



QA/QC Program Overview

November, 2015

Transbay Transit Center

TJPA



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.



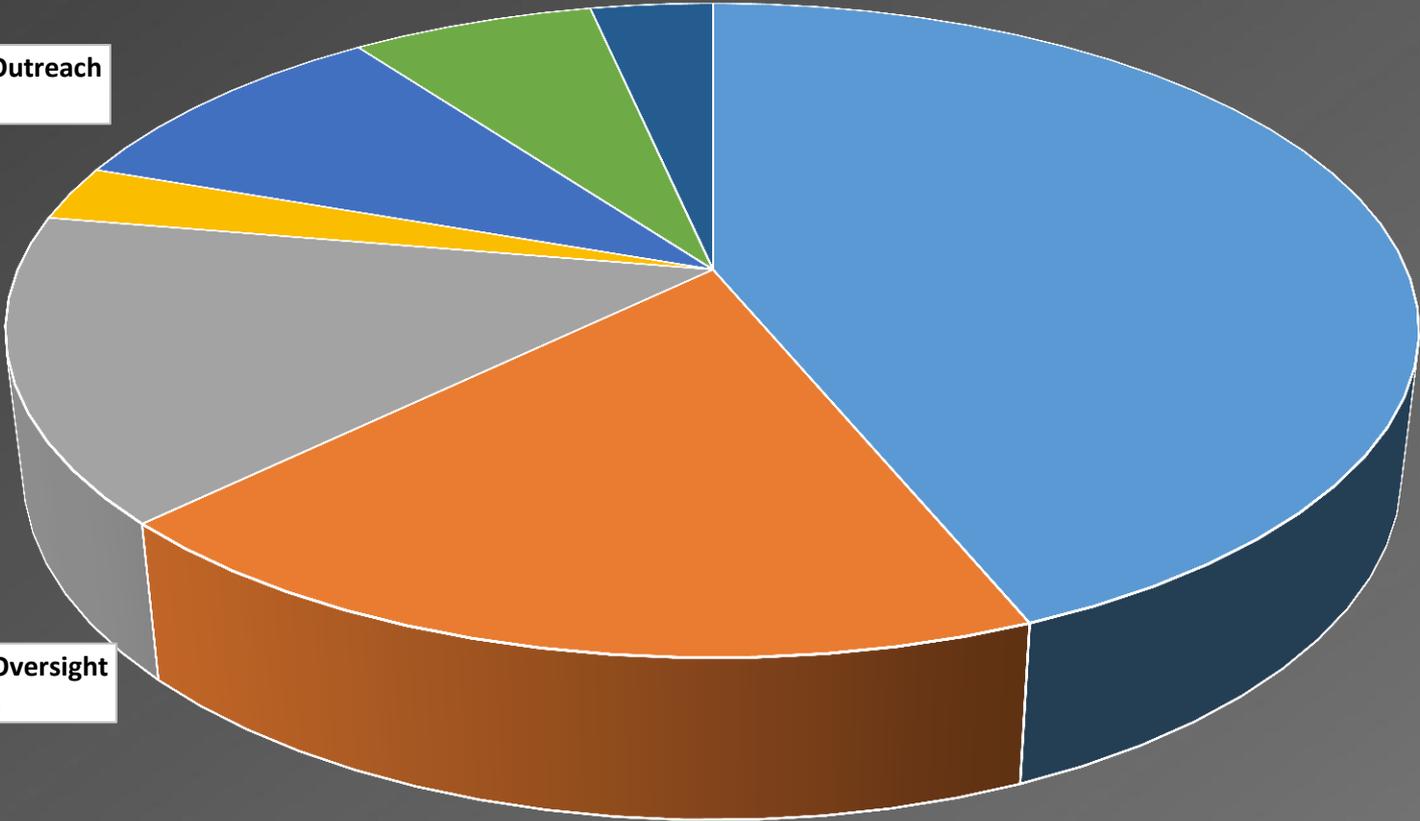
General Project Oversight / Agency Coordination
9%

Document Control
7%

Other
3%

Quality Assurance / Code Required Testing and Inspection
44%

Community Outreach
3%



Engineering Oversight
15%

Field Oversight
19%



Transbay Transit Center

Construction Management Oversight Breakdown (dollars)

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

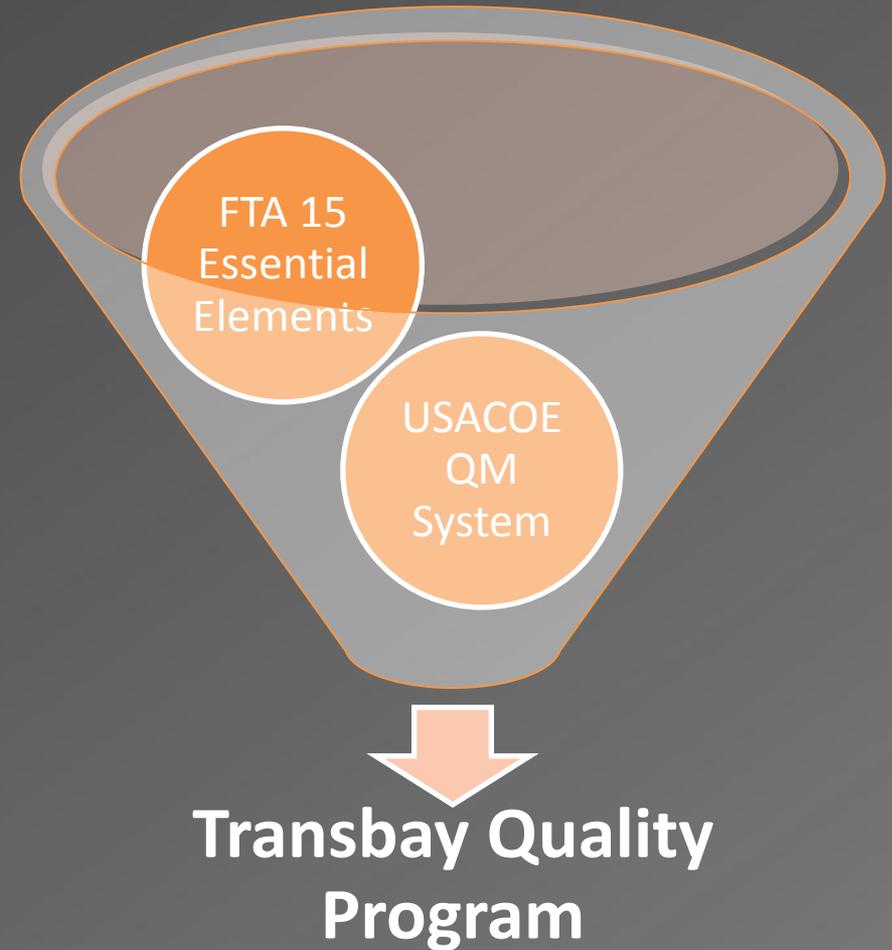
- **Issue:**
 - Accurate and auditable documentation is a cornerstone of a successful QA/QC program. Turner is charged with creating and maintaining this documentation.
- **Result:**
 - In 2011, Turner, working with the TJPA and other team members, identified the need for a modern, easy to use documentation 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.





Transbay Transit Center

- 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.





Transbay Transit Center

QA/QC Working Together

Trades

WOJV

Turner

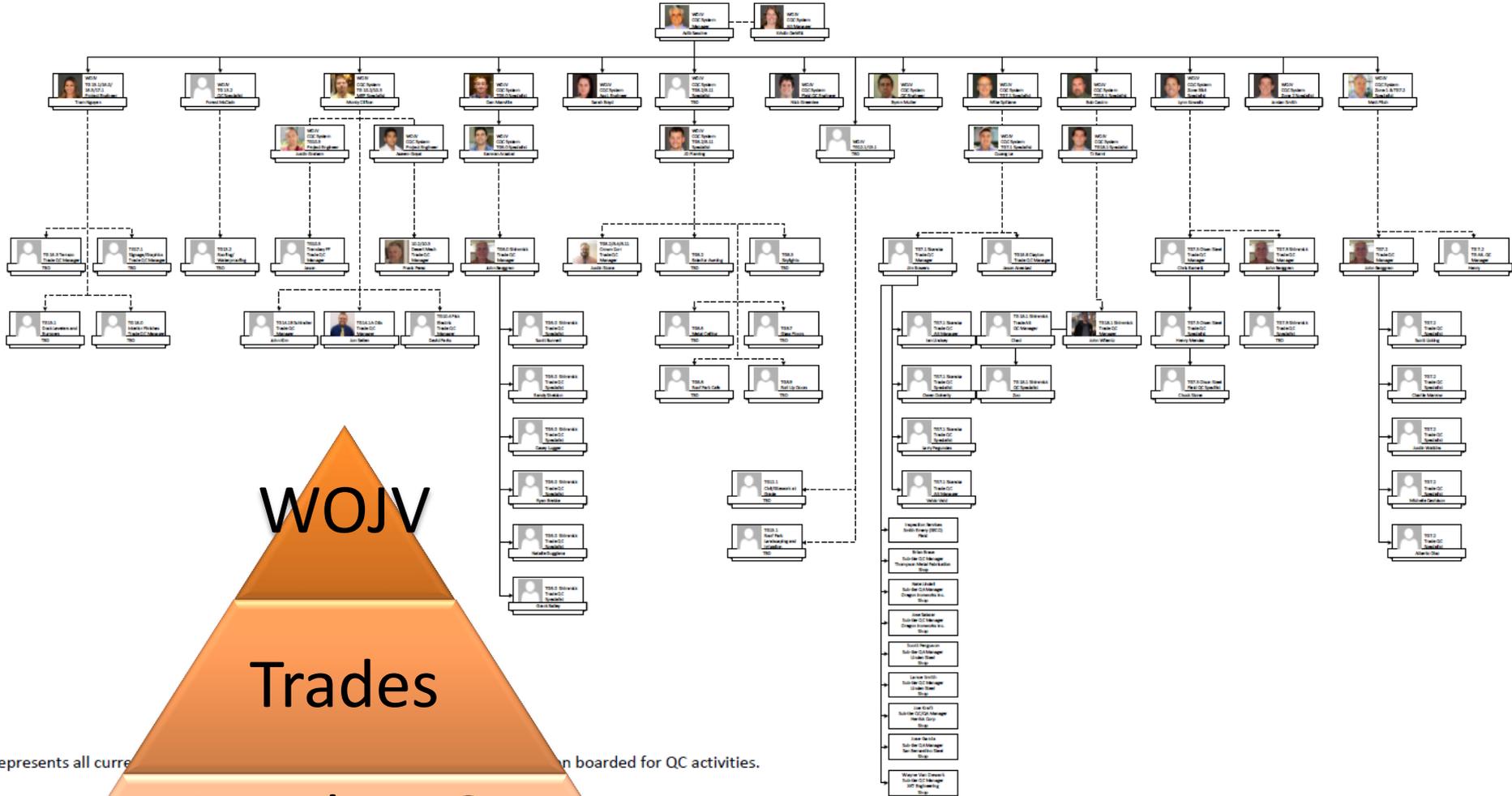
TJPA

Design
SMEs





CQC Organization



part represents all current... on boarded for QC activities.

WOJV

Trades

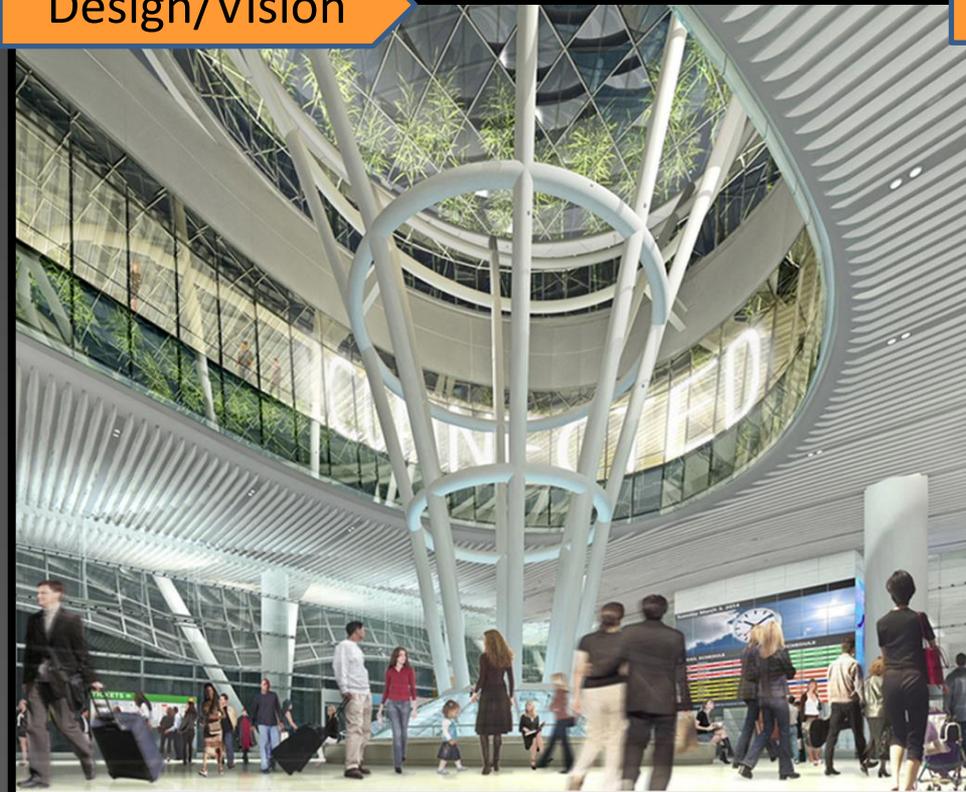
Vendors & Consultant



Transbay Transit Center

For each major activity in Construction, the CQC & QA teams follow a series of steps to ensure that requirements are set and met.

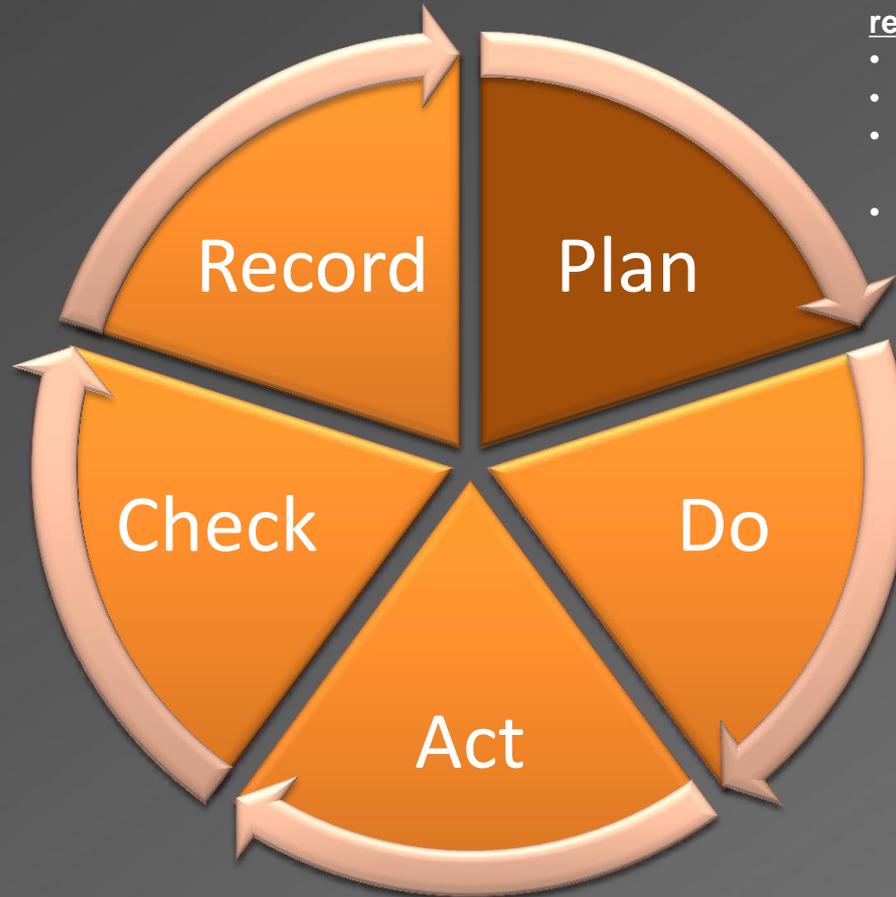
Design/Vision



Construction



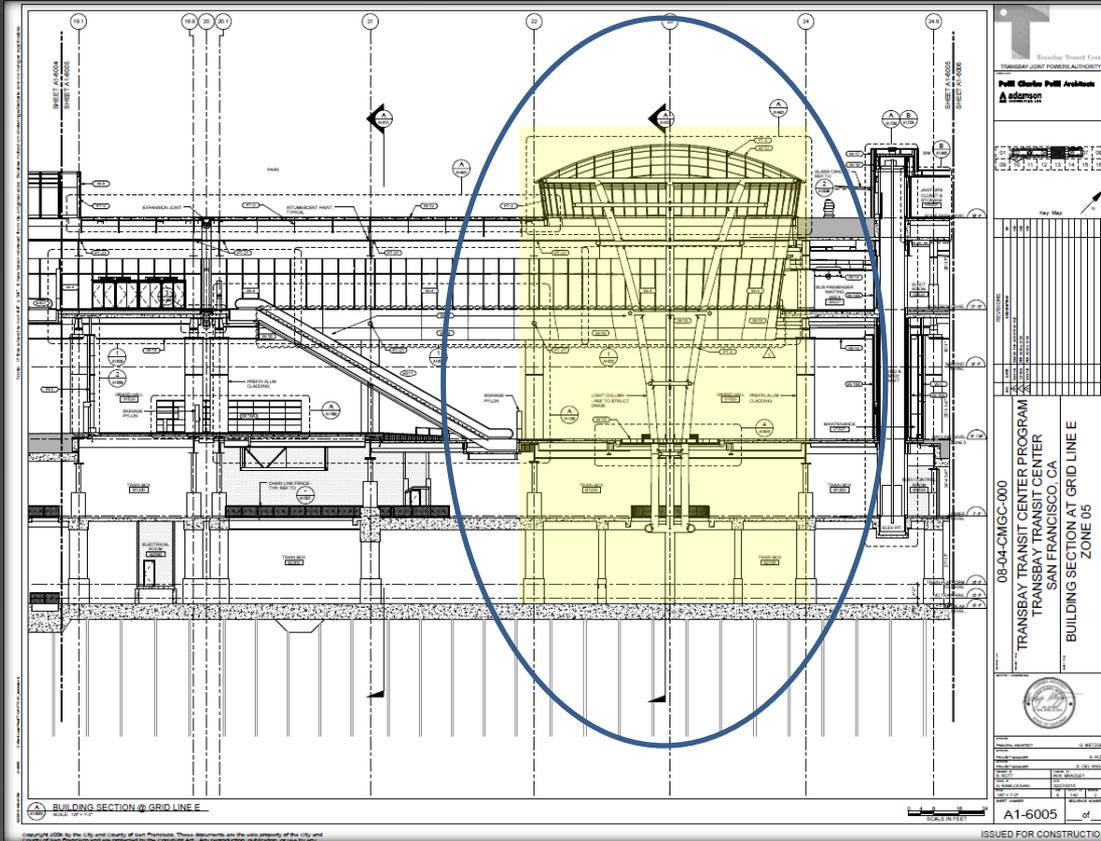
QA/QC Overview



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
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- Sketches

SECTION 05 12 14 - ARCHITECTURALLY EXPOSED STRUCTURAL STEEL - SUPERSTRUCTURE PACKAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for the fabrication, erection appearance and surface preparation of Architecturally Exposed Structural Steel (AESS).
- B. This Section applies to members noted on Architectural and Structural drawings as AESS and in the areas defined as AESS below.
- C. The LEED requirements specified in Section 05 10 00 apply to this Section.
- D. Hot dip galvanizing AESS, where indicated, is specified in Section 05 05 16.

1.2 REFERENCES

- A. Abbreviations and Acronyms:
 1. AESS: Architecturally Exposed Structural Steel.
 2. AHJ: Authority Having Jurisdiction.
 3. AWS: American Welding Society.
 4. AISC: American Institute of Steel Construction.
 5. DFT: Dry Film Thickness.
 6. FSS: Hollow Steel Section.
 7. LEED: Leadership in Energy and Environmental Design.
 8. SCAQMD: South Coast Air Quality Management District.
 9. SSPC: The Society for Protective Coatings (formerly known as Steel Structures Painting Council).
 10. VOC: Volatile Organic Compound.

B. Codes and Standards: The following govern the work of this Section.

- 1. CBC 2007 with San Francisco Amendments.
- 2. AISC Code of Standard Practice.
- 3. AISC Specifications.
- 4. AWS D1.1.

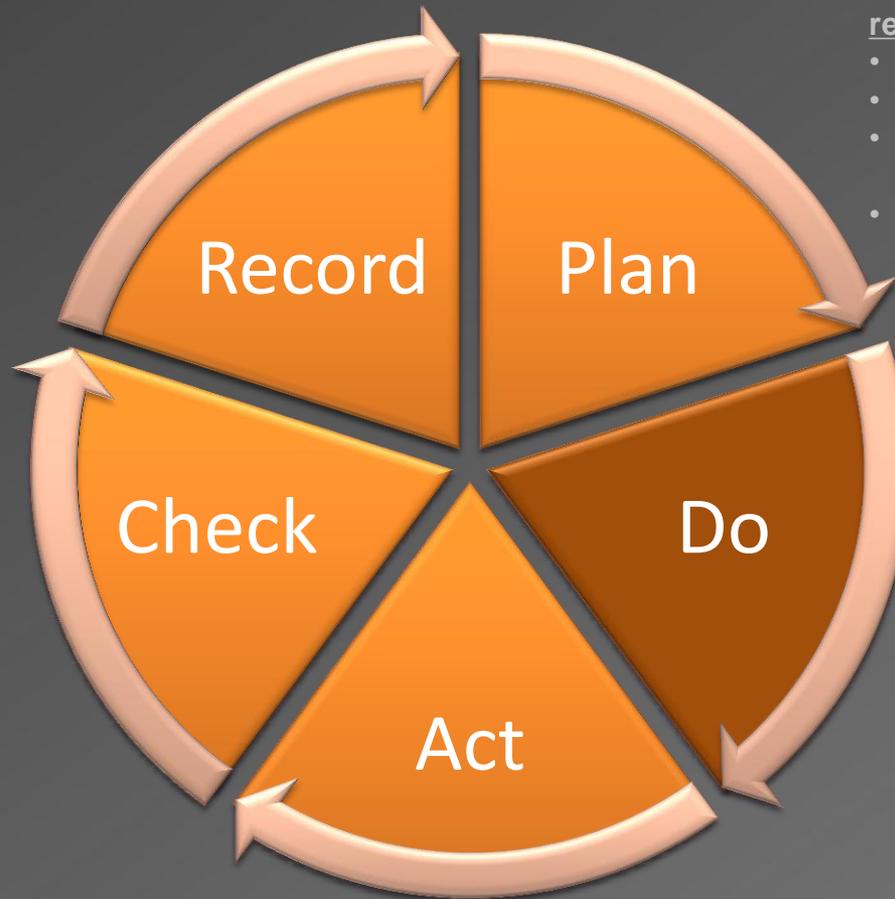
1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 1. Coordinate installation of anchors for AESS members relating to other work. Supply setting drawings, templates and directions for installing anchors, including sleeves, concrete inserts, anchor bolts and stems with integral anchors to be embedded in concrete or masonry.
 2. Field Measurements: Where AESS is indicated to fit against walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
- B. Preinstallation Meetings:
 1. General: Comply with Section 01 12 00 and Section 01 14 00, except as specified below. Where the provisions are in conflict, the more restrictive requirement apply.

Transbay Transit Center
 ARCHITECTURAL EXPOSED STRUCTURAL STEEL - SUPERSTRUCTURE PACKAGE
 Revised and Reissued for Construction DECEMBER 16, 2013
 DECEMBER 16, 2014

a. For cleaning, surface preparation and priming systems see Section 05 10 00

QA/QC Overview



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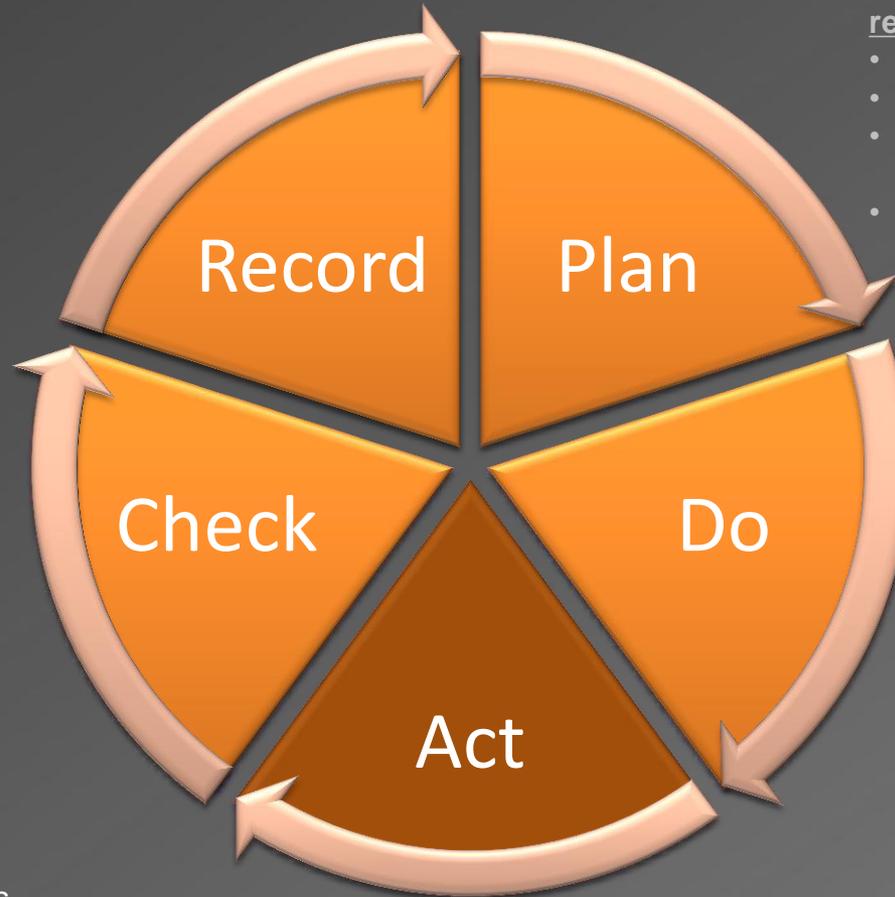
The CM/GC and Trades outline in more detail how the requirements will be met during construction through:

- Submittals
- RFIs
- 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



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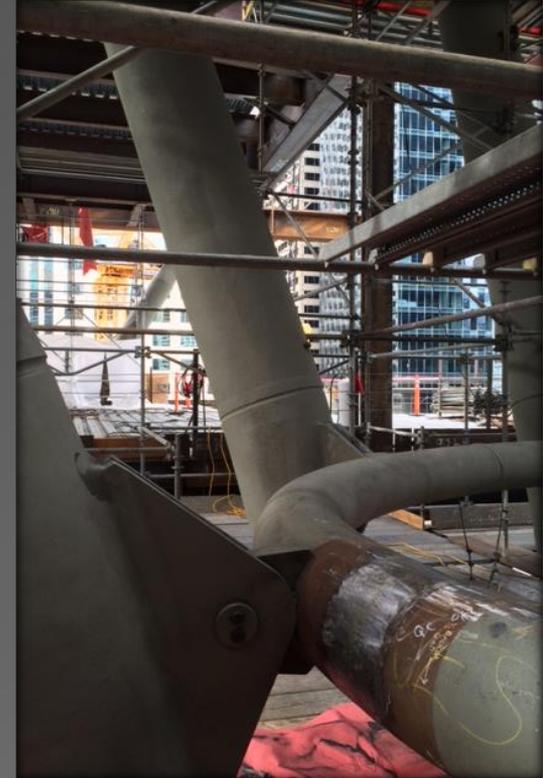
The CM/GC and Trades execute the work using QC oversight through:

- 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

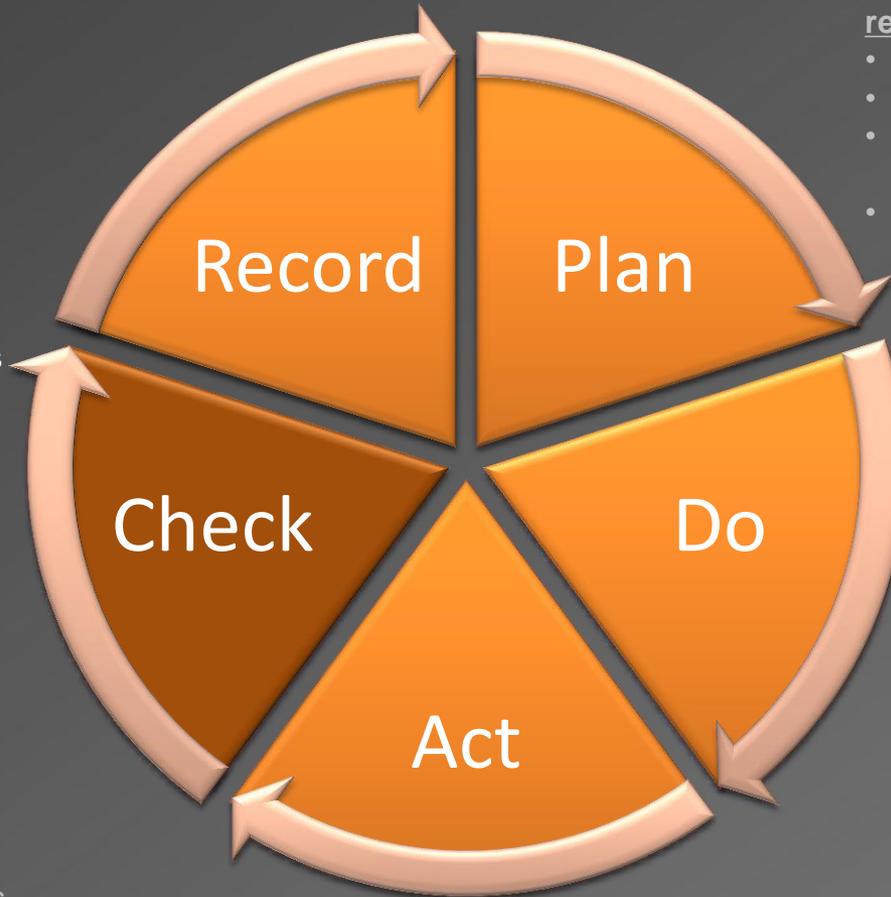


Execution of work





QA/QC Overview



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- Mockups

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 'Check' phase are led by:
Program and CMO QA



Testing & Inspection of Work in Place





QA/QC Overview

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:

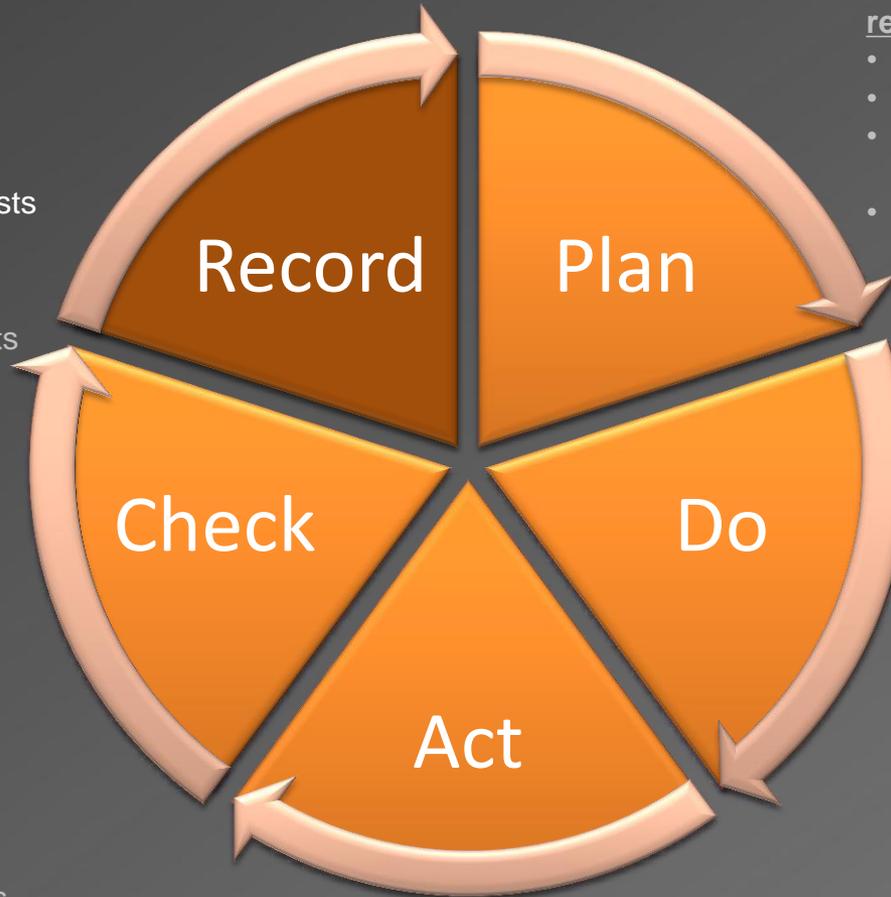
- Fabrication Surveillance
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The CM/GC and Trades outline in more detail **how** the requirements will be met during construction through:

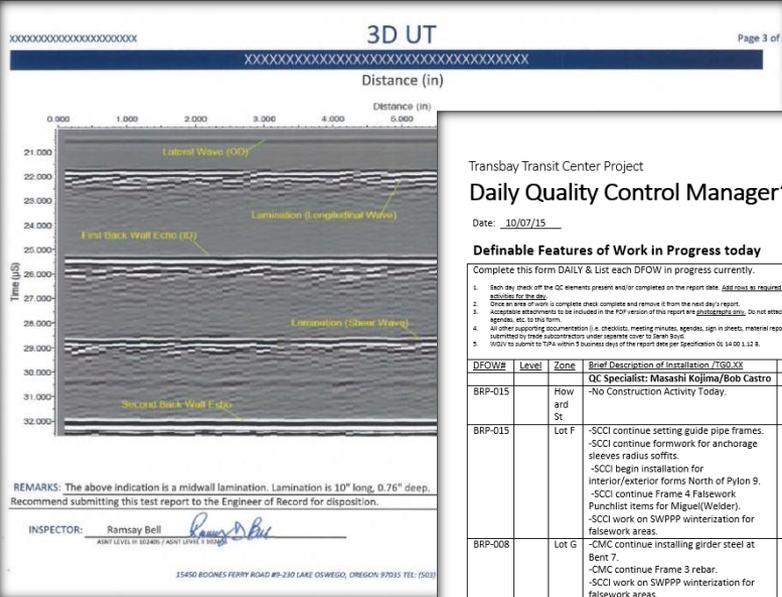
- Submittals
- RFIs
- QC Plans
- Logistic Plans
- Schedules
- Mockups



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



Quality Records



Transbay Transit Center Project

Daily Quality Control Manager's Report

Date: 10/07/15

Definable Features of Work in Progress today

Complete this form DAILY & List each DFWO in progress currently.

- Each day check off the QC elements present and/or completed on the report date. Add cost as required to list all the applicable activities for the day.
- Once the area of work is complete draw complete and remove it from the next day's report.
- Acceptance drawings to be included in the PDF version of this report are quasi-optional. Do not attach any other reports, log sheets, etc. to this form.
- All other supporting documentation (i.e. checklists, meeting minutes, agendas, sign off sheets, material reports, metallic labels) submitted by trade subcontractors under separate cover to Team Bays.
- WFO to submit to ISi within 5 business days of the report date per Specification Q3.14.03.1.1.1.8.

DFWO#	Level	Zone	Brief Description of Installation / WFO	Reference in WFO
BRP-015	Howard St		-No Construction Activity Today.	
BRP-015	Lot F		-SCC continue setting guide pipe frames. -SCC continue formwork for anchorage sleeves radius soffits. -SCC begin installation for interior/exterior forms North of Pylon 9. -SCC continue Frame 4 falsework Punchlist items for Miguel(Welder). -SCC work on SWPPP winterization for falsework areas.	
BRP-008	Lot G		-CMC continue installing girder steel at Bent 7. -CMC continue Frame 3 rebar. -SCC work on SWPPP winterization for falsework areas.	
BRP-008	Lot H		-CMC complete installing girder steel at Bent 6. -CMC continue Frame 3 rebar. -SCC install netting at areas over Tehema and Howard streets of walkway along west side of Frame 3-4. -SCC work on SWPPP winterization for falsework areas.	
BRP-008	Lot I		-SCC complete decking for Frame 1 soffit and forms north of Folsom St. -SCC continue formwork installation for exteriors and at Frame 1. -SCC begin formwork for Bent 2 extension. -SCC continue prep area at north end of Bent 3 for stair tower installation, fill in	

SKANSKA

TRADE SUBCONTRACTOR DAILY QUALITY CONTROL REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE: 10/01/2015
Report No: 1015-001

PHASE: TRANSBAY TRANSIT CENTER BUILDING Contract Number: 30100.01 Package Number: TG07-1R

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL PREPARATORY PHASE CHECKLIST

PREPARATORY PHASE WORK PERFORMED TODAY

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL PREPARATORY PHASE CHECKLIST

DEFINABLE FEATURE OF WORK PERFORMED TODAY

NO DFWO preparatory work performed on-site

NO INITIAL PHASE WORK PERFORMED TODAY

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL INITIAL PHASE CHECKLIST

DEFINABLE FEATURE OF WORK PERFORMED TODAY

NO DFWO initial work performed on-site

WORK COMPLETES WITH CONTRACT AS APPROVED DURING INITIAL PHASE

Schedule Activity No. Description of Work, Testing Performed & Section, Location on

DFWO#-SSS-01 See Coordination Sheet (page 3) for activity details

REMARKS: ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS), ENTER REVISION # COMPLETE REVISION # (IN YELLOW)

None

REMARKS: Area marked "No Following Phase Checklist Item From Above That Was Assessed "NO", Marked "None"

Schedule Activity No. Description

None

QC REPRESENTATIVE DATE

SKANSKA QUALITY CONTROL MANAGERS REMARKS AND/OR EXCEPTIONS TO THE REPORT

Schedule Activity No. Description

The Skanska QCM was not on site this day - The Skanska ADI QC

REVIEWED BY: James S. Stevens DATE: 10/01/2015

INSPECTOR: James S. Stevens DATE: 10/01/2015



1798 University Ave, Berkeley, CA 94703
510.900.2100 main 510.900.2101 fax

IR # u TG07/5535

MAGNETIC PARTICLE EXAMINATION OF WELDS

Inspector: JOHNSON, KENNETH ISI Project No.: 2498-070-0
Date: 08/04/2015, TUESDAY ISI Project Name: TRANSBAY TERMINAL TG 7
Hours Worked: NS: 1:00 Address: 2625 SE HIDDEN WAY, BLDG #33

Service Code(s): 2809: NDT MAGNETIC PARTICLE TESTING (MT) Permit No:
Re-inspection: NO Show Up: Other:
Job-site Contact: Steve Barnett, CIW QC supervisor, night shift Other 2: ISi TG07/5535

Quality Requirements - Section No.: AWS D1.1-10, AWS D1.8-06, Annex G, Project Spec.

Line No.	LOC	LINE	ROW	DIR	WELD LOC	ACC	REJ	WELDER	DETAIL / REMARKS
1	A2322	CJP weld	Pipe to Casting	Light Column	WJ-3	X	C83		No rejectable indications noted.
2	A2317/232	0	Field welds	Light Column	Erection aids	X	O18		No rejectable indications noted.
3	A2317	CJP weld	Pipe to Casting	Light Column	WJ-3	X	R35, C63.		No rejectable indications noted.
4	A1486	CJP weld	Pipe to Casting	Roof Column	WJ-1	X	S48		No rejectable indications noted.

I, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of AWS and Job Specification.

Method of Inspection: Continuous, AC yoke Notified: Steve Barnett

Equipment/Brand: Parker Model: DA400 Serial No.: 22232

Dry Residual Wet Continuous AC DC Half-Wave

Any Non-Compliance Reports? NO

Any attachments to this report? NO

Person notified of inspection results? Steve Barnett

Copy sent to the following email addresses: tsaul@inspectionsservices.net, cee@inspectionsservices.net, tsports@gmail.com

I verify that the work observed/performed does does not (check one) comply with the approved drawings, specifications, and the applicable building codes.

Ken Johnson

Dispatch ID: 147357
Inspector: JOHNSON, KENNETH
Date: 08/07/2015

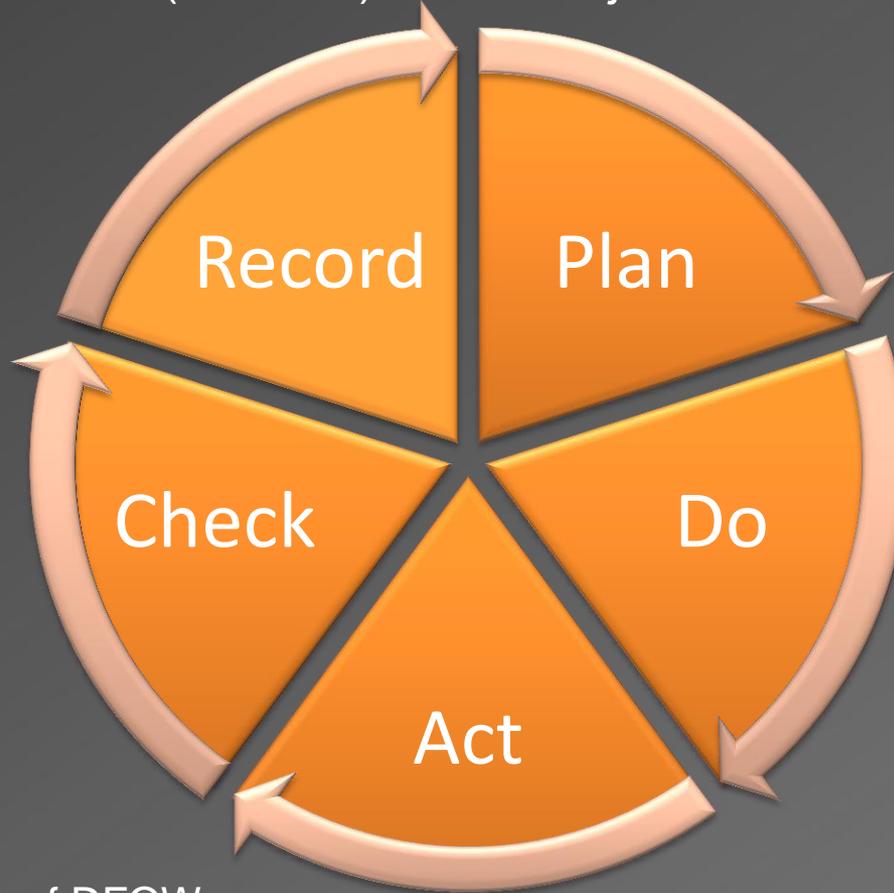
Representative Signature Inspector Signature

Copy of inspector/technician's daily reports are emailed to the jobsite (or shop) representative as a convenience to the contractor, owner's representative and/or other ISI inspectors. Official reporting of such daily reports will be submitted to the approved distribution, in a timely manner, after review and/or clarification by ISI managers and/or professional engineers. This procedure may not be followed to its full extent if a representative is not available.



QA/QC Overview

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+

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.



Questions?



Transbay Transit Center