

**January 26, 2016 e-mail response from Mark Colgan, P.E., to question of why the vertical clearance analysis was completed for 18'8" vs. 19'.**

VHB was asked by VTrans to complete an analysis for an 18'8" clearance. This required extensive efforts to design a new vertical profile, reset drainage components, update support of excavation walls, and modify uwall and tunnel precast concrete lengths and sizes. We developed new layout sheets, cross sections, and profiles for the length of the project to recalculate quantities for revised material needs. VHB was 60-70% complete with this exercise when the request was updated to ask us to consider 19'0" clearance. At that time we paused and evaluated whether it would be best to start over or continue with the 18'8" analysis. After considering the progress to date along with the consideration that we were still at only a 60% design stage (i.e. this is still just an order-of-magnitude estimate), it was determined that we could reasonably move forward using the 18'8" clearance for this level of cost estimating while also understanding that there would be some change for 19'0". It was noted that a change in 4" clearance would not impact costs enough to alter the decision-making needed to select the final clearance. Lastly, there are a few areas where the designers feel we have opportunities to save a couple inches here and there with the final design that in the end, the change of 4" did not warrant starting the analysis over.

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