

**CONTRACT CHANGE ORDER MEMORANDUM**

|                                                                                                         |                                           |                                                                |                                                                                                                                 |                                                                                   |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| TO: Tony Anziano, Program Manager /                                                                     |                                           |                                                                | FILE: E.A. 04 - 0120F4                                                                                                          |                                                                                   |
| FROM: Darryl Schram, Senior TE                                                                          |                                           |                                                                | CO-RTE-PM SF-80-13.2/13.9                                                                                                       |                                                                                   |
| FED. NO. No                                                                                             |                                           |                                                                |                                                                                                                                 |                                                                                   |
| CCO#: <b>291</b>                                                                                        | SUPPLEMENT#: <b>0</b>                     | Category Code: <b>CHPT</b>                                     | CONTINGENCY BALANCE (incl. this change) <b>\$87,010,782.99</b>                                                                  |                                                                                   |
| COST: <b>\$55,113.00</b> INCREASE <input checked="" type="checkbox"/> DECREASE <input type="checkbox"/> |                                           |                                                                | HEADQUARTERS APPROVAL REQUIRED? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO                             |                                                                                   |
| SUPPLEMENTAL FUNDS PROVIDED: <b>\$0.00</b>                                                              |                                           |                                                                | IS THIS REQUEST IN ACCORDANCE WITH ENVIRONMENTAL DOCUMENTS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO |                                                                                   |
| <b>CCO DESCRIPTION:</b><br>Cable Band Bolt Replacement                                                  |                                           |                                                                | <b>PROJECT DESCRIPTION:</b><br>CONSTRUCT SELF-ANCHORED SUSPENSION BRIDGE                                                        |                                                                                   |
| Original Contract Time:<br><b>2490</b> Day(s)                                                           | Time Adj. This Change:<br><b>0</b> Day(s) | Previously Approved CCO Time Adjustments:<br><b>501</b> Day(s) | Percentage Time Adjusted: (including this change)<br><b>20</b> %                                                                | Total # of Unreconciled Deferred Time CCO(s): (including this change)<br><b>3</b> |

**THIS CHANGE ORDER PROVIDES FOR:**

Removing existing cable band bolts, installing high strength cable band bolts that were fabricated under Contract Change Order (CCO) 273, and performing tensioning on five cable bands at Panel Points 34 EPP, 40 WPP/EPP, and 44 WPP/EPP in accordance with Submittal 2812. Removing, securing, and reinstalling obstructing work items as necessary to accommodate bolt replacement. Repairing caulk and paint damaged by cable band bolt replacement.

During installation and initial bolt tensioning of the cable bands the measured gap between the male/female halves of several cable bands is smaller than anticipated. Confirmation of cable band dimension had been determined and agreed to during the cable band friction test conducted previously at Pier 7. However, the cable band diameter of the North Main Span compacted to a smaller diameter than what was observed during the cable band friction test. Therefore, the Department is concerned about the small gap between the male/female halves of the cable band. An evaluation was performed and the Department issued CCO 247, directing the Contractor to modify a number of the cable bands to increase the gap size. This will account for the expected cable band gap reductions associated with the reduction in cable diameter that will take place during load transfer as the Main Cable is loaded.

Subsequently, field observations have determined several locations where cable band gaps had closed to less than 5 mm. This has been attributed to the reduction in Main Cable diameter, commensurate with the elongation of the Main Cable as it was loaded. However, field staff also witnessed further cable compaction (i.e.: reduction in cable diameter and cable band gaps) from the continual cable band bolt tensioning effort directed in CCO 264. In addition, the Main Cable may further elongate and reduce in diameter as it receives additional loading from the application of the epoxy AC wearing surface and the opening to vehicular "live load" traffic. Additional cable band bolt tensioning may be required to maintain the required cable band hoop stress (i.e.: sliding friction). With the additional tensioning, if the cable band gaps were to close and the cable band halves come into contact, a loss of hoop stress might be realized, requiring remedial action to maintain the required sliding friction.

To address this issue and to prevent schedule impacts to the Seismic Safety Opening (SSO) milestone, the Department is implementing multiple risk management strategies. CCOs 271 and 274 will procure four (4) additional cable bands and sixteen (16) supplemental cable band clamps, respectively. CCO 273 procured additional higher strength cable band bolts. In the event a cable band were to close, the cable bands and supplemental cable band clamps can be placed beneath the existing cable bands to bolster frictional resistance. Alternatively, frictional resistance in the cable band clamps can be increased as a whole by replacing the existing bolts with higher strength bolts. In this instance, the bolt tension in areas of a cable band with sufficient gap space can be increased to make up for the areas where bolt tension must be allowed to decrease to prevent a gap closure. CCO 280 will procure the tensioning equipment required to install the higher strength bolts and CCO 285 provided for the shipping of the CCO 273 bolts.

This change order will install the higher strength cable band bolts that were procured under CCO 273 and shipped to the project site under CCO 285 to increase frictional resistance at the five cable band locations listed above. Additional work necessary to accommodate bolt replacement includes unstressed length measurements and Bolttight jack load verification in the warehouse. Inboard hand rope stanchion posts, utility stanchion posts, messenger cables, pull box brackets, and electrical items will need to be temporarily removed for bolt replacement work to be performed and then reinstalled afterwards. Paint and caulk will be damaged during bolt replacement and will be repaired.

The Risk Register has captured the risk associated with this type of issue. Risk Item 1.2, "Schedule Delays to Seismic Safety

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Opening," captures the risk to schedule, and Risk Item 75, "Cable Field Installation: Issues with Load Transfer" and Risk Item 100, "Cable Field Installation: Cable Wrapping and Cable Bands," address potential direct costs.

The total cost of this change order is \$55,113.00 lump sum for this change, which can be financed from the contingency fund. A detailed cost analysis is on file.

No time adjustment is warranted as this change order does not affect the controlling operation.

This change order has concurrence from William Casey (Supervising TE), Rich Foley (HQ Oversight), Wenyi Long (Bridge Design), Jing Chen (District Design), and Lina Ellis (Maintenance).

| CONCURRED BY:                                                                      |                                |              | ESTIMATE OF COST                                                                                                                                                                                                                      |              |               |
|------------------------------------------------------------------------------------|--------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|
| Construction Engineer:                                                             | William Casey, Sup TE          | Date 2/11/13 |                                                                                                                                                                                                                                       | THIS REQUEST | TOTAL TO DATE |
| Bridge Engineer:                                                                   | CT Oversight, Wenyi Long, P.E. | Date 2/14/13 | ITEMS                                                                                                                                                                                                                                 | \$0.00       | \$0.00        |
| Project Engineer:                                                                  | District Design, Jing Chen     | Date 2/19/13 | FORCE ACCOUNT                                                                                                                                                                                                                         | \$0.00       | \$0.00        |
| Project Manager:                                                                   |                                | Date         | AGREED PRICE                                                                                                                                                                                                                          | \$55,113.00  | \$55,113.00   |
| FHWA Rep.:                                                                         |                                | Date         | ADJUSTMENT                                                                                                                                                                                                                            | \$0.00       | \$0.00        |
| Environmental:                                                                     |                                | Date         | TOTAL                                                                                                                                                                                                                                 | \$55,113.00  | \$55,113.00   |
| Other (specify):                                                                   | HQ, Rich Foley                 | Date 2/14/13 | FEDERAL PARTICIPATION                                                                                                                                                                                                                 |              |               |
| Other (specify):                                                                   | Struct. Maint, Lina Ellis      | Date 2/19/13 | <input type="checkbox"/> PARTICIPATING <input type="checkbox"/> PARTICIPATING IN PART <input checked="" type="checkbox"/> NONE<br><input type="checkbox"/> NON-PARTICIPATING (MAINTENANCE) <input type="checkbox"/> NON-PARTICIPATING |              |               |
| District Prior Approval By:                                                        |                                | Date         | FEDERAL SEGREGATION (if more than one Funding Source or P.I.P. type)                                                                                                                                                                  |              |               |
| HQ (Issue Approve) By:                                                             |                                | Date         | <input type="checkbox"/> CCO FUNDED PER CONTRACT <input type="checkbox"/> CCO FUNDED AS FOLLOWS                                                                                                                                       |              |               |
| Resident Engineer's Signature:                                                     |                                | Date         | FEDERAL FUNDING SOURCE                                                                                                                                                                                                                | PERCENT      |               |
|  |                                | 4/10/13      | _____                                                                                                                                                                                                                                 | _____        |               |
|                                                                                    |                                |              | _____                                                                                                                                                                                                                                 | _____        |               |