Quality Roles on the Project

- Construction Management Oversight (CMO-Turner) functions as the TJPA’s eyes and ears.
- Construction Manager/General Contractor (CM/GC-WOJV) manages and directs the work.
- Design Team sets Quality Standards during the design and specifications development.
- Design team verifies standards through the submittal process and field observations.
- Quality Control is the role of the CM/GC.
- Quality Assurance is the role of the CMO including specialty inspection.
Overview of the CMO Services

• “Construction management services to coordinate, administer, monitor, inspect and interface with the Transbay Transit Center design teams, the CM/GC, the Demolition Contractor and the TJPA…”

• “Administrative tasks…which include the documentation of work progress, progress reports, correspondence, record keeping, payment verification and communications…”

• “Rapid emergency response to the TJPA...provide 24-hour on-call representation for on-site emergencies.”

Key Activities:

– Quality Assurance including daily and code compliance inspections and coordination.
– Engineering oversight of RFI and submittal process.
– Change order and claims management.
– Pay application review and recommendations.
– Schedule analysis.
– Field supervision during all work shifts.
– Maintain a 24 hour hotline for neighbor issues.
– Design/Assist verifications.
Construction Management Oversight Breakdown (dollars)

- Quality Assurance / Code Required Testing and Inspection: 44%
- Field Oversight: 19%
- Engineering Oversight: 15%
- Community Outreach: 3%
- Other: 3%
- Document Control: 7%
- General Project Oversight / Agency Coordination: 9%
Quality Assurance – Prevent, Detect and Correct

• “Establish a quality assurance / quality control (QA/QC) plan and implementing procedures…that meets requirements of the Program Quality Management System, including compliance with the FTA’s Quality Assurance and Quality Control Guidelines and the TJPA’s approved Quality Management System.”

• “QA/QC plan and procedures shall provide for effective oversight of the CM/GC’s quality control plan…”

• Key Activities:
  – Turner developed the QA Plan in accordance with Project requirements, FTA requirements and Army Corp QMS best practices.
  – Turner has updated the QA Plan three times as work in the field has changed during construction.
  – QA Plan mandates observations, inspections, corrective actions, documentation and data collection.
  – As part of the QA Plan, Turner has performed quality surveillances of the CM/GC and vital offsite surveillances at manufacturing facilities around the country.
Quality Assurance – Prevent, Detect and Correct

• “Development of appropriate inspection guidelines and checklists, independent assurance and sampling test guidelines, formats for daily inspection reports and inspection and test documentation requirements. Include procedures for oversight and implementation of the non-conformance reporting and corrective action processes.”

• “Support for Program QA surveillance and audits of contractor, supplier and Contractor activities and products.”

Key Activities:

– Implemented Autodesk BIM360 (originally called Vela) quality tracking and inspection request system.

– In the last year, there have been 2,737 Inspection Requests (IRs) from the Contractors (Nov. 2014 – October 2015). Average of 57 IR’s per week, over 200 IR’s per month. All managed by Turner.

– To date, through daily observation, the QA/QC team has identified, tracked and assisted in resolving over 1600 Field Condition Reports (“FCRs”) and over 140 Non Conformance Reports (“NCRs”).

– Currently there are over 10,000 unique Inspection and Test records in the system.
Quality Assurance – Prevent, Detect and Correct

- “Provide code and quality inspections, on a timely basis in conformance with the Construction Documents…”
- “Provide specialty inspections and independent testing including…steel, concrete, masonry, fireproofing coverage, soil compaction, water intrusion, and waterproofing…in conformance with the Construction Documents…”

Key Activities:
- Local and National Building Codes, the structural engineer and National organizations such as the American Welding Society (AWS) and American Institute of Steel Construction (AISC) mandate code inspection and test requirements for steel fabrication. The same is true for concrete, soil compaction and other work activities.
- Turner has subcontracted with ISI to provide code compliance and special testing and inspection.
- In the case of structural steel, ISI provides Certified Welding Inspectors (CWI) onsite for field welding and offsite at 15 locations throughout the country. ISI has performed more than 2500 tests and inspections at a total of 16 offsite facilities to date.
Quality Assurance – Special Inspections and Tests

- Structural Steel (Non-Destructive Testing)
  - Visual Inspection.
  - Ultrasonic testing.
  - Magnetic particle testing.
  - Torque testing.
  - Decking and Nelson Stud welding inspection.
  - Pull testing.

- Soil Testing
  - Nuclear gauge testing (compaction).
  - Gradation testing.

- Concrete
  - Visual Inspection for reinforcing steel placement, embedded item placement and cast-in item placement.
  - Slump testing.
  - Air testing.
  - Temperature testing.
  - Shrinkage testing.
  - Compression testing.

- Future Testing
  - Fireproofing testing.
  - Masonry / Grout testing.
Quality Assurance – A Success Story

• Issue:
  – During shop fabrication of the built-up park level nodes, the ISI Inspector, during Non Destructive Testing (“NDT”), noted the presence of linear indications in the welds.

• Result:
  – The applicable code along with the Inspector’s experience mandated further investigation of the issue.
  – The Inspector’s diligence caught this issue at the shop and resulted in the rejection of the built-up nodes.
  – An independent 3rd party welding consultant was brought in to determine the root cause of the issue and develop a revised procedure.
  – The built-up nodes were rebuilt using the new procedure, passing visual inspection and NDT.
Quality Assurance – A Success Story

• Issue:
  – Accurate and auditable documentation is a cornerstone of a successful QA/QC program. Turner is charged with creating and maintaining this documentation.

• Result:
  – In 2011, Turner, working with the TJPA and other team members, identified the need for a modern, easy to use documentation system that would be accessible to all project participants.
  – Vela System (later purchased by Autodesk and renamed BIM 360 Field) was selected after significant research and meetings with providers of such systems.
  – Turner implemented the system Project wide and is responsible for both training and administration of the system.
  – BIM 360 Field documents / maintains all inspection requests, field conditions, non-conformance conditions, punchlists, quality checklists and, in the future, equipment and systems commissioning.
Place Holder

Steve Humphreys takes over here for CM/GC QC PRESENTATION
Slides 11-25
The Transbay Transit Center Construction Quality Control (CQC) Program is a blend of the requirements of the FTA QMS 2012 15 Essential Elements & the Army Corp of Engineers’ Contractor Quality Management System.

The Program has been in place during the design and construction process.

Updated to address design assist packages.
QA/QC Working Together

Trades  WOJV  Turner  TJPA  Design SMEs
For each major activity in Construction, the CQC & QA teams follow a series of steps to ensure that requirements are set and met.
Architects & Engineers provide the design of the Project thus setting the requirements through:
- Drawings
- Specifications
- Architectural Supplemental Instructions (ASI)
- Sketches

Quality Efforts in this ‘Plan’ phase are led by: Design Subject Matter Experts (SMEs)
Architects & Engineers provide the design of the Project thus setting the requirements through:

- Drawings
- Specifications
- Architectural Supplemental Instructions (ASI)
- Sketches
Architects & Engineers provide the design of the Project thus setting the requirements through:
- Drawings
- Specifications
- Architectural Supplemental Instructions (ASI)
- Sketches

The CM/GC and Trades outline in more detail how the requirements will be met during construction through:
- Submittals
- RFI's
- QC Plans
- Logistic Plans
- Schedules
- Mockups
- Reverse Scheduling

Quality Efforts in this ‘Do’ phase are led by:
Construction Manager / General Contractor
& Trade Subcontractors
QA/QC Overview

Planning & Pre-Execution Activities
Architects & Engineers provide the design of the Project thus setting the requirements through:
- Drawings
- Specifications
- Architectural Supplemental Instructions (ASI)
- Sketches

The CM/GC and Trades outline in more detail how the requirements will be met during construction through:
- Submittals
- RFI's
- QC Plans
- Logistic Plans
- Schedules
- Mockups

The CM/GC and Trades execute the work using QC oversight through:
- Fabrication Surveillance
- Delivery Checklists
- Pre-Installation Meetings
- Installation Checklists
- Submittal & RFI Review

Quality Efforts in this ‘Act’ phase are led by: Construction Manager / General Contractor & Trade Subcontractors
QA/QC Overview

Execution of work
QA/QC Overview

Architects & Engineers provide the design of the Project thus setting the requirements through:
- Drawings
- Specifications
- Architectural Supplemental Instructions (ASI)
- Sketches

The CM/GC and Trades outline in more detail how the requirements will be met during construction through:
- Submittals
- RFI s
- QC Plans
- Logistic Plans
- Schedules
- Mockups

Quality Efforts in this ‘Check’ phase are led by:
Program and CMO QA

QA verifies that the requirements have been met through:
- Inspection
- Special Inspection
- Tests
- Observation & reporting by Design SME

The CM/GC and Trades execute the work using QC oversight through:
- Fabrication Surveillance
- Delivery Checklists
- Pre-Installation Meetings
- Installation Checklists
- Submittal & RFI Review
Transbay Transit Center

Testing & Inspection of Work in Place
The CM/GC and Trades outline in more detail how the requirements will be met during construction through:
• Submittals
• RFI
• QC Plans
• Logistic Plans
• Schedules
• Mockups

Architects & Engineers provide the design of the Project thus setting the requirements through:
• Drawings
• Specifications
• Architectural Supplemental Instructions (ASI)
• Sketches

All Parties record the compliance with the requirements:
• Material Records
• Daily QC Reports
• Testing Reports
• Calibration Reports
• Completed Checklists

QA verifies that the requirements have been met through:
• Inspection
• Special Inspection
• Tests
• Observation & reporting by Design SME

The CM/GC and Trades execute the work using QC oversight through:
• Fabrication Surveillance
• Delivery Checklists
• Pre-Installation Meetings
• Installation Checklists
• Submittal & RFI Review

Quality Efforts in this ‘Record’ phase are led by:
Construction Manager / General Contractor & Trade Subcontractors

All Parties record the compliance with the requirements:
• Material Records
• Daily QC Reports
• Testing Reports
• Calibration Reports
• Completed Checklists

QA verifies that the requirements have been met through:
• Inspection
• Special Inspection
• Tests
• Observation & reporting by Design SME

The CM/GC and Trades execute the work using QC oversight through:
• Fabrication Surveillance
• Delivery Checklists
• Pre-Installation Meetings
• Installation Checklists
• Submittal & RFI Review

Quality Efforts in this ‘Record’ phase are led by:
Construction Manager / General Contractor & Trade Subcontractors
This process has been or will be completed for each Definable Feature of Work (“DFOW”) on the Project.

Total number of QA inspections completed to date:
- Concrete: 3,399
- Structural Steel: 798
- Other: 5,399

Number of DFOW in progress currently: 7

Total number of DFOW completed to date: 115
to completion: 1000+
Place Holder

Steve Rule returns to do Conclusion slide
QC/QA Program Conclusion

- The process in place is a robust team approach utilizing industry best practices with checks and balances to achieve quality control and assurance.
- High confidence that the construction quality and documentation demonstrates a best construction practice.