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## **MENTOR PROTEGE' WORKSHOP #9**

# **Best Quality Management Practices**

**Noon, Thursday  
December 9, 2021**

Presenters: Kieran Kelly-Sneed, Manager, Office  
Quality HNTB and Keith Gilliam, Owner QEI



Hosted by VTA

# Mentor Protégé Workshop #9

## Best Quality Management Practices



Keith Gilliam, CQA  
President and CEO  
Quality Engineering Incorporated



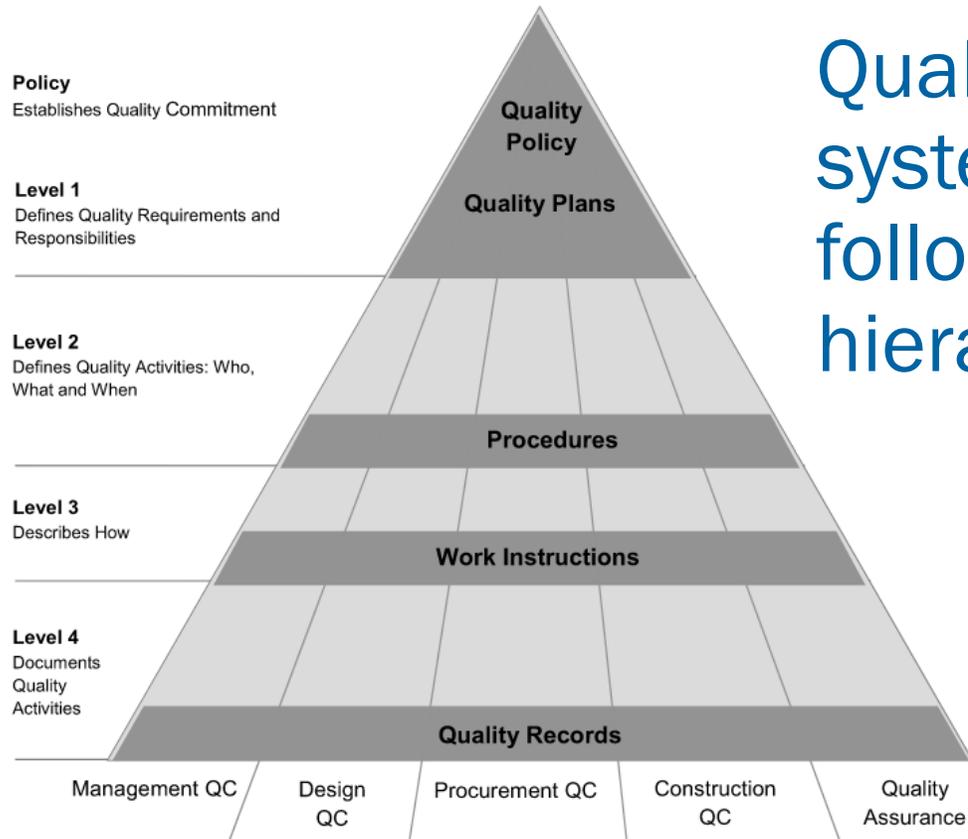
Kieran Kelly-Sneed, PE  
Office Quality Manager  
HNTB

### BART Silicon Valley Phase II Extension Project



# Quality Management Overview

Quality organizations, systems, and plans follow common hierarchies.



Keith Gilliam, CQA

President and CEO, Quality Engineering Incorporated

# Definitions

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- **Quality Control (QC):** Techniques used to assure that a product or service meets requirements or goals.
- **Quality Assurance (QA):** Actions at a management level that directly improve the chances that QC actions will be successful. Includes verification that QC was performed as planned.
- **Quality Management System (QMS):** “A formalized system that documents the structure, responsibilities and procedures required to achieve effective quality management.” <sup>1</sup>
- **Quality Plan (QMP):** Primary document of a QMS that typically includes the Quality Policy, objectives, and written procedures.
- **Quality Policy:** “The overall quality intentions and direction of an organization with regard to quality, determined by top management.” <sup>2</sup> (FTA definition)

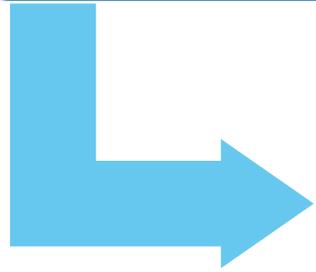
1. American Society for Quality (ASQ)

2. FTA, Quality Management System Guidelines, 2019

# Quality Management for Projects or Programs

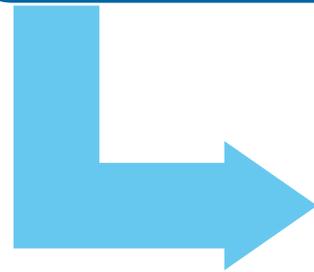
Owner/Agency

- Has their own QMP.
- QMP includes purchasing requirements.



Prime Consultant

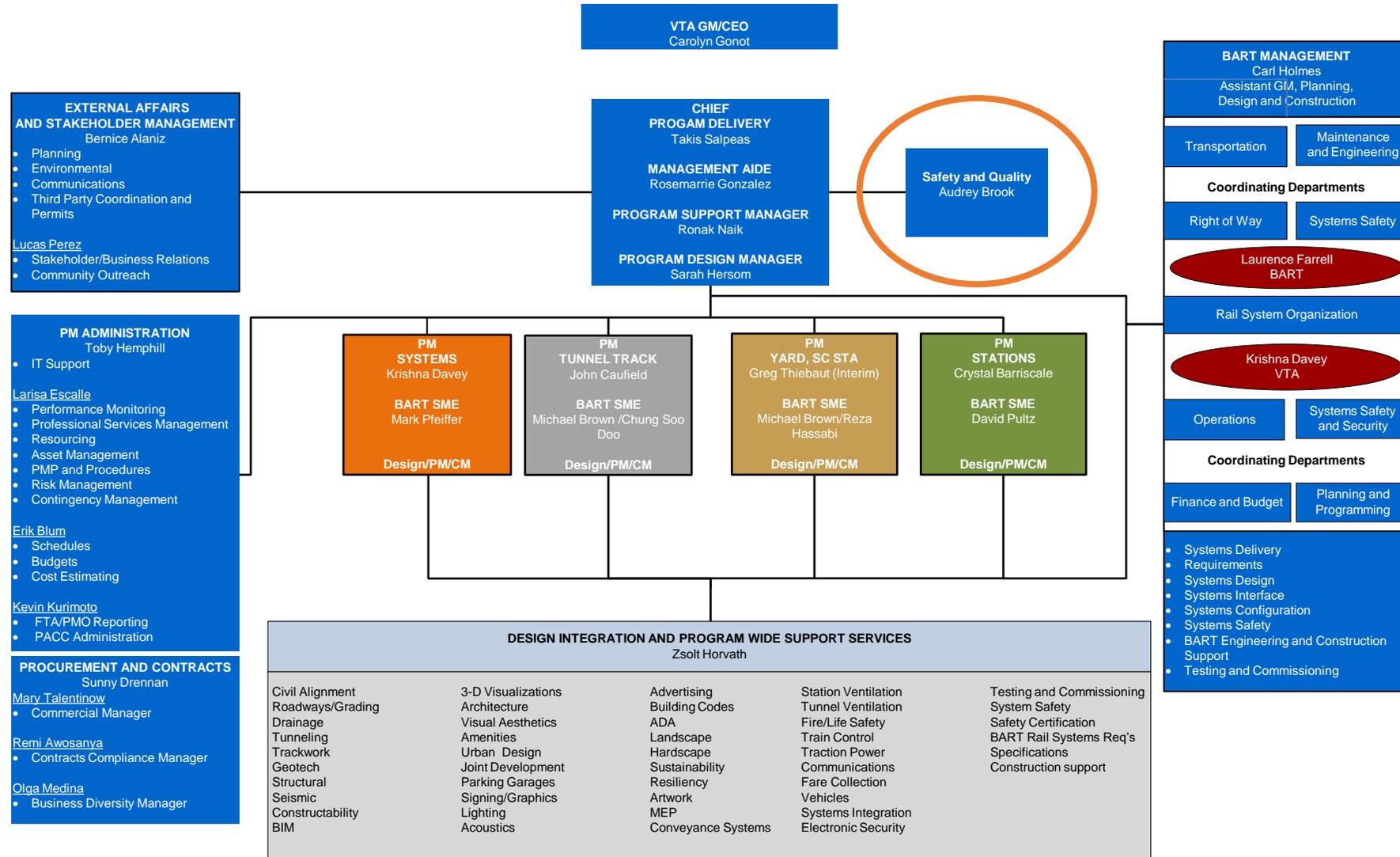
- Requirements for Quality Management flow from contract with owner.
- Additional Requirements based on Prime's standard QMP.



Subconsultants

- May follow Prime's QMP
- Own QMP, if used, must conform to Contract

# BSVII Organization Chart



**EXTERNAL AFFAIRS AND STAKEHOLDER MANAGEMENT**  
Bernice Alaniz

- Planning
- Environmental
- Communications
- Third Party Coordination and Permits

Lucas Perez

- Stakeholder/Business Relations
- Community Outreach

**PM ADMINISTRATION**  
Toby Hemphill

- IT Support

Larisa Escalle

- Performance Monitoring
- Professional Services Management
- Resourcing
- Asset Management
- PMP and Procedures
- Risk Management
- Contingency Management

Erik Blum

- Schedules
- Budgets
- Cost Estimating

Kevin Kurimoto

- FTA/PMO Reporting
- PACC Administration

**PROCUREMENT AND CONTRACTS**  
Sunny Drennan

Mary Talentinow

- Commercial Manager

Remi Awosanya

- Contracts Compliance Manager

Olga Medina

- Business Diversity Manager

**DESIGN INTEGRATION AND PROGRAM WIDE SUPPORT SERVICES**  
Zsolt Horvath

Civil Alignment	3-D Visualizations	Advertising	Station Ventilation	Testing and Commissioning
Roadways/Grading	Architecture	Building Codes	Tunnel Ventilation	System Safety
Drainage	Visual Aesthetics	ADA	Fire/Life Safety	Safety Certification
Tunneling	Amenities	Landscape	Train Control	BART Rail Systems Req's
Trackwork	Urban Design	Hardscape	Traction Power	Specifications
Geotech	Joint Development	Sustainability	Communications	Construction support
Structural	Parking Garages	Resiliency	Fare Collection	
Seismic	Signing/Graphics	Artwork	Vehicles	
Constructability	Lighting	MEP	Systems Integration	
BIM	Acoustics	Conveyance Systems	Electronic Security	

**BART MANAGEMENT**  
Carl Holmes  
Assistant GM, Planning, Design and Construction

Transportation      Maintenance and Engineering

**Coordinating Departments**

Right of Way      Systems Safety

Laurence Farrell  
BART

Rail System Organization

Krishna Davey  
VTA

Operations      Systems Safety and Security

**Coordinating Departments**

Finance and Budget      Planning and Programming

- Systems Delivery Requirements
- Systems Design
- Systems Interface
- Systems Configuration
- Systems Safety
- BART Engineering and Construction Support
- Testing and Commissioning

# BSVII Quality Policy

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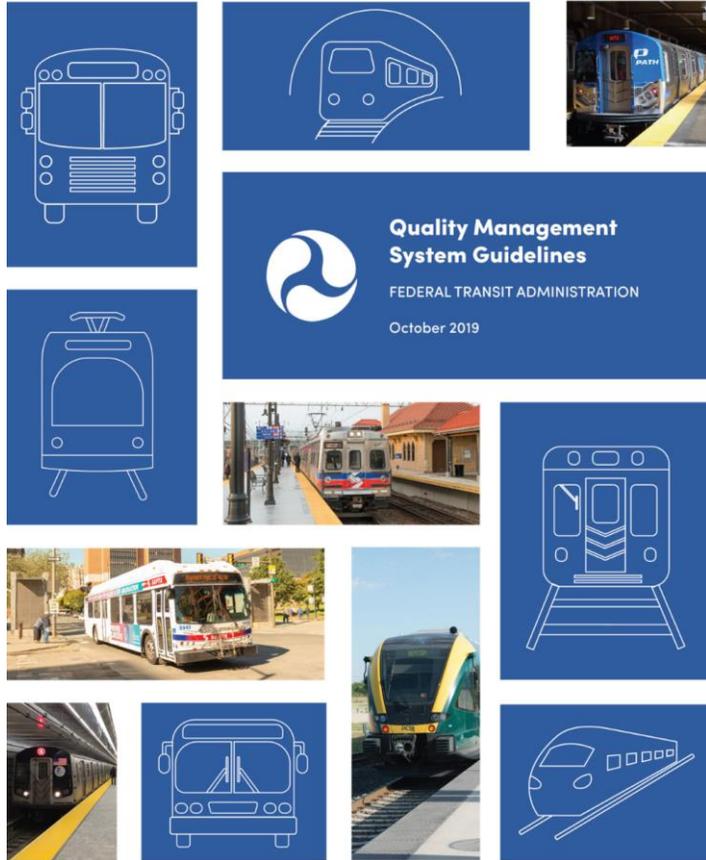
- Santa Clara Valley Transportation Authority's (VTA) goal is to serve the public with the planned, designed, and constructed BART Silicon Valley Phase II Extension Project (BSVII) that meets or exceeds industry quality standards to attain a safe, reliable, economical and convenient public mass transit system....
- ...The quality program is defined by the QMS, and the mission of the program is to:
  - Define quality goals and objectives, specify quality-related activities, and assign responsibilities to ensure that quality responsibilities are planned and executed in a cost-effective and timely manner.
  - Define the implementation of administration and control measures to achieve compliant quality services and work products during design, procurement, construction, installation, testing, inspection, systems testing and start-up, and facility/records turnover phases.
  - Establish the requirements for contractors performing management, design, construction, consulting, or other services to commit to establishing plans that define their quality goals and objectives, specify quality-related activities, and to assign responsibilities for fully implementing and complying with the quality requirements as defined in the contract documents and the BSVII Quality Management Plan (QMP).

# Why should I have a Quality Plan?

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- Every firm is responsible for the quality of its own work and deliverables.
- Demonstrate your commitment to delivering quality product or service.
- Standardize and document the way you perform, check, and deliver quality service or product.
- Specialized services may not be fully covered by the quality plan for your project.
- Commonly required by Contract.

# Common Elements of a Quality Program

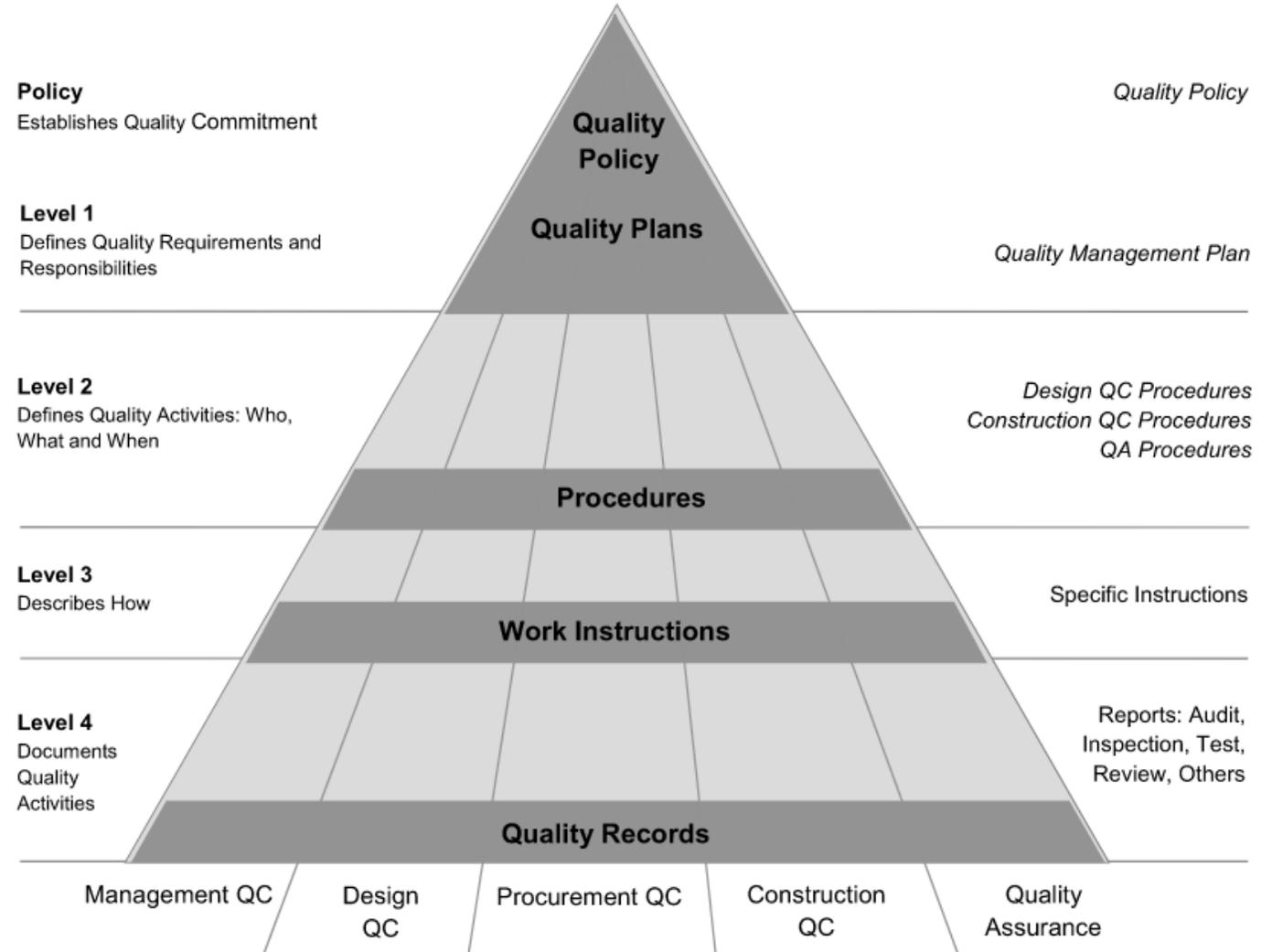


FTA's fifteen elements are a widely recognized model.

Kieran Kelly-Sneed  
Office Quality Manager, HNTB

# Common QMP / QMS Structure

- Quality Plan & Policy
- Procedures
- Forms → Records



# FTA's Fifteen Elements of a Quality Program

- |  |   |   |  |  |
|--|---|---|--|--|
| 1. Management Responsibility               |  |    | 8. Inspection and Testing                    |   |
| 2. Documented Quality Management System    |  |    | 9. Inspection, Measuring, and Test Equipment |   |
| 3. Design Control                          |  |   | 10. Inspection and Test Status               |   |
| 4. Document Control                        |  |    | 11. Nonconformance                           | <br>     |
| 5. Purchasing                              |  |    | 12. Corrective Action                        | <br>     |
| 6. Product Identification and Traceability |   |    | 13. Quality Records                          | <br>     |
| 7. Process Control                         |   |  | 14. Quality Audits                           | <br> |
|  |   |   | 15. Training                                 | <br> |

 = Common focus in designer's quality plan

 = Common focus in contractor's quality plan

# FTA's Fifteen Elements of a Quality Program

## 1. Management Responsibility

Management's commitment to quality, including implementation of the Quality Plan. Designate a leader responsible for quality who reports to the highest position within the organization. Include a Quality Policy.



## 2. Documented Quality Management System

Plans, procedures and instructions with clearly defined scope and requirements, including reference to applicable standards.

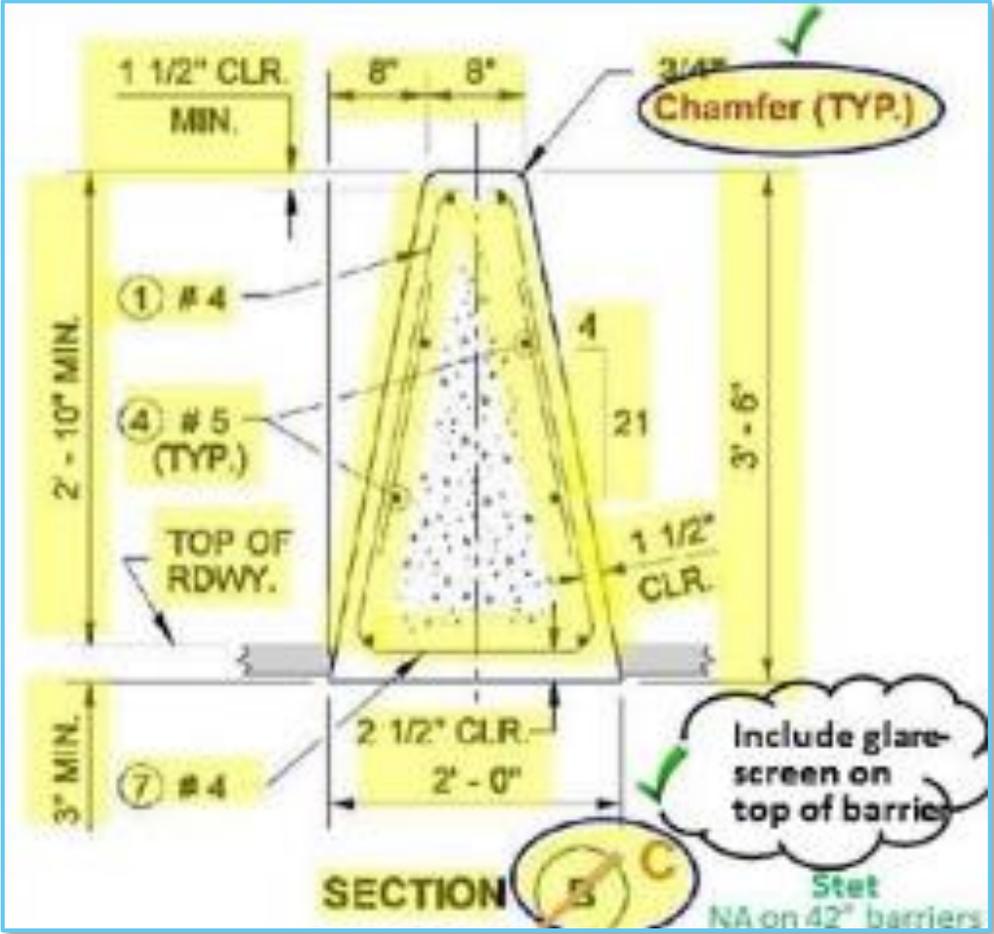


## 3. Design Control

Requirements for design inputs and outputs. Identify required QC and QA checks and the person or position responsible for them. This includes checking of calculations, drawings, specifications, estimates and validation of software. Indicate how design changes are incorporated and disseminated.



# Design Control Example



BART Silicon Valley Phase II Extension Project

Subject: Project Name

Computation Sheet

Page .....1 of 7.....

Made by Originator

Date XXX/XX/XX

Checked by Checker

Date XXX/XX/XX

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**Design Reference/Assumptions** 0.00 INPUT

- AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and traffic Signals, 6th ED 2013
- AASHTO Standard Specifications for Highway Bridges, 17th Edition

Expressway Luminaire Concrete Barrier Support Design

**Light Pole Properties**

Post Height	=	40.00	ft
Post Cap (Assumed)	=	1.00	ft
Post O.D. (Assumed non-Tapered)	=	10.80	in
Post Nominal Weight	=	40.50	plf
Elevation at top of deck (max)	=	99.27	ft
Post C.G.	=	20	ft
Elevation to Post C.G.	=	123.27	ft
Post CL-Fascia Edge Offset	=	10.00	in
Cantilever Arm Length	=	4.00	ft
Cantilever Arm Height from baseplate	=	27.00	ft
Arm O.D. (Assumed horizontal & non-Tapered)	=	6.63	in
Std Arm Nominal Weight	=	19.00	plf
Expressway Luminaire Weight	=	33.00	lb
Width	=	1.29	ft
(Assume Rectangular) Length	=	3.49	ft
Thickness	=	0.33	ft
Cobra Head Luminaire Weight (Assume Similar)	=	33.00	lb
Width	=	0.80	ft

101.3' Verify ✓

125.3' ✓

USE 1' ✓

# FTA's Fifteen Elements of a Quality Program

## 4. Document Control

Current versions of project documents are available to everyone who needs them, and superseded versions are removed from use. Revisions to controlled documents are typically made and approved by the same individuals who originally reviewed and approved them.



## 5. Purchasing

Ensure that purchased services or products meet applicable requirements, include appropriate terms and quality requirements in contracts. Appropriate review and approval of purchasing documents before execution. May include list of approved vendors or requirements for receiving and inspecting material. Common examples:



Buy America

Grade, Composition

Certifications

Quality requirements

## 6. Product Identification and Traceability

Track materials, parts, and components being fabricated or incorporated in construction. Includes stamping, tagging, and traceability through purchase records, serial or batch number, and mill certifications.



# Purchasing & Traceability Example

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION  
**FABRICATORS CERTIFICATE OF COMPLIANCE**  
 TL-6046 (REV. 6/98) CT# 7541 8024.0

TO: CHIEF State Depa

CUSTOMER MARTINEZ STEEL CORPORATION  
 13489 SLOVER AVE STE B OR D  
 FONTANA, CA 92337

**CASCADE STEEL**  
 Rolling Mills Inc.  
 A Schnitzer Company

**CERTIFIED MILL TEST REPORT**  
 (CMTR)  
 3200 NORTH HIGHWAY 99W  
 McMinnville, OREGON 97128  
 (503) 472-4181 FAX (503) 434-5739

DATE 7-26-21  
 BILL OF LADING 40258680  
 PAGE 1 OF 1

DESCRIPTION	TEST NAME / UNIT OF MEASURE									
HEAT NO. / PRODUCT / GRADE	YIELD PSI	TENSILE PSI	ELONG. 8 INCHES	NOM. WT %	BEND DEGREES	DEF.	Melted Rolled	Shipped Lbs/Tons	Melt Lbs Roll Lbs	
*184621 #4 706/60 GRADE REBAR ASTM A706-16 Grade 60 AASHTO M31-19	67,000	97,500	16	97	180 OK	OK	05/05/21 05/16/21	36,232 18.1	218,810 212,900	
*184421 #4 706/60 GRADE REBAR ASTM A706-16 Grade 60 AASHTO M31-19	65,000	94,000	17	96	180 OK	OK	05/05/21 05/17/21	12,184 6.1	208,390 207,128	

CHEMICAL ANALYSIS														
HEAT NO.	C %	Mn %	P %	S %	Si %	Cu %	Ni %	Cr %	V %	Mo %	Sn %	CE %		
184621	.29	1.25	.020	.033	.26	.35	.07	.17	.023	.02	.023	.53		
184421	.30	1.19	.018	.038	.24	.32	.07	.20	.024	.02	.023	.53		

This material fully complies with the requirements of the indicated revision of each specification listed.  
 PO NUMBER(S): 106282

CERTIFIED BY: *Jeff Kramer*  
 Jeff Kramer  
 Quality Assurance Manager

\* ALL MELTING AND MANUFACTURING PROCESSES FOR THE MATERIALS OCCURRED IN THE UNITED STATES.



# FTA's Fifteen Elements of a Quality Program

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## 7. Process Control

Production, installation, and test processes impact the quality in construction. Includes work instructions, acceptance criteria, certification, monitoring, and revision to established processes.



## 8. Inspection and Testing

Inspection and test procedures to verify quality, and requirements for procedures to be included in specifications where applicable.



## 9. Inspection, Measuring, and Test Equipment

Equipment used for required inspections, measurements and tests should be calibrated, maintained, and controlled to ensure results are accurate. May include a list of such equipment and maintenance schedule. May also include requirements for specifications and contracts.



# Testing Example



Designation: C31/C31M – 19

## Standard Practice for Making and Curing Concrete Test Specimens in the Field<sup>1</sup>



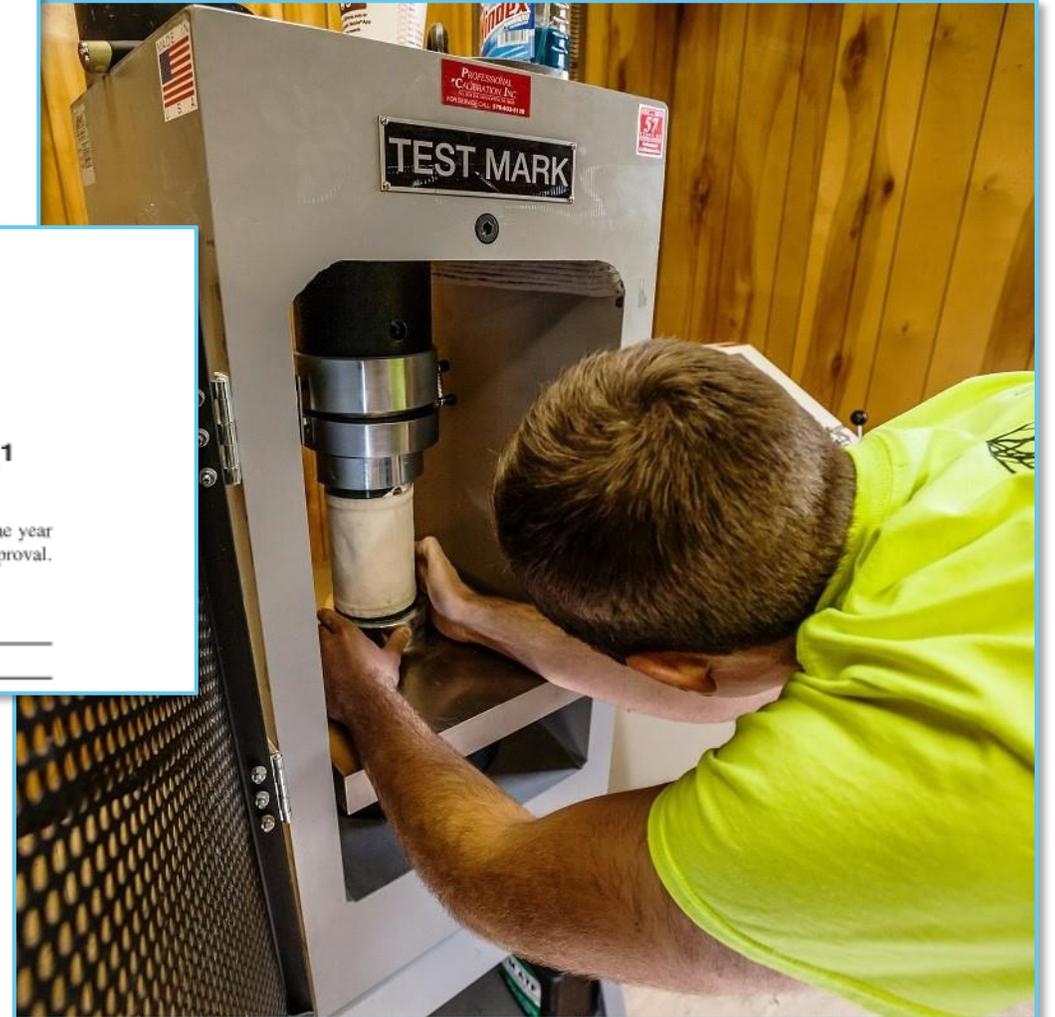
Designation: C 39/C 39M – 05<sup>ε1</sup>

## Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens<sup>1</sup>

This standard is issued under the fixed designation C 39/C 39M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense.*

<sup>ε1</sup> NOTE—**Note 1** was corrected editorially in September 2006.



Latest or correct versions? One or two of the above is outdated.

# FTA's Fifteen Elements of a Quality Program

## 10. Inspection and Test Status



“A means should be provided for identifying the inspection and test status of work during production and installation. The purpose of this is to ensure that only work that has passed the required inspections and tests is accepted.” <sup>1</sup>

## 11. Nonconformance



Describe procedures to identify and control nonconforming work and prevent unintended use or delivery. Documentation of nonconforming work should be traceable to corrective actions. Common examples:

Use-As-Is  
Repair

Rework  
Scrap

## 12. Corrective Action



Investigate the root cause of nonconformances and identify actions to prevent recurrence. Include QA follow-up to confirm that corrective action was taken and was effective. Disseminate lessons learned as appropriate.

1. FTA, Quality Management System Guidelines, 2019



# FTA's Fifteen Elements of a Quality Program

## 13. Quality Records



Specify procedures for establishing and maintaining quality records. Requirements for consultants and contractors should be specified and made part of bid contracts and specifications. Quality records document achievement of the quality objectives and adherence to the Quality Plan. They include QC/QA, inspection and test result, and calibration records.

## 14. Quality Audits



Describe an audit program to ensure that the Quality Plan is implemented in accordance with requirements. Audit findings should be documented and may contribute to corrective actions and lessons learned. Audits support continual improvement.

## 15. Training



Identify specific training required. All personnel performing work that affects quality should be qualified based on appropriate education, training, and/or experience, and records of training should be maintained.

# Summary – Quality Plan Expectations

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- Quality Plan is signed and dated, demonstrating management commitment, review, and approval. Identifies key management positions and individual responsible for quality.
- Quality policy clearly states intentions with respect to quality.
- Includes requirements and procedures for controlling and verifying the product, service, and related equipment, such as QC/QA, measuring and testing, and purchasing and receiving.
- Document control requirements ensure current versions are in use.
- Describes required quality records to demonstrate fulfillment of the plan.
- Demonstrates commitment to continual improvement through corrective/preventive action, audits, and lessons learned.
- Identifies training requirements to ensure that staff understand and follow the plan.
- Contract-specific requirements (if any) are incorporated.

# Questions



# Closing

- VTA's BART Silicon Valley Phase II

<https://www.vta.org/projects/bart-sv/phase-ii>

- American Society for Quality

<https://asq.org/>

- FTA Quality Management System Guidelines

<https://www.transit.dot.gov/funding/grant-programs/capital-investments/quality-management-system-guidelines>

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*Solutions that move you*

Strategic  
Partnership

The background of the left side of the slide features a 3D illustration of interlocking gears. One gear is yellow and has the word 'Strategic' written on it, while another is white and has the word 'Partnership' written on it.

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<https://www.vta.org/business-center>

**TO GET CERTIFIED go to:** <https://www.vta.org/business-center/business-diversity-programs> for online application

#### **UPCOMING EVENTS**

**BAY AREA DIVERSITY BUSINESS FORUM**

**MASS.ELECTRIC & KIEWIT**

**Noon-1:30pm Tuesday, December 14**

**Register at:** <https://tinyurl.com/BayAreadDBF-December>

**BOC MEET THE BUYERS PROCUREMENT FORUM**

**11am-Noon Thursday, December 16**

**Register at:** <https://tinyurl.com/BOC-Procurement-Forum>

#### **QUESTIONS CONTACT:**

**Jennifer.Mena@vta.org 408-321-5876**