



## Board Report

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**CONSTRUCTION COMMITTEE  
SEPTEMBER 17, 2015**

**SUBJECT: TUNNEL ADVISORY PANEL**

**ACTION: AUTHORIZE THE CHIEF EXECUTIVE OFFICER (CEO) TO EXECUTE CONTRACT MODIFICATION**

**RECOMMENDATION**

AUTHORIZING the Chief Executive Officer to:

- A. execute Contract Modification No. 10 to Contract No. PS-2020-1055 with **Geoffrey R. Martin for the continuation of Tunnel Advisory Panel Services**, in an amount not-to-exceed \$802,261, increasing the total contract value from \$1,287,745 to \$2,090,006 and extend the contract from October 1, 2015 to June 30, 2020;
- B. execute Contract Modification No. 7 to Contract No. PS-8510-2416 with **Harvey Parker and Associates, Inc. for the continuation of Tunnel Advisory Panel Services**, in an amount not-to-exceed \$981,465, increasing the total contract value from \$1,611,745 to \$2,593,210, and extend the contract from October 1, 2015 to June 30, 2020; and
- C. execute Contract Modification No. 5 to Contract No. PS-8510-2493 with **Cording, Dr. Edward J. for the continuation of Tunnel Advisory Panel Services**, in an amount not-to-exceed \$764,033, increasing the total contract value from \$1,311,745 to \$2,075,778 and extend the contract from October 1, 2015 to June 30, 2020.

**ISSUE**

In April 2015, the Board authorized funding on a month-to-month basis until the incoming Chief Executive Officer (CEO) could review the contract. The CEO completed a review of the proposed contract modifications, which included a nearly two hour meeting with the TAP members on June 4, 2015, to discern their role of providing independent advice on tunneling and other related issues. Based upon this due diligence the CEO concurs with the staff recommendations.

Board approval of the recommendations will allow the continuation of services of the TAP to support Metro on the Crenshaw/LAX Transit Project, the Regional Connector Transit Corridor Project, the Westside Purple Line Extension Section 1 and Section 2 Projects, and the SR-710 North Gap

Closure Project.

## **DISCUSSION**

Metro is currently planning, designing or constructing rail transit and highway projects with extensive underground engineering and construction that involve complex geotechnical and tunneling issues. These include the Crenshaw/LAX Transit Project, the Regional Connector Transit Corridor Project, the Westside Purple Line Extension Section 1 and Section 2 Projects, and the SR-710 North Gap Closure Project. Los Angeles County has challenging geologic and tunneling conditions and deep underground station construction, with some through tar impregnated soil, toxic gasses, and high concentration of methane. While Metro has extensive expertise and experience from both staff and engineering consultants, there is the need for a Tunnel Advisory Panel (TAP) to provide expert advice and review of this engineering work. The TAP comprised of Dr. Geoffrey Martin, Dr. Harvey Parker, and Dr. Edward Cording, are recognized in the industry and throughout the world as engineering/construction experts in the areas of geotechnical analyses, tunneling, deep excavation, earthquake engineering and building settlements.

The TAP convened in August 1995 in response to questions posed by the Board regarding feasibility of tunneling in Los Angeles ground conditions. Metro contracted with Drs. Dan Eisenstein, Geoffrey Martin and Harvey Parker to determine the feasibility of tunneling in Los Angeles, to assess the effectiveness of Metro's construction program to date, and to recommend any modifications to the current construction program deemed appropriate.

In June 2001, the Board approved two five-year contracts to the members of the TAP in the amount not-to-exceed \$1,167,826, and directed staff to return each year for funding approval. Since that time, the Board has approved funding and extensions to the TAP contracts. Due to Dr. Eisenstein's untimely death in April 2009, Metro management staff decided to procure two additional members for the TAP, Dr. Harvey Parker and Dr. Edward Cording, to provide expert technical services.

The three TAP members, Drs. Martin, Parker and Cording, have been providing advice to the Crenshaw/LAX Transit Project, the Regional Connector Transit Corridor Project, the Westside Purple Line Extension Section 1 and Section 2 Projects, and the SR-710 North Gap Closure Project. All of these projects include extensive underground engineering and construction that involve complex geotechnical and tunneling issues for which the TAP members are uniquely qualified. The status of each project is as follows:

### **Westside Purple Line Extension Project**

The Westside Purple Line Extension Project was adopted by the Board and the Final Environmental Impact Report (EIR) was certified in 2012. The project is being designed and constructed in three sections as part of Metro's 30-Year Long Range Transportation Plan. The entire 9-mile project

consists of twin-bored tunnels with 7 subway stations which are primarily under Wilshire Boulevard.

As part of the approval process for the Project, Metro commissioned a Peer Review Panel by the American Public Transportation Association (APTA) in 2005 to assess the safety of tunneling under Wilshire Boulevard. The Peer Review Panel agreed that it was possible to safely tunnel and operate a subway along the Wilshire Boulevard corridor using current technologies of tunneling, station construction and operation. The Panel also assessed the specific risks associated with tunneling, and recommended a course of action that addressed the following elements of tunnel construction and operation:

- Gas detection
- Mitigation of hazards
- Tunnel boring and station construction
- Safe operation
- Long-term monitoring and verification
- Technical feasibility

As a follow-up to the APTA Peer Review Panel's recommendations, Metro has retained the services of the TAP to provide independent review and monitoring of the following work that is being performed by Metro's engineering consultants and contractors:

- Section 1 Wilshire/Western Station to Wilshire/La Cienega Station (3.92 miles of twin-bored tunnels, 3 subway stations) - The Federal Transit Administration (FTA) issued a Record of Decision in 2012 and executed a New Starts Project Federal Full Funding Grant Agreement (FFGA) in 2014. The \$1.6 billion Design/Build Contract (Tunnels, Stations, Systems and Trackwork) Notice-To-Proceed (NTP) was issued in January 2015 and excavation of the underground stations and access shaft for the tunnel boring machines is expected to begin in the latter part of 2015. Tunneling is expected to be completed by the end of 2019. The TAP will be required to review the tunnel segment designs and geotechnical data which include gassy ground and tar sands. In addition, the TAP will be required to review the daily tunneling reports to monitor progress, potential ground movements and mitigations for gassy ground conditions.
- Section 2 - Wilshire/La Cienega to Century City Constellation Station (2.55 miles of twin-bored tunnels, 2 subway stations) - In February 2015, the Board authorized staff to complete Advanced Preliminary Engineering and the preparation of technical documents for construction contracts to solicit a Request For Proposals for Design-Build Contract procurement by the end of 2015. The TAP will be required to review the drawings, specifications and reports prepared by our engineering consultants. The Design-Build Contract is scheduled to be awarded by early 2017 followed by final design and construction;

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with the start of station excavation in mid-2018; followed by tunneling in early 2019. The TAP services will be required through 2020.

### **Crenshaw/LAX Transit Corridor Project**

The \$2.1 billion Crenshaw/LAX Light Rail Transit project consists of twin bored tunnels, cut and cover tunnels, and three underground stations. In 2011, the project was adopted by the Board and the Final EIR was certified for the 8.5-mile project. The Board, in 2013, approved a firm fixed price contract to Walsh/Shea Corridor Constructors for the final design and construction of the Crenshaw/LAX project with a NTP issued on September 10, 2013.

Final design by Walsh/Shea Corridor Constructors is nearing completion. Excavation for the underground stations and cut and cover structures is underway and the tunnel boring machine is expected to begin excavation through gassy ground along Crenshaw Boulevard in the latter part of 2015 with tunnel excavation anticipated to be complete by the end of 2016.

The TAP members are providing independent review and advice to Metro during the process of the final designs for the underground work prepared by the Walsh/Shea Corridor Constructors.

Throughout the course of construction, TAP members are independently reviewing monthly summary and progress reports prepared by the project team especially relating to construction of underground stations and tunnels including ground and soil conditions, gas and groundwater conditions, ground movements, Tunnel Boring Machine performance data, geotechnical instrumentation and monitoring, settlement, and building protection. They meet with project staff to discuss these and related issues and advise the Metro Executive Director and project staff on performance against these criteria. The TAP also perform quarterly on-site construction evaluation of quality control and soundness of the underground tunnel structure and provide expert advice to facilitate construction.

### **Regional Connector Transit Corridor Project**

The Regional Connector Transit Corridor project was adopted by the Board and the Final EIR was certified in 2012. The project is being designed and constructed as part of Metro's 30-Year Long Range Transportation Plan. The FTA issued a Record of Decision in 2012 and executed a New Starts Project Federal FFGA in 2014. This is a light rail project located in downtown Los Angeles that will connect the existing Blue and Expo Lines to the existing Gold and Eastside Lines. The project consists of 1.9 miles of twin bored tunnels with three underground stations. The \$1.4 billion Design/Build Contract was awarded to RCC (Skanska, Traylor Bros J.V.) and NTP was issued in July 2014. Construction of the underground stations and access shaft for the tunnel boring machines is expected to begin in the latter part of 2015. Tunneling is expected to be completed by the 3<sup>rd</sup> quarter of 2017. The TAP assessed the specific risks associated with tunneling as well as the cut and cover construction on Flower Street and recommended a course of action that addressed the following

elements of tunnel construction and operation:

- Tunnel construction methodology and station construction
- Flower Street cut and cover construction
- Construction of an underground cross-over cavern using the sequential excavation method (SEM)
- Safety
- Long-term monitoring and verification
- Review of Flower Street Supplemental Environmental Impact Statement
- Mitigation of hazards
- Technical feasibility studies

TAP members will continue to provide the Regional Connector Project with independent review and monitoring of the Design-Builder's final design and construction work. The TAP will also be involved with review of the tunnel segment designs, and geotechnical analyses for tunneling, building protection system and SEM. In addition, the TAP members will be required to review the daily tunneling and SEM reports to monitor progress, potential ground movements and provide suggested mitigations.

### **SR-710 North Study Gap Closure Project**

Four years ago, Metro initiated a study to alleviate the mobility constraints within East/Northeast Los Angeles and Western San Gabriel Valley. The State Route 710 North Environmental Impact Report/Environmental Impact Study contract (or State Route 710 North Study) includes evaluating alternatives, and performing preliminary engineering and planning studies. Two of the five alternatives under consideration include a Freeway Tunnel Alternative and a Transit Tunnel Alternative. TAP members will perform the following independent tasks, activities and program elements:

- Review and/or provide input on proposed schedule related to tunnel alternatives; provide input on cost/schedule estimates; and review of draft and final environmental documents for tunnel related information.
- Periodic meetings with study team.
- Assist in responding to public comments on Draft Environmental Impact Report/Environmental Impact Study (Draft EIR/EIS)
- Assist study team in briefings for Board staff/Board members.
- Review of final environmental documents and Final Environmental Impact Report/Environmental Impact Study (Final EIR/EIS).

All the projects listed above are at critical stages in their respective engineering and construction phases. Extension and additional funding for the TAP contracts are vital and essential to provide continuity that would otherwise be interrupted, should the Board decide to cancel and re-procure the TAP contracts (a 6 to 9 month process). Furthermore, the past history and knowledge of the current designs, geotechnical conditions and construction approaches will present a steep learning curve for a new team of TAP members, which could significantly delay the timely review and input necessary to provide this important layer of independent monitoring and oversight across these complex engineering and construction projects.

TAP members are involved with on-going support relating to third party and project stakeholders' issues, which will require continuation of their services for the future. They have unique knowledge and background on Los Angeles County's underground conditions and intimate knowledge of Metro's past and current engineering and construction projects. Board approval and execution of the Contract Modifications will allow continuation of these services.

### **DETERMINATION OF SAFETY IMPACT**

The Board actions will not have an impact on established safety standards for Metro's engineering and construction projects.

### **FINANCIAL IMPACT**

Funds are included in the FY16 budget for the actions under 865512 - Crenshaw/LAX Transit Project, 860228 - Regional Connector Transit Corridor Project, and 865518 and 865522 - Westside Purple Line Extension Section 1 and Section 2 Projects, respectively, in Cost Center 8510 (Construction Project Management) and under Account No. 50316 (Professional and Technical Services). Also, funds are included in the FY16 budget for the action under Project 460315 - SR-710 North Gap Closure, in Cost Center 4720 (Highway Programs A) and under Account No. 50316 (Professional and Technical Services). Since this is a multi-year contract, the Executive Director of Engineering and Construction and the Project Managers will be responsible for cost budgeting in future years.

#### **Impact to Budget**

The source of funds for these actions are a combination of Measure R Transit 35%, Measure R Highway Funds (20%), Federal Section 5309 New Starts, Transportation Infrastructure Finance and Innovation Act (TIFIA) Loan proceeds, Federal STP, CMAQ, State Proposition IB, Proposition A 35%, and Proposition C 25%. These were approved in the capital projects funding plan and no other funds were considered for the actions.

### **ALTERNATIVES CONSIDERED**

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Staff has considered the alternative of allowing the current contracts with Dr. Martin, Dr. Parker, and Dr. Cording to expire. The TAP institutional knowledge of Metro and technical understanding of specific tunnel related issues would require significant investment in time and resources to replicate if others were used in this role, which would not only incur cost, but would significantly reduce the benefit and validity of their advice, while this knowledge and understanding were obtained. This is not recommended as it will leave Metro without the benefit of their knowledge and expertise and create a void in receiving required tunneling expertise for a period of time, thereby creating the potential for delays and additional costs to ongoing Metro projects.

### **NEXT STEPS**

After Board approval and execution of the Contract Modifications, staff will direct the Tunnel Advisory Panel to provide tunnel engineering advice to Metro including supporting the aforementioned projects.

### **ATTACHMENTS**

Attachment A -Procurement Summary  
Attachment B - Contract Modification Summary

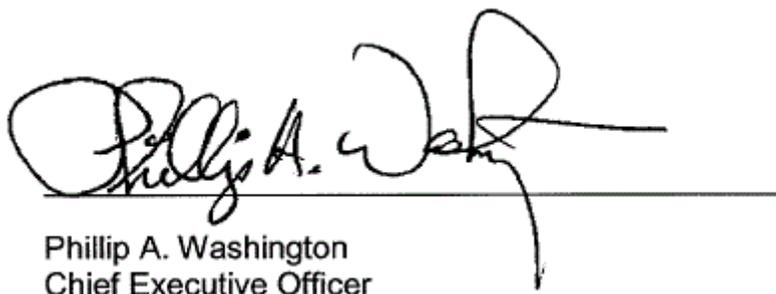
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