ATTACHMENT 2:

APM Operating System Supplier Eligibility Determination

Technical Capabilities Submittal Requirements and Project Experience Forms

MARCH 17, 2016

ELIGIBILITY DETERMINATION TECHNICAL CAPABILITIES SUBMITTAL REQUIREMENTS

GENERAL INSTRUCTIONS

Respondents shall submit their EDRs in accordance with this format.

Submit the following information in support of your Eligibility Determination Request. Certain project performance requirements considered important and anticipated for the project are provided in Attachment 3 – Select Draft Project Technical Performance Provisions; these requirements are referenced as "TP x.x" where appropriate in the submittal instructions below. Additionally, identified project physical plant constraints are provided in Attachment 4 – Preliminary APM Project Layout Plan. All submittals must be tabbed to match the following paragraph numbers:

I. Technical Maturity of the APM Operating System technology:

1. Submit the following data/documentation to demonstrate the technical maturity of the proposed APM Operating System technology:

a. Address the technical maturity status of the proposed APM Operating System technology requirements of TP 3.3. Describe the operational readiness status and/ or previous applications of proposed technology. Identify any proposed Technology Modifications, revisions and/or replacement subsystems and describe their features. Explain how these new items will be designed, tested and integrated into the remaining deployment ready and/or service-proven equipment.

b. As evidence of the APM Operating System's degree of technical maturity provide information for at least one reference application that most closely identifies with the proposed APM Operating System for this project. Use the Project Experience Forms contained herein and supplement as appropriate to provide the following information:

i. Project name and location.
ii. Client name/address/contact person/telephone number.
iii. Project start and completion dates - initial and actual with explanation of any discrepancy.
iv. Contract amount – awarded and actual with explanation of any discrepancy.
v. Project description, including system size (length of single-lane guideway, number of vehicles, number of stations and performance (shuttle, or loop, or pinched loop and maximum speed)) as compared with the APM Operating System technology.
vi. Provide letter from senior management executive(s) of the system owner indicating that the owner(s) of the APM Operating System technology is satisfied that the APM Operating System technology has met original expectations.
vii. Provide evidence, from at least one passenger service-proven application, documenting that the APM Operating System technology is technically mature and has been satisfactorily integrated to achieve a complete functioning system. Documented evidence shall clearly show that the features and components of the application are capable of satisfying the requirements of Attachment 3 – Select Draft Project Technical Performance Provisions.

viii. Names of key member firms involved in the referenced application and specific experience of said key member firms gained from the project. Also, identify the key member firms that are included as the "Respondent" under the Eligibility Determination Process.

ix. Evidence from system operating statistics that Major Subsystems, including automatic train control, vehicles (including propulsion and braking systems whether on-board the vehicle or wayside) and switches (if proposed), are technically mature for use in the manner proposed and capable of providing reliable service.

x. Identify any claim, change order or legal action associated with the contract with explanation.

xi. If Respondent anticipates needing to invoke TP 3.3.1.1, 3.3.1.2 and/or 3.3.1.3, then provide the additional information needed for LAWA to evaluate the APM Operating System under those sections, including adequacy of resources to support the approach/plan.

xii. If Respondent anticipates needing to invoke TP 3.3.6, then provide the additional information needed for LAWA to evaluate the APM Operating System under that section.

2. Submit the following information/documentation to demonstrate the Respondent's capabilities to successfully deliver the APM Operating System as an optimized life-cycle asset.

a. Evidence of at least five (5) years of direct experience with the APM Operating System technology which may include a predecessor generation of the technology or similar technologies, including achieved success in designing, supplying and installing APM Operating Systems as demonstrated by past projects, including at least one previous system of comparable size and complexity to the APM System defined in Attachment 3 – Select Draft Project Technical Performance Provisions and Attachment 4 – Preliminary APM Project Layout Plan. Utilizing the Project Experience Form contained herein, supplemented as appropriate, provide the following information:

   i. Respondent shall describe, as applicable, its and each key member firm of the Respondent's team's direct experience with the APM Operating System technology, which may include a predecessor generation of the APM Operating System technology and other similar technologies. This experience must include the development of the APM Operating System technology as well as its deployment and other related experience. Respondent shall describe how this experience qualifies these parties to accomplish their roles for design, manufacture, installation, and testing as related to that part of the APM Operating System for which they will be responsible.

   ii. Record of past performance in the design and construction (and to the extent performed, operations and maintenance), of similar projects using the APM Operating System technology for the past five (5) years including awards and citations received, record of forecasting and controlling cost (as measured by changes to contract amounts), adherence to contract schedules, record of claims/litigation, record of liquidated damages, record of terminations/defaults, and safety record.

   iii. Provide copies of letters of reference from clients regarding successful design, construction and passenger operation and satisfaction.

b. Satisfactory evidence of sufficient human and physical resources to perform and complete the APM Operating System in a timely manner (in addition to other commitments), assuming a Notice to

Proceed in or about early 2018, and project completion (i.e., start of passenger service) in early 2023. Provide the following:

i. Describe the Respondent's engineering and management organizations and include organizational charts for the Respondent and each proposed key first tier subcontractor, if any. Organizational charts shall clearly identify functional groups such as Design, Manufacturing, Installation/Field Organization, Integration (of subsystems as well as with APM Fixed Facilities), Testing and Commissioning and Operations and Maintenance activities; Respondent may add additional functional groups as it deems appropriate.

ii. Respondent shall describe its Preliminary Management Program and Organization Plan in sufficient detail to demonstrate how the Respondent plans to organize, manage and coordinate its work to ensure a smooth project delivery. The preliminary plan shall, at a minimum:
   - Identify alternate suppliers/subcontractors who may be utilized without compromising the intended demonstration of Technical Maturity.
   - Demonstrate sufficiency of manufacturing facilities to produce and factory-test system components within the time requirements for the APM Project. Provide a description of the manufacturing facilities. Identify current and anticipated commitments (i.e., other orders) and projected participation/availability of the identified resources for the Project.
   - Provide a preliminary work schedule addressing all activities associated with completing the design, manufacturing, installation and system safety certification, assuming a Notice to Proceed in or about early 2018 and project completion (i.e. start of passenger service) in early 2023.

3. Submit the following information/documentation to demonstrate the Respondent's capabilities to successfully operate and maintain the APM Operating System as an optimized life-cycle asset.

Address the following aspects:

a. Provide evidence of not less than five (5) years of experience in operations and maintenance for an APM Operating System of comparable size and complexity to the APM System defined in Attachment 3 – Select Draft Project Technical Performance Provisions and Attachment 4 – Preliminary APM Project Layout Plan. Identify if the Respondent provided operations and maintenance upon successful delivery of the APM Operating System, or if the system was operated/maintained by another entity. Utilize the Project Experience Forms contained herein to provide information about the identified projects.

b. Provide APM Operating System service availability data over the past five (5) years from APM Operating Systems that utilize substantially the same or similar APM Operating System design features. Where there are differences, identify the differences and any potential impacts on the APM Operating System service availability data submitted. Utilize the Project Experience Forms contained herein to provide information about the identified projects.

c. Methods to adjust for changing conditions, such as passenger demand, weather and special events to be conducted by the Owner's personnel with assistance by the Contractor. Provide an explanation for handling malfunctions and other downtime events.
d. Define the methods and procedures for keeping all operating records including those typically provided as part a System Assurance Monitoring Plan.
e. Identify schedule, separately for each major subsystem, of overhauls/refurbishment/rejuvenation of the APM Operating System to provide reliable service. The schedule shall be based on APM System hours/year(s), vehicle hours/year(s), or vehicle miles (whichever is relevant), for the duration of the anticipated term of the contract (i.e. up to 40 years) and shall be correlated to the equipment design service life.
f. Provide a description of the Respondent's spare parts and equipment delivery system and system repair/rejuvenation organization to support customers (either existing and/or proposed), and address how it will be utilized to support the APM Operating System during system operations and maintenance for the anticipated term of the contract (i.e. up to 40 years).

II. Ability of the Respondent to adapt and deliver the proposed APM Operating System to meet certain anticipated project performance requirements as defined in Attachment 3 – Select Draft Project Technical Performance Provisions.

The Respondent shall describe the features of its proposed APM Operating System and, where applicable, how the system will meet the specific requirements of Attachment 3 – Select Draft Project Technical Performance Provision identified below. Include references to section numbers and titles from Attachment 3 – Select Draft Project Technical Performance Provisions as set forth below.

1. System Line Capacity and Operating Modes

The Respondent shall describe the features of its proposed APM Operating System and how they will meet specific requirements of the Select Draft Project Technical Performance Provision sections identified below. The contents of this Section shall be indexed using the same Section numbers and titles of the Select Draft Technical Performance Provisions as set forth below.

a. TP 5.1 Passenger Service Characteristics: Define the passenger service characteristics for the proposed APM Operating System. Discuss the proposed peak period operating mode to meet the Ultimate System line capacity (clarifying whether the APM Operating System technology allows operation in the preferred normal mode of operation described in TP 5.2); Ultimate System minimum operational, platform and peak period operating headways; station dwell times; travel and round-trip times; speed profiles; line capacities; fleet size; spare vehicles; and maximum-length train. Follow the same numbering and titles of TP 5.1. Provide the calculations of line capacity consistent with the requirements of TP 5.1.5 and TP 5.2. Provide a dimensioned plan view of the APM station berth requirements for each station showing the configuration of vehicles to form a maximum-length train and the berth space required for a maximum-length train, including end of line overtravel buffers. Clearly identify the train berthing positions at each station for different length trains up to the maximum-length train. Provide characteristic curves of train acceleration and braking as a function of speed assumed for the simulation described above.

b. TP 5.1.5 Line Capacity: Provide detailed calculation of Ultimate System fleet-sizes (including spares and stand-by train) required to meet the ultimate line capacity, meeting the requirements of TP 5.1.6.

c. TP 5.2 System Operating Modes: Describe each operating mode of the Ultimate System as specified in TP 5.2.1.3 and 5.2.1.5. Describe the failure operating modes for the Ultimate System as required by TP 5.2.2. Identify any additional failure operating modes that can be achieved by the APM Operating System.

2. Exterior Noise Levels:

Per the requirements of TP 6.3.1, Respondent to state the proposed maximum exterior noise levels (see Table 6.3.1-1 - Exterior Noise Limits) that will be generated along the APM System and provide copies of recent test results that were performed at a Respondent's example system installation with similar characteristics and curve radii as depicted in the Preliminary APM System Layout Plan in Attachment 4. Respondent must also describe how their proposed system design will address and comply with noise limits (through design approach and/or operations/maintenance approach) throughout the useful life of the system.

3. Vehicle Features:

Respondent shall describe the features of its APM Operating System and how they will meet specific requirements of Select Draft Project Technical Performance Provision sections identified below. The contents of this Section shall be indexed using the same Section numbers and titles of the Select Draft Project Technical Performance Provisions as set forth below.

a. TP 9 Vehicle: Provide a definition of the vehicle configuration, the minimum length train configuration and the maximum-length train for the Ultimate System Line Capacity, consistent with the definitions of car, vehicle and train of TP 9. Provide scaled/dimensioned interior plan view showing all doors, seats, stanchions and areas where passengers can stand. Show the space(s) in the vehicle useable by a wheelchair passenger. Show features that will facilitate the movement of passengers with baggage carts in the vehicle. Provide photographs of the proposed vehicle, if available or of a similar vehicle. Also address passenger views outside of the vehicle while riding in a vehicle.

b. TP 9.1 Dynamic Envelope and Clearances: Provide the train dynamic envelope specified in TP 9.1.1. Provide the following data for how the APM Operating System design is to interface with fixed facilities along the APM Operating System alignment. The required clearance diagrams shall comply with the requirements of TP 9.1 and the site-specific constraints.

   i. Provide the dynamic and clearance envelope diagrams of a train on the proposed elevated guideway structure, both in tangent and super-elevated curve sections.

   ii. Provide a clearance diagram of a train parked in each station. Show a cross section of the train's interface with the station platform, platform barrier wall and platform passenger doors.

c. TP 9.2 Vehicle Space and Weight Allocations: State the AW0, AW1 and AW2 proposed weight of each car or vehicle and maximum-length train and provide detail for the interior space allocations.

d. TP 9.3 Vehicle Capacity: State the vehicle Normal Capacity and Design Capacity in terms of the number of seats and the total standee area (ft2). Identify the usable floor area (UFA) available for standees and provide a plan view of the vehicle layout at three elevations (floor level, 4 ft and 6 ft).

e. TP 9.6.3 Ride Comfort: State the proposed maximum acceleration, deceleration, wandering and jerk rates and provide copies of recent tests that were performed at a Respondent's example system installation with similar characteristics and curve radii as depicted in the Preliminary APM Project Layout Plan in Attachment 4. These tests shall include chart recordings depicting accelerations and jerk vs. time. The term "wandering" is similar to hunting or the lateral (side to side) movement of the vehicle as it travels along the entire alignment. The Respondent must also describe how their proposed system design will mitigate excessive wandering/hunting as well as address anti-climbing provisions (as applicable) necessary within the geometry defined in the Preliminary APM Project Layout Plan in Attachment 4, and provide ride comfort testing data of other similar systems.

f. TP 9.7 Propulsion and Braking Systems: Briefly describe the propulsion and braking systems and the performance capabilities according to items A, B and C of TP 9.7.

g. TP 9.7.5 Design Stopping Conditions: Provide details about the worst-case stopping distance, identifying all relevant parameters (reaction time, tolerances, etc.). Provide an example using the ultimate-length train stopping position to indicate the maximum required platform length including buffer space and overrun distance.

h. TP 9.9 Suspension and Guidance Subsystems: Provide a description of the suspension system, including types of wheels or other primary suspension, guidance method, load leveling method, secondary suspension, and a drawing of the suspension apparatus (e.g., bogie).

i. TP 9.10.1 Door Features and Dimensions: Provide a description of the passenger door system, with minimum clear opening height and width and description including how it is operated, types of mechanisms, and a calculation of time to completely unload the train.

j. TP 9.10.5 Door Emergency Exits: Describe required emergency exiting through the normal side doors and provide details of evacuation requirements including in tangents, curves and switch locations. Provide details of the time required to evacuate a fully loaded train from when all available exits per car are operational, and when only one exit per car is operational, to a safe location as per NFPA 130. Identify capability, if any, of ability to exit through alternate means other than normal side doors and provide details of evacuation requirements including in tangents, curves and switch locations.

k. TP 9.16 Vehicle Coupling: Describe the proposed coupling design and how these requirements will be met.

4. Power Distribution System:

Respondent shall describe the features of the APM Operating System design and how it will meet specific requirements of the Select Draft Project Technical Performance Provisions sections identified

below. The contents of this Section shall be indexed using the same Section numbers and titles of the Select Draft Project Technical Performance Provisions as set forth below.

a. TP 10.1 Power Distribution System: Describe the Power Distribution System (PDS), including all voltages and equipment ratings. Provide a schematic single-line drawing showing all substations, primary and secondary feeders, primary switchgear, power transformation/conditioning, secondary switchgear, and feeds to power rails, power rail segmentation, auxiliary power, power factor correction and uninterruptible power. Provide a preliminary load analysis for traction power and auxiliary loads, including peak loads for operation of maximum-length trains.

   Explain how the PDS will be sized to meet specified requirements. Explain how the requirements regarding single point failures will be met. Explain how circulating currents that could be generated due to the interface with the Los Angeles Water and Power Company (LADWP) will be mitigated. Describe impact of total failure of one substation.

b. TP 10.1.5.2 Grounding: Describe the grounding system.

5. Command, Control and Communication Systems:

   Respondent shall describe the features of its preliminary APM Operating System Design and how they will meet specific requirements of the Select Draft Project Technical Performance Provisions sections identified below. The contents of this Section shall be indexed using the same Section numbers and titles of the Select Draft Project Technical Performance Provisions as set forth below.

   a. TP 11 Automatic Train Control: Provide an overview of the proposed Automatic Train Control (ATC) system. Provide information about how the ATC equipment will function and how the transition to future phases could occur.

   b. TP 11.1 Automatic Train Protection: Provide a description of the proposed Automatic Train Protection (ATP) system. Briefly describe proposed methods and equipment for each of the functions required by TP 11.1.1 through 11.1.13, including how the requirements of TP 7.1.1 are met in each case.

   c. TP 11.2 Automatic Train Operation: Provide an overview of the proposed Automatic Train Operation (ATO) system. Briefly describe proposed methods and equipment for each of the functions required by TP 11.2.1 through 11.2.4. For the requirements of TP 11.2.1, state the proposed clear opening of vehicle and platform doorways and the maximum misalignment.

   d. TP 11.3 Automatic Train Supervision: Provide an overview of the Automatic Train Supervision (ATS) system.

6. Guideway Equipment:

   The Respondent shall describe the features of its proposed Preliminary APM Operating System Design and how it will meet specific requirements of Select Draft Project Technical Performance Provisions sections identified below. The contents of this Section shall be indexed using the same Section numbers and titles of the Select Draft Project Technical Performance Provisions as set forth below.

a. TP 13.1 Running and Guidance Surfaces: Provide a description of the design of the running and guidance surfaces, including dimensioned drawings to depict track components and interfaces with other guideway equipment such as power and signal rails, and any track mounted linear electric motors or reaction rails. State proposed materials and any coatings.

b. TP 13.7 Switching: Describe how the operational switching of trains as required by TP 13.5 will be accomplished. Discuss where the proposed switch has been successfully applied for other projects. Describe any improvements or development work in this regard for the APM Operating System. Provide a brief description and drawing(s) of the guideway switch(es) in all anticipated configurations, including method of operation and performance characteristics. Identify proposed switch locations on the alignment.

7. Maintenance and Storage Facilities (M&SF) and Equipment:

   Provide a proposed layout of the M&SF that fits within the M&SF shell of the conceptual plan included in the Preliminary APM Project Layout Plan in Attachment 4, and all access guideways to support the fleet (determined by Respondent in response to item II.1 above). Provide drawings illustrating, within the MS&F in the Preliminary APM Project Layout Plan, the locations and size requirements to accommodate the required operations and maintenance functions, including the Central Control Facility, equipment delivery, departure test track, vehicle maintenance, storage, and vehicle wash area.

III. Ability of Respondent to adapt the proposed APM Operating System to the physical constraints as defined in Attachment 4 – Preliminary APM Project Layout Plan.

Provide an overall description of the APM Operating System configuration and a discussion of the technology and associated equipment. Describe and provide drawings identifying the alignment and key APM Operating System facilities. Also include information and drawings to:

1. Demonstrate that the APM Operating System and system equipment fit within the alignment infrastructure identified in the Preliminary APM Project Layout Plan; and;

2. Identify any adjustments to the Preliminary APM Project Layout Plan that are needed to accommodate the proposed APM Operating System i.e., alignment, number and locations of the substations, M&SF, equipment rooms and any other space.

PROJECT EXPERIENCE FORMS (SUPPLEMENT WITH ADDITIONAL INFORMATION AS REQUIRED TO ADDRESS THE SUBMITTAL INSTRUCTIONS)

Verify all contacts prior to submittal. Do not leave any spaces blank. Responses such as "N/A" are not acceptable. If not applicable, state "Not Applicable" and explain why. If none, state "NONE." Provide a completed Project Experience Form for each identified project.

Project Name and Location:		**Reference Project No.:**
Type of Project Delivery: Design _____ Design/Build/Operate/Maintain_____ Construction _____ Operation and Maintenance _____ Design/Build _____ Other _____		
Respondent's Role on the Project: Design_____ Design/Build/Operate/Maintain_____ Construction_____ Operation and Maintenance _____ Design/Build_____ Other:_____		
Respondent's Work Scope: Fixed Facilities _____ Operating System_____ Other:_____		
Description of Respondent's Role:		
A. **Describe the relevance of referenced project to the LAMP APM Operating System in terms of similar scope and complexity**:		
B. Identify team participants (personnel and/or companies) who participated on the referenced project, including roles/responsibilities:		
C. Other key participants (companies):		
D. Team structure – management description (for referenced project):		

E. Customer and owner: (Name/address/name of contact person/phone number/email)
F. Location of project (City, State, Country, Airport):
G. Date of Notice to Proceed; and Current status of project (design, construction, or operations and maintenance phase)
H. Description of System: Was this System the same that is proposed for LAX LAMP? If not, describe the difference(s) Describe the following: System Configuration (pinch loop, shuttle, etc.) System Length (total, elevated, at-grade, tunnel) Number Vehicles (total, operating peak) Type of Vehicle Number of Vehicles per train Number of Passenger Stations Number of Power Distribution Substations Design Capacity (passengers per hour per direction)
I. Operation and Maintenance: Address the following: Description of Service Provided Operating Plan (days/year; hours/day; peak hours/day) System Availability for most recent five year period (clearly identify changed conditions/events as applicable) Safety record for most recent five year period
J. Original Contract Amount (Include Total Amount for Design and Construction and Respondent's portion):
K. Percent Change Orders through construction and cause (Respondent's portion):
L. Annual Operating and Maintenance Cost:
M. Annual capital asset replacement/rejuvenation costs (repair and replacement):
N. Sources of funding:
O. History of operations, including start-up date and number of years in service:

P. Operations contract renewal history:
Q. Description of responsible parties and procedure for gaining governmental approvals on project:
R. History of compliance with performance guarantees (if any):
S. Description of any ingenuity and innovation employed on project:
T. Respondent's key personnel on the referenced project:
U. Key project contact of Customer (Name, Address, Telephone, Fax, Email):
V. Key project contact of Respondent (Name, Address, Telephone, Fax, Email):
W. System Expansion, if any (Describe)
X. Degree of integration into existing or new facilities, and type of facilities