

QUALITY ASSURANCE PROGRAM (QAP)



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APPROVED BY:

A blue ink signature, appearing to read "L. Firsh", is written over a horizontal line.

Leon Firsh, P.E.
Director of Public Services and Engineering
R.C.E 63395, Exp. 9/30/2026

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The purpose of the Quality Assurance Program (QAP) is to provide assurance that the materials incorporated into each state and federally funded construction project conform to the contract specifications, as well as to 23 CFR 637.

- The QAP is updated every five years minimum.
- The QAP is updated if changes are made, such as to the test methods or to the testing sampling and frequencies.

I. Definition of Terms

Acceptance Testing	Testing of project materials to determine compliance with the contract specification criteria.
Certificate of Compliance	A signed document from the material manufacturer committing that the delivered goods meet the contract specifications.
Independent Assurance Program (IAP)	A program that verifies that acceptance testing is being performed correctly by certified testers using accredited laboratories and calibrated equipment.
Materials Acceptance Program	Sampling, testing, inspection, and certification of project materials to determine compliance with the contract specifications.
Quality Assurance Program (QAP)	A program that will ensure materials and workmanship incorporated into the project conform to the contract specifications. The main elements of a QAP are the Material Acceptance Program and the Independent Assurance Sampling and Testing Program.
Source Inspection	Sampling, testing, and/or inspection of manufactured or prefabricated structural materials at a location other than the job site, generally at the manufactured location.

II. Materials Acceptance Program

Material incorporated into the work is accepted by one or more of the following methods, as specified in the contract specifications:

1. Field Sampling and Acceptance Testing
2. Manufacturer's Certificate of Compliance
3. Source Inspection and Testing
4. Visual Inspection

Field Sampling and Acceptance Testing

- Acceptance sampling and testing are performed by certified materials personnel.
- Acceptance testing is performed utilizing accredited materials laboratories and properly calibrated equipment.
- Certifications and accreditations are specific to the tests being performed.
- A materials testing results log is maintained for any test method performed more than once on a project.
- Test results for materials incorporated into the work are to be in compliance with the contract specifications.
- Actions taken regarding material with failing test results will be fully documented, including details documenting remove/replace, rework/re-test, and deduction/change order.
- Justification will be provided for any failing material allowed to remain in-place.

Acceptance Sampling and Testing Locations / Frequencies

- Sample and testing locations and frequencies are to be in accordance with the contract specifications.
- If not specified in the contract documents, sampling and testing locations / frequencies are shown in **Attachment 1: Acceptance Sampling and Testing Frequencies**.
- When sampling products such as Portland cement concrete, cement-treated base, hot mix asphalt, or similar materials, sampling is varied with respect to the time of the day, in so far as possible, in order to *avoid a predictable sampling routine*.

Acceptance Test Methods

- The test methods used are as specified in the contract documents. If not specified, testing is done with the California Tests (CT) Method.
- For a material specified to comply with a property shown in the following table, testing is performed utilizing the noted test method(s):
-

Test Property	Test Method
Relative Compaction	ASTM D1557 and D2922 or D1556
Sand Equivalent	CT 217 or ASTM D2419
Resistance (R-value)	CT 301
Grading (sieve analysis)	CT 202 or ASTM C136
Durability Index	CT 229
Cleanness Value	CT 227

Acceptance Materials Testing Laboratory

Acceptance testing will be performed by:

- ☐ Local Agency Lab
- ☒ Accredited Consultant Materials Laboratory
- ☐ Other _____

The City of Coronado certifies that the following is true:

- The materials laboratory is under the responsible management of a *California Registered Engineer* with experience in sampling, inspection, and testing of construction materials.
- The Engineer will certify the results of all tests performed by laboratory personnel under the Engineer's supervision.
- The Materials Laboratory is properly accredited.
- The Materials Laboratory testing personnel are appropriately certified.
- Testing equipment is properly calibrated.
- Materials Laboratories will comply with **Section III. Independent Assurance Program (IAP)** of this document.

Reporting Acceptance Test Results

- The laboratory reports test results to the Resident Engineer (RE) as soon as possible by email or telephone.
- Copies of the complete material test result reports, including data and calculation sheets, are provided to the RE in accordance with the following timetable:

Timetable for Providing Full Test Results to the RE		
If the material is sampled ...	and the test performed is ...	submit results to the RE within ...
at the material plant	Sieve Analysis or Sand Equivalent (SE) or Cleanness Value (CV)	72 hours
at the jobsite	Compaction and/or maximum density	72 hours
	Sieve Analysis or Sand Equivalent (SE) or Cleanness Value (CV)	96 hours
	R value or Asphalt extraction	120 hours

Acceptance Testing Summary Logs

The RE maintains a testing summary log for each test method performed on the project utilizing Attachment 2: Test Result Summary Log.

The logs are used by the RE to track that:

- Sampling is performed at the required frequencies.
- Acceptance tests are performed at the required frequencies.
- Tester certifications are current and on file.
- All failing tests have been mitigated and documented.

Manufacturer's Certificate of Compliance

- Various manufactured materials may be accepted for incorporation into the work without sampling or testing, based on the following:
 - Visual examination of material is performed
 - Supplier has furnished similar material with a history of having met specifications
 - Manufacturer certification that materials comply with contract specifications
 - The products, materials, or assemblies do not involve structural integrity or safety to the public
- Where required by the contract specifications, the contractor must submit a certificate of compliance and comply with Buy America certification requirements as applicable.

- Where required by the contract, the contractor must attach test data or other documents to the certificate of compliance.
- The RE may perform sampling and testing on such materials at any time.
- Certificates of compliance must:
 - Be submitted by the Contractor before the material is incorporated into the work;
 - Accompany the material to the job site.
 - Identify the lot (or heat) number for each lot delivered;
 - Include the contract number;
 - Include test data and other documents when required.
 - State that the material complies with the contract specifications; and
 - Be signed by the producer of the material.

List of Materials Accepted by Certificate of Compliance

- *The City of Coronado* uses the *2024 Greenbook* Standard Specifications
- In accordance with the *2024 Greenbook*, the materials listed in Attachment 3 may be accepted by Certificate of Compliance
- This list may be amended by the contract Special Provisions or Technical Provisions

Source Inspection and Testing

- Some manufactured or pre-fabricated structural materials will be inspected or tested prior to arrival at the jobsite, generally at the manufacturer's location (a.k.a. source inspected).
- Structural items categorized as "catastrophic consequences of failure" or "significant safety concern" may be source inspected. Materials that might be source inspected include: structural steel, precast pre-stressed concrete girders and pilings; RCP greater than 60", joint seals, bearing pads, lighting and signal poles, sign structures, electrical items.
- The RE may reject source inspected material at the job site if deemed not acceptable, including:
 - Material damage in shipment or installation;
 - Defective material (source inspection is usually a random sampling and may not have checked 100% of the material.)
- The following materials laboratories will be used to perform source inspection and testing.

- ☐ Local Agency Laboratory
- ☒ Accredited Consultant Materials Laboratory
- ☐ Other _____

Visual Inspection

- Relatively minor quantities of construction materials may be accepted without testing.
- The following 3 conditions must be met:
 1. Visual examination of the material is performed.
 2. The manufacturer or supplier has recently furnished similar materials found to be satisfactory using normal sampling and testing requirements.
 3. The manufacturer (or supplier in the case of HMA or concrete) provides certification that the material furnished complies with the contract specifications.

Approximate Quantities that May be Accepted by Visual Inspection

- Aggregates other than for use in Portland Cement Concrete, not to exceed:
 - 100 tons per day, nor
 - 500 tons per project
- Bituminous mixtures (example: HMA), not to exceed
 - 50 tons per day
 - If project total is less than 500 tons., sample at engineer's discretion
- Bituminous material (example: Liquid Asphalt), not to exceed:
 - 100 gallons per project

III. Independent Assurance Program (IAP)

- The IAP verifies that:
 - Sampling and testing procedures are being performed correctly
 - All acceptance testing performed on the project uses an accredited laboratory and certified testing personnel.
 - All testing equipment is in good condition and properly calibrated
- The IAP duties, including certification of testers and laboratory accreditation, are executed by:
 - ☐ LPA designated independent assurance person
(this person must not perform any acceptance testing)
 - ☐ Caltrans
 - ☒ Consultant
(this consultant must be different from acceptance testing consultant)
- Independent assurance samples and tests are not to be used for determining compliance with contract requirements.

- Testing with only ASTM/AASHTO material testing will require the LPA hire a separate laboratory to perform independent assurance (see LAPM 16.11.2: Independent Assurance (IA) Program).

Laboratory Accreditation

- The acceptance testing materials laboratory must participate and comply with one or more of the following Correlation Testing Programs
 - AASHTO resource (formerly AMRL)
 - Cement and Concrete Reference Laboratory (CCRL)
 - Caltrans Reference Samples Program (RSP)
- The Acceptance Testing Laboratory Accreditation occurs annually or per issuance agency.
- A current copy of the laboratory's accreditation certificate is kept in the project records.

Tester Certification

- Sampling and testing personal are certified for a maximum of 5 years by one or more of the following Personnel Certification Programs:
 - ☒ CT METS IA Representative (at JTCP or outside of JTCP for other test methods)
 - ☒ American Concrete Institute
 - ☒ National Institute of Certification of Engineering Technologies
 - ☐ Other nationally recognized organization: _____
- LPA's designated and qualified independent assurance person (independent assurance person may not perform acceptance testing)
- Proficiency tests are performed for testers to be certified on Sieve Analysis, Sand Equivalent, and Cleanness Value tests; all other types are witness tests.
- A copy of each tester's current and applicable certifications is kept in the project files.

Equipment Calibration

Laboratory testing equipment will be:

- Capable of performing the tests required.
- Be in good working order.
- Be calibrated at least *once each year*, and *more frequently* if required by test method or manufacturer's recommendation.

- Be calibrated by impartial means using devices of accuracy traceable to the National Institute of Standards and Technology.
- Have a *decal* firmly affixed to each piece of equipment showing:
 - Equipment Identification Number
 - Calibration Date
 - Calibration Expiration/Due
 - Calibrator Name/Company Name

IV. Project QAP Records

Project records will have on file pertinent quality assurance documents which may include, but not limited to (see LAPM 16.3.1: Organization of Project Records for more details):

- Copy of Quality Assurance Plan
- Certificates of Proficiency
- Certificate of Accreditation for Testing Laboratory
- Notice of Materials to be Used
- Acceptance Testing Summary Logs and Test Results
- Certificates of Compliance (Buy America certification requirements as applicable; see LAPM)
- Source inspection records and reports
- Final Materials certification

All project records will be available in a single location for inspection by auditors and reviewers:

- At any time during the project
- For three years following the date of the final project voucher

V. Attachments

Attachment No. 1: Acceptance Sampling and Testing Frequencies

Attachment No. 2: Test Results Summary Log

Attachment No. 3: List of Materials Accepted by Certificate of Compliance

Attachment 1 - Acceptance Sampling and Testing Frequencies (for projects *off* the SHS)**Portland Cement Concrete**

Materials	Sample Size	Frequency	Methods	Comments
Cement / Fly Ash (Sampling Only)	8-lb sample	If possible, take at least one sample per job	ASTM D75; CT 125; AASHTO T127, M85, M295	Standard for sampling hydraulic cement or fly ash
Cement (Testing Only)	8-lb sample	<i>If accepted by Certificate of Compliance → no testing required.</i> Otherwise test at least once per job	ASTM C109; CT 515; AASHTO T106	Fabricate six 2-in mortar cubes; test compressive strength
Fresh Concrete (Sampling)	~150 lb (1 cu ft)	1 sample per 500–1000 cu yd	ASTM C172; CT 539; AASHTO T141, M157	Sampling procedure
Slump	Same	≥1 per job (≥500 cu yd projects)	ASTM C143; AASHTO T119	Measures workability
Air Content	Same	Same	ASTM C231; CT 504; AASHTO T152	Pressure method
Compressive Strength	Cylinders (6"x12")	≥1 per 500–1000 cu yd	ASTM C39; CT 521; AASHTO T22	Strength test

Soils and Aggregates

Materials	Sample Size	Frequency	Methods	Comments
Gradation (Sieve Analysis)	50-lb	1 per 500-1,000 tons	ASTM C136; CT 202; AASHTO T27	Gradation
Sand Equivalent	50-lb	Same	ASTM D2419; CT 217; AASHTO T176	Sand equivalent
Fines (No. 200)	50-lb	Same	ASTM C117; AASHTO T11	Wash gradation
Resistance Value (R-Value)	50-lb	Same	ASTM D2844; CT 301; AASHTO T190	Strength. For roadway applications
Moisture (Nuclear)	1 per 2500 sq ft	Same	ASTM D3017; CT 231; AASHTO T239	Moisture
Maximum Density and Relative Compaction	1 per 2500 sq ft	1 Min. Test per 2000 sq. yd. per 8" lift	ASTM D1557 and D2922 or D1556, AASHTO T238	Density

Hot Mix Asphalt (Asphalt Concrete)

Materials	Sample Size	Frequency	Methods	Comments
Marshall Stability	30-lb	1 per 1000 tons	ASTM D1559; AASHTO T245	Strength. If specified.
Extraction / Gradation	30-lb	Same	ASTM C117, D2172; AASHTO T164	Gradation
Nuclear Density	random	Same	ASTM D2950; CT 375	In-place density
Asphalt Binder Content		Production startup evaluation; minimum 1 per day of paving of at least 300 tons per day.	AASHTO T 308, Meth. A	
12' Straightedge		As needed based on ride quality determined by the RE	+/-0.01' over 12' Straightedge in wheel paths	Final Pavement Surface

Slurry Seals

Materials	Sample Size	Frequency	Methods	Comments
Aggregate Sand Equivalent	30-lb	1 per project	ASTM D2419; CT 217	Quality
Fines Gradation	30-lb	1 per project	ASTM C117; AASHTO T11	Gradation
Wet Track Abrasion	0.5 gal	1 per project	ASTM D3910	Durability

Steel

Materials	Sample Size	Frequency	Methods	Comments
Steel Strand	Various	If no Certificate of Compliance → test 2 per job	ASTM A370, A416, E328; AASHTO T244	Tensile strength
Steel Rebar	Various	Same as above	ASTM A615, A370; AASHTO T244	Strength & bend

Attachment 3 - List of Materials Accepted by Certificate of Compliance

General Materials & Chemicals

- Additives, Chemical (Pavement)
- Admixtures (Air-Entraining, Chemical, Fly Ash, Mineral)
- Bonding Agents (Concrete Repair / Surface Bonding)
- Epoxy Materials (Binder, Paste, Structural)
- Joint Sealants & Assemblies (includes all seal types, fillers, compression seals)

Concrete & Cementitious Materials

- Concrete Anchorage Devices
- Concrete Curing Compounds
- Minor Concrete

Piping and Drainage Systems

- Steel Pipe Systems (including CSP, structural plate, perforated)
- Plastic Pipe Systems (HDPE, PVC, polyethylene, perforated)
- Reinforced Concrete Pipe
- Culverts & Culvert Components
- Drainage Structures (inlets, manholes, down drains, flumes)
- Drain Tile / Subsurface Drain / Underdrains
- Slotted Edge Drain
- Pipe Joints & Watertight Joint Systems

Structural & Reinforcement Materials

- Reinforcing Steel (Bar, Wire, Mesh)
- Reinforcing Steel Couplers & Splices
- Epoxy-Coated Reinforcement Systems
- Prestressing Components
- Steel Pipe Piles / Structural Steel Piles
- Metal Fabrications (Sheet metal, grating, plates)
- Cable Systems (Railing, Netting, Seismic Restrainers)

Roadway & Traffic Materials

- Guardrail Systems (Metal Beam, Bike Rail, Terminals)
- Barrier Systems (Rail, Crash Cushions)
- Pavement Markings (Thermoplastic, Paint, Striping)
- Pavement Markers
- Traffic Control Devices (Signs, Beacons, Delineators, Channelizers)
- Traffic Signal Systems & Equipment (controllers, detectors, cabinets)

Electrical & Utility Materials

- Electrical Components & Equipment
- Conduit & Conductors
- Electrical Systems (signal, lighting, interconnect)
- Battery Backup Systems
- Pull Boxes & Electrical Enclosures

Erosion Control, Landscaping & Environmental

- Erosion Control Materials (fiber, mats, tackifiers)
- Geosynthetics & Engineering Fabrics

Metals, Hardware & Miscellaneous

- Bolts, Nuts, Washers (All Types)
- Stainless Steel Fasteners
- Fusion Bonded Coatings / Powder Coatings

Wood & Timber

- Lumber
- Timber (Treated, Structural, Glue Laminated)

Fencing & Appurtenances

- Fencing Systems (Chain Link, Wood, Metal)
- Posts & Sign Supports

Irrigation & Plumbing

- Irrigation Systems (hose, pipe, drip systems)
- Control Valves
- Backflow Preventers
- Quick Couplings