Control of Materials: Quality Assurance Programs (QAP)

Control of Materials/QAP: Objectives

Be able to….

- Find helpful resources
- Know basic materials “concepts”
- Understand the key elements of a QAP
- Update and implement QAP
- Perform proper record keeping

Control of Materials/QAP: Helpful Resources

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Quality Assurance Program (QAP) Manual for Use by Local Agencies

This manual provides quality assurance guidelines for materials used in Federal-aid projects off the State Highway System.

APPROVED BY:

DENIX D. ANBIAH
Chief
Division of Local Assistance
California Department of Transportation

01/06/09
Date

for VINCENT MAMMANO
Acting California Division Administrator
Federal Highway Administration

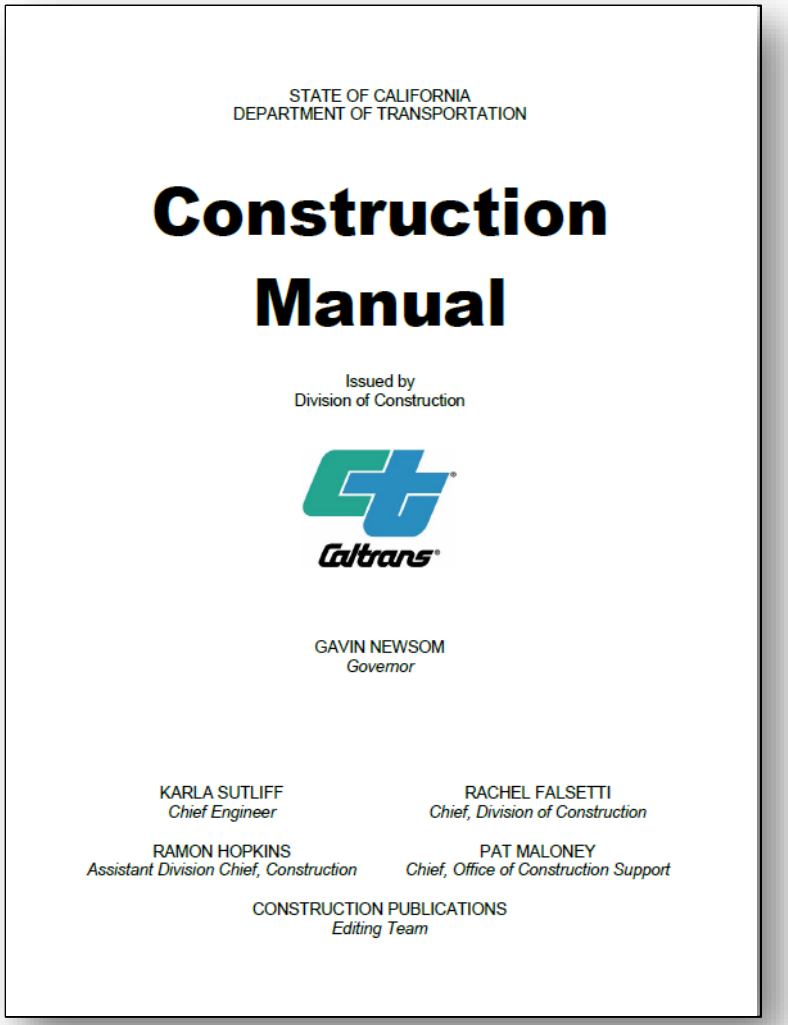
1/09/09
Date

December 2008
Division of Local Assistance

Note: Quality Assurance Programs should be reviewed and updated every five years or more frequently.

www.dot.ca.gov/hq/LocalPrograms/public/QAP_Manual.pdf

Control of Materials/QAP: Helpful Resources



STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

Construction Manual

Issued by
Division of Construction

Caltrans

GAVIN NEWSOM
Governor

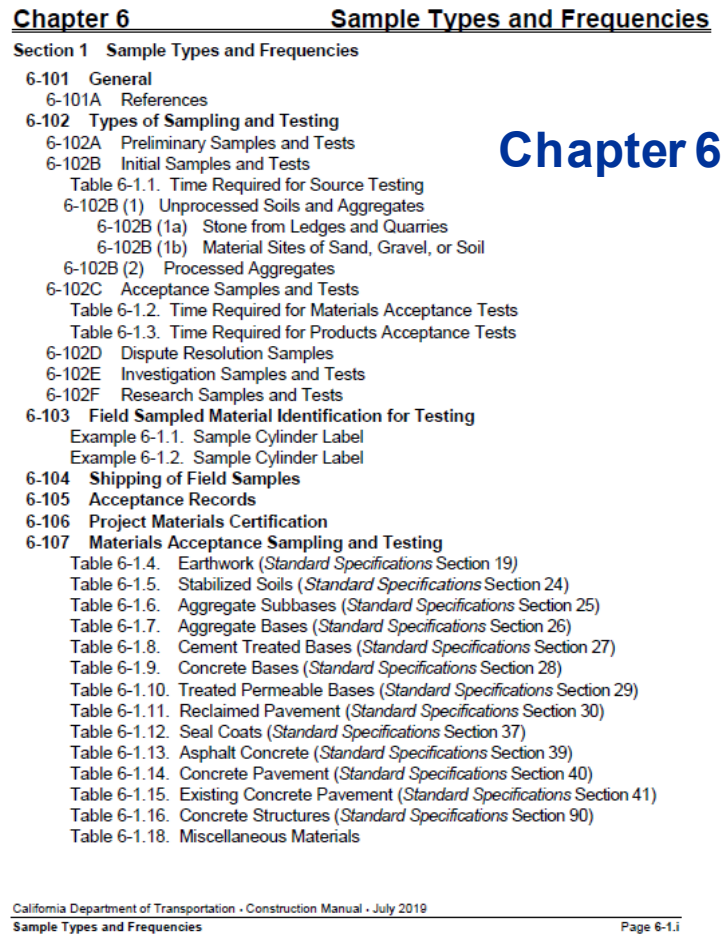
KARLA SUTLIFF
Chief Engineer

RACHEL FALSETTI
Chief, Division of Construction

RAMON HOPKINS
Assistant Division Chief, Construction

PAT MALONEY
Chief, Office of Construction Support

CONSTRUCTION PUBLICATIONS
Editing Team



Chapter 6 Sample Types and Frequencies

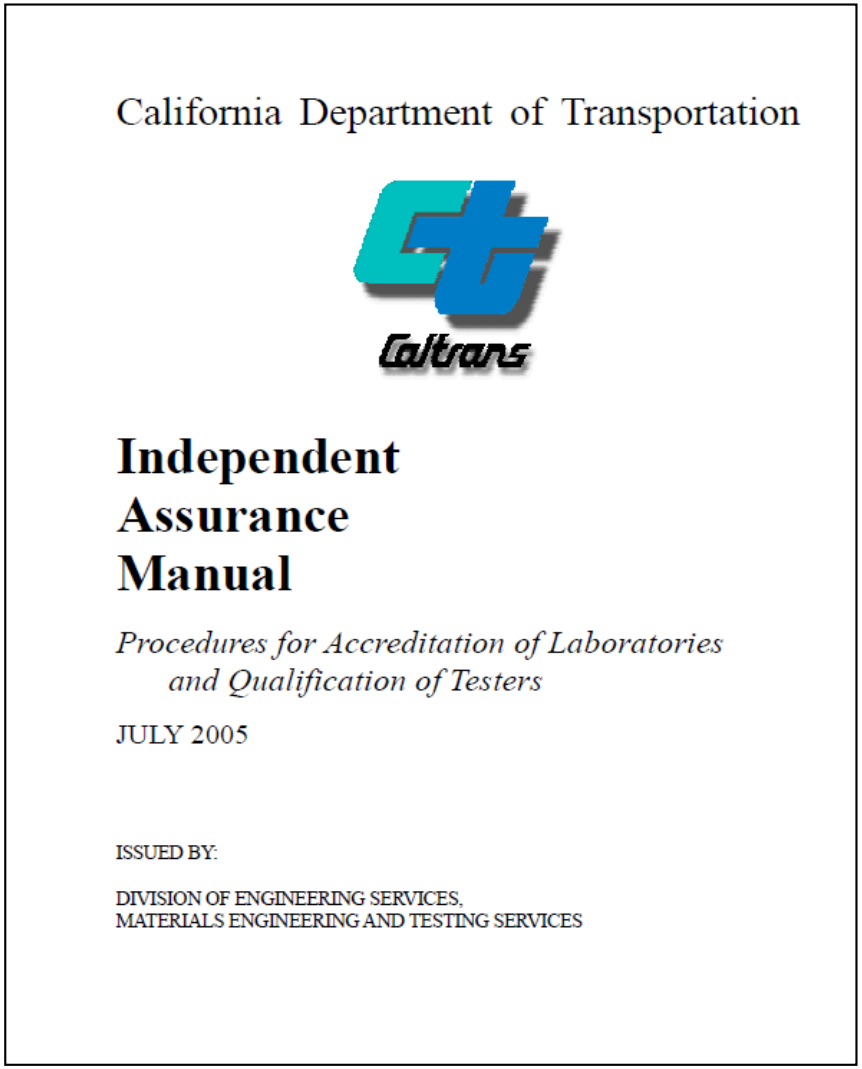
Section 1 Sample Types and Frequencies

Chapter 6

https://dot.ca.gov/-/media/dot-media/programs/construction/documents/policies-procedures-publications/construction-manual/sec6-1.pdf

Control of Materials/QAP: Helpful Resources

- Tester Qualification
- Laboratory Accreditation
- Reference Sample Program



https://dot.ca.gov/programs/engineering-services/

Control of Materials/QAP: Helpful Resources

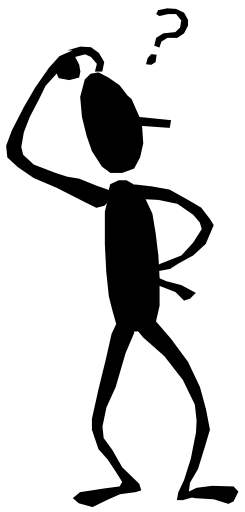
Six Key Resources:

1. LAPM
2. QAP Manual
3. Construction Manual (Ch. 6)
4. Independent Assurance Manual
5. Index to California Test Methods (CTM)
6. Standard Specifications/Special Provisions

Control of Materials/QAP: Basic Materials "Concepts"

Why Do We Sample and Test?

- Establish the quality of materials entering the work
- Ensure all materials incorporated into the work meet contract specifications
- Check other samples, tests, testers, and equipment



SECTION B

The Sacramento Bee

★★ Tuesday, November 14, 1995

METRO

STATE

EDUCATION EXTRA back page

EDITORIALS

OBITUARIES

Resurfaced Metro runway needs repair

By Ted Bell
Bee Staff Writer

A $1.1 million resurfacing job on Sacramento Metro Airport's primary runway – completed last year and designed to last up to 15 years – has already turned up defective, county officials report.

The asphalt surface has begun separating at the critical zone on the runway where the aircraft brakes are applied just before turning on to a taxiway.

"You don't want that slippage when a 120,000-pound aircraft suddenly brakes," said Bruce Mosley, head of air operations for the county's Department of Airports.

If left unrepaired, pieces of the runway could begin crumbling and get sucked into jet engines, according to a report to be presented to county supervisors today.

An emergency-repair crew will start working on the airport's west runway, designated 16R-34L, shortly after 6 a.m. today, and the asphalt cover over an approximately 11,500-square-foot area should be ready for use again Wednesday.

The work should have minimal effect on arrivals and departures today, according to Mosley. He said taxiing time by airliners using the 8,600-foot east runway will be longer, but he anticipates no delays.

Mosley said repairing the west runway is particularly urgent because it's the stretch best equipped to handle aircraft in poor weather. Metro's other runway, to the east of the terminal area, is not as well equipped for instrument landings and takeoffs.

The county's Board of Supervisors will be asked later today to approve the expenditure of up to $50,000 to cover the repair contract awarded by Public Works Director Douglas Fraleigh under his emergency authority.

The repair work will be done by Teichert Construction crews because they are already at the airport, working on a new overcrossing and interchange.

In a report to the county supervisors, Fraleigh said an investigation is under way "to determine the cause of the failure and culpability of the parties involved with the runway rehabilitation completed in June 1994."

The $1.1 million west runway work was part of an $11 million contract awarded to Granite Construction Co. to refurbish all of Metro's runways and taxiways. The job was completed between May 26 and June 11 last year.

A spokesman for Granite Construction said Monday the repair work should cost

Please see AIRPORT, page B4

West Dublin costs soar as BART scraps walkways

Phillip Matier and Andrew Ross
Published 4:00 a.m., Monday, February 15, 2010

The price tag for BART's stalled West Dublin/Pleasanton Station has jumped to $106 million - a whopping $26 million more than the cash-strapped transit system had planned.

You can blame the increase on a pair of prefab walkways that have been sitting on the side of Interstate 580 for several months.

The walkways were intended to connect the new station, which sits on the freeway median, to adjacent neighborhoods.

But much to the embarrassment of BART planners, the walkways' welds failed to meet Caltrans' standards. Because they would be going over the freeway, Caltrans got to make the call to scrap them.

BART directors recently voted to pay $6 million to settle a dispute with the contractors over the agency's role in approving the substandard bridges. But BART spokesman Linton Johnson said the transit agency also is on the hook for an additional $20 million in extra construction costs for having to work around the missing bridges for the past year and a half.

That doesn't include the estimated $3 million in lost fares from delaying the station's opening, which is now set for spring 2011.

"I don't know what to say other than I am extremely distressed," said new BART board President James Fang.

Control of Materials/QAP: Basic Materials "Concepts"

Concept 1.

- Failing material tests are **always** the problem of the Contractor.
- Failing material tests are **never** the problem of the RE, provided you take appropriate action in a timely manner.
- If the RE does not act in a timely manner, failing material tests **always** become the problem of the Resident Engineer.

Control of Materials/QAP: Basic Materials "Concepts"

Concept 2.

RE has the right to…

- Sample
- Test
- Inspect
- Reject …material at the jobsite

"The Engineer may reject work that does not comply with the Contract <u>at any time</u>, including after a payment has been made."

<u>Section 5-1.01 and 5-1.03 CT Standard Specifications</u>

Control of Materials/QAP: Basic Materials "Concepts"

Concept 3.

- Not paying for a material that fails to meet a contract requirement, but allowing it to remain in place, is not an acceptable solution.
- Material good enough to be left in place has some value and should be paid for at that value.
- If the material has no value then it is not good enough to be left in the completed work.

Control of Materials/QAP: Basic Materials "Concepts"

Concept 4.

- **All** materials entering into the work must meet the *contract requirements* for that item.
- If material that does not meet the contract requirements is to remain in the work, a contract change (CCO) is required.

Control of Materials/QAP: What is a QAP?

A sampling and testing program that will provide assurance that the *materials and workmanship* incorporated in each roadway/highway construction project are in *conformance with* the *contract specifications.*

Chapter 16.14 LAPM, "Quality Assurance Program"

Control of Materials/QAP: What is a QAP?

- Required for all projects
- Signed by public works director or next highest PE
- Updated once every 5 years, or more often

Control of Materials/QAP: What is a QAP?

It is the document by which an *auditor* will determine if adequate testing/QA was performed on <u>your</u> project.

Control of Materials/QAP: What is a QAP?

Structure of a typical QAP:

A. General Discussion

- Variations for SHS, NHS, Non-NHS projects
- Acceptance Program elements
- IA Program elements
- Dispute resolution process
- Filing of QA Documents

Control of Materials/QAP: What is a QAP?

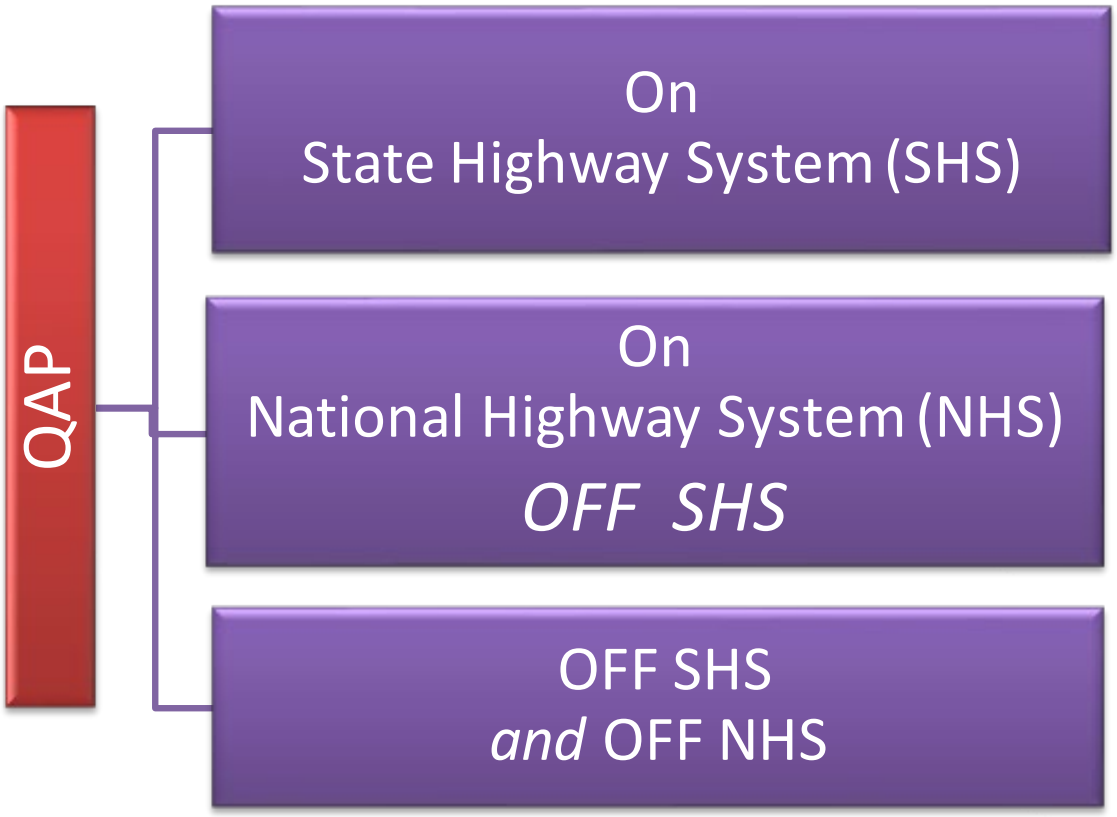
Structure of a typical QAP:

B. Tables and Attachments

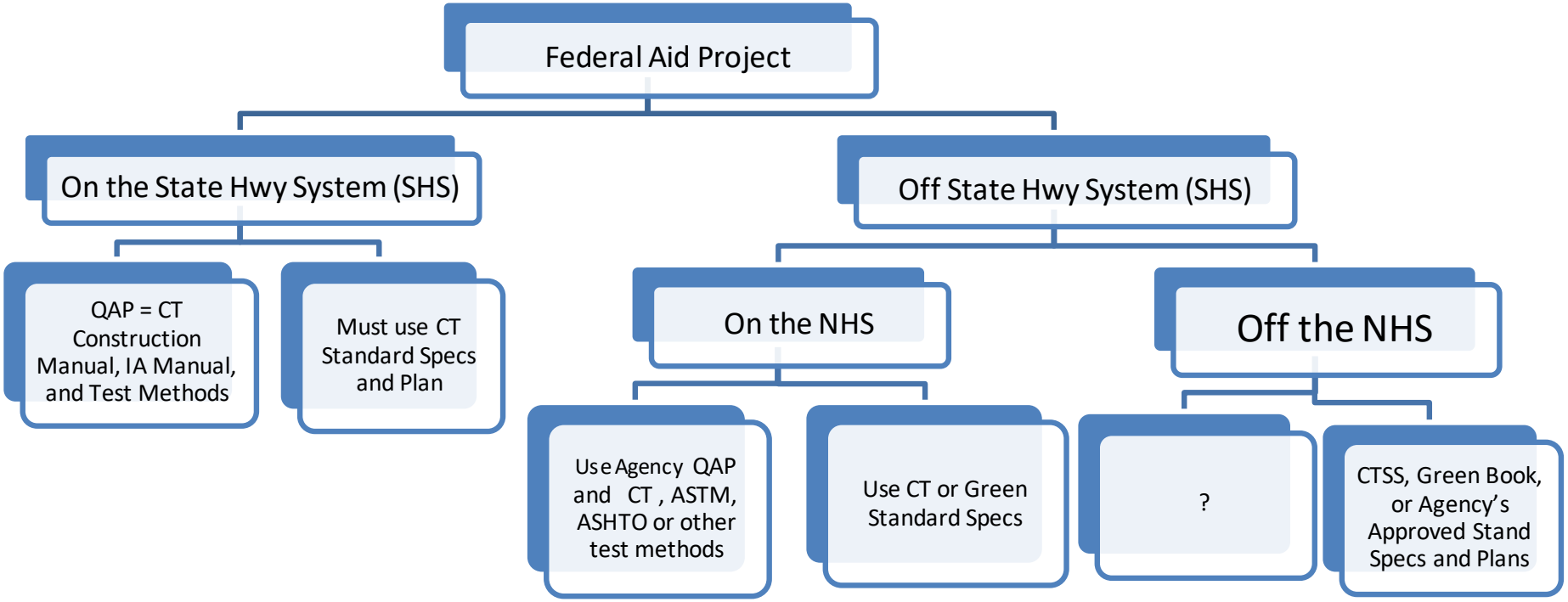
- Sampling and Testing Frequency Requirements.
- Materials Accepted by a Certificate of Compliance.
- Testing Results Summary Log.
- QA Filing Index (recommended).

Control of Materials/QAP: Elements of a QAP

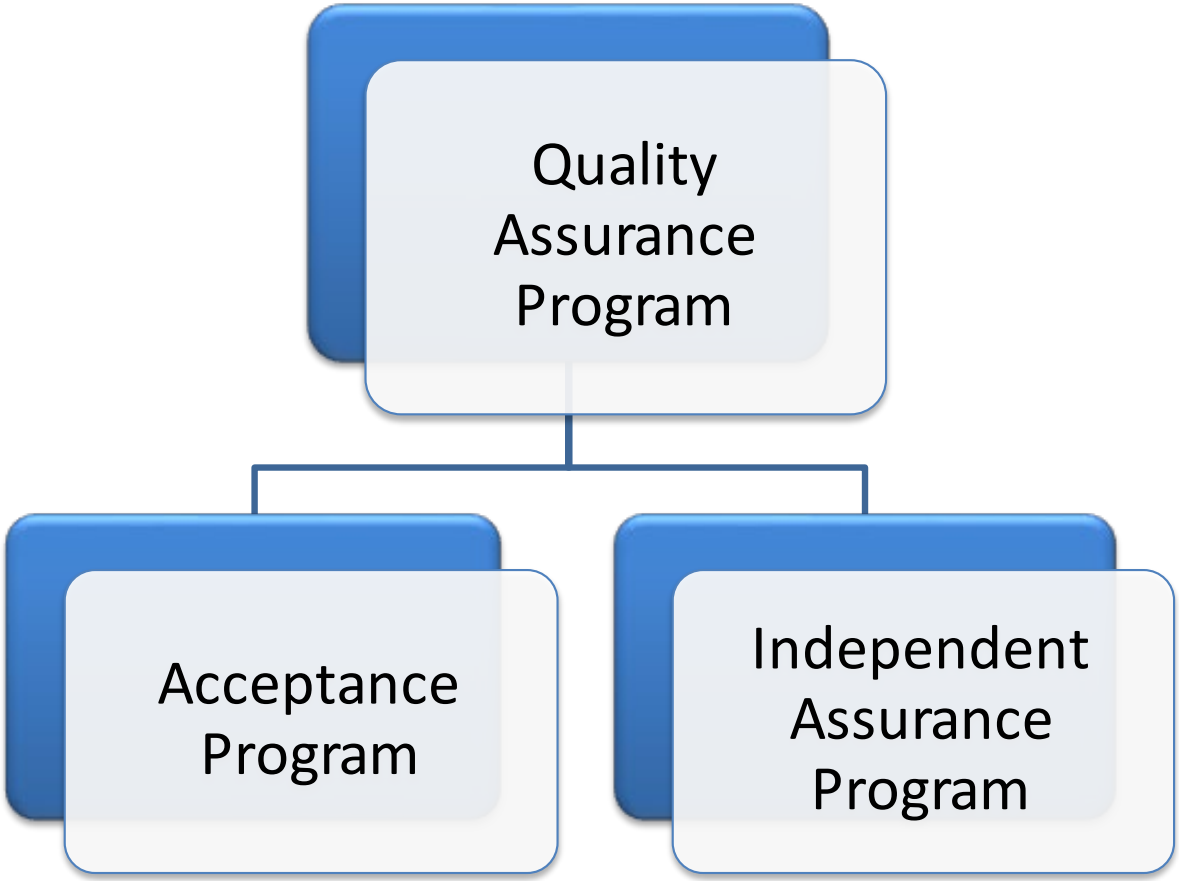
Variations within your QAP:



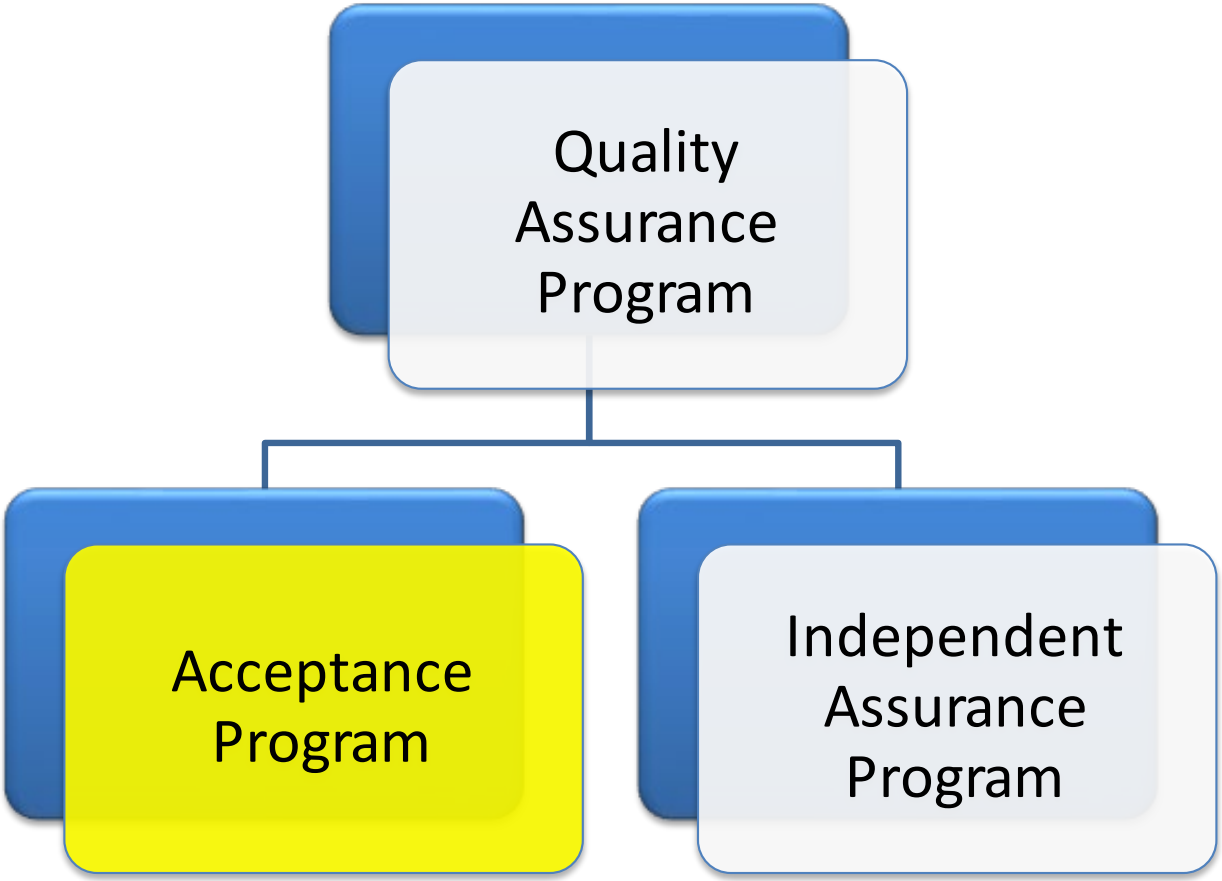
Control of Materials/QAP: Elements of a QAP



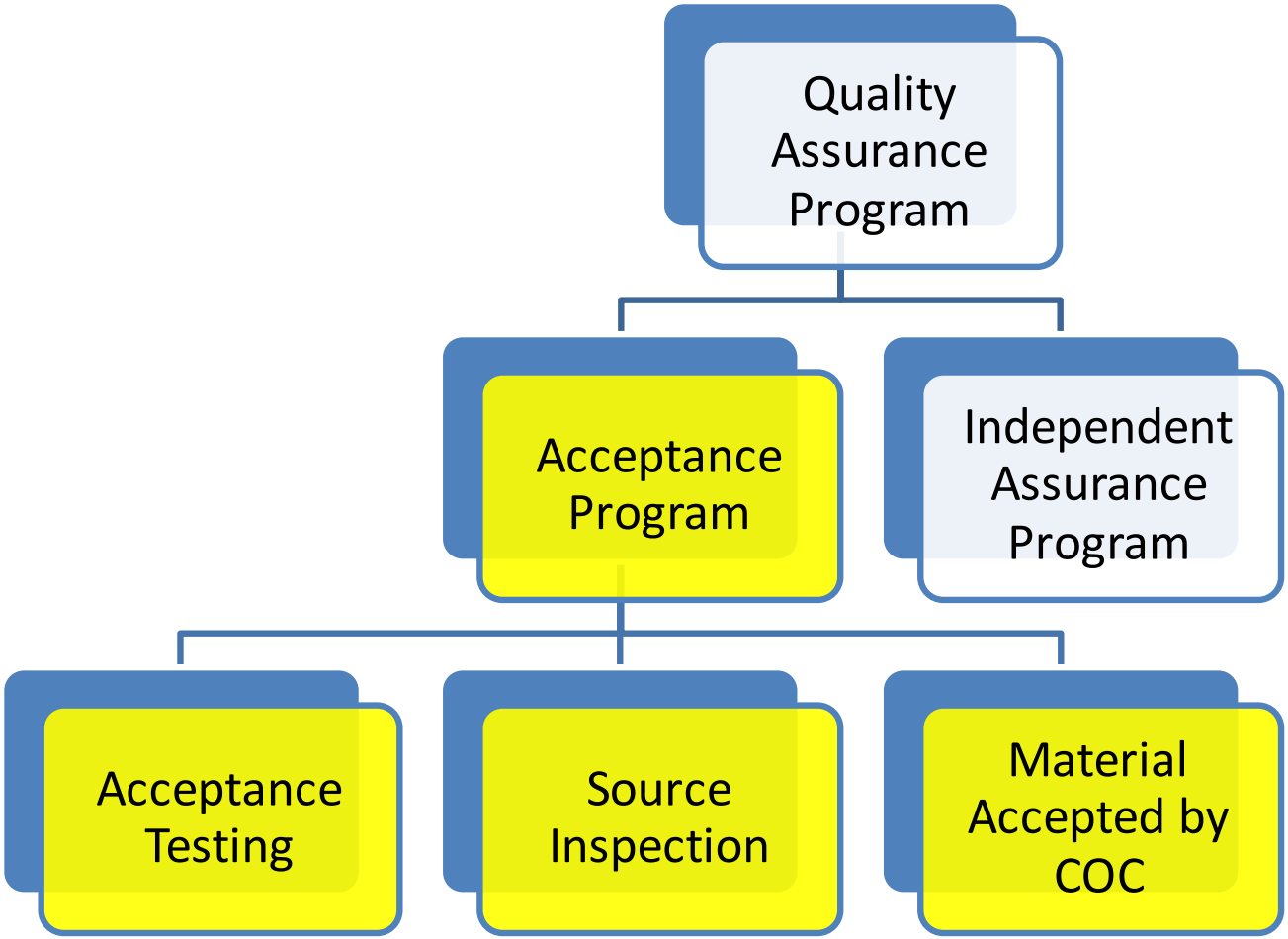
Control of Materials/QAP: Elements of a QAP



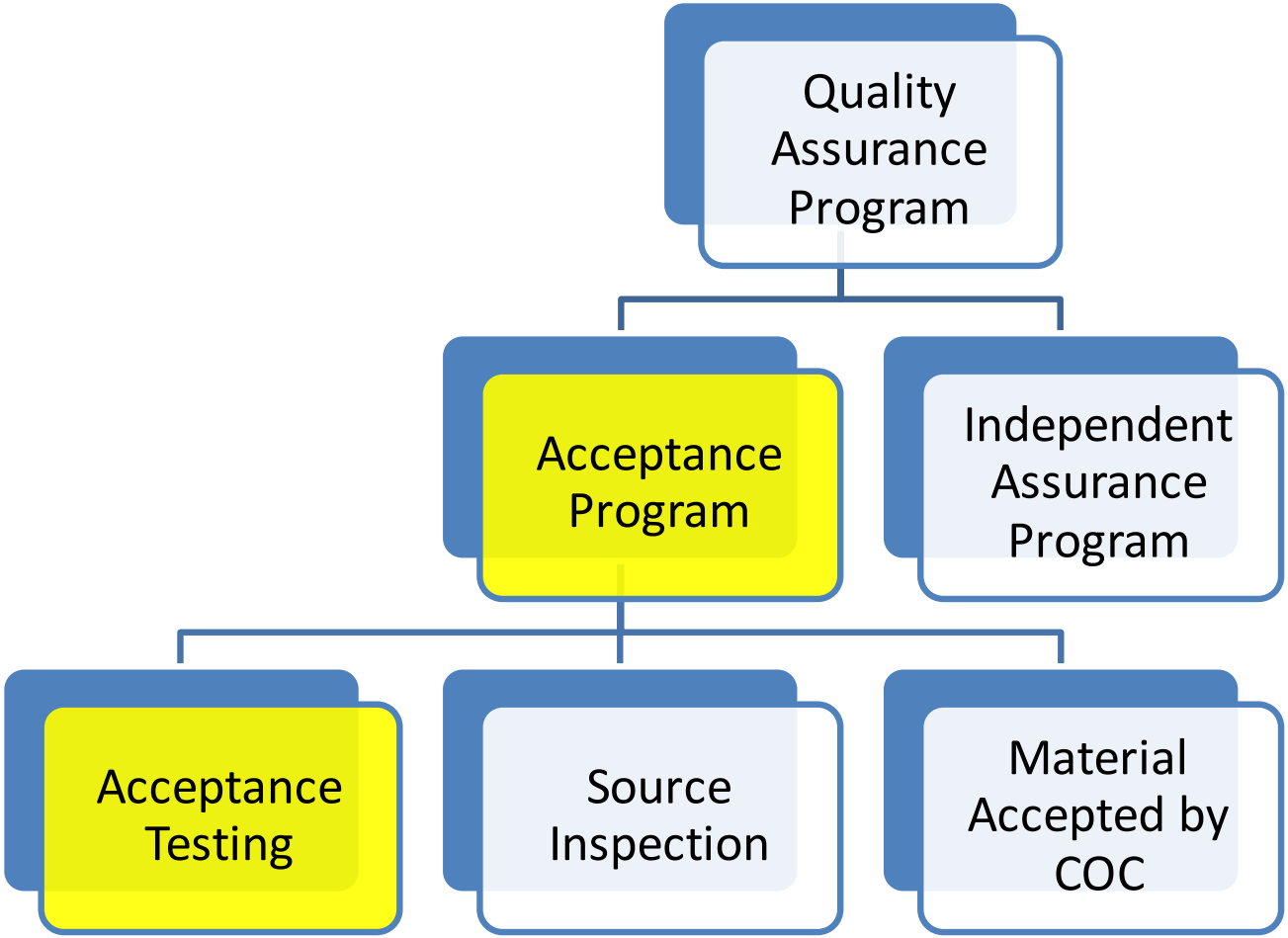
Control of Materials/QAP: Elements of a QAP



Control of Materials/QAP: Elements of a QAP



Control of Materials/QAP: Elements of a QAP



Control of Materials/QAP:
Acceptance Program - Testing

- Verifies the materials and workmanship complies with the contract specs.
- Establishes the minimum number of acceptance tests to be used on each type of material to determine compliance –

Control of Materials/QAP:
Acceptance Program - Testing

26-1.02B Class 2 Aggregate Base

Aggregate gradation must be within the percentage passing limits for the sieve sizes shown in the following table:

Aggregate Gradation

Sieve size	Percentage passing			
	1-1/2 inch maximum		3/4 inch maximum	
	Operating range	Contract compliance	Operating range	Contract compliance
2"	100	100	–	--
1-1/2"	90–100	87–100	–	--
1"	--	--	100	100
3/4"	50–85	45–90	90–100	87–100
No. 4	25–45	20–50	35–60	30–65
No. 30	10–25	6–29	10–30	5–35
No. 200	2–9	0–12	2–9	0–12

The aggregate quality characteristics must comply with the requirements shown in the following table:

Aggregate Quality Characteristics

Quality characteristic	Requirement	
	Operating range	Contract compliance
Resistance (R-value, min)	–	78
Sand equivalent (min)	25	22
Durability index (min)	–	35

Control of Materials/QAP:
Acceptance Program - Testing

Table 6-1.7. Materials Acceptance Sampling and Testing Requirements: Aggregate Bases (2010 *Standard Specifications* Section 26)

Test	Test Method	Sample Size & Container Size	Sampling Location (See Note 1)	Acceptance Test Frequency	Remarks
AGGREGATE BASES Class 1, Class 2, and Class 3					
Sieve Analysis	California Test 202	50 lb	Materials site or stockpile	Every 3000 tons or 2000 cu yd; see Remarks and Note 2	If material is uniform and well within specification limits, frequency may be decreased to 1 per day
Sand Equivalent	California Test 217			Every 3000 tons or 2000 cu yd; see Remarks and Note 2	If material is uniform and well within specification limits, frequency may be decreased to 1 per day
R-Value	California Test 301	50 lb	Materials site or stockpile	Every 3000 tons or 2000 cu yd; see Remarks	R-value testing may reduced to minimum 1 acceptance test per project when test records demonstrate that material from the same source, and having comparable grading and sand equivalent values, meets minimum R-value requirements
Durability Index	California Test 229	50 lb	Materials site or stockpile	1 per project; see Remarks	Durability test not required for Class 3 aggregate base
Moisture	California Test 226	25 lb	Materials site or stockpile	2 daily when aggregate base is paid for by weight	
Relative Compaction	California Test 231	Sample for California Test 216	Project site in accordance with California Test 231	Every 2000 sq yd	
Maximum Wet Density	California Test 216	35 lb	Relative compaction test site locations	Every 2000 sq yd, see Remarks	Wet common-composite test maximum value may be used in accordance with California Test 231
Dimensions	N/A	N/A	Random locations	As necessary for acceptance	Verify thickness of aggregate base

Notes:
1. See California Test 125 for sampling procedures.
2. If material is outside the specification limits sample and test representative material every 500 cu yd so that deductions may be taken for noncompliant material.

CT Construction Manual

Control of Materials/QAP:
Acceptance Program - Testing

SUBGRADE (DISTURBED BASEMENT SOIL) OR EMBANKMENT

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Maximum Density and Relative Compaction	CT 216/CT 231	1 Min. Test per 5000 sq ft under vehicle traveled way and shoulder 1 Min. Test Per 300 linear foot under sidewalk	Random locations as determined by the Engineer in place after compaction.

AGGREGATE BASES AND SUBBASES, IMPORTED BORROW

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Sieve Analysis	CT 202	1 Min. Test Per Material Source	Sample from site stockpile/plant prior to placement.
R-Value	CT 301		
Sand Equivalent	CT 217		
Maximum Density and Relative Compaction	CT 216/CT 231	1 Min. Test per 5000 sq ft	Random locations as determined by the Engineer in place after compaction.

STRUCTURE BACKFILL, SELECT BACKFILL

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Sieve Analysis	CT 202	1 Min. Test Per Material Source	Sample from site stockpile/plant prior to placement
R-Value	CT 301		
Sand Equivalent	CT 217		
Maximum Density and Relative Compaction	CT 216/CT 231	1 Min. Test Per 2 Vertical Lifts of Placement	Random locations as determined by the Engineer in place after compaction.

Control of Materials/QAP:
Acceptance Program - Testing

Minor Quantities Accepted Without Testing Allowed, if:

1. Meets the criteria of Section 16-14 of the LAPM
   A. The source has recently furnished similar materials that passed testing requirements.
   B. The manufacturer will certify it meets the specs.

Control of Materials/QAP:
Acceptance Program - Testing

Only for "minor" quantities:

- Aggregates of PCC:

  <100 tons/day, < 500 tons/project

- Bituminous mixtures (Hot Mix AC)

  < 50 tons/day, also at RE's discretion if job < 500 ton

- Bituminous Material (Asphalts)

  < 20 gallons/project

- Non-reinforced or clay pipe

  < 100 feet/project

Control of Materials/QAP:
Acceptance Program - Testing

Mix Design Approval

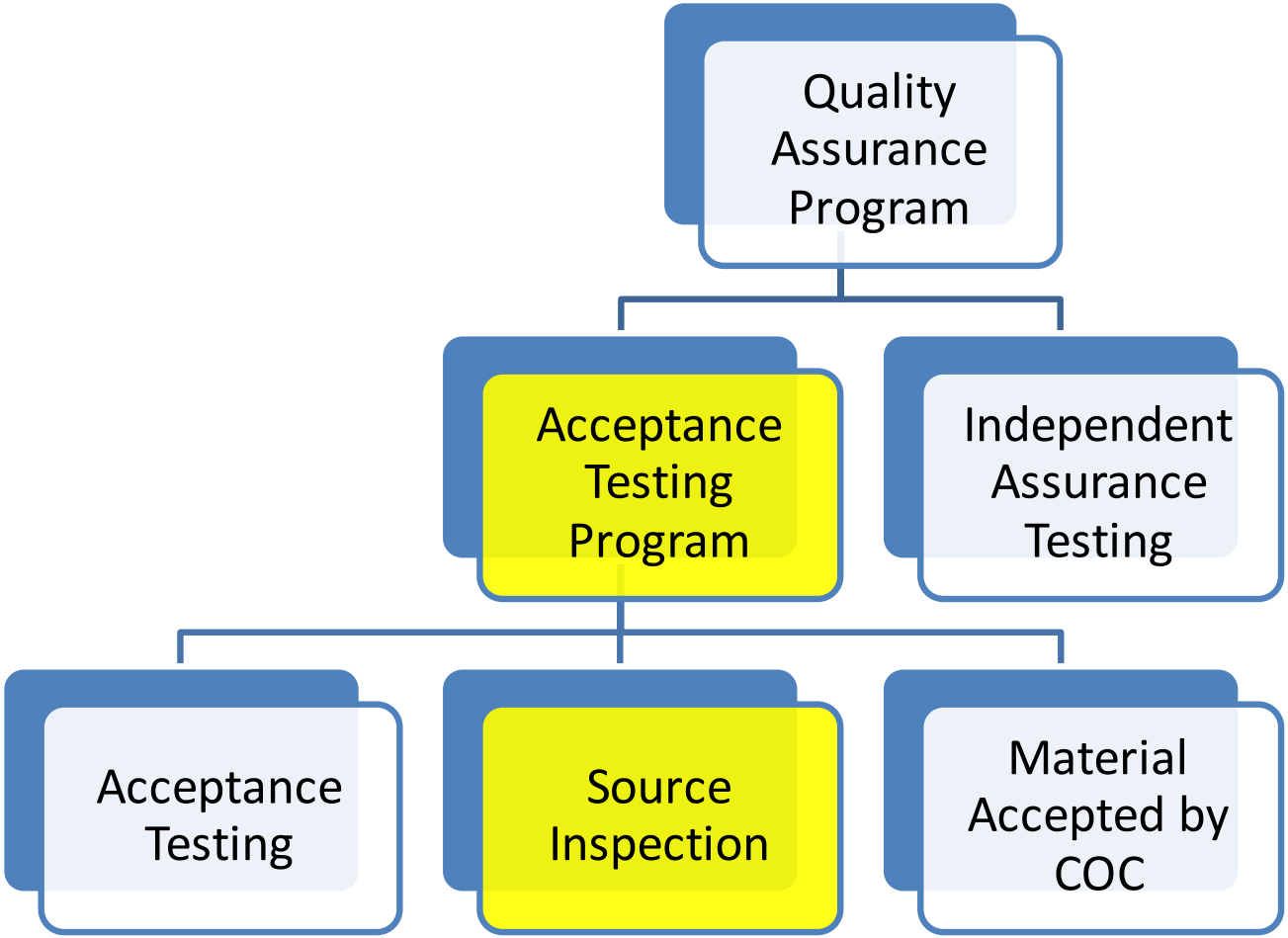
Submittal by contractor

- Source (plant)
- Product
- Mix design number
- Specify area/location or item of work

Reviewed and approved by RE

- Approve in writing
- Specifies what work it may be used in
- Copy in file

Control of Materials/QAP:
Acceptance Program - Source Inspection

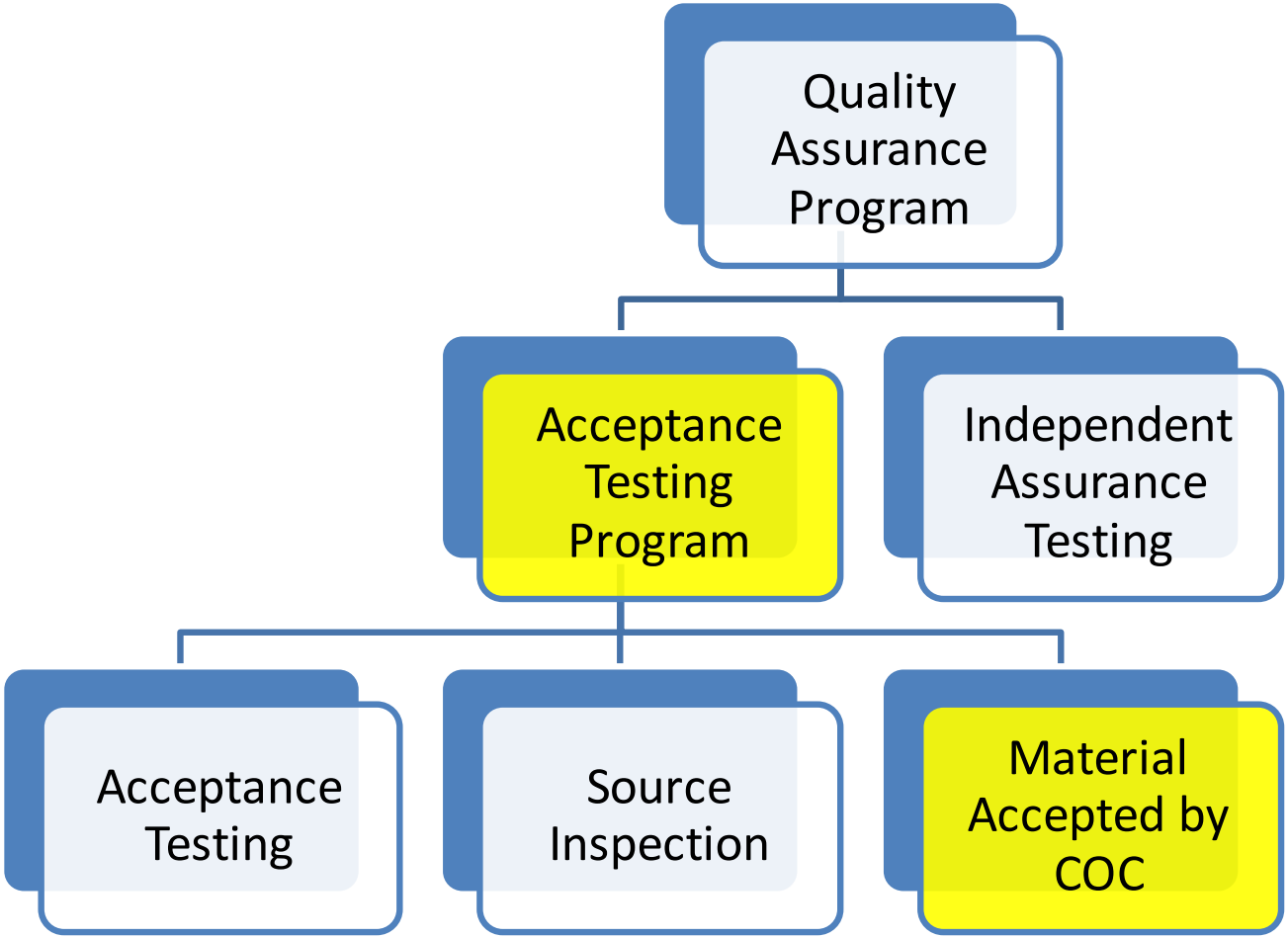


Control of Materials/QAP:
Acceptance Program - Source Inspection

Source Inspection

- Used for manufactured and prefabricated materials at locations other than the job site
- Performed by agency or consultant lab staff
- Documentation is key!

Control of Materials/QAP: Elements of a QAP



Control of Materials/QAP: Materials Accepted by COC

certificate of compliance: Certificate stating the material complies with the Contract.

1-1.07 DEFINITIONS, CTSS

Control of Materials/QAP: Materials Accepted by COC

When specified in the contract –

Submit a certificate:

- **Before** material is incorporated.
- For each lot, and identify lot on the COC.
- Signed by producer of the material.
- Stating the material complies with the contract.

6-2.03C Certificates of Compliance, CTSS

4-1.5 General, Greenbook

Control of Materials/QAP: Materials Accepted by COC

12-3.03 PLASTIC TRAFFIC DRUMS

12-3.03A(3) Submittals

Submit a certificate of compliance for plastic traffic drums.

12-3.03A(3) Submittals CTSS

Control of Materials/QAP: Materials Accepted by COC

52 REINFORCEMENT

52-1 GENERAL

52-1.01C(3) Certificates

Submit a certificate of compliance for each shipment of reinforcement.

If requested, submit the following:

1. Copy of the certified mill test report for each heat and size of reinforcing steel showing physical and chemical analysis
2. 2 copies of a list of all reinforcement before starting reinforcement placement

52-1.01C(3) Certificates
CTSS

Control of Materials/QAP: Materials Accepted by COC

Materials Accepted by a Certificate of Compliance - CTSS

Table 6-2.3. Materials Accepted by Certificate of Compliance (1 of 8)

Material/Product	Remarks (Including Requirements for Additional Backup Information Required with Certificate of Compliance)
Alternative earth retaining systems	Must state that the supplied material complies with the index criteria for the system at the time of prequalification.
Asphalt	Certificate of compliances must include the following: 1. Name and location of the supplier. 2. Grade of the asphalt. 3. The date and time of shipment. 4. A unique shipment number, such as a bill of lading number or manifest number. 5. A statement confirming that the transport vehicle was checked before loading and was found acceptable for the asphalt shipped. 6. The following wording: *" (Supplier name) hereby certifies that the asphalt product accompanying this certification was produced in accordance with the California Department of Transportation's Certification Program for Suppliers of Asphalt, and that this product complies in all respects with the requirements of the applicable specifications for the asphalt product identified on this document.* *I hereby certify by my signature that I have the authority to represent the*
	5. Signature by the manufacturer of the material and a statement that the material complies with the contract.
Asbestos cement pipe	
Asbestos sheet packing	
Asphalt modifier	Test results required with each truckload.

Table 6-2.3. Materials Accepted by Certificate of Compliance, CTCM

(Handout Pgs. 1-8)

Control of Materials/QAP: Materials Accepted by COC

Materials Requiring a Certificate of Compliance – Greenbook 2018

(Handout Pgs. 9-10)

	Section #	Material
1	4-5	Certificates of Compliance
2	4-7	Weighing and Metering Equip.
3	201-1.21	Cement
4	201-1.2.5.3	Fly Ash
5	201-1.2.5.4	Pozzolans
6	201-3.9	Joint Sealant , Type E
7	201--4.3	Curing Compound
8	203-1.3	Paving Asphalt
9	203-2.2	Liquid Asphalt
10	203-3.5	Microsurfacing Emulsion (MSE)
11	203-10.2.2	Latex
12	203-11.2	Asphalt Rubber Hot Mix (ARHM)
13	203-11.2.3.1	Crumb Rubber Modifier (CRM)
14	204-2.4	Treated Wood
15	206-1.1.2	Structural Steel , Rivets, Bolts, Pins
16	206-3.4.2.1	Gray Iron and Ductile Iron Castings
17	206-3.4.2.2	Gray Cast Iron Castings
18	206-3.4.2.3	Ductile Iron Castings
19	207-11.2.1	Corrugated Steel Pipe, pipe arches.
20	207-12.2.1	Structural Steel Products
21	207-14.2.1	Structural Aluminum Products
22	207-17.4.1	PVC Pipe
23	207-25.6.1	PolyPropylene Pipe
24	211-2	Materials used in Sewers
25	211-4.2	Viscometer Calibration
26	213-1	Engineering Geosynthetics
27	214-2	Traffic Paint, Thermo and Markers
28	216-8	Precast Reinforced Concrete Box
29	700-3.3.4	Fiberglass Standards
30	700-4.2.2	Conductors for Series Circuits, 5000V
31	700-5.3.1	Conductors and Cable
32	700-5.5.7	Lamp Receptable Conductors
33	700-5.5.11.8	LED Signal Modules
34	700-5.6.6.7	LED Pedestrian Signal Module

Control of Materials/QAP: Materials Accepted by COC

Buy America Certification

(A type of certificate of compliance)

Control of Materials/QAP: Materials Accepted by COC

Buy America Requirements

All manufacturing processes involved in steel or iron products must occur within the United States.

23 CFR 635.410 & 23 U.S.C. 313

Chapter 12 LAPM and 6-2.05 CTSS 2010

- Rolling
- Extruding
- Machining
- Bending
- Grinding
- Drilling
- Coating
- Welding
- Smelting

(Handout Pgs. 11-13)

Control of Materials/QAP: Materials Accepted by COC

Buy America applies:

To the **entire** construction contract even if there is only $1 in federal money in the project.

An Agency cannot "avoid" the Buy America requirement by declaring that the material is being paid for with the non-Federal portion of the funding.

Control of Materials/QAP: Materials Accepted by COC

Buy America Certification:

Furnish steel and iron materials with:

- COC for each shipment
  - Must also state, “All melting and manufacturing processes for these materials, including any application of a coating, occurred in the United States”
- Certified Mill Test Report for each heat and size.
  - Mill test report must indicate where the steel and iron were melted and manufactured

Control of Materials/QAP: Materials Accepted by COC

Buy America Certificate of Compliance must:

- Accompany all steel and iron
- Specify project number
- Specify lot number or mill marking
- State that the material complies with the contract specifications.
- Signed by the manufacturer (not the contractor)

Control of Materials/QAP: Materials Accepted by COC

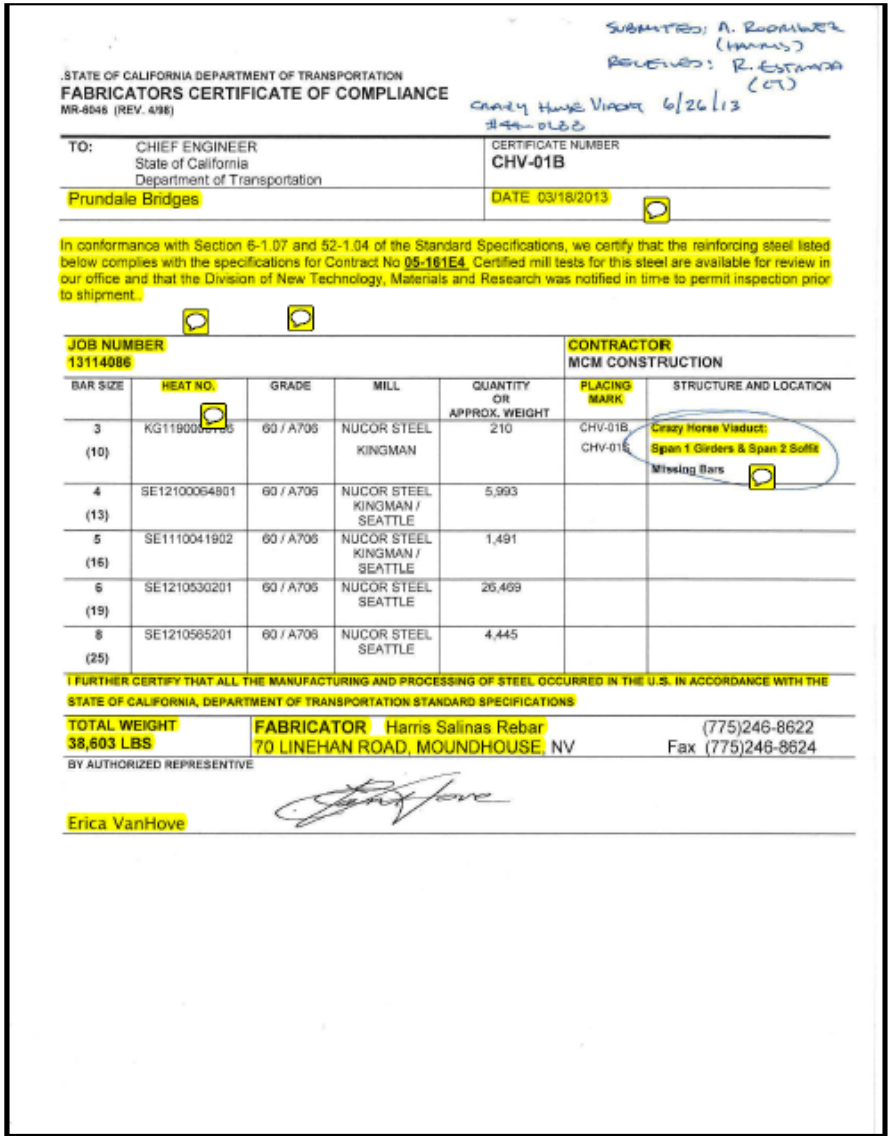
Buy America does not apply to:

A. Temporary steel
   - Falsework
   - Sheet piling
   - Shoring

B. Minimal use of all foreign iron and steel in which the total delivered cost to the project site is less than $2,500 or 0.1 percent of the contract amount, whichever is greater.
   - Supported by invoices
   - Includes cost of transportation
   - Keep records in your project files

Control of Materials/QAP: Material Accepted by COC

Sample Certificate of Compliance w/ Buy America Requirement



SUBMITTED: A. ROSALES (HARRIS)
RECEIVED: R. ESTRADA (CT)

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
FABRICATORS CERTIFICATE OF COMPLIANCE
MR-6045 (REV. 4/98)

Crazy Horse Viadu 6/26/13
#44-0182

TO: CHIEF ENGINEER, State of California, Department of Transportation	CERTIFICATE NUMBER: CHV-01B
Prundale Bridges	DATE 03/18/2013

In conformance with Section 6-1.07 and 52-1.04 of the Standard Specifications, we certify that the reinforcing steel listed below complies with the specifications for Contract No 05-161E4. Certified mill tests for this steel are available for review in our office and that the Division of New Technology, Materials and Research was notified in time to permit inspection prior to shipment.

JOB NUMBER 13114086 — CONTRACTOR MCM CONSTRUCTION

BAR SIZE	HEAT NO.	GRADE	MILL	QUANTITY OR APPROX. WEIGHT	PLACING MARK	STRUCTURE AND LOCATION
3 (10)	KG1190038736	60 / A706	NUCOR STEEL KINGMAN	210	CHV-01B CHV-01B	Crazy Horse Viaduct: Span 1 Girders & Span 2 Soffit Missing Bars
4 (13)	SE12100064801	60 / A706	NUCOR STEEL KINGMAN / SEATTLE	5,993		
5 (16)	SE1110041902	60 / A706	NUCOR STEEL KINGMAN / SEATTLE	1,491		
6 (19)	SE1210530201	60 / A706	NUCOR STEEL SEATTLE	26,469		
8 (25)	SE1210565201	60 / A706	NUCOR STEEL SEATTLE	4,445		

I FURTHER CERTIFY THAT ALL THE MANUFACTURING AND PROCESSING OF STEEL OCCURRED IN THE U.S. IN ACCORDANCE WITH THE STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS

TOTAL WEIGHT 38,603 LBS

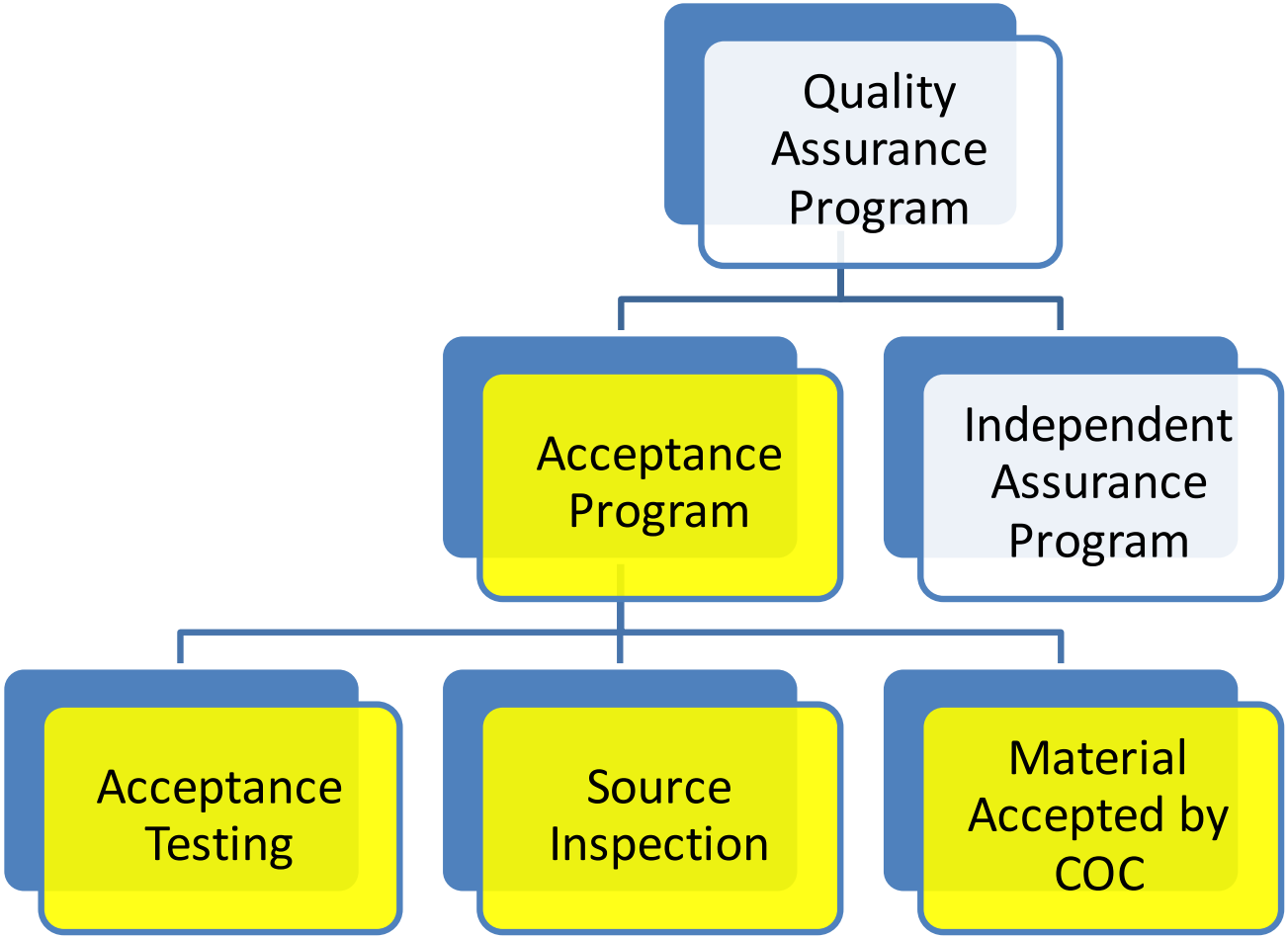
FABRICATOR Harris Salinas Rebar
70 LINEHAN ROAD, MOUNDHOUSE, NV
(775)246-8622
Fax (775)246-8624

BY AUTHORIZED REPRESENTIVE

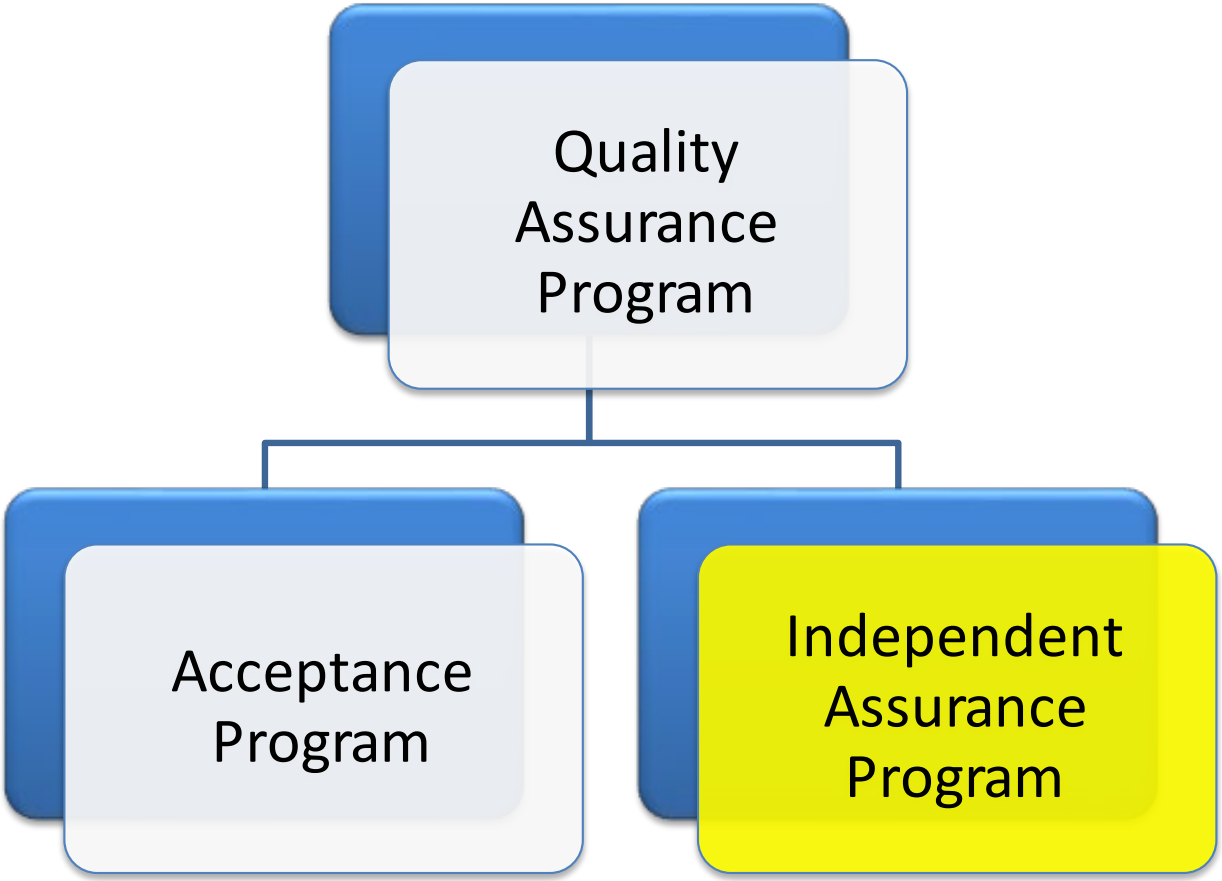
Erica VanHove

(Handout Pg. 14)

Control of Materials/QAP: Elements of a QAP



Control of Materials/QAP: Elements of a QAP



Control of Materials/QAP: Elements of a QAP

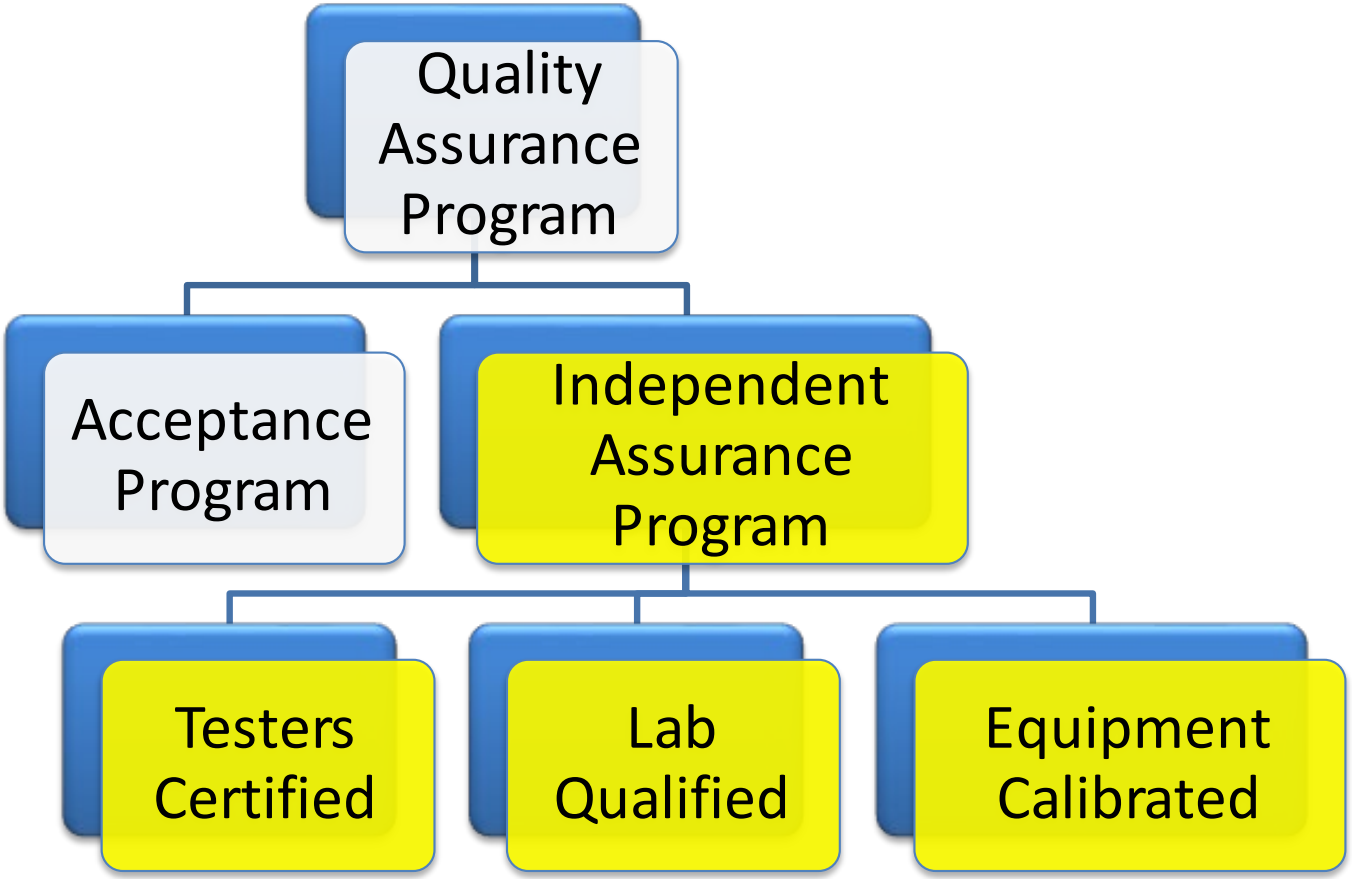
Independent Assurance Program

Verifies that the acceptance testing is being performed correctly.

"…*an unbiased and independent evaluation of all the sampling and testing procedures used in the acceptance program.*"

23 CFR 637.203

Control of Materials/QAP: Elements of a QAP



Control of Materials/QAP: Elements of a QAP

The Independent Assurance program shall also:

- Include a schedule of frequency for IA evaluation
- Maintain records of tester certificates of proficiency and lab accreditation

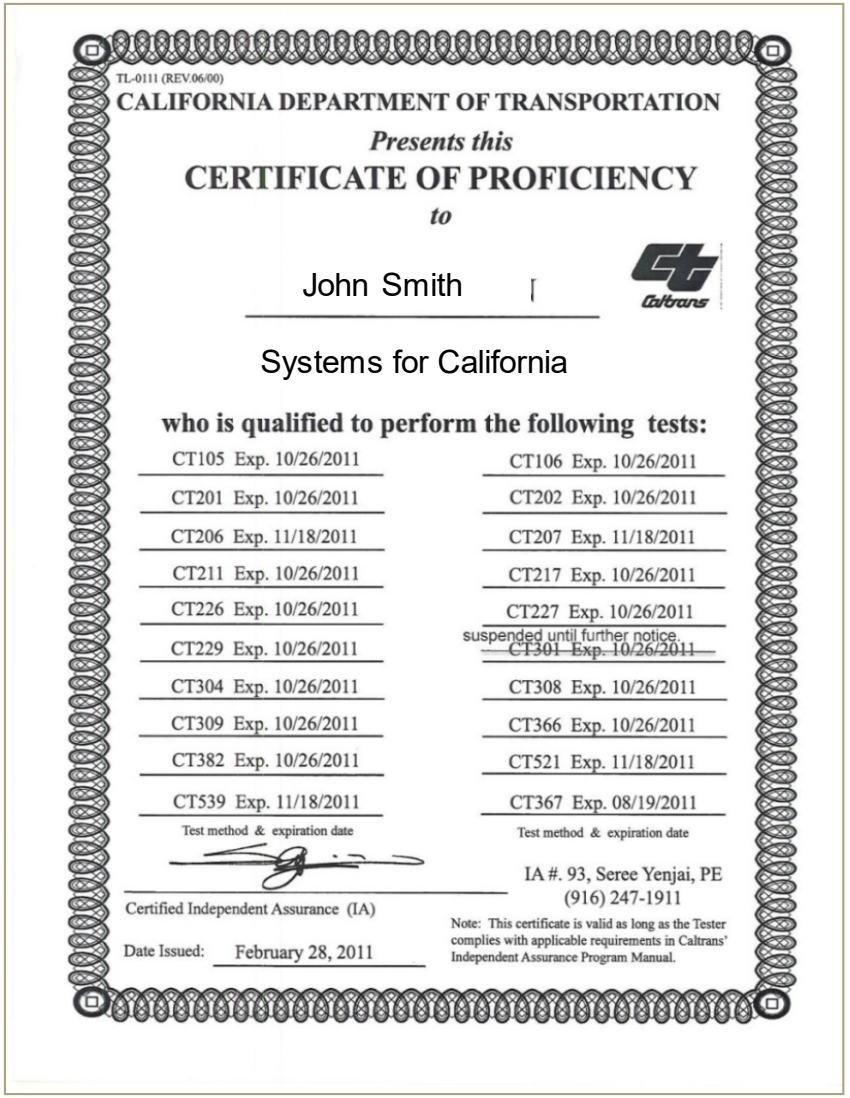
(Handout Pgs. 15-23)

FHWA Tech Brief: Independent Assurance Programs

Control of Materials/QAP: Elements of a QAP

IA:
Tester Certificates of Proficiency

1. Name of tester
2. Methods certified
3. Expiration date



TL-0111 (REV.06/00)

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Presents this

CERTIFICATE OF PROFICIENCY

to

John Smith

Systems for California

who is qualified to perform the following tests:

CT105 Exp. 10/26/2011	CT106 Exp. 10/26/2011
CT201 Exp. 10/26/2011	CT202 Exp. 10/26/2011
CT206 Exp. 11/18/2011	CT207 Exp. 11/18/2011
CT211 Exp. 10/26/2011	CT217 Exp. 10/26/2011
CT226 Exp. 10/26/2011	CT227 Exp. 10/26/2011
CT229 Exp. 10/26/2011	suspended until further notice. CT301 Exp. 10/26/2011
CT304 Exp. 10/26/2011	CT308 Exp. 10/26/2011
CT309 Exp. 10/26/2011	CT366 Exp. 10/26/2011
CT382 Exp. 10/26/2011	CT521 Exp. 11/18/2011
CT539 Exp. 11/18/2011	CT367 Exp. 08/19/2011
Test method & expiration date	Test method & expiration date

Certified Independent Assurance (IA)

IA #. 93, Seree Yenjai, PE
(916) 247-1911

Date Issued: February 28, 2011

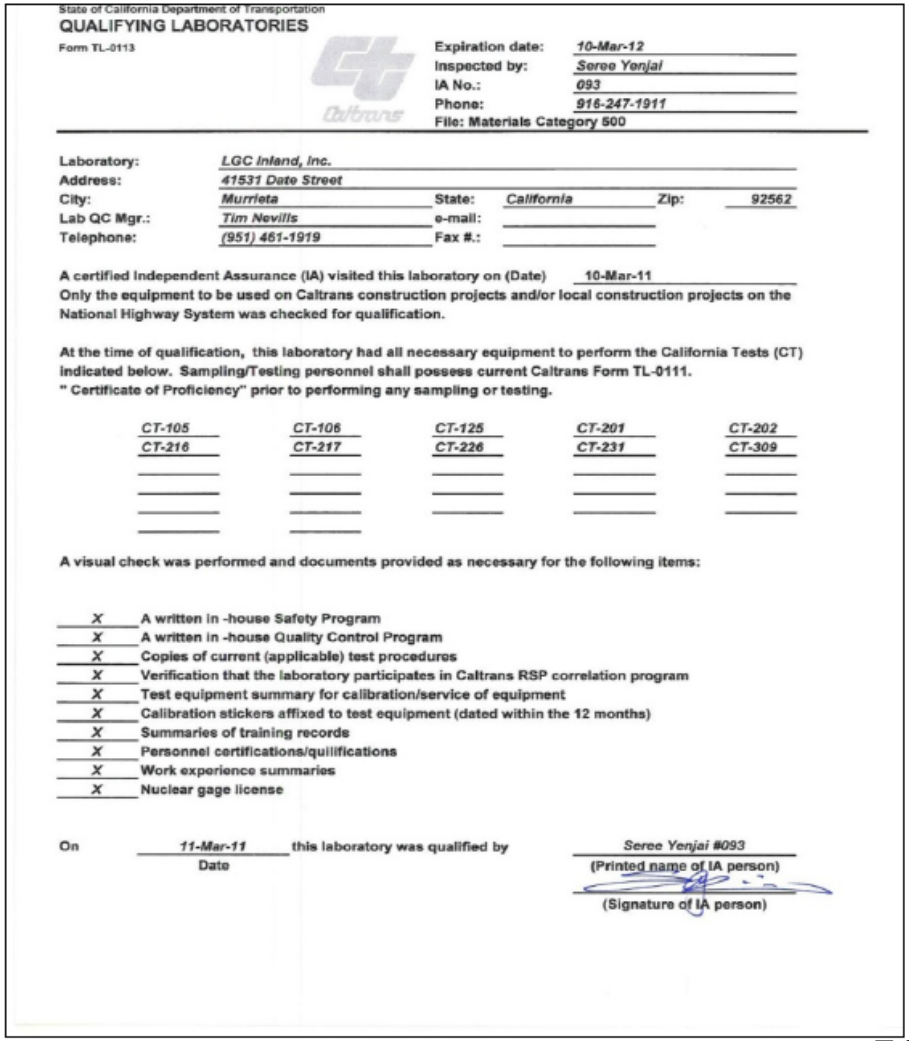
Note: This certificate is valid as long as the Tester complies with applicable requirements in Caltrans' Independent Assurance Program Manual.

(Handout Pg. 24)

Control of Materials/QAP: Elements of a QAP

IA:
Laboratory Accreditation

1. Lab name and location
2. Test methods
3. Expiration date



State of California Department of Transportation
QUALIFYING LABORATORIES
Form TL-0113

Expiration date: 10-Mar-12
Inspected by: Seree Yenjai
IA No.: 093
Phone: 916-247-1911
File: Materials Category 500

Laboratory: LGC Inland, Inc.
Address: 41531 Date Street
City: Murrieta State: California Zip: 92562
Lab QC Mgr.: Tim Nevills e-mail:
Telephone: (951) 461-1919 Fax #.:

A certified Independent Assurance (IA) visited this laboratory on (Date) 10-Mar-11
Only the equipment to be used on Caltrans construction projects and/or local construction projects on the National Highway System was checked for qualification.

At the time of qualification, this laboratory had all necessary equipment to perform the California Tests (CT) indicated below. Sampling/Testing personnel shall possess current Caltrans Form TL-0111. " Certificate of Proficiency" prior to performing any sampling or testing.

CT-105	CT-106	CT-125	CT-201	CT-202
CT-216	CT-217	CT-226	CT-231	CT-309

A visual check was performed and documents provided as necessary for the following items:

- X A written in -house Safety Program
- X A written in -house Quality Control Program
- X Copies of current (applicable) test procedures
- X Verification that the laboratory participates in Caltrans RSP correlation program
- X Test equipment summary for calibration/service of equipment
- X Calibration stickers affixed to test equipment (dated within the 12 months)
- X Summaries of training records
- X Personnel certifications/quilifications
- X Work experience summaries
- X Nuclear gage license

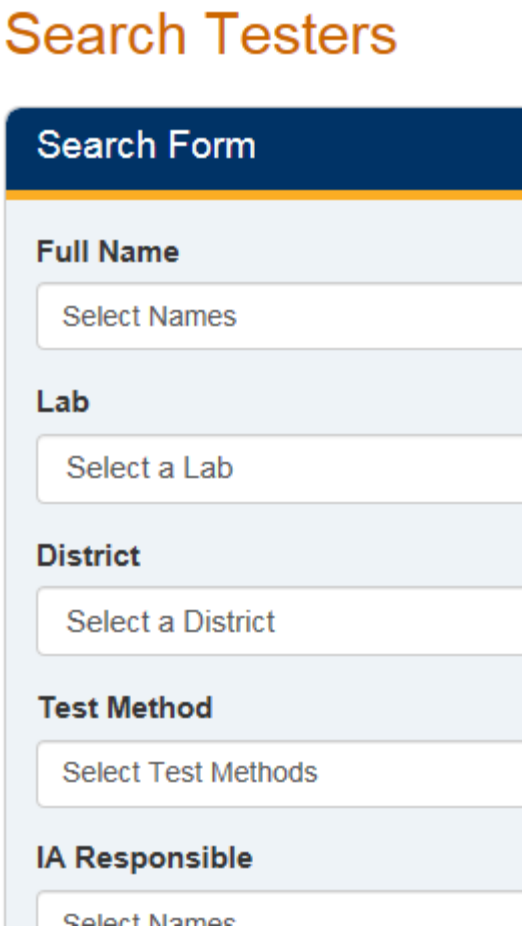
On 11-Mar-11 (Date) this laboratory was qualified by Seree Yenjai #093 (Printed name of IA person)
(Signature of IA person)

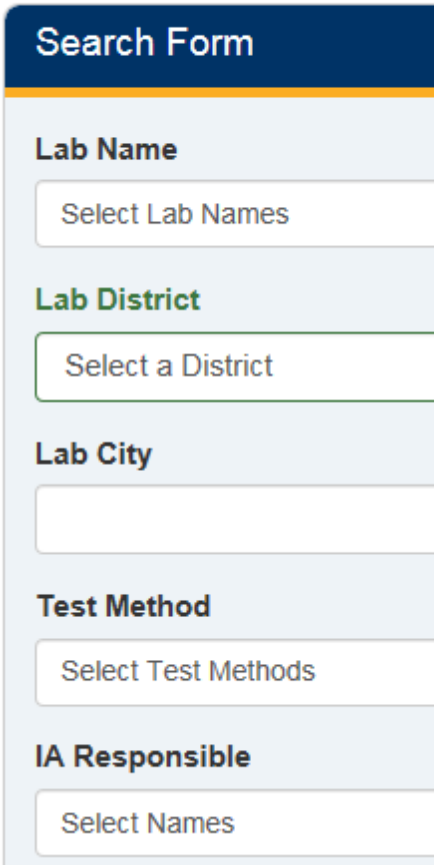
(Handout Pg. 25)

Control of Materials/QAP: Elements of a QAP

Statewide Independent Assurance Database (SIAD)

https://sia.dot.ca.gov





Control of Materials/QAP: Sampling and Testing Certification

Joint Training and Certification Program

Four Certifications Offered:

- HMA I (3 yrs)
- HMA II (3 yrs)
- Soils and Aggregate (S&A) (3 yrs)
- Portland Cement Concrete (ACI Field Tech. – Grade I) (5 yrs)

Partnership with CSU Long Beach and San Jose State University

http://www.dot.ca.gov/hq/esc/Translab/ormt/IA_reports/JTCP/index.htm

Control of Materials/QAP: Elements of a QAP

IA:

Equipment Calibration - Nuclear Gauge:

All local agency's and/or consultant's nuclear gauges must have been calibrated on NIST traceable blocks and have current calibration stickers.

Control of Materials/QAP: Implement Your QAP

1. RE's and Inspectors

   Know your contract and your contract items!

   - Anticipate…
     - What types and how much material will be arriving?
   - Know…
     - What tests methods must be used? (Contract Docs)
     - How often or how many tests are needed? (QAP)

Control of Materials/QAP: Implement Your QAP

2. Materials Testing Lab (agency or consultants)

   Must:

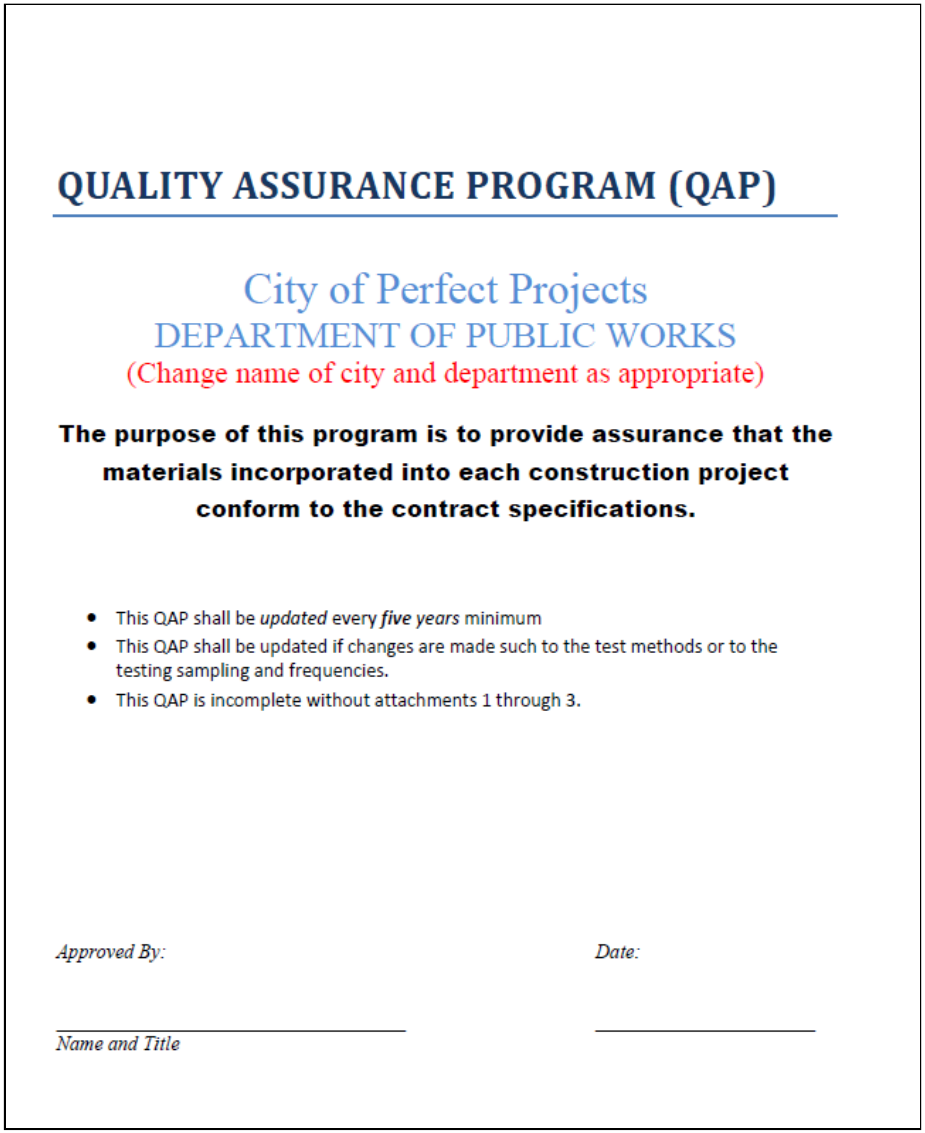
   - Have a copy of agency's approved QAP
   - Prepare a project testing plan - what tests, how many.
   - Have lab accreditations, tester certifications.
   - Maintain ongoing logs of acceptance testing results.

Control of Materials/QAP: Update Your QAP

It's your QAP…

- If you are not doing it, take it out!
- Edit to customize for your agency
- Helpful Template - ~~Appendix Y (QAP Manual)~~

Use the new template just released!



QUALITY ASSURANCE PROGRAM (QAP)

City of Perfect Projects
DEPARTMENT OF PUBLIC WORKS
(Change name of city and department as appropriate)

The purpose of this program is to provide assurance that the materials incorporated into each construction project conform to the contract specifications.

- This QAP shall be *updated* every ***five years*** minimum
- This QAP shall be updated if changes are made such to the test methods or to the testing sampling and frequencies.
- This QAP is incomplete without attachments 1 through 3.

Approved By: *Date:*

Name and Title

New QAP Template 2015

(Handout Pgs. 26-45)

Control of Materials/QAP: Update Your QAP

Sample for Local Agency QAPs

Sampling and Testing Frequency Table

for projects OFF the SHS.

HOT MIX ASPHALT (HMA) / ASPHALT CONCRETE (AC)

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Aggregate Gradation (Sieve)	CT 202	1 Per 1000 Tons or Part Thereof ; Minimum 1 per day during production/placement of at least 300 tons per day.	At Plant Per CT 125 (a)
Sand Equivalent	CT 217		
Asphalt Binder Content	CT 382		Loose Mix Behind Paver Per CT 125
In-Place Density and Relative Compaction (Nuclear)	Nuclear (b)	1 Per 1000 Tons or Part Thereof ; Minimum 1 per day during production/placement of at least 300 tons per day. (b)	Random Locations Per CT 375 (c
	CT 375 or ASTM D2950 (c		
Theoretical Maximum Specific Gravity and Density (Rice)	CT 309	1 Per Day During Production/Placement of At Least 300 Tons Per Day	Loose Mix Behind Paver Per CT 125
HMA Moisture Content	CT 226 or CT 370		
Stabilometer Value (d)	CT 366		
Asphalt Binder	Sample per Section 92	Sample 1 min. per day for production over 300 tons per day; See (f) regarding testing.	At Plant Per CT 125
Smoothness	12-foot Straightedge	As necessary to confirm contract compliance.	Final Pavement Surface

(a) Exact tonnage of sample location to be determined by Random Sampling Plans

(b) Compaction determined by Neclear Density Device. Core testing required if compaction fails the neclear test

(c Correlation between core densities and nuclear device required only if compaction fails the nuclear test

(d) Report the average of 3 tested briquettes from a single split source

(e) Use CT 309 to determine maximum theoretical density in lieu of CT 367 calculated maximum theoretical density

(f) No testing required unless warranted by concern ; sample and store until completion of project

(Handout Pgs. 39)

Control of Materials/QAP: Update Your QAP

Sample for Local Agency QAPs

Sampling and Testing Frequency Table for projects **off** the SHS.
(See note 1 and 2 regarding sampling and sample size.)

ASPHALT CONCRETE (Note, sampling and testing is performed on the aggregates and asphalt, AND on the HMA.)

Quality Characteristic	Test Method (See note 2)	Acceptance Test Frequency	Location of Sampling
Aggregate			
Aggregate Gradation (Sieve)	CT 202	Production start up evaluation. Minimum 1 per day of paving of at least 300 tons per day.	HMA plant.
Sand Equivalent	CT 217		
Asphalt Binder			
Various properties based on asphalt type (see Standard Specifications Section 92)	See Standard Specifications Section 92	Sample daily for placement over 300 tons per day; store; no test required unless warranted by concern	Asphalt feed line connecting to palnt storage tanks.
In place Type A HMA			
Moisture Content	AASHTO T 329	Production start up evaluation, and minimum 1 per project.	Loose mix from behind the paver.
Asphalt Binder Content	AASHTO T 308, Meth. A	Production start up evaluation; minimum 1 per day of paving of at least 300 tons per day.	
Maximum Theoretical Density	AASHTO T 209		
Air Void Content	AASHTO T 269	Production start up evaluation; minimum 1 for every 25,000 tons of paving.	
Voids in Mineral Aggregate	SP-2 Asphalt Mixture Volumetrics		
Dust Proportion	SP-2 Asphalt Mixture Volumetrics		
Hamburg Wheel Tracker	AASHTO T 324 (Modified)	Production start up evaluation; minimum 1 for every 10,000 tons of paving.	Loose mix at plant, truck or windrow.
Moisture Susceptibility	AASHTO T 283	Production start up evaluation; minimum 1 random for every 50,000 tons of paving.	
Pavement Density			
Density of cores (See note 3)	California Test 375	1 for each 250 tons (for thickness of 0.15' or greater)	Final layer, total paved thickness
Pavement Smoothness			
Straightedge	See Standard Specifications Section 36-3.01D9(b)(i)	Entire surface Per Standard Specifications Section 36-3.01D(4).	Final Pavement Surface
Inertial Profiler			

(Handout Pgs. 39)

Control of Materials/QAP: Update Your QAP

SUBGRADE (DISTURBED BASEMENT SOIL) OR EMBANKMENT

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Maximum Density and Relative Compaction	CT 216/CT 231	1 Min. Test per 5000 sq ft under vehicle traveled way and shoulder 1 Min. Test Per 300 linear foot under sidewalk	Random locations as determined by the Engineer in place after compaction.

AGGREGATE BASES AND SUBBASES, IMPORTED BORROW

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Sieve Analysis	CT 202	1 Min. Test Per Material Source	Sample from site stockpile/plant prior to placement.
R-Value	CT 301		
Sand Equivalent	CT 217		
Maximum Density and Relative Compaction	CT 216/CT 231	1 Min. Test per 5000 sq ft	Random locations as determined by the Engineer in place after compaction.

STRUCTURE BACKFILL, SELECT BACKFILL

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Sieve Analysis	CT 202	1 Min. Test Per Material Source	Sample from site stockpile/plant prior to placement
R-Value	CT 301		
Sand Equivalent	CT 217		
Maximum Density and Relative Compaction	CT 216/CT 231	1 Min. Test Per 2 Vertical Lifts of Placement	Random locations as determined by the Engineer in place after compaction.

(Handout Pgs. 40)

Control of Materials/QAP: Update Your QAP

PORTLAND CEMENT CONCRETE (PCC) - STRUCTURAL AND SIGNAL/LIGHTING FOUNDATIONS

COARSE AGGREGATE

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Sieve Analysis	CT 202	1 min. test per 500 cu yds and per each material source ; 1 min. test on smaller projects; If bridge, 1 min. set per separate pour per abutment/pier/deck.	Sample from site stockpile/plant prior to placement
Cleanness Value	CT 227		

FINE AGGREGATE

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Sieve Analysis	CT 202	1 min. test per 500 cu yds and per each material source ; 1 min. test on smaller projects; If bridge, 1 min. set per separate pour per abutment/pier/deck.	Sample from site stockpile/plant prior to placement
Sand Equivalent	CT 217		

WET MIX

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Slump/Penetration	CT 533	2 per day	Sample from truck/work site
Cylinders	CT 539/540	1 min. set of 3 per day; If bridge, 1 min. set per separate pour of abutment/pier/deck.	

(Handout Pgs. 41)

Control of Materials/QAP: Update Your QAP

Test Result Log

Test Method Name and Number: ___CT 231 Compaction_____

Project Name: __Main St. Rehab_____

Contract Number: ____5376(056)_____

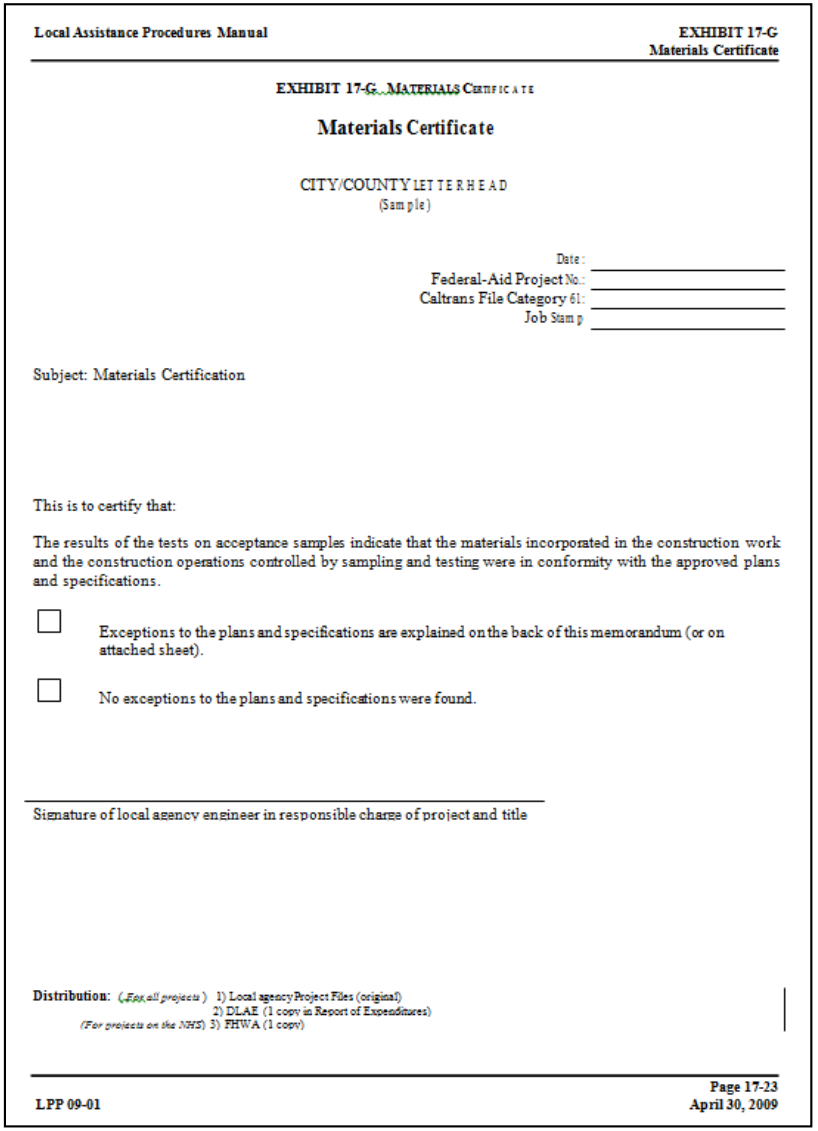
Test Number	Date Sampled	Name of Tester/ Company		Production			Test Results			Remarks
		Tester Certification of file?		Location	Elevation	Production Quantity Represented	Required Result	Actual Result	Pass/Fail	Include action taken for any failing test result; note test number of any retest.
1	9/9/2014	Doug Hole/ County Lab	x	Retaining Wall #3, backfill	4' below Top of Wall	1400 sy	95	96	P	
2	9/10/2014	Rusty Bridges/ County Lab	x	Retaining Wall #3, backfill	2' below Top of Wall	1400 sy	95	94	F	see test 3 for retest
3	9/10/2014	Reid Enright/ County Lab	x	Retaining Wall #3, backfill	2' below Top of Wall	1400 sy	95	95	P	
4										
5										
6										
7										

(Handout Pgs. 45)

Control of Materials/QAP: Materials Certificate

- Appendix K (QAP Manual)
- RE signs off that "materials …conform to the approved plans and specifications"
- Materials which did not conform to specifications must be explained and justified on materials certificate
- Submitted to Caltrans with final report of expenditures at end of project
- Copy in construction file

(Handout Pg. 46)



Local Assistance Procedures Manual — EXHIBIT 17-G Materials Certificate

EXHIBIT 17-G MATERIALS CERTIFICATE

Materials Certificate

CITY/COUNTY LETTERHEAD
(Sample)

Date: _____
Federal-Aid Project No.: _____
Caltrans File Category 61: _____
Job Stamp _____

Subject: Materials Certification

This is to certify that:

The results of the tests on acceptance samples indicate that the materials incorporated in the construction work and the construction operations controlled by sampling and testing were in conformity with the approved plans and specifications.

☐ Exceptions to the plans and specifications are explained on the back of this memorandum (or on attached sheet).

☐ No exceptions to the plans and specifications were found.

_____
Signature of local agency engineer in responsible charge of project and title

Distribution: (*For all projects*) 1) Local agency Project Files (original)
2) DLAE (1 copy in Report of Expenditures)
(*For projects on the NHS*) 3) FHWA (1 copy)

LPP 09-01 — Page 17-23 April 30, 2009

Control of Materials/QAP: Record Keeping

Sample QA filing system for small projects:

a. Copy of Quality Assurance Plan

b. Independent Assurance

   i. Certs. of Proficiency-Testers and Samplers (Exh. 16-D TL-0111)

   ii. Cert. of Accreditation of Testing Lab (TL-0113)

c. Notice of Material to be Used (Exh. 16-I)

d. Approved Mix Designs

Control of Materials/QAP: Record Keeping

Recommended filing system for small projects (cont.):

e. Acceptance Testing Results and Initial Tests: (*Make a Category 6d for each material…6d.1, Cl 2 base, 6d.2, AC etc..Include items below for each.)*

   i. Test Result Summary Log

   ii. Test Results (field/lab data records, not just summary of results)

f. Certificates of Compliance (include Exh. 16-T)

g. Source Inspection Records/Report of Inspection of Material

h. Buy America Certifications

i. Material Certification (Exh. 17-G)

Control of Materials/QAP: METS Contacts

Independent Assurance

METS offers free Tester Certification and Lab Accreditation for Federal-aid projects that use California Test Methods.

District	Contact	Phone
HQ Leadworker	Brett Soldanoa	(916) 227-7234
1	Dominika Pekala	(916) 227-7105
2, 3, 6 & 10	Peter Gan	(858) 527-8195
4 & 5	Mathew Abel	(510) 774-6009
7, 8, 9, 11 & 12	Krishna Moorthy	(951) 436-6777

https://dot.ca.gov/programs/engineering-services/mets-representatives

Control of Materials/QAP: METS Other Contacts

Office of Roadway Materials Testing:

Chief: Tim Greutert (916) 227-7303

Hot Mix Asphalt Laboratory, Roadway Materials Field Testing, Electrical Testing, Instrumentation Services and Chemical Testing

Office of Structural Materials:

Chief: Keith Hoffman (916) 227-7016

Quality Assurance and Source Inspection, Concrete Materials Testing, Structural Materials Testing, Corrosion and Field Investigations, and Quality Assessment and Management

Control of Materials/QAP: Quiz

Control of Materials/QAP: Quiz

True or False

The two main elements of a Quality Assurance Program are an Acceptance Program and an Independent Assurance Program. An Acceptance Program tests the work and materials, and an Independent Assurance Program tests the testers.

Control of Materials/QAP: Quiz

True or False

The two main elements of a Quality Assurance Program are an Acceptance Program and an Independent Assurance Program. An Acceptance Program tests the work and materials, and an Independent Assurance Program tests the testers.

TRUE

Control of Materials/QAP: Quiz

Control of Materials/QAP: Quiz

True or False

The Resident Engineer determines the minimum amount of testing to be performed on a project.

Control of Materials/QAP: Quiz

True or False

The Resident Engineer determines the minimum amount of testing to be performed on a project.

False: The QAP Testing Frequency Tables determine the minimum amount of testing that must be performed.

Control of Materials/QAP: Quiz

Control of Materials/QAP: Quiz

True or False

All material incorporated into the work must be in conformance with the contract specifications.

Control of Materials/QAP: Quiz

True or False

All material incorporated into the work must be in conformance with the contract specifications.

True

Control of Materials/QAP: Quiz

Control of Materials/QAP: Quiz

Choose the true statements.

A certificate of compliance…

a. must be delivered with the material to the job site.

b. must be signed by the contractor.

c. must include a lot number.

d. state that the material complies with the contract.

e. Include the contract number.

Control of Materials/QAP: Quiz

Choose the true statements.

A certificate of compliance…

a. must be delivered with the material to the job site.

b. must be signed by the contractor.

c. must include a lot number.

d. state that the material complies with the contract.

e. Include the contract number.

Answer b., is not true because the manufacturer must sign a COC.

Control of Materials/QAP:

Exercise 1 and 2

(Handout Page 47)