

Quality Management approach for Design-Build (DB) contracts by delegating certain Quality Assurance (QA) responsibilities to the Contractor.

Date: August 2016

Project Name: Central Mesa Light Rail Extension (CME)

Abstract: Valley Metro Rail (VMR) used a Design-Build (DB) delivery method to execute the CME project. VMR's Quality Management process incorporated a broad definition of Quality Assurance and placed the responsibility of Quality Control (QC) and certain QA responsibilities on the DB contractor. To help mitigate risk in this approach, VMR set clear expectations for the project QA/QC program in the Request for Proposals for DB contractor. The contractor submitted Quality Plans which were part of the "best value" proposal evaluations.

VMR monitored the implementation and execution of the QA/QC Plan by developing three programs – a Compliance Auditing System (CAS); Owner Verification Testing Program (OVT); and Project Acceptance. These programs provided various mechanisms for VMR to effectively address quality issues such as - Non-Conformance Reports (NCR); Deficiency Lists, Stop Work Orders, and even withholding funds from the contractor if necessary. The CME project successfully opened for Revenue Service in August 2015, 7 months ahead of schedule.

Project Phase(s): Engineering and Construction

Category: Management

1. Background

The CME Project is a 3.10-mile double track, center of roadway, light rail project located in the City of Mesa (COM), Arizona. This is a Small Starts project that was awarded the Project Construction Grant Agreement (PCGA) in October 2012. The project Grantee is the City of Phoenix and the Project Sponsor is VMR.

The CME project extends VMR's existing Central Phoenix/East Valley (CP/EV) light rail system, from its current terminus at the approximate intersection of Sycamore

Street and Main Street to Downtown Mesa. Four (4) stations have been constructed: Alma School Road, Country Club Drive, Center Street, and Mesa Drive. A Park-and-Ride (PNR) lot has been constructed at the Mesa Drive Station. The Operations Control Center (OCC) was upgraded with additional equipment and work stations to support the light rail extension. No additional transit vehicles were required as part of the CME Project.

The contracting approach for the project was a DB procurement. VMR awarded the DB contract to Valley Transit Constructors (VTC) in April 2012. The project opened for Revenue Service on August 22, 2015.

2. The Lesson

The DB contract delivery method used for the CME project was the first of such kind for VMR. The chosen QA program approach had to be consistent with a DB project delivery method. Although some project owners may not entrust a contractor with monitoring the quality of work on a project, VMR chose to use a broader definition of QA similar to other Federal agencies such as the US Army Corps of Engineers. VMR placed the responsibility of QC and certain QA responsibilities on the contractor since the contractor had the most control over “planned and systematic activities”. This approach carries inherent risk of conflict of interest when there is a difference of opinion between owner and contractor (for whom the designer works). In addition the level of quality inspection performed by the owner may also be minimized which could lead to sub-standard work.

To mitigate such risk, VMR defined the QA/QC program expectations very clearly in the Request for Proposals in the DB contractor procurement. Bidders were required to submit a draft Quality Management Plan (QMP) and a draft Construction QMP as part of the proposals. The winning bidder was required to further define both plans on receiving the Notice to Proceed (NTP). VMR regularly evaluated the contractor’s organizational chart for staffing levels and to ensure that the Quality and Production staff were independent of each other.

During Engineering and Construction, the QA/QC plan was monitored by VMR for compliance with contract specifications by frequently auditing the DB contractor. VMR developed three programs to facilitate verification of compliance.

1) Compliance Auditing System (CAS)

Compliance auditing is a proven system that has been used on other DB projects around the country. VMR developed the CAS system based on the Work Breakdown Structure that defines the deliverables associated with the project. This process enabled VMR to provide timely and preventative feedback. Using the CAS database, VMR was able to

- Select contract requirements for audit;
- Record audit observations;
- Produce audit reports;
- Identify and track non-conforming areas to closure; and
- Identify performance trends.

2) Owner Verification Testing (OVT)

The OVT program that VMR used provided:

- A materials testing program that tested at approximately 10% of the testing rate used by the DB contractor.
- A verification of the DB contractor's testing frequencies based on material quantities.

3) Project Acceptance – Provided to the contractor once all punch-list items were completed and submittals delivered.

Quality issues identified during monitoring activities were addressed using tools such as stop work orders, Non-Conformance Reports (NCRs), deficiency lists, and even withholding funds from the contractor if necessary.

VMR has identified areas of improvement that could be implemented on future DB projects.

- The OVT program VMR used should be further expanded. Improvements may include maintaining a materials testing database that consolidates the test results from both the DB contractor and the OVT program; using an independent testing agency to oversee equipment, processes, and personnel qualifications for both the QA and OVT labs; including a penalty if the contractor fails to staff its Quality team with qualified staff; and establishing a team to audit the contractor on a more regular basis.
- VMR additionally recommends creating an Integrated Project Requirements database which would have enabled VMR to link the data collected by the DB contractor, the OVT process, and their Independent Assurance Testing process as a whole.

3. Applicability

The VMR QA/QC approach is applicable to all DB projects. VMR's QA program and allocation of responsibilities met the expectations of their project partners namely the FTA and the City of Mesa.

4. Contact Person/Info

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