment and shall function as the interface between the operator and all onboard components. | **M** | | | |
| **3.7.2** | MDT data storage shall be solid state. | **M** | | | |
| **3.7.3** | MDT shall have a color liquid crystal display (LCD) touch-screen. | **M** | | | |
| **3.7.4** | MDT shall be operable while wearing gloves. | **M** | | | |
| **3.7.5** | MDT shall be readable by operators | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | wearing polarized lenses. | | | | |
| **3.7.6** | The MDT shall be legible for the color blind. | **M** | | | |
| **3.7.7** | MDT shall be readable in direct sunlight and must offer low-glare setting for night operation. | **M** | | | |
| **3.7.8** | MDT touch-screen shall have a video graphics array (VGA) resolution of at least 640 x 480 pixels. | **M** | | | |
| **3.7.9** | MDT shall display vehicle status including data transmission, pending messages, and communication mode. | **M** | | | |
| **3.7.10** | MDT shall be capable of providing aural tones to indicate incoming messages to operators while keeping operator attention on the road. | **M** | | | |
| **3.7.10.a** | Logon | **M** | | | |
| **3.7.10.b** | Emergency Alarm | **M** | | | |
| **3.7.10.c** | Data Messaging | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.7.10.d** | Transfer Notification | **M** | | | |
| **3.7.10.e** | Schedule Adherence | **M** | | | |
| **3.7.10.f** | Headsigns | **M** | | | |
| **3.7.10.g** | Fare Collection | **M** | | | |
| **3.7.10.h** | Passenger Count | **M** | | | |
| **3.7.10.i** | Maintenance | **M** | | | |
| **3.7.10.j** | Stop Announcement | **M** | | | |
| **3.7.10.k** | Trip/Schedule | **M** | | | |
| **3.7.10.l** | Route | **M** | | | |
| **3.7.10.m** | Direction | **M** | | | |
| **3.7.11** | When the power is turned on, the MDT software shall automatically perform a power-on self-test, followed by configuring and initializing the MDT to the user-specified default values. | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.7.12** | The MDT shall be self-restarting and shall not become unresponsive and require manual restarts to continue operations. The MDT shutdown process will be controlled by the MDT software and shall only be possible when the ignition is in the off position. | **M** | | | |
| **3.7.13** | A user specified shutdown delay shall be provided to continue operations and to initiate the shutdown procedure that shall automatically close all files, save values, and send a shutdown message to be recorded in the CAD/AVL system. | **M** | | | |
| **3.7.14** | An on-board covert microphone shall be included for communication between dispatcher and operator – refer to technical requirements for location requirements. | **M** | | | |
| **3.7.15** | Wheelchairs lifts and ramps shall be monitored and data shall be recorded for each cycle. | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.7.16** | MDT shall display warning to operator and dispatcher workstation and shall transmit to central system if wheelchair lift was not cycled prior to leaving garage. All messages and warning shall be stored. | **M** | | | |
| **3.7.17** | MDT shall display a warning if logon has not occurred following vehicle movement of predefined distance per technical requirements. Warning shall be transmitted to CAD/AVL system for storage and display at dispatcher station. | **M** | | | |
| **3.7.18** | A logon process shall be provided for maintenance purposes to enable a vehicle to be moved through-out a facility for servicing and maintenance purposes without triggering alarms. | **M** | | | |
| **3.7.19** | MDTs shall be capable of remote log-on/log-off via the data communications connection. | **M** | | | |
| **3.7.20** | MDT shall have the "safe driving" mode enabled when the vehicle is moving above a configurable speed | **M** | | | |

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| | limit. | | | | |
| **3.7.21** | The safe driving mode shall allow the agency to stop vehicle operators from interacting with MDTs when driving, the MDT shall allow enabling of the following screen configurations under safe driving mode: | **M** | | | |
| **3.7.21.a** | Blank display on the screen; | **M** | | | |
| **3.7.21.b** | Disabled MDT buttons to stop vehicle operators from performing any actions on the screen; and | **M** | | | |
| **3.7.21.c** | Display of information relevant to vehicle operators when of high priority (e.g., route and schedule adherence status, missed messages or calls from dispatchers). | **M** | | | |
| **3.7.22** | Dispatch shall have the ability to remotely change the configurations for the safe driving mode. | **M** | | | |
| **3.7.23** | Dispatch shall be able to change the safe driving mode configurations by vehicle operator login. For example, | **M** | | | |

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| | the safe driving mode could be disabled for maintenance or training purposes. | | | | |
| **3.7.24** | The MDT shall allow two way text messaging between the transit vehicles and dispatch using a set of predefined messages, or free form text messaging. | **M** | | | |
| **3.7.25** | The MDT shall support the display of text messages longer than can fit on one line of the display. A minimum of 40 canned messages shall be supported. | **M** | | | |
| **3.7.26** | The MDT shall store multiple messages received from dispatch and indicate those text messages that are unread. | **M** | | | |
| **3.8** | **Mobile Access Router (MAR)** | | | | |
| **3.8.1** | Shall support both wireless and wired switched Ethernet Local Area Network (LAN) functionality, as well as multiple wireless Wide Area Network (WAN) links and a | **M** | | | |

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| | gateway. | | | | |
| **3.8.2** | MAR shall be a separate device from the VLU and MDT. | **M** | | | |
| **3.8.3** | MAR shall be equipped with a minimum of 1 GB of internal data storage capacity. | **M** | | | |
| **3.8.4** | MAR shall include a minimum of two (2) USB 2.0 connections through which USB enabled devices such as a portable computer or solid state memory can be connected. | **M** | | | |
| **3.8.5** | MAR shall include a minimum of eight (8) switched Ethernet ports. | **M** | | | |
| **3.8.6** | The wireless data communications device shall be easily replaceable to accommodate potential future adaptation to different wireless WAN link services. | **M** | | | |
| **3.8.7** | MAR shall incorporate a LAN Ethernet multiport switch capability to interconnect CAD/AVL onboard system components and existing | **M** | | | |

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| | onboard Ethernet enabled equipment. | | | | |
| **3.8.8** | MAR shall support the following wireless data services: | **M** | | | |
| **3.8.8.a** | 3G and 4G WAN, including LTE | **M** | | | |
| **3.8.8.b** | 802.11n Wi-Fi WLAN | **M** | | | |
| **3.8.8.c** | Act as a WLAN access point capable of enabling LAN access from public WLAN client devices within the bus interior, supporting the 802.11n WLAN standard and on a separate subnet firewalled from the onboard Ethernet switched LAN. | **M** | | | |
| **3.8.9** | The MAR shall be integrated with onboard CAD/AVL components and other existing onboard Ethernet enabled systems per technical requirements. | **M** | | | |
| **3.8.10** | The MAR and all WLAN communications shall support Wi-Fi Protected Access 2 (WPA2) security and communications protocols, or alternate approved through the design | **M** | | | |

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| | review process. | | | | |
| **3.9** | **Global Positioning System (GPS)** | | | | |
| **3.9.1** | AVL module shall provide a derived location using an onboard GPS receiver and other location determination devices (gyroscope, odometer, etc.) per technical requirements. | **M** | | | |
| **3.9.2** | Vehicle location shall be determined by a navigation algorithm – refer to technical requirements. | **M** | | | |
| **3.9.3** | Other location determination devices other than GPS shall automatically calibrate and require no operator or maintenance personnel intervention for daily usage. | **M** | | | |
| **3.9.4** | Proper operation of the onboard systems relying on location reporting shall not be interrupted for vehicles leaving from an enclosed storage area. | **M** | | | |

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| **3.9.5** | The GPS antenna shall be a low-profile unit housed in a rugged and weather tight enclosure. The GPS antenna shall be securely mounted and sealed on the exterior of the vehicle, clear of obstructions, and clear of interference from other generating devices or 91 Radio Frequency interference. | **M** | | | |
| **3.9.6** | The GPS system shall provide a spare NMEA-based GPS output. | **M** | | | |
| **3.9.7** | GPS system shall meet cold and warm acquisition and current position update times per technical requirements. The GPS system shall include multi-path rejection capabilities to help eliminate inaccurate signals caused by reflections off of buildings or other structures. | **M** | | | |
| **3.9.8** | Vehicle location shall be transmitted at least once every 20 seconds (polling rate) to the central CAD/AVL system for display and storage purposes and every 5 seconds | **M** | | | |

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| | during an Emergency Alarm situation. | | | | |
| **3.9.9** | The AVL shall at all times provide current position information to the VLU per technical requirements. | **M** | | | |
| **3.9.10** | GPS delay time from location acquisition to formatting for transmission shall not exceed one (1) second. | **M** | | | |
| **3.9.11** | The GPS system shall store the most recent location to provide as the "last known good" location in the event that location reporting is interrupted. | **M** | | | |
| **3.9.12** | Location messages transmitted to dispatch shall indicate messages status as current or "last known verified". | **M** | | | |
| **3.10** | **Automatic Passenger Counters** | | | | |
| **3.10.21** | Napa VINE currently owns and operates UTA APC's on board fixed route and demand response vehicles. The proposed AVL system shall | **M** | | | |

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| | integrate with the existing UTA APC's to provide the Agency with time, location, and on-off counts. | | | | |
| **3.11** | **Emergency Alarms** | | | | |
| **3.11.1** | When a covert alarm signal is received from a vehicle, the CAD/AVL software shall display the event in the performance queue to all dispatchers with configurable visual alerting methods. | **M** | | | |
| **3.11.2** | The CAD/AVL software shall provide a configurable audible and visual alert to all dispatchers, road supervisors, and others using the CAD/AVL software. | **M** | | | |
| **3.11.3** | The CAD/AVL software shall notify the dispatcher in the performance queue that a silent alarm message has been received using an Agency-approved visual notification method. | **M** | | | |
| **3.11.4** | Once a dispatcher selects the covert alarm event, this shall be so indicated | **M** | | | |

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| | to that dispatcher and all others. | | | | |
| **3.11.5** | When acknowledging an alarm the CAD/AVL software shall zoom and center the map display on the alarming vehicle and locate the nearest road supervisor vehicle when selected by a dispatcher. The scale for the zoom shall be configurable by the Agency. | **M** | | | |
| **3.11.6** | The CAD/AVL software shall allow dispatchers to downgrade emergency alarms to a lower message priority, or upgrade lower priority messages to an emergency alarm. The CAD system shall log all alarm status changes (create, upgrade, downgrade, and cancel). | **M** | | | |
| **3.11.7** | Activation of an emergency message shall place the vehicle in a priority status for frequency of location and message updates which will result in vehicle location and status updates at a rate that is configurable by the Agency. | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.12** | **Automatic Vehicle Announcements (AVA)** | | | | |
| **3.12.1** | The AVL central software shall be used to generate and manage next stop, customer, and other announcements, manage device configurations, generate reports, and manage device fault reporting and logs. | **M** | | | |
| **3.12.2** | The AVA central software shall meet or exceed requirements of the United States Access Board. | **M** | | | |
| **3.12.3** | The AVA central software shall include functionality to import route and stop data from an external system via Agency file(s) per technical requirements. | **M** | | | |
| **3.12.4** | The AVA central software shall include the capability to announce all or only selected stops per technical requirements. | **M** | | | |
| **3.12.5** | Location based stop announcement triggers shall be configurable by the | **M** | | | |

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| | Agency for any stop announcement. | | | | |
| **3.12.6** | Stops to be announced shall be set through system configuration data managed by the Agency. | **M** | | | |
| **3.12.7** | The AVA central software shall include the ability to customize announcements per technical requirements (i.e. add, link, etc.). | **M** | | | |
| **3.12.8** | Content of the AVA announcements shall be configurable and shall include the minimum messages types: | **M** | | | |
| **3.12.8.a** | Cross-street only | **M** | | | |
| **3.12.8.b** | Current street and cross-street | **M** | | | |
| **3.12.8.c** | Landmark | **M** | | | |
| **3.12.8.d** | Transfer opportunities | **M** | | | |
| **3.12.8.e** | Bus Stop Name | **M** | | | |
| **3.12.8.f** | Service announcements | **M** | | | |

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| **3.12.9** | The AVA central software shall include the ability for the Agency to independently configure audio and text messages associated with a specific stop. | **M** | | | |
| **3.12.10** | The AVA central software shall include the ability to append a standard message header to all messages per technical requirements. Different headers shall be available for different types of announcements. The AVA central software shall support English at a minimum plus any other languages as required by the Agency. | **M** | | | |
| **3.12.11** | The AVA central software shall enable creating audio messages using both text-to-speech synthesized and recorded voice. Voice files shall be MP3 or WAV format as required by technical requirements. | **M** | | | |
| **3.12.12** | The AVA central software shall be able to create composite announcements that combine synthesized and recorded | **M** | | | |

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| | announcement segments. | | | | |
| **3.12.13** | The AVA central software speech engine shall be a modular component that allows the Agency to independently replace it at a later date without other system changes. | **M** | | | |
| **3.12.14** | The AVA central software shall be configurable by the Agency so that external announcements may be set for activation on any route. External announcements shall include at minimum: | **M** | | | |
| **3.12.14.a** | Route number. | **M** | | | |
| **3.12.14.b** | Route name. | **M** | | | |
| **3.12.14.c** | Destination. | **M** | | | |
| **3.12.14.d** | Direction. | **M** | | | |
| **3.12.14.e** | Branch. | **M** | | | |
| **3.12.14.f** | Route Type. | **M** | | | |

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| **3.12.15** | The AVA central software shall be configurable so that external announcements can be made less frequently, only at specified stops or not at all. | **M** | | | |
| **3.12.16** | The AVA central software shall allow specific volume levels to be configured for individual stops, times of day and/or sections of routes. | **M** | | | |
| **3.12.17** | The AVA central software shall be able to configure external announcements to repeat without operator interaction at any or all stops at a time interval configurable by the Agency. | **M** | | | |
| **3.12.18** | The database of announcement messages shall associate stops with message data for each trip pattern. | **M** | | | |
| **3.12.19** | The AVA central software shall enable incremental updates of onboard message data on an as-needed basis. | **M** | | | |

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| **3.12.20** | The user interface for entry/deletion/modification of messages shall be easy to use, and shall associate all messages with a trip pattern. | **M** | | | |
| **3.12.21** | The system shall accept the addition, deletion, or movement (from one trip pattern to another) of stop association data. | **M** | | | |
| **3.12.22** | The database shall support direct SQL interfaces. | **M** | | | |
| **3.12.23** | Each message shall have a unique identifier, defined by the Agency. | **M** | | | |
| **3.12.24** | The AVA central software shall include look-up tables to associate messages entered through the workstation with the message identifier. | **M** | | | |
| **3.12.25** | Creation or deletion of a message shall not change the identifiers of the other messages. | **M** | | | |

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| **3.12.26** | Provisions shall be included to rebuild the message database and identifiers on a periodic basis. (e.g., after there have been a significant number of message additions and deletions). | **M** | | | |
| **3.12.27** | The AVA central software shall provide means to record and generate announcement audio and to define message-stop associations. | **M** | | | |
| **3.12.28** | The AVA central software shall be installed on a desktop PC or server supplied by the Agency, accessible by multiple clients or workstations if on a server, and configured with required hardware and operating system software. | **M** | | | |
| **3.12.29** | Internal single line LED headsigns shall be provided. | | | | |
| **3.13** | **Single Point Log-On** | | | | |
| **3.13.1** | Vehicle logic unit should allow for single point of logon for all onboard equipment including electronic | **M** | | | |

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| | fareboxes, headsigns, APC system, the AVA system, and other integrated devices. | | | | |
| **3.13.2** | The single point logon shall log onto the other on-board equipment or override the current logon to those other devices. | **M** | | | |
| **3.13.3** | The central system should recognize that the vehicle is ready to commence its assigned work, has started work and completed work for the day. | **M** | | | |
| **3.14** | **Not Used** | | | | |
| **3.14.1** | Not Used | | | | |
| **3.14.2** | Not Used | | | | |
| **3.14.3** | Not Used | | | | |
| **3.14.4** | Not Used | | | | |
| **3.15** | **Destination Headsign Interface** | | | | |
| **3.15.1** | Existing destination signs shall interface with the VLU, which shall | **M** | | | |

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| | automatically provide sign codes for every route and direction change during revenue service. | | | | |
| **3.15.2** | Firmware updates needed to the destination headsigns and any subcontracting for support services needed from the destination headsign vendor shall occur during interfacing of this system. | **M** | | | |
| **3.15.3** | The MDT shall be capable of changing the destination headsign and providing codes for the operator to manually determine the selection of destinations and to manually input codes when the CAD/AVL system is down. | **M** | | | |
| **3.16** | **Connection Protection** | | | | |
| **3.16.1** | The Contractor shall provide an option for the CAD/AVL system to provide and operate in conjunction with the Mobile Data Terminal software to provide Transfer Connection Protection (TCP). | **M** | | | |

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| **3.16.2** | TCP shall be triggered when an incoming fixed route operator makes a transfer for a specific outgoing route, which the vehicle operator enters via the Mobile Data Terminal. | **M** | | | |
| **3.16.3** | The system shall, without any need for dispatcher intervention, hold the outgoing vehicle to allow the connection, if it would not need to be held more than a configurable time based on the estimated arrival time of the incoming vehicle. | **M** | | | |
| **3.16.4** | The system shall notify the outgoing vehicle via the Mobile Data Terminal if it is to hold, until what time and for what route. | **M** | | | |
| **3.16.5** | The dispatcher shall be able to review current pending transfers, including the incoming and outgoing vehicles involved, and the time the incoming vehicle is expected to arrive at the transfer. | **M** | | | |
| **3.16.6** | The dispatcher shall have the ability to intervene and override as | **M** | | | |

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| | necessary in the operation of transfers. | | | | |
| **3.17** | **Video System Interface** | | | | |
| **3.17.1** | The VLU shall be interfaced with the existing video system including the digital video recorders (DVR) on-board. The Contractor shall be entirely responsible for developing and integrating this interface. | **O** | | | |
| **3.17.2** | The VLU to DVR interface shall be accessible using the MDT. | **O** | | | |
| **3.17.3** | VLU shall be able to store alarms that are received from the DVR. | **O** | | | |
| **3.17.4** | The VLU shall send an update message to the MDT when there is an alarm received from the DVR. | **O** | | | |
| **3.17.5** | The VLU shall provide a discrete signal to the DVR when an emergency alarm is generated by the operator. | **O** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.17.6** | The CAD/AVL software shall support the ability to tag an incident record with an index or link to specific video frame(s)/snippets in the future. | **O** | | | |
| **3.17.7** | The VLU shall send alert to dispatch and maintenance if the DVR is not functioning properly. | **O** | | | |
| **3.17.8** | The Video System Interface will be an optional item for Napa VINE to be potentially added in the future. | **O** | | | |
| **3.18** | **Farebox Interface** | | | | |
| **3.18.1** | The VLU shall be interfaced with the existing GenFare Fareboxes. | **M** | | | |
| **3.18.2** | Interface completion shall include any firmware updates needed to the fareboxes and any subcontracting for support services needed from the farebox vendor. | **M** | | | |
| **3.18.3** | The VLU to farebox interface shall support farebox logon using the | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| | MDT. | | | | |
| **3.18.4** | MDT logon shall logon to the farebox or override the current logon on the farebox. | **M** | | | |
| **3.18.5** | The VLU shall send an update message to the farebox when there is a change to the block, route, trip, operator, or fareset. | **M** | | | |
| **3.18.6** | VLU shall send the current location upon request message from the farebox. | **M** | | | |
| **3.18.7** | VLU shall be able to store farebox alarms received from the farebox. | **M** | | | |
| **3.18.8** | Data records transmitted from the farebox to the CAD/AVL system shall use synchronous time and location stamping to support central system reporting functions that combine farebox data with data from other systems (e.g. CAD/AVL, APC) – for example, fares collected by stop location. | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **3.20** | **Transit Automatic Vehicle Monitoring** | | | | |
| **3.20.1** | Automatic Vehicle Monitoring (AVM) System shall be included as an option. | **O** | | | |
| **3.20.2** | Automatic Vehicle Monitoring (AVM) shall collect data on revenue-vehicle drive-train performance, CAD/AVL subsystem health warnings, pre run checklist completion, and discrete alarms in order to identify problems, improve maintenance, and reduce vehicle breakdowns. | **O** | | | |
| **3.20.3** | AVM data triggered by operating conditions beyond pre-defined threshold shall be reported in real-time to the CAD/AVL system and stored for reporting purposes. | **O** | | | |
| **3.20.4** | Standard AVM reports and user query tools shall be supplied for easy access to the stored data. | **O** | | | |
| **3.20.5** | AVM drive-train data and mechanical alarms shall be collected | **O** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | from the installed Engine Control Module provided by the vehicle's manufacturer and/or the installed Multiplexer I/O system. | | | | |
| **3.20.6** | Alarms shall be transmitted over CAD/AVL cellular for real-time display to maintenance users. | **O** | | | |
| **3.20.7** | The AVM data messages and alarms shall be stored for analysis and interface to the Agency's Vehicle Maintenance System. | **O** | | | |
| **3.20.8** | Up to twelve (12) user defined discrete inputs shall be provided to monitor mechanical alarms. | **O** | | | |
| **3.20.9** | System shall monitor the Emergency Alarm, low oil pressure, hot engine, and low air pressure. | **O** | | | |
| **3.20.10** | System shall allow user/Agency to define and connect unused discrete inputs for future requirements. | **O** | | | |
| **4.** | **Dispatch and Data Reporting** | | | | |

| Napa VINE Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **4.1** | **Text Messaging** | | | | |
| **4.1.1** | Messages shall be capable of being grouped into categories for quick selection. | **M** | | | |
| **4.1.2** | Canned message categories and message text shall be user definable. | **M** | | | |
| **4.1.3** | The operator and dispatcher shall be able to reply to a message in the queue in either a canned response or free-form text message. | **M** | | | |
| **4.1.4** | A text message shall support an acknowledgement message back to dispatch once the driver has viewed a message flagged by dispatch as requiring acknowledgement. | **M** | | | |
| **4.1.5** | Text messages shall be either deleted or saved by the Operator after viewing. Storage for saved text messages shall handle a minimum of eight messages. | **M** | | | |
| **4.2** | **Automated Recording and Archiving** | | | | |

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| **4.2.1** | The CAD/AVL system shall store the position and tracking of the transit vehicles in some form of database. | **M** | | | |
| **4.2.2** | Database shall include ability to query the data with different parameters for performance and safety improvements. | **M** | | | |
| **4.2.3** | Data shall be stored in a database for planning and evaluation purposes. The specific requirements shall be decided by the Agency and should include an assessment of the following: | **M** | | | |
| **4.2.3.a** | Length of time AVL data is to be stored | **M** | | | |
| **4.2.3.b** | The sampling rate AVL data is to be stored (i.e. at every minute, at every stop). | **M** | | | |
| **4.3** | **Real-time, Reporting, and Archival Data** | | | | |
| **4.3.1** | System shall provide the Agency the right to access, use, and distribute data to create interfaces to the | **M** | | | |

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| | CAD/AVL system, export data to other agencies and third party licensed systems, generate reports, and for other Agency purposes. | | | | |
| **4.3.2** | Access to real-time operating data shall not be affected by the Agencies reporting and data access by user groups other than dispatchers and supervisors. | **M** | | | |
| **4.3.3** | Proper safeguards shall also be enabled to ensure dispatcher and supervisors cannot overload the primary database server with faulty or ill-designed queries. | **M** | | | |
| **4.3.4** | If required, a secondary database server that takes the processing load off of the primary real time database shall be provided for the purpose of data retrieval for reporting and data analysis. | **M** | | | |
| **4.3.5** | Enough online data storage shall be provided to keep at least three (3) years of historical data. | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| **4.3.6** | Applications and tools shall be provided for historical data access. | **M** | | | |
| **4.3.7** | Provisions shall be provided to save data and database schema more than three years old to long term storage media such as magnetic tape, CD, DVD, etc. and delete the archived data from the main or secondary database(s). | **M** | | | |
| **4.3.8** | Provisions shall be provided to restore data by copying archived data from long term storage to either a stand-alone database machine or onto the current database(s). | **M** | | | |
| **4.3.9** | Archiving data shall be possible by either a graphical user interface or via the command line for automating tasks. | **M** | | | |
| **4.4** | **Daily Schedules** | | | | |
| **4.4.1** | The CAD/AVL system shall automatically load the daily schedule of blocks, runs, driver/operator assignments, and vehicle | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | assignments. | | | | |
| **4.4.2** | The CAD/AVL system shall support an overlap of daily schedules for service that continues past midnight. | **M** | | | |
| **4.4.3** | The CAD/AVL system shall support multiple service types to accommodate service variations at the route and trip level per technical requirements. | **M** | | | |
| **4.4.4** | Each schedule day shall permit assignment of multiple service types. | **M** | | | |
| **4.5** | **Incident Reports** | | | | |
| **4.5.1** | The CAD/AVL system shall provide an integrated Incident Reporting subsystem per technical requirements. | **M** | | | |
| **4.5.2** | Incident types and the association of data messages to incident types shall be user definable. | **M** | | | |
| **4.5.3** | A form creation editor shall be provided that provides the CAD/AVL | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | System Administrator the capability to create property-specific customized incident forms that are accessible to dispatchers and other users of the CAD/AVL system. | | | | |
| **4.5.4** | Forms shall be created and associated with incident types. | **M** | | | |
| **4.5.5** | Every new Incident Report shall be uniquely identified and the associated Incident Report form displayed for completion. | **M** | | | |
| **4.5.6** | Incident forms shall include data fields supported and auto-populated by the CAD/AVL system as well as user defined fields per the technical requirements. | **M** | | | |
| **4.5.7** | User definable fields shall be implemented such that custom fields do not inhibit upgrades to software. | **M** | | | |
| **4.5.8** | Incident forms shall include a combination of automatically filled in data fields and manually entered data fields. Upon creation of an incident | **M** | | | |

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| | report all known CAD/AVL data shall be "pre-populated" or automatically entered into the configured incident form fields. | | | | |
| **4.5.9** | An open Incident Report Queue shall be provided for each dispatcher logged into the CAD/AVL system along with information about dispatcher responsibility. All Incident Reports must be closed or responsibility transferred prior to the dispatcher logging off. | **M** | | | |
| **4.5.10** | The current date, time, and user ID shall be stamped to indicate information that is added to an Incident Report after the original owner of the Incident Form has closed the incident. | **M** | | | |
| **4.5.11** | Incident Reports shall provide the following capabilities: | **M** | | | |
| **4.5.11.a** | Incident Forms shall have the option to be required for specific incident types. | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| **4.5.11.b** | If a message requiring an Incident Form is deleted the CAD/AVL system shall generate the form and mark it as CAD/AVL generated. | **M** | | | |
| **4.5.11.c** | Incident Reports shall provide access to a spell checker. | **M** | | | |
| **4.5.11.d** | Incident Reports shall be capable of being forwarded to individuals or groups of individual electronically. | **M** | | | |
| **4.5.11.e** | Incident reports shall have the capability to be displayed online for at least twelve months for any new, open, or closed Incident Report. | **M** | | | |
| **4.5.11.f** | Incident Reports shall be able to be queried based upon CAD/AVL variables such as open/closed status, date range, incident type, dispatcher ID, Operator ID, Route, or vehicle ID. | **M** | | | |
| **4.5.11.g** | Mechanical, breakdown, and vehicle switch out Incident Reports shall provide an interface to the Maintenance system to document the | **M** | | | |

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| | incident for maintenance action. | | | | |
| **5** | **Scheduling System** | | | | |
| **5.1** | The Contractor shall convert the existing route and stop databases from each of the agencies to import that data in the proposed schedule software database. | **M** | | | |
| **5.2** | The scheduling system shall also have the ability to import stop data from an external system in excel or comma separated value (CSV) file format | **M** | | | |
| **5.3** | The scheduling system or CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) using a GTFS feed. | **M** | | | |
| **5.4** | The system shall have the capability to create and define an unlimited number of bus stops and nodes. | **M** | | | |
| **5.5** | The system shall be able to create | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | new routes and update exiting routes. | | | | |
| **5.6** | The system shall be able to create new patterns and update existing patterns, including time points and stops. | **M** | | | |
| **5.7** | The system shall permit the user to define bus stops using a variety of methods, as identified in the technical requirements. | **M** | | | |
| **5.8** | The system shall be capable of allowing stops to be properly positioned at intersections. | **M** | | | |
| **5.9** | The system shall be capable of allowing the user to assign stop amenities (e.g., bench, shelter, etc.) to each stop and other supplemental data. | **M** | | | |
| **5.10** | The system shall allow any number of trip patterns to be defined as distinct bus stop sequences, as identified in the technical requirements. | **M** | | | |

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| **5.11** | The system shall be capable of displaying all trip patterns, or fixed portions of flexible trip patterns, on a map for visual display. | **M** | | | |
| **5.12** | The system shall be capable of calculating distances for deadhead route segments, entire trip patterns, and selected trip pattern segments defined by the user. | **M** | | | |
| **5.13** | The system shall allow the definition of average running speeds, for various days and time periods, for deadhead segments and between designated pairs of stops along each trip pattern. | **M** | | | |
| **5.14** | The system shall be able to generate a list of turning movements for an entire trip pattern. | **M** | | | |
| **5.15** | The system shall allow routes to be defined as a sequence of trips using selected trip patterns during defined time periods. | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **5.16** | **System Viewing** | | | | |
| **5.16.1** | The system shall allow the viewing of pattern statistics, as identified in the technical requirements. | **M** | | | |
| **5.16.2** | View a pattern's route adherence along a route or corridor. | **M** | | | |
| **5.17** | **Creation of Timetables** | | | | |
| **5.17.1** | The system shall be capable of rotating the extra board automatically. | **M** | | | |
| **5.17.2** | The system shall be capable of calculating the running time between any pair of timepoints on any trip pattern, taking into account running speeds. The system shall also allow running times to be manually input if needed, such as for deviated/flexible route segments. | **M** | | | |
| **5.17.3** | The system shall be capable of automatic or manual trip building for each route, using the designated sequence of trip patterns, per the | **M** | | | |

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| | technical requirements. | | | | |
| **5.17.4** | The system shall permit users to automatically or manually assign trip numbers. | **M** | | | |
| **5.17.5** | The system shall allow for modifying built trips, based on modifying a single trip pattern, all trips in a single direction or a combination of the above. | **M** | | | |
| **5.17.6** | The system shall permit authorized users to assign specific vehicle types to trips. | **M** | | | |
| **5.17.7** | The system shall be capable of computing deadhead time, including the effect of varying running speed in various time periods. | **M** | | | |
| **5.17.8** | The system shall provide summary data on trips and running times, per the technical requirements. | **M** | | | |
| **5.18** | **Vehicle Assignment** | | | | |

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| **5.18.1** | The system shall be capable of either automatic or manual vehicle block development based on user-defined variables, per the technical requirements. | **M** | | | |
| **5.18.2** | The system shall allow users to automatically or manually assign block numbers. | **M** | | | |
| **5.18.3** | The system shall be capable of developing potential interline relationships for the entire service or based on the user selecting specific routes or trips. | **M** | | | |
| **5.19** | **Runcutting** | | | | |
| **5.19.1** | The system shall be capable of cutting single-piece or multi-piece work assignment runs, per the technical requirements. | **M** | | | |
| **5.19.2** | The system shall allow users to automatically or manually assign run numbers. | **M** | | | |

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| **5.19.3** | The system shall generate runs that incorporate all applicable agency labor agreement provisions. | **M** | | | |
| **5.19.4** | The system shall generate runs that incorporate agency management rules. | **M** | | | |
| **5.19.5** | The system shall provide a notification flag when a manual or automatically generated runcut violates a management rule or labor agreement provision. | **M** | | | |
| **5.19.6** | The system shall allow for the development of alternative runcut scenarios, per the technical requirements. | **M** | | | |
| **5.19.7** | The system shall allow the shifting of trip relief times (stated in block tables) to optimize runcuts. | **M** | | | |
| **5.19.8** | The system shall allow the user to specify compressed work weeks (e.g., 4 day work weeks, 10 hour days). | **M** | | | |

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| **5.19.9** | The system shall permit the agency to manually cut some or all of the blocks. | **M** | | | |
| **5.20** | **Rostering and Bid Management** | | | | |
| **5.20.1** | The system shall support both roster and cafeteria style bids. | **M** | | | |
| **5.20.2** | The system shall be able to create and maintain rosters including the extra board. | **M** | | | |
| **5.20.3** | The system shall be capable of building bid rosters automatically. | **M** | | | |
| **5.20.4** | The system shall permit users to automatically or manually assign roster numbers. | **M** | | | |
| **5.20.5** | The system shall have the capability to take into account special service in effect for selected dates (e.g., holidays). | **M** | | | |
| **5.20.6** | The system shall allow agency staff to establish rules on which rostering suggested by the system will be | **M** | | | |

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| | based. | | | | |
| **5.20.7** | The system shall have the capability to create separate rosters for various groups of vehicle operators (e.g., part-time rosters). | **M** | | | |
| **5.20.8** | The system shall have the capability to validate the transitions between rosters for two consecutive bid periods. | **M** | | | |
| **5.20.9** | The system shall have the capability to automatically generate one roster at a time or all rosters. | **M** | | | |
| **5.20.10** | The system shall allow agency staff to access human resources information that has been imported into the system for any bus driver (optional). | **M** | | | |
| **5.20.11** | The system shall validate driver choices to determine whether each driver meets minimum rest time requirements between runs. | **M** | | | |

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| **5.20.12** | The system shall validate driver choices to determine whether each driver meets requirements for minimum/maximum assigned work load. | **M** | | | |
| **5.20.13** | The system shall be able to associate a driver to a specific roster or rosters. | **M** | | | |
| **5.20.14** | The system shall generate work on a nightly basis from the schedule's bids. | **M** | | | |
| **5.20.15** | The nightly generation shall generate work a user-defined number of days into the future. | **M** | | | |
| **5.20.16** | Extra board items shall be included. | **M** | | | |
| **5.20.17** | Report Generation errors or rule violations that occur during schedule generation shall be identified. | **M** | | | |
| **5.21** | **Schedule Validation** | | | | |
| **5.21.1** | Schedule Validation must allow the user to review different aspects of the schedule and validate the schedule | **M** | | | |

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| | against a set of rules. | | | | |
| **5.21.2** | All additions, omissions, time modifications, conflicts and errors shall be propagated through the rest of the schedule and be validated against a set of rules developed by the agency. | **M** | | | |
| **5.21.3** | Conflicts or errors associated with the changes must be highlighted in the application and noted to the agency. | **M** | | | |
| **6** | **Data Management** | | | | |
| **6.1** | The CAD/AVL system should include data management software to manage the entry, and manipulation of data and automate reporting for performance monitoring. | **M** | | | |
| **6.2** | The data management system should integrate with the scheduling software and facilitate easy National Transit Database (NTD) reporting. | **M** | | | |
| **6.3** | The system shall be capable of establishing automatic daily, weekly, | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
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| | monthly, quarterly routines to produce and email standard PDF reports to defined user groups. | | | | |
| **6.4** | Standard reports shall be developed through the design review process, and shall include at minimum: | **M** | | | |
| **6.4.1** | Schedule Adherence (by stop or timepoint) | **M** | | | |
| **6.4.2** | Passenger Loadings and Alightings (by stop and capacity) | **M** | | | |
| **6.4.3** | Daily Revenue | **M** | | | |
| **6.4.4** | Missed Trips | **M** | | | |
| **6.4.5** | Stop Time Analysis | **M** | | | |
| **6.4.6** | Farebox vs. APC validation | **M** | | | |
| **6.4.7** | Layover/Recovery | **M** | | | |
| **6.4.8** | In-service hours | **M** | | | |
| **6.4.9** | Actual hour and actual miles | **M** | | | |

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| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **6.4.10** | Route deviation | **M** | | | |
| **6.4.11** | Travel time and average speeds | **M** | | | |
| **6.4.12** | Driver Log ins (by bus and route) | **M** | | | |
| **6.4.13** | Origin and Destination Information | **M** | | | |
| **6.4.14** | Dashboard | **M** | | | |
| **6.4.15** | Wheelchair Lift Use (by stop) | **M** | | | |
| **6.4.16** | Bike Rack Use (by stop) | **M** | | | |
| **6.4.17** | Luggage Bay Use (by stop) | **M** | | | |
| **6.4.18** | Incidents | **M** | | | |
| **6.4.19** | Bus Change-off | **M** | | | |
| **6.4.20** | Collisions | **M** | | | |
| **6.4.21** | General Delay | **M** | | | |
| **6.4.22** | Trip Delays | **M** | | | |
| **6.4.23** | Trip Cancellation | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **6.4.24** | Equipment Issues | **M** | | | |
| **6.4.25** | Vehicle Locations | **M** | | | |
| **6.4.26** | Vehicle Speeds | **M** | | | |
| **6.4.27** | Vehicle Performance | **M** | | | |
| **6.4.28** | Communications Status | **M** | | | |
| **6.4.29** | Emergency Alarm | **M** | | | |
| **6.4.30** | Driver Incident (incapacitated, sick, performance) | **M** | | | |
| **6.4.31** | System Diagnostics | **M** | | | |
| **6.4.32** | Maintenance | **M** | | | |
| **6.4.33** | On Peak Loading by Route, Trip, and Stop | **M** | | | |
| **6.5** | All reports shall have the capability to export information into a common analysis and text editing office software such as Microsoft Excel and Word. | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **7.** | **Real Time Passenger Information -** | | | | |
| **7.1** | The system shall generate real-time arrival/departure predictions for all vehicles that are integrated in the proposed CAD/AVL system. | **M** | | | |
| **7.2** | The real-time arrival predictions shall report predicted arrival times based on actual arrivals and not based on scheduled arrivals. | **M** | | | |
| **7.3** | The CAD/AVL system shall be able to interface with field equipment including passenger information displays, agency websites and mobile applications to provide and display real-time arrival/departure data for fixed-route and demand-response vehicles. | **M** | | | |
| **7.4** | The data required to be provided to the field equipment, agency websites and mobile applications includes current bus schedules, bus schedule adherence status, and estimated (predicted) arrival/departure times of transit vehicles at designated bus | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | stops and transit centers. | | | | |
| **7.5** | The real-time arrival predictions shall meet or exceed the following performance criteria: | **M** | | | |
| **7.5.1** | For predictions between one and ten minutes, the prediction accuracy shall be three minutes or less for 90% of the generated predictions. | **M** | | | |
| **7.5.2** | For predictions between 11 and 25 minutes, the prediction accuracy shall be four minutes or less for 85% of the generated predictions. | **M** | | | |
| **7.5.3** | For predictions more than 25 minutes, the prediction accuracy shall be six minutes or less for 85% of the generated predictions. | **M** | | | |
| **8.** | **Passenger Information Displays** | | | | |
| **8.1** | The Contractor shall provide passenger information signs that display, at the stop level, the estimated count-down arrival time and/or departure time of the next | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | buses at the stop within a defined time interval. | | | | |
| **8.2** | Both scheduled and dynamic text message capabilities shall be provided to either individual or groups of signs. | **M** | | | |
| **8.3** | A user interface shall provide easy setup, configuration, diagnostic, and messaging status at all sign locations. | **M** | | | |
| **8.4** | The displays shall be able to display multiple routes, CAD/AVL system time, ad hoc messages, and scheduled messages. | **M** | | | |
| **8.5** | Physical design of the sign shall be modular for easy maintenance, vandal resistant, and suitable for an outdoor environment. | **M** | | | |
| **8.6** | Solar power, high brightness LED displays, and multi-line displays shall be available where required by | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | operational needs. | | | | |
| **8.7** | The final location of the Contractor supplied bus stop and shelter passenger information displays shall be determined prior to the final design approval. | **M** | | | |
| **8.8** | Assistance shall be provided to the Agency in acquiring necessary permits. | **M** | | | |
| **8.9** | Outdated information for a transit vehicle on the display shall be cleared within a maximum of fifteen (15) seconds of the transit vehicle departing the stop or station. | **M** | | | |
| **8.10** | Proposers shall indicate what means (wired or wireless) shall or can be used to connect to the passenger information displays. | **M** | | | |
| **9.** | **Mobile Applications (Apps)** | | | | |
| **9.1** | The CAD/AVL system shall generate and disseminate real-time transit traveler information to the regional | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | 511 system, agency-owned infrastructure, and web/mobile services. | | | | |
| **9.2** | The system shall update real-time arrival predictions and generate service alerts to mobile applications based upon real time service adjustments and measures implemented by the agency dispatchers including: | **M** | | | |
| **9.2.1** | Cancelled Service; | **M** | | | |
| **9.2.2** | Detours (planned or ad hoc); | **M** | | | |
| **9.2.3** | Drop off only; | **M** | | | |
| **9.2.4** | Additional of supplemental service (‘trippers’) in addition to scheduled trips. | **M** | | | |
| **9.3** | It is desired that the Contractor develop a mobile app to allow transit riders to communicate with Dispatch or other Operations staff to report suspicious activity, crime, or quality of life problems at a transit station or | **O** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| | on a bus. | | | | |
| **10.** | **511 Integration** | | | | |
| **10.1** | The CAD/AVL system shall support the exchange of data with the Bay Area's regional 511 traveler information system operated by the Metropolitan Transportation Commission (MTC). | **M** | | | |
| **10.2** | Data exchange with 511 shall consist of the following: | **M** | | | |
| **10.2.1** | Export of static configuration data. | **M** | | | |
| **10.2.2** | Export of real-time arrival information. | **M** | | | |
| **10.2.3** | Export of CAD/AVL system status information to 511. | **M** | | | |
| **10.2.4** | The latest requirements and specifications for the 511 integration shall be gathered from the Metropolitan Transportation Commission (MTC). | **M** | | | |

| Napa VINE Compliance Matrix | | | | | |
|---|---|---|---|---|---|
| **Section Number** | **Description** | **Mandatory or Optional (M/O)** | **Comply? (Y/N)** | **If yes, provide proposal section reference** | **If no, propose alternate requirement language** |
| **10.3** | The CAD/AVL system shall be able to exchange static configuration data (routes, stops, patterns, etc.) and other types of static and real-time information using GTFS. | **M** | | | |

# APPENDIX E-2 – NAPA VINE FLEET DETAILS

# APPENDIX E-2 – NAPA VINE FLEET DETAILS

**NCTPA Fixed Route Vehicles**

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Vehicle Status |
|---|---|---|---|---|---|---|
| 1 | 15GCB2015R1085641 | Gillig | Phantom | 34 | 2 | Active |
| 2 | 15GCB2017R1085642 | Gillig | Phantom | 34 | 2 | Active |
| 3 | 15GCB2019R1085643 | Gillig | Phantom | 34 | 2 | Active |
| 4 | 15GCB2010R1085644 | Gillig | Phantom | 34 | 2 | Active |
| 5 | 15GCB2012R1085645 | Gillig | Phantom | 34 | 2 | Active |
| 6 | 15GCD201631111911 | Gillig | Phantom | 44 | No lift | Active |
| 7 | 15GCD201831111912 | Gillig | Phantom | 44 | No lift | Active |
| 8 | 1N9APACL7DC084172 | El Dorado | 40' Diesel | 31 | 2 | Active |
| 9 | 1N9APACL9DC084173 | El Dorado | 40' Diesel | 31 | 2 | Active |
| 10 | 1N9APACL0DC084174 | El Dorado | 40' Diesel | 31 | 2 | Active |
| 11 | 1N9APACL2DC084175 | El Dorado | 40' Diesel | 31 | 2 | Active |
| 12 | 1N9AMACL9ECO84054 | El Dorado | 35' Diesel | 32 | 2 | Active |
| 13 | 1N9AMACL9ECO84056 | El Dorado | 35' Diesel | 32 | 2 | Active |
| 14 | 1N9AMACL9ECO84056 | El Dorado | 35' Diesel | 32 | 2 | Active |
| 15 | 1N9AMACL9ECO84057 | El Dorado | 35' Diesel | 32 | 2 | Active |
| 16 | 1N9AMACL9ECO84058 | El Dorado | 35' Diesel | 32 | 2 | Active |
| 17 | 1N9AMACL9ECO84059 | El Dorado | 35' Diesel | 32 | 2 | Active |
| 18 | 5FYC2LL0XYU021172 | New Flyer | C40LF | 31 | 2 | Active |
| 19 | 5FYC27701YU021173 | New Flyer | C40LF | 31 | 2 | Active |
| 20 | 5FYU5KY109B035814 | New Flyer | 35' LFR | 20 | 2 | Active |
| 21 | 5FYU5KY129BO35815 | New Flyer | 35' LFR | 20 | 2 | Active |
| 22 | 5FYU5KY149B035816 | New Flyer | 35' LFR | 20 | 2 | Active |
| 23 | 5FYU5KY169B035817 | New Flyer | 35' LFR | 20 | 2 | Active |
| 24 | 5FYU5KY19AB038070 | New Flyer | 35' LFR | 20 | 2 | Active |
| 25 | 5FYU5KY10AB038071 | New Flyer | 35' LFR | 20 | 2 | Active |
| 26 | 5FYU5KY12AB038072 | New Flyer | 35' LFR | 20 | 2 | Active |

## APPENDIX E-2 – NAPA VINE FLEET DETAILS

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Vehicle Status |
|---|---|---|---|---|---|---|
| 27 | 5FYU5KY14B038073 | New Flyer | 35' LFR | 20 | 2 | Active |
| 28 | 1GB9G5AG4A1162645 | Chevy | ARBOC 28' | 21 | 2 | Active |
| 29 | 1GB9G5AG2A1136318 | Chevy | ARBOC 28' | 21 | 2 | Active |
| 30 | 1GB6G5BG0B1151788 | Chevy | ARBOC 28' | 21 | 2 | Active |
| 31 | 1GB6G5BG5B1150944 | Chevy | ARBOC 28' | 21 | 2 | Active |
| 32 | 1GB6G5Bg6C1197062 | Chevy | ARBOC 28' | 21 | 2 | Active |
| 33 | 1GB6G5BG1C1197406 | Chevy | ARBOC 28' | 21 | 2 | Active |
| 34 | 1GB6G5BG8C1197628 | Chevy | ARBOC 28' | 21 | 2 | Active |
| 35 | 1GB6G5BG4C1197707 | Chevy | ARBOC 28' | 21 | 2 | Active |
| 36 | 1N9AMALGXDC084176 | El Dorado | 35' CNG | 32 | 2 | Active |
| 37 | 1N9AMALGXDC084177 | El Dorado | 35' CNG | 32 | 2 | Active |
| 38 | 1N9AMALGXDC084178 | El Dorado | 35' CNG | 32 | 2 | Active |
| 39 | 1N9AMALGXDC084179 | El Dorado | 35' CNG | 32 | 2 | Active |
| 40 | 1N9AMALGXDC084180 | El Dorado | 35' CNG | 32 | 2 | Active |
| 41 | 1VH5H3C00852603 | Orion | 40' CNG | 36 | 2 | Active |
| 42 | 1VH5H3C00852605 | Orion | 40' CNG | 36 | 2 | Active |

**VINEGO Paratransit Vehicles**

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Vehicle Status |
|---|---|---|---|---|---|---|
| 43 | 1FDXE40S0XHB13821 | Ford | Aerotech | 14 | 2 | Active |
| 44 | 1FDXE40SOXHB13818 | Ford | Aerotech | 14 | 2 | Active |
| 45 | 1FDWE45F41HA31542 | Ford | Aerotech | | | Inactive |
| 46 | 1FDWE45F21HA31541 | Ford | Aerotech | 14 | 2 | Active |
| 47 | 1FDWE35F31HA97347 | Ford | Champ | 14 | 4 | Active |
| 48 | 1FDWE45F52HB75795 | Ford | Aerotech | 14 | 5 | Active |
| 49 | 1FDWE45F92HB75797 | Ford | Aerotech | 14 | 5 | Active |
| 50 | 1FDXE45SX4HB26614 | Ford | Aerotech | 8 | 3 | Active |
| 51 | 1FDXE45S14HB26615 | Ford | Aerotech | 21 | 2 | Active |

## APPENDIX E-2 – NAPA VINE FLEET DETAILS

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Vehicle Status |
|---|---|---|---|---|---|---|
| 52 | 1FDXE45S57DA59190 | Ford | Econo | 14 | 5 | Active |
| 53 | 1FDXE45S27DA61205 | Ford | Econo | 8 | 3 | Active |
| 54 | 1FDXE45S47DA61206 | Ford | Econo | 8 | 3 | Active |
| 55 | 1FDXE45SX7DA61209 | Ford | Econo | 8 | 3 | Active |
| 56 | 1FD4E45S48DA01415 | Ford | | 8 | 3 | Active |
| 57 | 1FD4E45S48DA01401 | Ford | Starcraft | 8 | 3 | Active |
| 58 | 1FDFE4FS6BDB36555 | Ford | Aerotech | 12 | 5 | Active |
| 59 | 1FDFE4FS8BDB36556 | Ford | Aerotech | 12 | 5 | Active |
| 60 | 1FDFE4FSXBDb36557 | Ford | Aerotech | 12 | 5 | Active |
| 61 | 1FDE4FS7CDA67456 | Ford | Aerotech | 12 | 5 | Active |
| 62 | 1FDFE4FS9CDA67457 | Ford | Aerotech | 12 | 5 | Active |
| 63 | 1FDE4FSOCDA67458 | Ford | Aerotech | 12 | 5 | Active |
| 64 | Pending | Ford | E450 | Pending | Pending | Ordered |
| 65 | Pending | Ford | E450 | Pending | Pending | Ordered |
| 66 | Pending | Ford | E450 | Pending | Pending | Ordered |

**Yountville Trolley Vehicles**

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Vehicle Status |
|---|---|---|---|---|---|---|
| 67 | 4UZABFAD4XCF34306 | Supreme | Trly | 25 | 2 | Inactive |
| 68 | 1F66F5DY3C00852933 | Supreme | Trly | 25 | 2 | Active |

**Calistoga Shuttle Vehicles**

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Vehicle Status |
|---|---|---|---|---|---|---|
| 69 | 1FDEE3FL6BDB22640 | El Dorado | Aerolight | 7 | 1 | Active |
| 70 | 1FDEE3FL8BDB22641 | El Dorado | Aerolight | 7 | 1 | Active |

## APPENDIX E-2 – NAPA VINE FLEET DETAILS

### American Canyon Transit Vehicles

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Vehicle Status |
|---|---|---|---|---|---|---|
| 71 | 1FDWE45F02HA07935 | Ford | Econo | 10 | 1 | Active |
| 72 | 1FDZE45565HA60208 | Ford | Econo | 10 | 1 | Active |
| 73 | Pending | Ford | E450 | Pending | Pending | Ordered |
| 74 | Pending | Ford | E450 | Pending | Pending | Ordered |

### St. Helena Shuttle Vehicles

| Vehicle Number | Serial Number/VIN | Manufacturer | Model | Capacity - Seated | Wheelchair Positions | Vehicle Status |
|---|---|---|---|---|---|---|
| 75 | 1FDEE3FL8BDB22638 | El Dorado | Aerolight | 7 | 1 | Active |
| 76 | 1FDEE3FLXBDB22639 | El Dorado | Aerolight | 7 | 1 | Active |

### Supervisor Vehicles

Napa VINE has four supervisor vehicles, all of which are sedans.

**APPENDIX E-3: NAPA VINE PRICE PROPOSAL**

## APPENDIX E-3: NAPA VINE PRICE PROPOSAL

| NO. | ITEM DESCRIPTION | UNIT | QTY. | UNIT PRICE | EXTENDED PRICE |
|---|---|---|---|---|---|
| **BASE BID ITEMS** | | | | | |
| 1 | System Design | LS | 1 | | |
| 2 | CAD/AVL System Software and Licensing | LS | 1 | | |
| 3 | Servers at Dispatch | EA | 1 | | |
| 4 | Workstations at Dispatch and Administrative offices | EA | 3 | | |
| 5 | Scheduling Software | EA | 1 | | |
| 6 | On Board Equipment (Fixed Route) | EA | 42 | | |
| 7 | On Board Equipment (Paratransit/ Community shuttles) | EA | 24 | | |
| 8 | On Board Equipment (Support Vehicles) | EA | 4 | | |
| 9 | Communications System for Mobile Vehicles – at Dispatch | LS | 1 | | |
| 10 | Mobile Communications Equipment – fixed route, paratransit, community shuttles, support vehicles | EA | 70 | | |
| 11 | Cellular (3G/4G) Service (5 years) | LS | 1 | | |
| 12 | Testing | LS | 1 | | |
| 13 | Maintenance Service Agreement (5 years) | LS | 5 | | |
| 14 | Training | LS | 1 | | |
| 15 | 511 Integration | | | | |
| 16 | Connection Protection | EA | 4 | | |
| 17 | Data Management Software | EA | 42 | | |
| 18 | Farebox Integration | LS | 1 | | |
| 19 | Mobile Work Stations for Supervisors | LS | 1 | | |
| 20 | Spare VLU | EA | 7 | | |
| 21 | Spare GPS receiver | EA | 7 | | |
| 22 | Spare Antenna | EA | 7 | | |
| 23 | Spare MDT | EA | 7 | | |
| 24 | Spare MAR | EA | 7 | | |
| 25 | Spare Cellular Router (3G/4G) and WLAN communications card | EA | 7 | | |
| 26 | Spare AVA | EA | 7 | | |
| | | | | **TOTAL BASE PRICE:** | |
| **ADD ALTERNATE BID ITEMS** | | | | | |
| A1 | Video System Integration | EA | 42 | | |
| A2 | Automatic Vehicle Monitoring | EA | 70 | | |

## APPENDIX E-3: NAPA VINE PRICE PROPOSAL

Napa VINE reserves right to reject all proposals. Napa VINE will negotiate with the highest-rated proposer for final items, pricing and quantities.

All prices shall include furnishing and delivery, installation, and integration of all materials and associated equipment (mounting, cable, connectors, etc) necessary for a complete and functioning system.

The Unit Prices for the Base Price and Add Alternate Price Items shall be fixed for up to one (1) year after the submission of the Price Proposal. Unit prices shall be fixed for adjustments to quantities of 25% above and below the item quantity. Quantity adjustments shall be at Napa VINE's sole discretion.

Exercise of Add Alternate Price Items shall be exercised at Napa VINE's sole discretion. Napa VINE reserves the right not to exercise any Add Alternate Price Items. Napa VINE shall have up to one year after submission of Price Proposal to provide notice-to-proceed for exercising Add Alternate Price Items.

System Design Documents will be paid based on completion of each stage, i.e., Preliminary Design (30%), Draft Final Design (30%) and Final Design (40%).

CAD/AVL System Software and Licensing will be paid based on the delivery and installation of the system software in the CAD/AVL servers at the agency dispatch centers.

CAD/AVL Servers will be paid based on the delivery and installation of the servers to the agency's facilities.

CAD/AVL Workstations will be paid based on the delivery, installation and integration of each workstation with the CAD/AVL server for the agency

Communication System for Mobile Devices- at Dispatch will be paid based on delivery, installation, and integration of communications equipment at Napa VINE Dispatch for functioning communications to all Napa VINE mobile vehicles.

On Board Equipment will be paid based on the completion of testing of each vehicle.

Mobile Communications Equipment for mobile vehicles will be paid based on the completion of testing and functioning communications to Dispatch of each vehicle.

Cellular Service shall cover mobile communications costs for the entire system and will be paid based on commissioning of the system.

Testing will be paid based on the successful completion of the FAT testing (30%), Pilot Fleet testing (30%) and SAT testing (40%).

Spare equipment will be paid based on delivery of equipment to Napa VINE.

Training will be paid upon completion of training sessions.

Connection Protection will be paid based on the delivery and installation of the feature into the system software in the CAD/AVL servers at the agency dispatch centers.

Video System Integration will be paid based on completion of integration and testing of each vehicle.

Automatic Vehicle Monitoring will be paid based on completion of integration and testing of each vehicle.

# APPENDIX E4 – NAPA VINE TERMS AND CONDITIONS

**NAPA COUNTY TRANSPORTATION AND PLANNING AGENCY (NCTPA)**

**AGREEMENT NO. NCTPA**

THIS AGREEMENT is made and entered into as of this day of , 20 , by and between the Napa County Transportation and Planning Agency, a joint powers agency under the laws of the State of California, hereinafter referred to as "NCTPA", and whose mailing address is , hereinafter referred to as "CONTRACTOR";

## RECITALS

**WHEREAS**, NCTPA wishes to obtain specialized services in order to ; and

**WHEREAS**, NCTPA has authorized the NCTPA Executive Director to enter into a contract for services at its meeting; and (delete this clause if within signature authority)

**WHEREAS**, CONTRACTOR is willing and has been determined to be qualified to provide such specialized services to NCTPA under the terms and conditions set forth herein;

## TERMS

**NOW, THEREFORE**, NCTPA hereby engages the services of CONTRACTOR, and CONTRACTOR agrees to serve NCTPA in accordance with the terms and conditions set forth herein:

1. **Term of the Agreement**. The term of this Agreement shall commence on the date first above written and shall expire on , 20 unless earlier terminated as provided herein, except that the obligations of the parties under "Insurance" and "Indemnification" shall continue in full force and effect after said expiration date or early termination in relation to acts or omissions occurring prior to such dates during the term of the Agreement, and the obligations of CONTRACTOR to NCTPA shall also continue after said expiration date or early termination in relation to the obligations prescribed by "Confidentiality," "Taxes," and "Access to Records/Retention)".

2. **Scope of Services**. CONTRACTOR shall provide NCTPA those services set forth in CONTRACTOR's proposal (Exhibit "A"), attached hereto and incorporated by reference herein. Exhibit A is provided solely to describe the services to be provided. Any terms contained in Exhibit A that add to, vary or conflict with the terms of this Agreement are null and void.

SAMPLE

3. **Compensation**.

(a) Rates. In consideration of CONTRACTOR's fulfillment of the promised work, NCTPA shall pay CONTRACTOR at the rate set forth in Exhibit "B", attached hereto and incorporated by reference herein.

(b) Expenses. Unless explicitly agreed in writing, no direct expenses, including travel or other expenses, will be reimbursed by NCTPA.

(c) Maximum Amount. Notwithstanding subparagraphs (a) and (b), the maximum payments under this Agreement shall be a total of $ for professional services and expenses; provided, however, that such amounts shall not be construed as guaranteed sums, and compensation shall be based upon services actually rendered.

4. **Method of Payment**.

(a) Invoices. All payments for compensation shall be made only upon presentation by CONTRACTOR to NCTPA of an itemized billing invoice in a form acceptable to the NCTPA Manager of Finance which indicates, at a minimum, CONTRACTOR's name, address, Social Security or Taxpayer Identification Number, itemization of the hours worked or, where compensation is on a per-task basis, a description of the tasks completed during the billing period, the person(s) actually performing the services and the position(s) held by such person(s), and the approved hourly or task rate. CONTRACTOR shall submit invoices not more often than every 30 days to NCTPA Accounts Payable who, after review and approval as to form and content, shall submit the invoice to the NCTPA Manager of Finance no later than fifteen (15) calendar days following receipt.

(b) Legal status. So that NCTPA may properly comply with its reporting obligations under federal and state laws pertaining to taxation, if CONTRACTOR is or becomes a corporation during the term of this Agreement, proof that such status is currently recognized by and complies with the laws of both the state of incorporation or organization and the State of California, if different, shall be maintained on file with the Secretary of NCTPA's Board of Directors at all times during the term of this Agreement in a form satisfactory to the NCTPA Manager of Finance. Such proof shall include, but need not be limited to, a copy of any annual or other periodic filings or registrations required by the state of origin or California, the current address for service of process on the corporation or limited liability partnership, and the name of any agent designated for service of process by CONTRACTOR within the State of California.

5. **Independent Contractor**. CONTRACTOR shall perform this Agreement as an independent contractor. CONTRACTOR and the officers, agents and employees of CONTRACTOR are not, and shall not be deemed, NCTPA employees for any purpose, including workers' compensation and employee benefits. CONTRACTOR shall, at CONTRACTOR's own risk and expense, determine the method and manner by which duties imposed on CONTRACTOR by this Agreement shall be performed; provided, however, that NCTPA may monitor the work performed by CONTRACTOR. NCTPA

SAMPLE

shall not deduct or withhold any amounts whatsoever from the compensation paid to CONTRACTOR, including, but not limited to amounts required to be withheld for state and federal taxes. As between the parties to this Agreement, CONTRACTOR shall be solely responsible for all such payments.

6. **Specific Performance**. It is agreed that CONTRACTOR, including the agents or employees of CONTRACTOR, shall be the sole providers of the services required by this Agreement. Because the services to be performed by CONTRACTOR under the terms of this Agreement are of a special, unique, unusual, extraordinary, and intellectual or time-sensitive character which gives them a peculiar value, the loss of which cannot be reasonably or adequately compensated in damages in an action of law, NCTPA, in addition to any other rights or remedies which NCTPA may possess, shall be entitled to injunctive and other equitable relief to prevent a breach of this Agreement by CONTRACTOR.

7. **Insurance**. CONTRACTOR shall obtain and maintain in full force and effect throughout the term of this Agreement, and thereafter as to matters occurring during the term of this Agreement, the following insurance coverage:

(a) Workers' Compensation insurance. CONTRACTOR will provide workers' compensation insurance as required by law during the term of this Agreement, CONTRACTOR shall provide workers' compensation insurance for the performance of any of the CONTRACTOR's duties under this Agreement; including but not limited to, coverage for workers' compensation and employer's liability and a waiver of subrogation, and shall provide NCTPA with certification of all such coverage's upon request by NCTPA's Risk Manager.

(b) Liability insurance. CONTRACTOR shall obtain and maintain in full force and effect during the term of this Agreement the following liability insurance coverage's, issued by a company licensed (admitted) to transact business in the State of California and/or having a A.M. Best rating of A VII or better:

1. General Liability. Commercial general liability [CGL] insurance coverage (personal injury and property damage) of not less than ONE MILLION DOLLARS ($1,000,000) combined single limit per occurrence, covering liability or claims for any personal injury, including death, to any person and/or damage to the property of any person arising from the acts or omissions of CONTRACTOR or any officer, agent, or employee of CONTRACTOR under this Agreement.

2. Professional Liability/Errors and Omissions. Professional liability/errors and omissions insurance for all activities of CONTRACTOR arising out of or in connection with this Agreement in an amount not less than ONE MILLION DOLLARS ($1,000,000) per claim.

3. Comprehensive Automobile Liability Insurance. Comprehensive automobile liability insurance (Bodily Injury and Property Damage) on owned, hired, leased and non-owned vehicles used in conjunction with CONTRACTOR's business of

SAMPLE

not less than THREE HUNDRED THOUSAND DOLLARS ($300,000) combined single limit per occurrence.

(c) Certificates. All insurance coverage's referenced in 7(b), above, shall be evidenced by one or more certificates of coverage or, with the consent of NCTPA's Risk Manager, demonstrated by other evidence of coverage acceptable to NCTPA's Risk Manager, which shall be filed by CONTRACTOR with NCTPA's Deputy Executive Director prior to commencement of performance of any of CONTRACTOR's duties; shall be kept current during the term of this Agreement; shall provide that NCTPA shall be given no less than thirty (30) days prior written notice of any non-renewal, cancellation, other termination, or material change, except that only ten (10) days prior written notice shall be required where the cause of non-renewal or cancellation is non-payment of premium; and shall provide that the inclusion of more than one insured shall not operate to impair the rights of one insured against another insured, the coverage afforded applying as though separate policies had been issued to each insured, but the inclusion of more than one insured shall not operate to increase the limits of the company's liability. For the commercial general liability insurance coverage referenced in 7(b)(1) and, where the vehicles are covered by a commercial policy rather than a personal policy, for the comprehensive automobile liability insurance coverage referenced in 7(b)(3) CONTRACTOR shall also file with the evidence of coverage an endorsement from the insurance provider naming NCTPA, its officers, employees, agents and volunteers as additional insureds and waiving subrogation, and the certificate or other evidence of coverage shall provide that if the same policy applies to activities of CONTRACTOR not covered by this Agreement then the limits in the applicable certificate relating to the additional insured coverage of NCTPA shall pertain only to liability for activities of CONTRACTOR under this Agreement, and that the insurance provided is primary coverage to NCTPA with respect to any insurance or self-insurance programs maintained by NCTPA.

(d) Deductibles/Retentions. Any deductibles or self-insured retentions shall be declared to, and be subject to approval by, NCTPA's Risk Manager, which approval shall not be denied unless the NCTPA's Risk Manager determines that the deductibles or self-insured retentions are unreasonably large in relation to compensation payable under this Agreement and the risks of liability associated with the activities required of CONTRACTOR by this Agreement. At the option of and upon request by NCTPA's Risk Manager if it is determined that such deductibles or retentions are unreasonably high, either the insurer shall reduce or eliminate such deductibles or self-insurance retentions as respects NCTPA, its officers, employees, agents and volunteers or CONTRACTOR shall procure a bond guaranteeing payment of losses and related investigations, claims administration and defense expenses.

8. **Hold Harmless/Defense/Indemnification**. To the fullest extent permitted by law, CONTRACTOR shall hold harmless, defend at its own expense, and indemnify NCTPA and the officers, agents, employees and volunteers of NCTPA from and against any and all liability, claims, losses, damages or expenses, including reasonable attorney's fees, for personal injury (including death) or damage to property, arising from

SAMPLE

Choose one: all acts or omissions or, if an architect, engineer or surveyor, , pertaining to, or relating to the negligence, recklessness, or willful misconduct of CONTRACTOR or its officers, agents, employees, volunteers, contractors and subcontractors in rendering services under this Agreement, excluding, however, such liability, claims, losses, damages or expenses arising from the sole negligence or willful acts of NCTPA or its officers, agents, employees, volunteers, or other contractors or their subcontractors. Each party shall notify the other party immediately in writing of any claim or damage related to activities performed under this Agreement. The parties shall cooperate with each other in the investigation and disposition of any claim arising out of the activities under this Agreement.

9. **Employee Character and Fitness**. CONTRACTOR accepts responsibility for determining and approving the character and fitness of its employees (including volunteers, agents or representatives) to provide the services required of CONTRACTOR under this Agreement, including completion of a satisfactory criminal/background check and period rechecks to the extent permitted by law. Notwithstanding anything to the contrary in this Paragraph, CONTRACTOR, shall hold NCTPA and its officers, agents and employees harmless from any liability for injuries or damages resulting from a breach of this provision or CONTRACTOR's actions in this regard.

10. **Termination for Cause**. If either party shall fail to fulfill in a timely and proper manner that party's obligations under this Agreement or otherwise breach this Agreement and fail to cure such failure or breach within 20 days of receipt of written notice from the other party describing the nature of the breach, the non-defaulting party may, in addition to any other remedies it may have, terminate this Agreement by giving 10 days written notice to the defaulting party in the manner set forth in Paragraph 13 (Notices). NCTPA hereby authorizes the NCTPA Executive Director to make all decisions and take all actions required under this Paragraph to terminate the Agreement on behalf of NCTPA for cause.

11. **Termination for Convenience**. This Agreement may be terminated by NCTPA for any reason and at any time by giving no less than 30 days written notice of such termination and specifying the effective date thereof. NCTPA hereby authorizes the NCTPA Executive Director to make all decisions and take all actions required under this Paragraph to terminate the Agreement on behalf of NCTPA.

12. **Disposition of, Title to and Payment for Work upon Expiration or Termination**.

(a) Upon expiration of this Agreement or earlier termination of Agreement, all finished or unfinished documents and other materials, if any, and all rights therein shall become, at the option of NCTPA, the property of and shall be promptly returned to NCTPA, although CONTRACTOR may retain a copy of such work for its personal records only. Unless otherwise expressly provided in this Agreement, any copyrightable or patentable work created by CONTRACTOR under this Agreement shall be deemed a

SAMPLE

"work made for hire" for purposes of copyright or patent law and only NCTPA shall be entitled to claim or apply for the copyright or patent thereof.

(b) CONTRACTOR shall be entitled to receive compensation for any satisfactory work completed prior to receipt of the notice of termination or commenced prior to receipt of the notice and completed satisfactorily prior to the effective date of the termination; except that CONTRACTOR shall not be relieved of liability to NCTPA for damages sustained by NCTPA by virtue of any breach of the Agreement by CONTRACTOR whether or not the Agreement expired or was otherwise terminated, and NCTPA may withhold any payments not yet made to CONTRACTOR for purpose of setoff until such time as the exact amount of damages due to NCTPA from CONTRACTOR is determined.

13. **No Waiver**. The waiver by either party of any breach or violation of any requirement of this Agreement shall not be deemed to be a waiver of any such breach in the future, or of the breach of any other requirement of this Agreement.

14. **Notices**. All notices required or authorized by this Agreement shall be in writing and shall be delivered in person or by deposit in the United States mail, by certified mail, postage prepaid, return receipt requested. Any mailed notice, demand, request, consent, approval or communication that either party desires to give the other party shall be addressed to the other party at the address set forth below. Either party may change its address by notifying the other party of the change of address. Any notice sent by mail in the manner prescribed by this paragraph shall be deemed to have been received on the date noted on the return receipt or five days following the date of deposit, whichever is earlier.

| NCTPA | CONTRACTOR |
|---|---|
| Kate Miller | [Name] |
| Executive Director | [Address] |
| 625 Burnell Street | |
| Napa, CA. 94559 | |

15. **Compliance with NCTPA Policies on Waste, Harassment, Drug/Alcohol-Free Workplace, and Computer Use**. CONTRACTOR hereby agrees to comply, and require its employees and subcontractors to comply, with the following policies, copies of which are on file with the Board Secretary of NCTPA and incorporated by reference herein. CONTRACTOR also agrees that it shall not engage in any activities, or permit its officers, agents and employees to do so, during the performance of any of the services required under this Agreement, which would interfere with compliance or induce violation of these policies by NCTPA employees or contractors.

(a) NCTPA Policy for Maintaining a Harassment Free Work Environment effective June 18, 2008.

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(b) NCTPA Drug and Alcohol Policy adopted by resolution of the Board of Directors on July 25, 2008.

(c) Napa County Information Technology Use and Security Policy adopted by resolution of the Napa County Board of Supervisors on April 17, 2001. To this end, all employees and subcontractor's of CONTRACTOR whose performance of services under this Agreement requires access to any portion of the NCTPA computer network shall sign and have on file with NCTPA prior to receiving such access the certification attached to said Policy.

(d) NCTPA System Safety Program Plan adopted by resolution of the Board of Directors on July 25, 2008.

16. **Confidentiality**. Confidential information is defined as all information disclosed to CONTRACTOR which relates to NCTPA's past, present, and future activities, as well as activities under this Agreement. CONTRACTOR shall hold all such information as CONTRACTOR may receive, if any, in trust and confidence, except with the prior written approval of NCTPA, expressed through its Executive Director. Upon cancellation or expiration of this Agreement, CONTRACTOR shall return to NCTPA all written and descriptive matter which contains any such confidential information, except that CONTRACTOR may retain for its files a copy of CONTRACTOR's work product if such product has been made available to the public by NCTPA.

17. **No Assignments or Subcontracts**.

(a) A consideration of this Agreement is the personal reputation of CONTRACTOR; therefore, CONTRACTOR shall not assign any interest in this Agreement or subcontract any of the services CONTRACTOR is to perform hereunder without the prior written consent of NCTPA, which shall not be unreasonably withheld. The inability of the assignee to provide personnel equivalent in experience, expertise, and numbers to those provided by CONTRACTOR, or to perform any of the remaining services required under this Agreement within the same time frame required of CONTRACTOR shall be deemed to be reasonable grounds for NCTPA to withhold its consent to assignment. For purposes of this subparagraph, the consent of NCTPA may be given by its Executive Director.

(b) Effect of Change in Status. If CONTRACTOR changes its status during the term of this Agreement from or to that of a corporation, limited liability partnership, limited liability company, general partnership, or sole proprietorship, such change in organizational status shall be viewed as an attempted assignment of this Agreement by CONTRACTOR. Failure of CONTRACTOR to obtain approval of such assignment under this Paragraph shall be viewed as a material breach of this Agreement.

18. **Amendment/Modification**. Except as specifically provided herein, this Agreement may be modified or amended only in writing signed by both Parties. In particular, only NCTPA, through its Board of Directors in the form of an amendment of this Agreement, may authorize extra and/or changed work beyond the scope of services

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prescribed by Exhibit "A". Failure of CONTRACTOR to secure such authorization in writing in advance of performing any of the extra or changed work shall constitute a waiver of any and all rights to adjustment in the contract price or contract time and no compensation shall be paid for such extra work.

19. **Interpretation; Venue**.

(a) Interpretation. The headings used herein are for reference only. The terms of the Agreement are set out in the text under the headings. This Agreement shall be governed by the laws of the State of California without regard to the choice of law or conflicts.

(b) Venue. This Agreement is made in Napa County, California. The venue for any legal action in state court filed by either party to this Agreement for the purpose of interpreting or enforcing any provision of this Agreement shall be in the Superior Court of California, County of Napa, a unified court. The venue for any legal action in federal court filed by either party to this Agreement for the purpose of interpreting or enforcing any provision of this Agreement lying within the jurisdiction of the federal courts shall be the Northern District of California. The appropriate venue for arbitration, mediation or similar legal proceedings under this Agreement shall be Napa County, California; however, nothing in this sentence shall obligate either party to submit to mediation or arbitration any dispute arising under this Agreement.

20. **Compliance with Laws**. CONTRACTOR shall observe and comply with all currently applicable Federal, State and local laws, ordinances, and codes, including but not limited to the Federal laws contained in Attachment 1, and as amended from time to time. Such laws shall include, but not be limited to, the following, except where prohibited by law:

(a) Non-Discrimination. During the performance of this Agreement, CONTRACTOR and its subcontractor's shall not deny the benefits thereof to any person on the basis of sex, race, color, ancestry, religion or religious creed, national origin or ethnic group identification, sexual orientation, marital status, age (over 40), mental disability, physical disability or medical condition (including cancer, HIV and AIDS), nor shall they discriminate unlawfully against any employee or applicant for employment because of sex, race, color, ancestry, religion or religious creed, national origin or ethnic group identification, sexual orientation, marital status, age (over 40), mental disability, physical disability or medical condition (including cancer, HIV and AIDS), or use of family care leave. CONTRACTOR shall ensure that the evaluation and treatment of employees and applicants for employment are free of such discrimination or harassment. In addition to the foregoing general obligations, CONTRACTOR shall comply with the provisions of the Fair Employment and Housing Act (Government Code section 12900, et seq.), the regulations promulgated there under (Title 2, California Code of Regulations, section 7285.0, et seq.), the provisions of Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (sections 11135-11139.5) and any state or local regulations adopted to implement any of the foregoing, as such statutes and regulations may be amended from time to time. To the extent this Agreement

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subcontracts to CONTRACTOR services or works required of NCTPA by the State of California pursuant to Agreement between NCTPA and the State, the applicable regulations of the Fair Employment and Housing Commission implementing Government Code section 12990 (a) through (f), set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations are expressly incorporated into this Agreement by reference and made a part hereof as if set forth in full, and CONTRACTOR and any of its subcontractor's shall give written notice of their obligations there under to labor organizations with which they have collective bargaining or other agreements.

(b) Documentation of Right to Work. CONTRACTOR agrees to abide by the requirements of the Immigration and Control Reform Act pertaining to assuring that all newly-hired employees of CONTRACTOR performing any services under this Agreement have a legal right to work in the United States of America, that all required documentation of such right to work is inspected, and that INS Form 1-9 (as it may be amended from time to time) is completed and on file for each employee. CONTRACTOR shall make the required documentation available upon request to NCTPA for inspection.

(c) Inclusion in Subcontracts. To the extent any of the services required of CONTRACTOR under this Agreement are subcontracted to a third party; CONTRACTOR shall include all of the provisions of this Section, and any applicable Federal provisions contained in Attachment 1 in all such subcontracts as obligations of the subcontractor.

(NOTE: Include the following paragraphs (d – h) if federal dollars are used in this contract. If not, delete these and the Attachment 1)

(d) Federal Required Clauses. Notwithstanding anything to the contrary in this Agreement, pursuant to 29 C.F.R. 97.36(i), CONTRACTOR is hereby notified of, and shall comply with the requirements and regulations imposed by the Federal Transit Administration for federally funded contracts, to the extent they are applicable to the services to be provided under this Agreement, and as set forth in Attachment 1, attached hereto and incorporated herein by reference.

(e) Federal Changes - CONTRACTOR shall at all times comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in Appendix E for RFP #2009-__ and the Master Agreement between NCTPA and FTA, as they may be amended or promulgated from time to time during the term of this contract. CONTRACTOR's failure to so comply shall constitute a material breach of this contract.

(f) No Obligation by the Federal Government

1. NCTPA and CONTRACTOR acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the

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solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to the NCTPA, CONTRACTOR, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

2. CONTRACTOR agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

(g). Disadvantaged Business Enterprises

This contract is subject to the requirements of Title 49, Code of Federal Regulations, Part 26, Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs if CONTRACTOR intends to engage any subcontractors. The national goal for participation of Disadvantaged Business Enterprises (DBE) is %. The agency's overall goal for DBE participation is %. A separate contract goal has not been established for this procurement. If applicable, CONTRACTOR shall comply with the Disadvantaged Business Enterprise contract provisions/Caltrans Disadvantage Business Enterprise provisions contained in Appendix for RFP # - incorporated herein.

(h). Incorporation of Federal Transit Administration (FTA) Terms - The preceding provisions include, in part, certain Standard Terms and Conditions required by DOT, whether or not expressly set forth in the preceding contract provisions. All relevant contractual provisions required by DOT, as set forth in FTA Circular 4220.1F shall be compiled by the parties. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. CONTRACTOR shall not perform any act, fail to perform any act, or refuse to comply with any (name of grantee) requests which would cause (name of grantee) to be in violation of the FTA terms and conditions.

21. **Taxes**. CONTRACTOR agrees to file federal and state tax returns or applicable withholding documents and to pay all applicable taxes or make all required withholdings on amounts paid pursuant to this Agreement and shall be solely liable and responsible to make such withholdings and/or pay such taxes and other obligations including, without limitation, state and federal income and FICA taxes. CONTRACTOR agrees to indemnify and hold NCTPA harmless from any liability it may incur to the United States or the State of California as a consequence of CONTRACTOR's failure to pay or withhold, when due, all such taxes and obligations. In the event that NCTPA is audited for compliance regarding any withholding or other applicable taxes or amounts, CONTRACTOR agrees to furnish NCTPA with proof of payment of taxes or withholdings on those earnings.

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22. **Access to Records/Retention**. NCTPA, any federal or state grantor agency funding all or part of the compensation payable hereunder, the State Controller, the Comptroller General of the United States, or the duly authorized representatives of any of the above, shall have access to any books, documents, papers and records of CONTRACTOR which are directly pertinent to the subject matter of this Agreement for the purpose of making audit, examination, excerpts and transcriptions. Except where longer retention is required by any federal or state law, CONTRACTOR shall maintain all required records for at least seven (7) years after NCTPA makes final payment for any other work authorized hereunder and all pending matters are closed, whichever is later.

23. **Authority to Contract**. CONTRACTOR and NCTPA each warrant hereby that they are legally permitted and otherwise have the authority to enter into and perform this Agreement.

24. **Conflict of Interest.**

(a) Covenant of No Undisclosed Conflict. The parties to the Agreement acknowledge that they are aware of the provisions of Government Code section 1090, et seq., and section 87100, et seq., relating to conflict of interest of public officers and employees. CONTRACTOR hereby covenants that it presently has no interest not disclosed to NCTPA and shall not acquire any interest, direct or indirect, which would conflict in any material manner or degree with the performance of its services or confidentiality obligation hereunder, except as such as NCTPA may consent to in writing prior to the acquisition by CONTRACTOR of such conflict. CONTRACTOR further warrants that it is unaware of any financial or economic interest of any public officer or employee of NCTPA relating to this Agreement. CONTRACTOR agrees that if such financial interest does exist at the inception of this Agreement, NCTPA may terminate this Agreement immediately upon giving written notice without further obligation by NCTPA to CONTRACTOR under this Agreement.

(b) Statements of Economic Interest. CONTRACTOR acknowledges and understands that NCTPA has developed and approved a Conflict of Interest Code as required by state law which requires CONTRACTOR to file with the Elections Division of the Napa County Assessor-Clerk Recorder “assuming office”, “annual”, and “leaving office” Statements of Economic Interest as a “consultant”, as defined in section 18701(a)(2) of Title 2 of the California Code of Regulations, unless the NCTPA Executive Director has determined in writing that CONTRACTOR, although holding a “designated” position as a consultant, has been hired to perform a range of duties so limited in scope as to not be required to fully comply with such disclosure obligation. CONTRACTOR agrees to timely comply with all filing obligations for a consultant under NCTPA’s Conflict of Interest Code unless such a determination is on file on the filing dates for each of the required Statements of Economic Interest.

25. **Non-Solicitation of Employees**. Each party agrees not to solicit for employment the employees of the other party who were directly involved in the performance of the services hereunder for the term of this Agreement and a period of

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six (6) months after termination of this Agreement except with the written permission of the other party, except that nothing in this Paragraph shall preclude NCTPA from publishing or otherwise distributing applications and information regarding NCTPA job openings where such publication or distribution is directed to the general public.

26. **Third Party Beneficiaries**. Nothing contained in this Agreement shall be construed to create any rights in third parties and the parties do not intend to create such rights.

27. **Attorney's Fees**. In the event that either party commences legal action of any kind or character to either enforce the provisions of this Agreement or to obtain damages for breach thereof, the prevailing party in such litigation shall be entitled to all costs and reasonable attorney's fees incurred in connection with such action.

28. **Severability**. If any provision of this Agreement, or any portion thereof, is found by any court of competent jurisdiction to be unenforceable or invalid for any reason, such provision shall be severable and shall not in any way impair the enforceability of any other provision of this Agreement.

29. **Entirety of Contract**. This Agreement constitutes the entire agreement between the parties relating to the subject of this Agreement and supersedes all previous agreements, promises, representations, understandings and negotiations, whether written or oral, among the parties with respect to the subject matter hereof.

**IN WITNESS WHEREOF**, this Agreement was executed by the parties hereto as of the date first above written.

| "NCTPA" | "CONTRACTOR"<br>[NAME OF CONTRACTOR] |
|---|---|
| By_____<br>Kate Miller, Executive Director | By_____<br>NAME, Position |
| ATTEST: | |
| By_____<br>Karalyn E. Sanderlin, Board Secretary | By _____<br>NAME, Position |
| Approved as to Form: | |
| By_____<br>NCTPA | Counsel |

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# ATTACHMENT 1 FEDERAL CONTRACT REQUIREMENTS

1. AMENDMENTS

Any changes in the activities to be performed under this Agreement shall be incorporated in written amendments, which shall specify the changes in work performed and any adjustments in compensation and schedule. All amendments shall be executed by the NCTPA Executive Director or a designates representative and CONTRACTOR. No claim for additional compensation or extension of time shall be recognized unless contained in a duly executed amendment.

2. TERMINATION

Contractor's failure to perform any term or condition of this Agreement as a result of conditions beyond its control such as, but not limited to, war, strikes, fires, floods, acts of God, governmental restrictions, power failures, or damage or destruction of any network facilities or servers, shall not be deemed a breach of this Agreement, and may be cause for termination of the Agreement.

3. RETENTION OF RECORDS

Contractor agrees to keep, in accordance with generally accepted accounting principles, all records pertaining to the project for audit purposes for a minimum of three (3) years following final payment to Contractor or four (4) years following the fiscal year of the last expenditure under this Agreement, whichever is longer, except in the event of litigation or settlement of claims arising from the performance of this contract, in which case Contractor agrees to maintain same until NCTPA, the FTA Administrator, the Comptroller General, or any of their duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto.

4. AUDITS

Contractor agrees to grant NCTPA or any agency that provides NCTPA with funds for the Project, including but not limited to, the U.S. Department of Transportation, FTA, the Comptroller General of the United States, the State, and their authorized representatives access to Contractor's books and records for the purpose of verifying that funds are properly accounted for and proceeds are expended in accordance with the terms of the Agreement. All documents shall be available for inspection during normal business hours at any time while the Project is underway, and for the retention period specified herein.

The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

Contractor further agrees to include in all its third-party contracts hereunder a provision to the effect that the contractor agrees that NCTPA, the U.S. Department of Transportation, FTA, the Comptroller General of the United States, the State, or any of their duly authorized representatives shall have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, during normal business hours, for the term specified above. The term "contract" as used in this clause excludes agreements not exceeding $25,000.

5. PATENT AND RIGHTS IN DATA

A. **Rights in Data** - This following requirements apply to each contract involving experimental, developmental or research work:

(1) The term "subject data" used in this clause means recorded information, whether or not copyrighted, that is delivered or specified to be delivered under the contract. The term includes graphic or pictorial delineation in media such as drawings or photographs; text in specifications or related performance or design-type documents; machine forms such as punched cards, magnetic tape, or computer memory printouts; and information retained in computer memory. Examples include, but are not limited to: computer software, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information. The term "subject data" does not include financial reports, cost analyses, and similar information incidental to contract administration.

(2) The following restrictions apply to all subject data first produced in the performance of the contract to which this Attachment has been added:

(a) Except for its own internal use, the Purchaser or Contractor may not publish or reproduce subject data in whole or in part, or in any manner or form, nor may the Purchaser or Contractor authorize others to do so, without the written consent of the Federal Government, until such time as the Federal Government may have either released or approved the release of such data to the public; this restriction on publication, however, does not apply to any contract with an academic institution.

(b) In accordance with 49 C.F.R. § 18.34 and 49 C.F.R. § 19.36, the Federal Government reserves a royalty-free, non-exclusive and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, for "Federal Government purposes," any subject data or copyright described in subsections (2)(b)1 and (2)(b)2 of this clause below. As used in the previous sentence, "for Federal Government purposes," means use only for the direct purposes of the Federal Government. Without the copyright owner's consent, the Federal Government may not extend its Federal license to any other party.

1. Any subject data developed under that contract, whether or not a copyright has been obtained; and

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2. Any rights of copyright purchased by the Purchaser or Contractor using Federal assistance in whole or in part provided by FTA.

(c) When FTA awards Federal assistance for experimental, developmental, or research work, it is FTA's general intention to increase transportation knowledge available to the public, rather than to restrict the benefits resulting from the work to participants in that work. Therefore, unless FTA determines otherwise, the Purchaser and the Contractor performing experimental, developmental, or research work required by the underlying contract to which this Attachment is added agrees to permit FTA to make available to the public, either FTA's license in the copyright to any subject data developed in the course of that contract, or a copy of the subject data first produced under the contract for which a copyright has not been obtained. If the experimental, developmental, or research work, which is the subject of the underlying contract, is not completed for any reason whatsoever, all data developed under that contract shall become subject data as defined in subsection (a) of this clause and shall be delivered as the Federal Government may direct. This subsection (c) , however, does not apply to adaptations of automatic data processing equipment or programs for the Purchaser or Contractor's use whose costs are financed in whole or in part with Federal assistance provided by FTA for transportation capital projects.

(d) Unless prohibited by state law, upon request by the Federal Government, the Purchaser and the Contractor agree to indemnify, save, and hold harmless the Federal Government, its officers, agents, and employees acting within the scope of their official duties against any liability, including costs and expenses, resulting from any willful or intentional violation by the Purchaser or Contractor of proprietary rights, copyrights, or right of privacy, arising out of the publication, translation, reproduction, delivery, use, or disposition of any data furnished under that contract. Neither the Purchaser nor the Contractor shall be required to indemnify the Federal Government for any such liability arising out of the wrongful act of any employee, official, or agents of the Federal Government.

(e) Nothing contained in this clause on rights in data shall imply a license to the Federal Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Federal Government under any patent.

(f) Data developed by the Purchaser or Contractor and financed entirely without using Federal assistance provided by the Federal Government that has been incorporated into work required by the underlying contract to which this Attachment has been added is exempt from the requirements of subsections (b), (c), and (d) of this clause , provided that the Purchaser or Contractor identifies that data in writing at the time of delivery of the contract work.

(g) Unless FTA determines otherwise, the Contractor agrees to include these requirements in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance provided by FTA.

(3) Unless the Federal Government later makes a contrary determination in writing, irrespective of the Contractor's status (i.e. , a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual, etc.), the Purchaser and the Contractor agree to take the necessary actions to provide, through FTA, those rights in that invention due the Federal Government as described in U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," 37 C.F.R. Part 401.

(4) The Contractor also agrees to include these requirements in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance provided by FTA.

B. **Patent Rights** - This following requirements apply to each contract involving experimental, developmental, or research work:

(1) General - If any invention, improvement, or discovery is conceived or first actually reduced to practice in the course of or under the contract to which this Attachment has been added, and that invention, improvement, or discovery is patentable under the laws of the United States of America or any foreign country, the Purchaser and Contractor agree to take actions necessary to provide immediate notice and a detailed report to the party at a higher tier until FTA is ultimately notified.

(2) Unless the Federal Government later makes a contrary determination in writing, irrespective of the Contractor's status (a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual), the Purchaser and the Contractor agree to take the necessary actions to provide, through FTA, those rights in that invention due the Federal Government as described in U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," 37 C.F.R. Part 401.

(3) The Contractor also agrees to include the requirements of this clause in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance provided by FTA.

6. EQUAL EMPLOYMENT OPPORTUNITY/ CIVIL RIGHTS

In accordance with Title VI of the Civil Rights Act, as amended (42 U.S.C. § 2000d); Section 303 of the Age

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Discrimination Act of 1975, as amended (42 U.S.C. § 6102); Section 202 of the Americans with Disabilities Act of 1990 (42 U.S.C. § 12132; and 49 U.S.C. § 5332 for federally funded projects, Contractor agrees that it will not, on the grounds of race, religious creed, color, national origin, age, physical disability, or sex, discriminate or permit discrimination against any employee or applicant for employment

7. DISADVANTAGED BUSINESS ENTERPRISES (DBE)

The requirements of 49 CFR Part 26, Regulations of the U.S. Department of Transportation, apply to this contract. It is the policy of the Napa County Transportation and Planning Agency to practice nondiscrimination based on race, color, sex, or national origin in the award or performance of this contract. All firms qualifying under this solicitation are encouraged to submit bids/proposals. Award of this contract will be conditioned upon satisfying the requirements of this bid specification. These requirements apply to all bidders/offerors, including those who qualify as a DBE. A DBE contract goal of ___ percent has been established for this contract. The bidder/offeror shall make good faith efforts, as defined in Appendix A, 49 CFR Part 26 (Attachment 1), to meet the contract goal for DBE participation in the performance of this contract.

The bidder/offeror will be required to submit the following information: (1) the names and addresses of DBE firms that will participate in the contract; (2) a description of the work that each DBE firm will perform; (3) the dollar amount of the participation of each DBE firm participating; (4) Written documentation of the bidder/offeror's commitment to use a DBE subcontractor whose participation it submits to meet the contract goal; (5) Written confirmation from the DBE that it is participating in the contract as provided in the commitment made under (4); and (6) if the contract goal is not met, evidence of good faith efforts.

The contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 15 days from the receipt of each payment the prime contract receives from NCTPA. The prime contractor agrees further to return retainage payments to each subcontractor within thirty days after the subcontractors work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the NCTPA. This clause applies to both DBE and non-DBE subcontracts.

Failure to comply with the terms of this provision may result in any or all of the following actions including but not limited to:

1. A finding of material breach of contract
2. Suspension of payment of invoices
3. Bringing to the attention of the Department of Transportation any false, fraudulent, or dishonest conduct in connection with the program, so that DOT can take the steps (e.g., referral to the Department of Justice for criminal prosecution, referral to the DOT Inspector General, action under suspension and debarment or Program Fraud and Civil Penalties result) provided in 26.109.

The obligation of the bidder/offeror is to make good faith efforts. The bidder/offeror can demonstrate that it has done so either by meeting the contract goal or documenting good faith efforts. Examples of good faith efforts are found in Appendix A to Part 26. Forms 1 and 2 should be provided as part of the solicitation documents.

8. INCORPORATION OF FEDERAL TRANSIT ADMINISTRATION (FTA) TERMS

In the event that this project is funded by FTA in whole or in part, all contractual provisions required by DOT, as set forth in FTA Circular 4220.1E are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The Contractor shall not perform any act, fail to perform any act, or refuse to comply with any NCTPA requests which would cause NCTPA to be in violation of the FTA terms and conditions.

9. ACCESS REQUIREMENTS FOR INDIVIDUALS WITH DISABILITIES (Reserved)

10. STATE ENERGY CONSERVATION PLAN

Contractor shall comply with all mandatory standards and policies relating to energy efficiency that are contained in the State energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. § 6321)

12. CLEAN AIR AND WATER POLLUTION ACTS

Contractor agrees to comply with the applicable requirements of all standards, orders, or requirements issued under the Clean Air Act (42 U.S.C. § 7401 *et seq.*), the Clean Water Act (33 U.S.C. § 1251 *et seq.*), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15). The Contractor agrees to report each violation to NCTPA and understands and agrees that NCTPA will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office. (2) The Contractor also agrees to include

SAMPLE

these requirements in each subcontract exceeding $100,000 financed in whole or in part with Federal assistance.

13. LOBBYING

Contractor agrees to comply with the restrictions on the use of federal funds for lobbying activities set forth in 31 U.S.C. § 1352 and 49 CFR Part 20. In addition, in the event the Agreement exceeds $100,000, Contractor agrees to comply with the Byrd Anti-Lobbying Amendment, 31 U.S.C. 1352, as amended by the Lobbying Disclosure Act of 1995, P.L. 104-65 and shall file the certification required by 49 CFR Part 20, "New Restrictions on Lobbying." Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award coved by 31 U.S.C. 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-Federal funds with respect to that Federal contract, grant or award covered by 31 U.S.C. 1352. Such disclosures are forwarded from tier to tier up to the recipient. APPENDIX A, 49 CFR PART 20--CERTIFICATION REGARDING LOBBYING Certification for Contracts, Grants, Loans, and Cooperative Agreements (To be submitted with each proposal or offer exceeding $100,000).

14. INDEMNIFICATION

To the fullest extent permitted by law, Contractor shall hold harmless, defend at its own expense, and indemnify NCTPA and the officers, agents, employees and volunteers of NCTPA from any and all liability, claims, losses, damages or expenses, including reasonable attorney's fees, for personal injury (including death) or damage to property, from claims that to the extent they arise out of, pertain to, or relate to the negligent acts or omissions of Contractor or its officers, agents, employees, volunteers, contractors and subcontractors in rendering professional services under this Agreement which constitute negligence, recklessness, or willful misconduct, excluding, however, such liability, claims, losses, damages or expenses arising from the negligence or willful acts of NCTPA or its officers, agents, employees or volunteers or any third parties. Notwithstanding the foregoing, the parties agree that Contractor's obligation to defend the NCTPA is solely limited to reimbursing NCTPA for its reasonable costs for defending a claim including reasonable attorney's fee, incurred by NCTPA which are ultimately determined to be due to Contractor's negligence, recklessness or willful misconduct. Each party shall notify the other party immediately in writing of any claim or damage related to activities performed under this Agreement.

15. COMPLIANCE WITH LAWS

Contractor shall comply with any and all laws, statutes, ordinances, rules, regulations, and requirements of the federal, state or local government, and any agency thereof, including, but not limited to NCTPA, the U.S. DOT and FTA, which relate to or in any manner affect the performance of this Agreement. Those law, statutes, ordinances, rules, regulations, and procedural requirements that are imposed on NCTPA as a Recipient of federal or state funds are hereby in turn imposed on Contractor (including, but not limited to, 49 CFR Part 18, "Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments"), and are herein incorporated by this reference and made a part hereof.

20. NO GOVERNMENT OBLIGATION TO THIRD PARTIES

(a) Contractor acknowledges and agrees that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to NCTPA, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

(b) The Contractor agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

21. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS AND RELATED ACT

(a) The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § § 3801 et seq. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract or the FTA assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.

(b) The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a contract connected with a project that is financed in whole or in part with Federal assistance

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originally awarded by FTA under the authority of 49 U.S.C. § 5307, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5307(n)(1) on the Contractor, to the extent the Federal Government deems appropriate. (3) The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

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# ATTACHMENT E-1

Local Agency Proposer DBE Commitment (Consultant Contracts)

**NOTE: PLEASE REFER TO INSTRUCTIONS ON THE REVERSE SIDE OF THIS**

AGENCY:_____ LOCATION:_____

PROJECT DESCRIPTION: _____

CONTRACT GOAL: $_____

PROPOSAL DATE:_____

PROPOSER'S NAME:_____

| WORK ITEM NO. | DESCRIPTION OR SERVICES TO BE SUBCONTRACTED | DBE Cert. No. AND EXPIRATION DATE | NAME OF DBEs (Must be certified on the date the proposals are opened - include DBE address and phone number) | PERCENTAGE AMOUNT OF EACH DBE |
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## For Local Agency to Complete:

Local Agency Contract Number: _____

Federal Aid Project Number: _____

Federal Share: _____

Proposal Award Date: _____

Local Agency certifies that the UDBE certification(s) has been verified and all information is complete and accurate.

_____ _____ _____

Print Name Signature Date

Local Agency Representative

(Area Code) Telephone Number: _____

Total Claimed Participation $_____ _____%

_____

Signature of Proposer

_____

Date (Area Code) Tel. No.

## For Caltrans Review:

_____ _____ _____

Print Name Signature Date

Caltrans District Local Assistance Engineer

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## EXHIBIT "A"

## SCOPE OF WORK

CONTRACTOR shall provide NCTPA with the following services:

**II. COMPLIANCE WITH GOVERNMENT CODE SECTION 7550.** As required by Government Code section 7550, each document or report prepared by CONTRACTOR for or under the direction of NCTPA pursuant to this Agreement shall contain the numbers and dollar amounts of the Agreement and all subcontracts under the Agreement relating to the preparation of the document or written report. The Agreement and subcontract dollar amounts shall be contained in a separate section of the document or written report. If multiple documents or written reports are the subject of the Agreement or subcontracts, the disclosure section may also contain a statement indicating that the total contract amount represents compensation for multiple documents or written report

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# EXHIBIT B

## COMPENSATION RATES

*(see attached)*

# NAPA Vine PRICE PROPOSAL

*Revised 9/25/2014 per Contract Negotiations*

| NO. | ITEM DESCRIPTION | UNIT | QTY. | UNIT PRICE | EXTENDED PRICE |
|---|---|---|---|---|---|
| **BASE PRICE ITEMS** | | | | | |
| 1 | System Design | LS | 1 | $ 187,787.37 | $ 187,787.37 |
| 2 | CAD/AVL System Software and Licensing | LS | 1 | $ 60,407.28 | $ 60,407.28 |
| 3 | Hosted Servers (project term plus 5 years) | LS | 1 | $ 98,866.02 | $ 98,866.02 |
| 4 | Workstations at Dispatch and Administrative offices | EA | 3 | $ 2,036.39 | $ 6,109.18 |
| 5 | Scheduling Software Interface to Veolia | EA | 1 | $ 47,279.18 | $ 47,279.18 |
| 6 | On Board Equipment (Fixed Route) | EA | 40 | $ 10,352.33 | $ 414,093.28 |
| 7 | On Board Equipment (Paratransit) | EA | 29 | $ 3,726.42 | $ 108,066.19 |
| 8 | On Board Equipment (Supervisor Vehicles) | EA | 6 | $ 2,982.49 | $ 17,894.95 |
| 9 | Communications System for Mobile Devices – at Dispatch | LS | 1 | $ 10,697.85 | $ 10,697.85 |
| 10 | Mobile Communications Equipment - fixed, paratransit, supervisor vehicles | EA | 75 | $ 1,054.22 | $ 79,066.33 |
| 11 | Cellular (3G/4G) Service (5 years) | LS | 1 | $ 75,365.19 | $ 75,365.19 |
| 12 | Testing | LS | 1 | $ 73,195.06 | $ 73,195.06 |
| 13 | Maintenance Service Agreement (Years 2-5, Year 1 is included) | LS | 1 | $ 341,580.47 | $ 341,580.47 |
| 14 | Training | LS | 1 | $ 23,255.92 | $ 23,255.92 |
| 15 | 511 Integration | LS | 1 | Included | $ - |
| 16 | Connection Protection | EA | 40 | Included | $ - |
| 17 | Data Management System | LS | 1 | $ 4,166.67 | $ 4,166.67 |
| 18 | Farebox Integration | EA | 40 | $ 27.15 | $ 1,086.08 |
| 19 | Mobile Work Stations for Supervisors | EA | 1 | $ 3,461.87 | $ 3,461.87 |
| 20 | Spare Vehicle Equipment Kit | EA | 7 | $ 6,250.84 | $ 43,755.87 |
| 27 | Real-time Bus Stop Sign | EA | 20 | $ 14,212.51 | $ 284,250.22 |
| 30 | Phone Interactive Voice Response System | LS | 1 | $ 67,206.17 | $ 67,206.17 |
| 31 | SMS texting fees and 321123 short code | LS | 1 | $ 19,098.38 | $ 19,098.38 |
| 32 | Clipper Integration | LS | 1 | $ 45,626.78 | $ 45,626.78 |
| 33 | Video System | LS | 1 | $ 683,399.16 | $ 683,399.16 |
| 34 | Automatic Vehicle Monitoring | EA | 76 | $ 178.08 | $ 13,534.07 |
| | | | | **TOTAL BASE PRICE:** | **$ 2,709,249.53** |