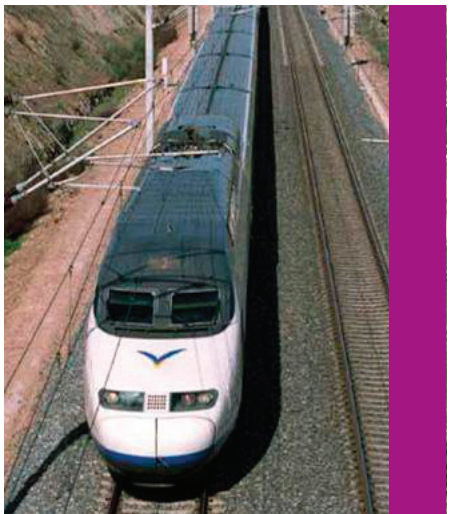
Submitted to
California High-Speed Rail Authority
September 14, 2015

AECOM

Expressions of Interest

Delivery of an Initial Operating Segment

RFEI HSR#15-02



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14 September 2015

Ms. Rebecca Harnagel
California High Speed Rail Authority
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SUBJECT: RFEI HSR#15-02 AECOM Expression of Interest

Dear Ms. Harnagel:

AECOM, a world leader in Infrastructure Design, Construction, Finance, Operations, and Maintenance, with our world headquarters in Los Angeles, California, is very pleased to submit our Expression of Interest for HSR # 15-02, Initial Operating Segments 1 and 2, via email as specified in the RFEI. At this time, we are submitting our EOI without joint venture or consortium partners, although we anticipate such teaming may eventually be required depending upon the approach eventually adopted by the Authority. Should the Authority desire hard copies of the EOI, please contact me per the contact information below.

AECOM has worked with the Authority for more than fifteen years and takes great pride in our work to achieve the Records of Decision for the first two segments to go into construction. Our partnership with the Authority is extremely important to AECOM and we are eager to continue and grow that relationship. We look forward with great anticipation to the one-on-one discussion envisaged in the RFEI.

In order to arrange the one-on-one meetings, or if you require additional information, please contact me at:

Stephen J. Polechronis
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Sincerely,

AECOM
Stephen J. Polechronis
Sr. Vice President

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1 Firm Experience and Team Structure

AECOM is a premier, fully integrated professional and technical services firm positioned to design, build, finance and operate infrastructure assets around the world. A Fortune 500 firm headquartered in Los Angeles, AECOM had revenue of over $18 billion in 2014. As summarized in the table on the following page, AECOM and its legacy firms have an extensive history of transportation project development, construction, and design.

Project Development: Development initiatives of AECOM have included some of the most prominent infrastructure projects in the United States. Projects such as the Hudson Bergen Light Rail Transit Project have involved planning, finance, design, construction, operation, and maintenance. Others, such as Houston Metrorail, have included innovative financing plans. Our experience in these development initiatives has informed our responses to the California High Speed Rail Authority's (Authority) Request for Expressions of Interest (RFEI). We are strong supporters of private development of infrastructure because we believe it leverages the distinctive skills of the private sector in project execution and operation, and of the public sector in the procurement and contract administration of these complex projects. The format for private financing of the public's infrastructure also permits the public agency to off-load risks that are more properly assigned to a development team such as design, construction, operation and maintenance.

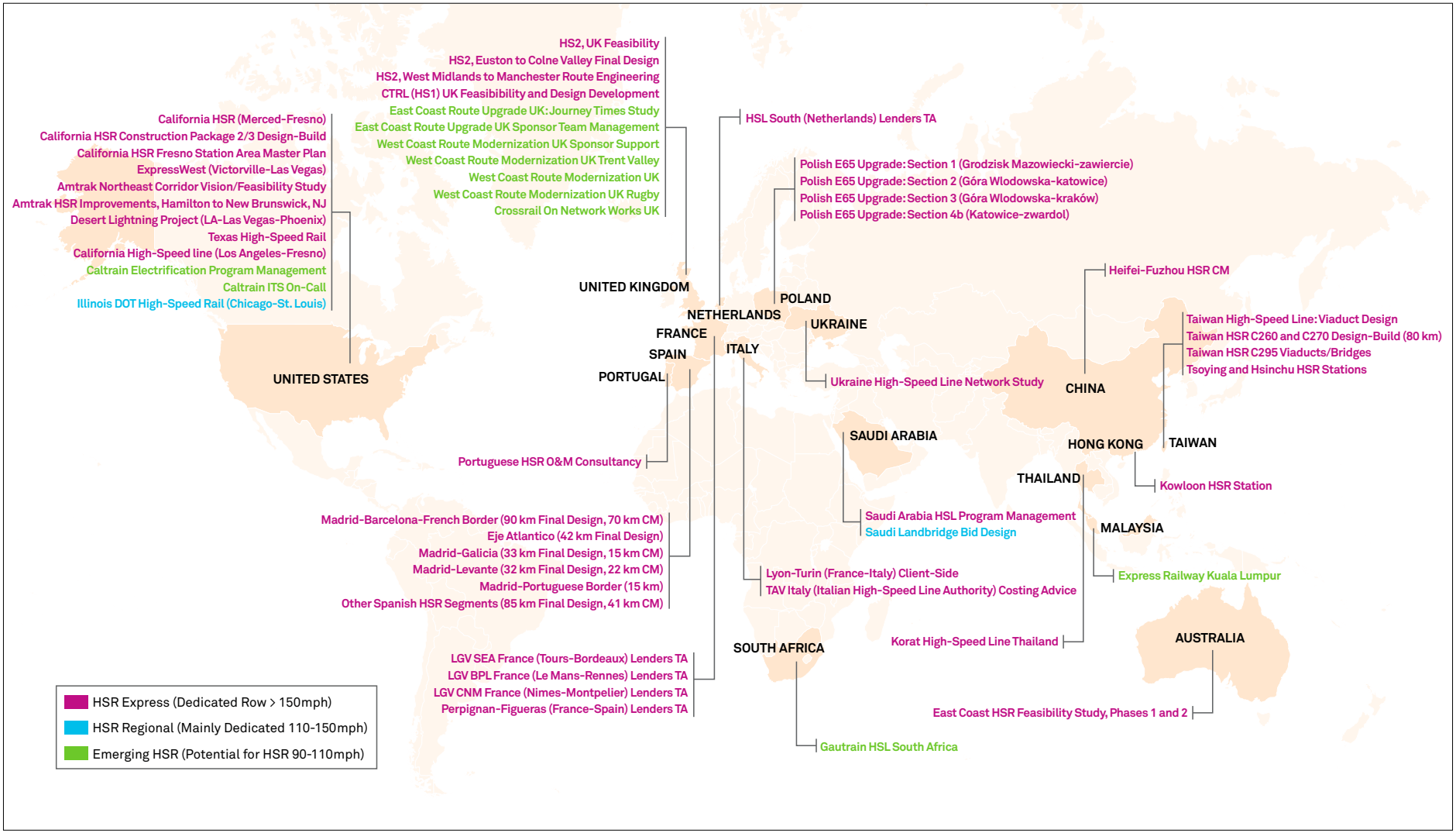
High-Speed Rail: AECOM, ranked No.1 in Mass Transit/Rail by *Engineering News-Record,* has been working on California high-speed rail for 15 years. Our experience includes the initial programmatic environmental impact studies, environmental and preliminary engineering of the first two segments to achieve Records of Decision, and participation on the design team for two of the initial design-build packages. As shown in the map on page 4, we also bring extensive knowledge from the implementation of high-speed rail globally.

Public-Private Partnership (P3) Leadership: AECOM is a leader in P3 services, regularly teaming with contractors, developers, investors and lenders, concessionaires, and grantors. AECOM Capital was established in 2013 with a focus on direct investments in real estate projects. AECOM Capital is a semi-open ended fund with an initial funding from AECOM of $150 million. In 26 months of operation, AECOM Capital has closed on or is in contract for $2.8 billion in projects.

Project Name	Location	CAPEX ($M)	Scope	AECOM Role	Comment
Hudson Bergen Light Rail Transit	New Jersey	1,500	Light rail transit project paralleling the Hudson River across from Manhattan	Design, build operate, maintain, and arrange bridge financing	NJ Transit adopted and closed AECOM's permanent financing plan.
Dulles Metrorail	Virginia	5,000	Extension of Silver Line from East Falls Church to Reston	Finance plan, EIS, preliminary engineering, design-build procurement documents	Plan included special tax districts and monetization of excess Dulles Toll Road revenues.
Houston Metrorail	Texas	2,000	Light rail transit system	Securitization trust financing plan	Facility provider contract provided for deferred payments for 40 years. Permanent finance provided by selling rights to those receivables to the trust.
E-470 Toll Road Segments II, III, and IV	Colorado	560	Toll highway	Structured interim and long term financing, construction, development risk sharing, Section IV preliminary engineering	Accelerated project delivery.
I-895 Pocahontas Parkway	Virginia	325	Toll highway	Development and construction	Development efforts provided accelerated delivery, no change orders or claims, and development risk sharing.

Project Name	Location	CAPEX ($M)	Scope	AECOM Role	Comment
Northwest Parkway	Colorado	200	Toll highway	Developer	Structured $350 million in financing and received development fee.
California High-Speed Rail, Merced-Fresno Section	California	5,000	High-speed rail	Preliminary engineering, Final EIR/EIS	1st CAHSR section to receive a Record of Decision.
High-Speed Rail System	Spain	5,000	High-speed rail	Final design and construction management	Over 27 years of experience on Europe's largest HSR network.
High-Speed Rail System	Taiwan	1,500	High-speed rail	Final design (three design-build contracts)	Over 80 km of seismic-resistant viaducts.
Crossrail	United Kingdom	20,000	Heavy rail	Program management	Europe's largest construction project; major tunneling component.
Second Avenue Subway	New York	17,000	Heavy rail	General engineering consultant	8.5-mile subway alignment with 16 stations on Manhattan's east side.
East Side Access	New York	8,000	Commuter rail	Program management, construction management, and station design	Extending the Long Island Railroad to Grand Central Terminal.
Presidio Parkway	California	270	Highway	Developer and equity member (Meridiam), and technical advisor	First project under California's P3 enabling legislation.
I-595	Florida	1,250	Highway	Final design (design-build-finance-operate-maintain contract)	Accelerated schedule provides improvements 15 years sooner than planned.

AECOM Global High-Speed Rail Projects



2 Project Approach

Approach Principles – A program the size of the California High-Speed Rail Project (Project) has significant opportunities for cost efficiencies but requires a contracting plan that recognizes both the operational benefit of early commissioning and the limitations of contract size imposed by the contracting industry and by the lending community. Award of both Initial Operating Segment (IOS) North and South to a single entity also has benefit of limiting the interface exposure of the Authority, particularly on the portion of the alignment with shared trackage. The imperative of interface control also dictates that the provision of stations and procurement of rolling stock and its associated systems be assigned to a single entity. We appreciate the opportunity to comment on the Authority's procurement process because we believe the Authority is in a unique position to adopt new and innovative means for provision of the public's infrastructure.

AECOM's role in Taiwan's high-speed rail system included architecture and engineering for the Tsoying station and final design for three aerial guideway design-build contracts.

Comprehensive Development Agreement (CDA) – We believe that a CDA with AECOM is the preferred vehicle for accomplishing the Authority's objectives. Selection of AECOM as the developer would be based on qualifications to finance, design, build, operate, and maintain a complex infrastructure program. A CDA is a negotiated vehicle that defines the risks assigned to the developer and those retained by the owner; e.g., design and construction to the developer, and environmental permitting, right-of-way acquisition, and community relations to the Authority with support from a special-purpose vehicle (SPV) as required. Having been selected as the developer under the CDA, AECOM would establish the SPV with other investors in order to execute the Project. Once selected, the SPV would work with the Authority to define logical contract packages that would permit early revenue generation. The SPV would be responsible for financing of those packages, and subsequent engineering, procurement, construction, operation, and maintenance of the Project.

Financing – Leadership of the financing component would be provided by a finance team led by AECOM Capital. The team would include both investors (including AECOM) and lenders. The finance team would avail themselves of tools that are further described in our response to the RFEI questions in Section 3 of this document.

Subordinate Agreements – The SPV would separately contract for execution of the design and construction and for the operations and maintenance and thereby assign risk to the party best able to manage that risk. Stations are key to achieving early revenue generation on minimum operating segments. Therefore, the CDA would include the design, construction, and operation of the stations, unless these services are already provided under contracts currently contemplated by the Authority. The SPV would also procure the rolling stock and rail systems including signals, communication, and traction power in order to minimize the technology interfaces. The preferred selection method would be best value in order to foster competition and innovation among potential vehicle suppliers.

Alignment of Interest – AECOM would assume a position in each of these contracted teams in order to assure alignment of interests from financing through operation. For instance, an engineer who will have long-term maintenance responsibility will assure that life cycle considerations are incorporated in the design. AECOM's success in operating the Hudson Bergen light rail system is an example of how private sector business interests can be effectively mobilized to achieve superior performance on an operating railroad.

Work Distribution Plan – AECOM is capable of undertaking the total design responsibility although, as part of the design-build team, it expects to subcontract major portions of the work to other engineers. The design-build team would be capable of self-performing portions of the construction, but the size of the Project would dictate subcontracting major portions to third-party contractors. The Authority would provide independent oversight of the contracting process to assure the public interest is protected in terms of competitive pricing as well as distribution of the work to a wide spectrum of the engineering, manufacturing, materials, and construction industries. Selection of subcontractors would preferably be on the basis of best value.

In terms of organizational development, the SPV would establish a joint project management office in Sacramento with the Authority. Similarly, joint construction offices would be established close to active construction projects. To assure construction progress to the satisfaction of the lenders, the SPV would implement a project controls program including cost and schedule controls. The schedule would provide for an orderly prosecution of the work, while concurrently considering the ability of industry to undertake the work. It would also be constrained to the extent that availability payments from the Authority are able to provide for the debt service.

3 Responses to Questions

3A: COMMERCIAL QUESTIONS

3a.1 – Is the delivery strategy (combining civil works, track, traction power, and infrastructure) likely to yield innovation that will minimize whole-life-cycle costs and accelerate schedule? If so, please describe how. If not, please recommend changes to the delivery strategy and describe how those changes will better maximize innovation and minimize whole-life costs and schedule.

Design-build-finance-maintain (DBFM) contracts are useful business models for delivering IOS-North and IOS-South. Combining design and construction is an effective way to shorten schedules, reduce costs, and minimize changes and claims. Engineers work as a contractor's partner and they are able to incorporate construction means and methods and subcontractor packaging into their designs. Adding maintenance and financing further helps transfer risk through performance-based payment systems and the security of private equity investment. A DBFM contract model also reduces whole life cycle costs, promotes innovation, and provides quality guarantees. Fixed maintenance and capital asset replacement costs and quality assurance (through performance penalties and bonuses) are an integral part of DBFM contracts. The DBFM contractor also enforces supplier warranties and guarantees the long-term performance of purchased equipment. Most importantly, the DBFM contractor ensures technical integration among a variety of contracts and manages the coordination of all technical, physical, and schedule interfaces.

Taken together, all of these advantages minimize life cycle costs, shorten schedules, and improve quality.

DBFM contracts also provide a reasonable allocation of risks. In general, project income and funding risk is held by the public agency. Cost, schedule, and performance risk is held by the DBFM contractor. Community action and other third-party risks are shared. The Authority would act as the sponsor for the Project and retain the responsibility for maintaining political support, establishing policy objectives, achieving community and stakeholder consensus, coordinating government agencies, obtaining environmental clearance, and acquiring property. The Authority would be responsible for securing long-term funding commitments and providing private financing backstops as necessary. The Authority would also be responsible for risks associated with political actions, political delays, and/or cancellation.

The DBFM contractor would be responsible for project implementation. It would assume the cost, schedule, and performance risk historically owned by the public sector. These guarantees would be secured through contracts that allow the private partner to participate in the environmental process, oversee and coordinate design concepts, directly manage or self-perform construction, operate and maintain part or all of the system, and partner with the public sector in financing the Project.

We believe a comprehensive contract that spans the entire Project would be in the best interest of the Authority. Our preference would be to include all of the project scope, including vehicles, stations, and operations, into a single DBFM contract, with the benefits more fully described in section 3a.3. As a world leader in the development and operation of transportation systems and an equity partner in a variety of public infrastructure projects, AECOM, together with other partners, would be able to provide a single point of accountability for the Project. Having a full-service development and operating company responsible for the Project would ensure a unified system, with consistent design and construction standards and a fully integrated operating plan. This could be accomplished through a DBFM contract with AECOM taking an equity position. AECOM, along with other technology, construction, and investment partners, would provide the project equity, arrange debt financing, and provide all of the project performance guarantees. AECOM would develop all of the operating and construction standards, issue contracts for design and construction, partner with the rail equipment supplier, partner in land development for stations and facilities, and partner with an operating company under a single-point-of-service contract. This approach would allow the system to be developed over time, as dictated by regulatory approvals and transportation demand, with consistent program goals and objectives and comprehensive financial and performance guarantees.

3a.2 – Does the delivery strategy adequately transfer the integration and interface risks associated with delivering and operating a high-speed rail system? What are the key risks that will be borne by the State if such risk transfer is not affected? What are the key risks that are most appropriate to transfer to the private sector?

The DBFM delivery method for the Initial Operating Segments achieves the objectives of minimizing the whole-life cost of the System, securing private sector investment, accelerating System completion, and transferring key delivery and long-term maintenance risk to the private sector. However, the operational risk for on-time performance and availability are inherently embedded in the quality of product offerings, design, maintenance access, and downtime. Therefore, realistic goals need to be set for reliability, availability, and maintainability that are consistent with the Project budget and industry product offerings. Further, the delivery strategy should be centered on a turnkey supplier providing a proven operating system with a set number of years of successful revenue service. Five years may be a good starting point for operating service. As a result, all technical and all internal operational risks would be handled by one supplier. The risks that the State may face would then be mostly external to the turnkey systems and would include such items as utilities, land acquisition, and geotechnical.

3a.3 – Are there any other components of a high speed rail system that should be included in the scope of work for each project (e.g., rolling stock, train operations, stations)? If so, how will this help meet the Authority's objectives stated in this RFEI?

It is not practical to have two separate rail operations contracts for IOS-North and IOS-South. We believe it would be desirable, and in the best interests of the Project, to include vehicles, stations, and operations into a single comprehensive DBFM contract that encompasses both IOS-North and IOS-South. Technical coordination and contract timing are critical to the success of the systems contracts, the vehicle contract and, to a lesser degree, the station contracts. All of that work must be delivered simultaneously, so the cash demands on the Project are nearly identical regardless of the split in contracts. All of those contracts would need to be managed simultaneously, so the management effort is nearly identical as well. Rolling them into one comprehensive project development contract with a single point of responsibility would further reduce schedules, lower costs, and transfer nearly all of the integration and interface management risk away from the Authority to a single DBFM contract.

At a minimum, securing the operator at the same time as the other contracts would be an improvement. The operator could provide valuable input for the design and construction of the entire project. That would reduce the possibility of disputes among the parties during the operating phase. Just before final testing and revenue service, the operator would be asked to accept the system as ready for service, which means safe, reliable, and designed and built to the advertised standards. That is difficult for an operator to do unless the operator has been involved in the decision-making along the way. At best, it is a risk that the operator will price. At worst, it will make for very difficult contract negotiations that could push certain performance risks back to the Authority. Having the operator on board and cooperating in the design and construction review process makes their acceptance of the system at the end much easier. If the operator is involved in the development phase, it would make the pricing of maintenance and capital asset replacement more straightforward for the civil/systems/vehicle contractors because windows for maintenance, capital asset replacement and upgrades, and coordination with operations can be clearly defined. It would also develop a spirit of cooperation among the parties even if the operator is independently contracted with the Authority. This cooperation would be essential during the transition to operations. During that very critical period of the project, concurrent activities would include individual system testing, integrated testing, commissioning vehicles, training operators, vehicle maintenance training, systems maintenance training, and the handover of facilities. In addition to all of the contractor's personnel, the project will be home to equipment suppliers, local utility companies, and local emergency response personnel for training, just to name a few. Seamless cooperation between the DBFM contractor and the operator will be key to avoiding workplace accidents and providing a smooth transition to revenue service.

Including the stations in a comprehensive DBFM contract would yield other benefits as well. As presently proposed, the stations would be designed, built, and presumably maintained by others, except for the platforms and communications systems such

as the passenger information system. That approach would require a level of cooperation both during design and construction and throughout the operating and maintenance term. Including the stations in a single, comprehensive DBFM contract would eliminate some of the risk of claims and changes over the entire life of the contract. It would also open up an opportunity for equity investment by the DBFM contractor. Property ownership and the related growth and income potential could be a source of real equity not subject to backstops or repayment guarantees.

3a.4 – What is the appropriate contract term for the potential DBFM contract? Will extending or reducing the contract term allow for more appropriate sharing of risk with the private sector? If the Respondent recommends a different delivery model, what would be the appropriate term for that/those contract(s)?

The DBFM contract term and availability payment model specified in the RFEI (25-50 years) is within the range of similar DBFM contracts and consistent with industry standards. As IOS-North and IOS-South are placed into revenue service, a 30-35 year contract term could be considered for each segment. As additional segments come online, contracts may overlap and extend for a period of 50 years in total. Availability payments would be made to the DBFM team over the life of contract's term commensurate with agreed-upon performance standards.

3a.5 – What is the appropriate contract size for this type of contract? What are the advantages and disadvantages of procuring a contract of this size and magnitude? Do you think that both project scopes should be combined into a single DBFM contract?

The estimated contract value for either IOS-North or IOS-South would be unprecedented in the construction industry. The award of one single contract valued at $65 billion would be an unparalleled standard. The greatest advantage of selecting one CDA developer would be transferring program risks to a single point of accountability. If two developers are considered, the Authority would need to ensure that project information is well communicated and coordinated between developers to assure that IOS-North and IOS-South are built to similar quality standards.

If the Authority awards two independent contracts, each segment could be valued at $30-$35 billion. Developers could consider leveraging a "progressive or multi-phase development" approach that is consistent with surety practices to share risks with subcontractors. Under these scenarios, design-build packages would be let for select portions of the alignment that could be put into revenue service while other segments are being developed. The value of these sub-segments could be valued at $2-5 billion each. Joint ventures would most likely be formed to bid this work, covering the management, labor, and surety requirements associated with projects of this size.

3a.6 – Does the scope of work for each project expand or limit the teaming capabilities? Does it increase or reduce competition?

The scope of work as defined by the RFEI for IOS-North and IOS-South is well within the construction industry's capability. As identified above, logistical challenges such as the depth and experience of a qualified labor force and the underwriting risks of the surety industry are of greater concern whether one or multiple developers are considered.

The Project would attract the world's most experienced developers and contractors from the engineering and construction industry. However, the size and complexity of the master contract(s) and sub-segment contracts would require joint ventures in order to share risk and bring the requisite management and skilled labor to bid and build the work. This situation may, in turn, limit the number of firms that would bid subsequent contacts. For example, the recently awarded Tappan Zee Bridge replacement design-build project in New York is, at $3.14 billion, the largest single transportation facility project ever awarded in the US. The Tappan Zee Bridge requires four construction partners working in joint venture to manage the work and risks associated with a five-year, multi-billion-dollar project. Whether the Authority decides to select one or several developers to perform DBFM services for IOS-North and IOS-South, logistical issues would need to be addressed.

3B: FUNDING AND FINANCING QUESTIONS

3b.1 – Given the delivery approach and available funding sources, do you foresee any issues with raising the necessary financing to fund the IOS-South project scope? IOS-North project scope? Both? What are the limiting factors to the amount of financing that could be raised?

Given the size of the Project and the available funding sources, the work should be divided into individual projects in order to be financeable. Lenders find it difficult to finance billion-dollar projects due to the increased risks (e.g., schedule and construction) and the need to syndicate a large number of banks to meet the debt needs. Additionally, because the revenue generated from passenger rail projects is small in comparison to the capital and operating costs, there must be significant government funding to cover any availability payment. The key for the Project is to divide it into smaller $3-5 billion segments, distributing the risks and making the individual projects financeable.

<u>Sources of financing</u>

For each of these projects, the necessary financing will be composed of equity and debt, subsidized by public funding. Based on previous P3 contracts and the anticipated cash flows of the Project, AECOM would fund approximately 10% of the cost through equity and 90% through debt. The exact proportion of debt and equity funding will depend on the quantum and profile of Project costs. However, AECOM would optimize the financing solution to achieve the lowest net present value and thus the lowest life cycle

cost for the Authority. For transportation projects of this type, various financial solutions exist, mainly bank debt, bond finance, private placement, or a combination as detailed below.

In addition, the Project could use tax-exempt bonds such as Private Activity Bonds (PABs) and apply to programs such as Transportation Infrastructure and Finance and Innovation Act (TIFIA) loans, which offers three types of credit assistance (secured, direct short-term, and long-term loans), loan guarantees, and standby letters of credit. PABs have lower rates due to their tax-exempt status and have market depth. Investors are familiar with the risk structure of these bonds, which can help in their execution. TIFIA loans provide low cost of financing and flexible amortization profiles. However, a typical TIFIA challenge is the timing of the application and execution process. When applying to TIFIA, starting the process early and understanding the requirements (including eligible costs) is key.

Debt facilities available

Senior Bank Funding: In a bank funding solution, the most likely financiers would be international project finance banks, particularly those active in the US, Canadian, and European P3 markets. Potential lenders would be evaluated (by AECOM as the developer) based on their credit strength, commitment to and experience in the infrastructure finance market, and knowledge of P3 structures. AECOM would work with the lender group to create an over-subscription of the funding requirements, and obtain adequate financial resources upon entering the preferred bidder stage, and create competition among prospective lenders to obtain the best possible terms and conditions. While the bank debt market has less appetite for the longer tenors and liquidity than the pre-recession levels, AECOM believes there is an opportunity to utilize a few competitive banks that may provide cost effective medium-term lending. Banks can also be used for the shorter term financing and to bridge the potential milestone payments during construction, if the Authority wishes to provide public funding during the construction phase.

Capital Markets: AECOM would investigate both taxable and tax-exempt capital markets as potential options. Capital markets options and the senior bank financing options can be tracked concurrently to determine the certainty of execution and the lowest cost of funding. Bonds can be used for long tenors, and their use has increased in a number of transactions, mainly due to lower bond yields and higher liquidity in the current market. The bond market is generally a volume commitment, not price. However, the due diligence process, the indicative rating, and engagement of experienced underwriters during the development stage will provide accurate estimates of market appetite and yields at financial close.

Private Placement: A private placement, which is a narrowly marketed unrated bond placement with a small group of insurance companies and/or bond underwriters, is also a long-term debt facility which can provide significant benefits to a project such as delayed draw, eliminating potential negative carry. Private placements (144A/4[2] of the Securities Act of 1933) offer competitive rates and terms comparable to other taxable bond markets.

The table below provides a general summary of the available debt facilities and market capacity.

Summary table of the available debt facilities and market capacity.

Terms	Bank Loan	Private Placement	Taxable/Tax-exempt Bonds
Short-Term Capability	Yes (10-12 years)	Yes	Yes
Long-Term Capability	Mini-perms and long-term amortizing debt	Yes (30+ years)	Yes (30+ years)
Market Capacity	$1 billion	< $100 million to $1 billion	>$100 million to $1.5 billion (investment grade rating)
Market Depth	Deep market of financially stable American and international banks	Limited market of insurance companies and pension funds	Underwritten by American financial institutions. Deep market of American institutional investors
Timings Of Drawdowns	Drawn over course of construction	Drawn over course of construction or at financial close	Drawn at financial close

Equity developers and market appetite

Due to the amount of equity required and the existing market conditions, AECOM anticipates that three or more equity firms would partner to share the equity capital requirement for the Project. The average infrastructure fund in the market raises $2-3 billion for each diversified portfolio of projects.

The Tours-Bordeaux high-speed line (LISEA), delivered as a revenue-based DBFM (concession), and the Bretagne-Pays de la Loire high-speed line (HSL Bretagne), delivered as an availability-based DBFM, are two examples which help illustrate market capacity for this type of project. They are the largest high-speed rail projects completed as P3s to date and are both in France.

The LISEA project is a 50-year revenue risk concession which reached financial close in 2011 and which links the cities of Bordeaux and Tours with a new 380-kilometer high speed rail line. The project, with a total development cost of approximately EUR7.8 billion, also demonstrates that a revenue risk concession of this type is possible given the right funding structure and risk appetite of the participants. The following tables summarize the publicly available information with respect to the funding structure of this deal.

LISEA Funding Details – Debt Profile

Senior Secured Facilities:	Millions (EUR)
Term Loan (40 Yr)	EUR 757.00
Equity Bridge Loan	EUR 772.00
Term Loan (27 Yr)	EUR 618.60
Term Loan (27 Yr)	EUR 1,060.00
Subsidy Bridge Loan	EUR 178.50
VAT Facility	EUR 110.00
Government Subsidies:	
Government Grant	EUR 3,000.00
Government Grant	EUR 1,000.00

LISEA Equity Allocation

Sponsors' Equity Obligations	Allocation	Millions (EUR)
AXA Infrastructure Fund II	19.48%	EUR 150.39
CDC Infrastructure	25.81%	EUR 199.25
Meridiam Infrastructure SCA	21.31%	EUR 164.51
Vinci Concessions	33.40%	EUR 257.85
Total	**100%**	**EUR 772.00**

Source: InfraDeals. September 12, 2015. Retrieved from *http://www.infra-deals.com/deals/310601/hsr-tours-bordeaux-lisea.thtml*

The HSL Bretagne project is a 25-year availability-based P3 linking Le Mans and Rennes with a 180-kilometer high speed rail line. The total project cost is approximated at EUR3 billion. The following tables summarize the publicly available information with respect to the funding structure of this deal.

Through AECOM Capital, AECOM's infrastructure and real assets fund, AECOM provides experience as a developer and private equity investor supporting public sector clients to deliver their infrastructure needs under a P3 procurement model and real assets investments. Through its capital group, AECOM seeks to leverage its expansive technical and managerial global services platform and provide value added through an integrated approach to project development.

AECOM has been involved in numerous P3 projects in various roles including as an equity developer and has been responsible for raising third-party project financing (both bank and bonds). AECOM's previous project financing experience includes over 20 performance-based P3 projects in the water treatment and waste-to-energy markets globally. In addition, As of the fourth quarter of 2014, AECOM Capital has closed and is under contract for approximately $2.8 billion of real assets investments.

As a lead market player, AECOM undertakes a comprehensive and competitive financing process to identify the most efficient financing structure. The firm's success is a result of established relationships with lenders, private placement investors, bond underwriters (both American and international). AECOM leverages these relationships in order to secure competitive terms. The firm continually monitors the debt finance market to stay abreast of metrics, including pricing of debt instruments, financial covenants, and security package requirements that have an impact on debt pricing.

HSL Bretagne Funding Details – Debt Profile

Debt Facilities:	Millions (EUR)
Various, 12 Commercial Banks	EUR +1,000
Government Subsidies:	
Government Funds/Grants	EUR 1,800

HSL Bretagne Equity Allocation

Sponsor's Equity Obligations	Allocations	Millions (EUR)
Eiffage Concessions	100.00%	EUR 129

Source: Eiffage Rail Express. September 12, 2015. Retrieved from *http://www.ere-lgv-bpl.com/financement*

3b.2 – What changes, if any, would you recommend be made to the existing funding sources? What impact would these changes have on raising financing?

With regards to the funding sources, lenders would like to see a highly rated counterparty with appropriated funds and a reliable revenue stream to meet the obligations of the Project. Therefore, the Proposition 1A funds, which are currently not a renewable source of funding, could be appropriately used to fund subsidy payments for the Project (such as substantial completion and milestone payments). On the other hand, the California Cap-and-Trade (C&T) program seems to be consistently generating annual proceeds (with an upward trend), and the State has approved continuous appropriation of funding from this program to the Authority. This makes the funds from the C&T program a viable revenue stream to fund availability payments for the Project.

With respect to changes to the existing funding sources, once the contract packaging and delivery vehicle is determined, the Authority should consider applying to the TIFIA program (after a careful analysis of the TIFIA requirements and timelines) in addition to requesting additional federal grants. The Authority has already successfully applied and received over $2 billion in federal grants and may be able to receive additional funding which will be necessary for substantial completion payments, milestone payments and other Project costs. The Authority would need to comply fully with the TIFIA grant process, including timing and eligibility requirements.

3b.3 – Given the delivery approach and available funding sources, is an availability payment mechanism appropriate? Could financing be raised based on future revenue and ridership (i.e., a revenue concession)? Would a revenue concession delivery strategy better achieve the Authority's objectives?

Given an appropriate amount of government funding, delivery structure, risk allocation, and size of the individual projects, the projects can be deliverable as either an availability payment or revenue concession P3. Similar past projects, including LISEA and HSL Bretagne, have been delivered as revenue-based DBFM (concession) and availability-based DBFM, respectively.

An availability payment mechanism is appropriate for the Project. It allows the Authority to benefit from the expertise and innovation of the financial markets. This approach also helps the Authority achieve its other objectives, including of minimizing the whole-life cost, achieving early revenue generation, and transferring key delivery and long-term maintenance risk to the private sector. The key difference between using the availability payment mechanism and the revenue concession delivery strategy is the risk allocation between the public and private sectors and therefore also the overall cost of the Project. There is a give and take between the two options.

In general, it would be more difficult to raise financing based on ridership revenue for various reasons, including higher overall costs of financing and political and community buy-in. Although a revenue risk P3 would lower the risk allocation to the Authority, it also would demand higher rates of return to the private

sector because the private sector would be taking on the revenue and demand risk of the Project. This increases the overall cost of the Project. The Authority would also need to spend additional resources on community outreach to ensure that the public does not perceive the Project as a "privatization".

3C: TECHNICAL QUESTIONS

3c.1 – Based on the Authority's capital, operating, and lifecycle costs from its 2014 Business Plan, describe how the preferred delivery model could reduce costs, schedule, or both. Please provide examples, where possible, of analogous projects and their cost and/or schedule savings from such delivery methods.

The literature is replete with examples of cost overruns in transportation projects. In fact, a study undertaken by Bent Flyvbjerg of Aalborg University in 2004 reported that of 258 highway and rail projects studied representing $90 billion in capital investment in 20 countries, 90% suffered cost overruns. The rail projects studied had an average overrun of 45%, so the Authority's plan to use an availability payment structure has considerable merit. Management, whether by public or private entity, was not a deciding factor in these cost overruns. Two often-cited examples of mismanagement are the Boston Big Dig (public) and the Channel Tunnel (private). An important distinction is that the overruns on the Big Dig were paid for by the taxpayer, while those on the Channel Tunnel were paid by the lenders and investors. It was also observed by Flyvbjerg that the larger the project, the more likely the overrun. This assertion is particularly apt in the case of the California High-Speed Rail Project with its large capital expenditure.

There is anecdotal evidence that performance is enhanced when accountability is assigned to entities best able to manage that risk. In the case of a P3 where design, construction, finance, operation, and maintenance are assigned under a project agreement to a single entity, accountability is more likely to be clearly defined via sub-agreements to entities. For instance, assignment of design and construction risk to a design-builder or maintenance risk to a maintenance contractor clearly fixes accountability. We are comfortable with this approach, while recognizing that the contracting and performance mechanisms represent a host of new challenges.

It is difficult, if not impossible, to compare the potential savings in cost or schedule that could result by adopting a P3 format. However, there are examples of schedule differences that evolve from a commercial versus governmental project management model. An extreme example is the twin Hampton Roads Bridge Tunnels in Virginia. The first bridge/tunnel complex funded under a bond indenture program with tolls to service debt was completed in 1957 after a three-year construction period. Its twin was completed in 1976, some 9 years after its start and funded under the Federal Interstate Highway Program. In the first case, there was pressure by the bondholders to achieve early revenue generation. In the case of its twin, Virginia DOT was pressured to distribute federal funding throughout the state. Removing commercial elements from contract delivery often extends projects and leads to questionable stewardship of the public treasury. We favor a commercially based decision process.

3c.2 – How does this compare to separately procuring each high-speed rail component (e.g., separate contracts for civil works, rail, systems, and power separately)? Please discuss design/construction costs, operating/maintenance/lifecycle costs, and schedule implications.

The principal argument for separating civil works from systems elements is that industry providers of these services are typically different, and the contract delivery methods are also different. For instance, the industry norm for delivering civil works, including trackwork, is to bid the work based on a set of detailed drawings and detailed specifications prepared by a third-party engineer. Under this design-bid-build scenario, the contractor and the engineer are separately contracted to the owner. By contrast, systems elements such as traction power, communications, and railroad signals have traditionally mimicked a design-build format. The owner's engineer prepares a set of performance specifications and the provider proposes to design, furnish, and install proprietary systems that satisfy the owner's requirement.

High speed rail is a comprehensive all-inclusive integrated system consisting of track, power, signals, rolling stock, and communications. Breaking the elements into separate contracts introduces interface and schedule risk, including issues such as shared access and major milestone completions. Further, interfaces must be managed by the sponsor, which translates into more construction oversight and overall project cost. All of the major equipment suppliers have proven full turnkey capabilities and are able to assemble the skilled trades to sequence the work in an optimum, common-sense manner to meet interim and final milestone completion dates. To break up these systems into separate procurements increases schedule risk and requires coordination between the contractors that the sponsor could find onerous to manage. While separate systems element procurements have been done in Europe, they have the advantage of a standard EU specification for this equipment. Separate procurement makes the project harder to manage and increases the technical risk, which in the end increases costs and put stress on schedules.

In both the design-bid-build and the design-build cases described, responsibility for operations and maintenance is assigned to yet another party and responsibility for performance of the assembled system rests with the owner. The owner also retains responsibility for resolution of interfaces whether temporal, physical, or technological. This methodology is fraught with risks and can result in disputes that can be costly and time consuming. A private investor cannot abide this type of conflict.

From an owner's perspective, consolidation of responsibility for design, construction, and maintenance of both systems and civil works protects the owner from this disputes risk. Our view is that the Authority would be best served by maintaining an arms-length relationship with the concessionaire. By way of example, the use of build-operate-transfer (DBFM) in Hong Kong is a useful model. For the Western Harbour Crossing, a requirements document was prepared by the owner in accordance with an ordinance passed by the Hong Kong Legislative Counsel that permitted a vehicular crossing of Victoria Harbour. A concession team was selected for this build-operate-transfer project. The Hong Kong government, wishing to avoid execution risk, joined with the concessionaire to select an independent checking engineer (ICE) and an independent site engineer (ISE)

to assure that the project was delivered in accordance with the requirements document and managed in accordance with the governing ordinance. No reviews were undertaken by the government, which received periodic reports from the ICE and ISE. While this type of strict arms-length relationship is not common in the US, it is gaining traction with many governmental agencies.

In our view, to the extent that government can mobilize the commercial interests of the private sector to advance public works projects, it should do so. The design-build methodology adopted by the Authority on recent contracts is a step in the right direction. A full concession is preferable for the reasons enumerated. The concession should include all systems, including the vehicles because of the safety-critical interfaces that exist between the vehicle-mounted systems and the wayside systems.

3c.3 – For each project, are there any technical changes to the respective scope of work that would yield cost savings and/or schedule acceleration while still achieving the Authority's objectives? If so, please describe.

Under the concept described in the RFEI, the DBFM contractor would be responsible for delivering every element of the system within the limits of construction, with the exception of stations. This work includes the design and installation of the signal, communications, and traction power systems. The DBFM contractor would be responsible for delivering communications equipment to be installed into train sets by the vehicle manufacturer, and for delivering and maintaining the on-board signal equipment to be installed in the train sets. The DBFM contractor would be also responsible for delivering and installing the operations control center equipment in a facility built by the vehicle supplier and installing communications systems in the stations, also built by others.

The signal, traction power, and communications systems will be highly dependent on the design of the vehicles. The technical coordination of those contracts will be critical to the success of the Project. The timing of the vehicle contract and stations contracts is also critical. These contracts must coordinate deadlines for information that must be shared, and coordinate dates for the construction of the vehicles and facilities and the installation of equipment. This will be a significant source of risk. If the risk is transferred to the individual contracts, it would be priced and the Authority would bear the cost. If the coordination risk is retained by the Authority, it would bear the associated exposure. The Authority may wish to consider transferring some elements of the systems work to the vehicle supplier through a comprehensive vehicle/systems contract. The coordination of design and construction would still be an issue to be managed among various contracts, but the risk of the technical integration of systems may be reduced.

Notwithstanding our recommendations, if the Authority prefers to keep vehicle procurement and station development separate, and keep the scopes of work as described in this RFEI, we believe that approach to be workable.

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