HAWAII

DEPARTMENT OF TRANSPORTATION

QUALITY ASSURANCE MANUAL

FOR

MATERIALS

2025

MATERIALS TESTING AND RESEARCH BRANCH
2530 LIKELIKE HIGHWAY
HONOLULU, HAWAII 96819

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Useful Links:

Material Testing and Research Branch Forms

Field Sampling and Testing Qualification Program (FSTQP) and Independent Assurance Reviews

Sampling and Testing Guide for Acceptance and Verification

I. INTRODUCTION

The Materials Quality Assurance (MQA) Program represents the Hawaii Department of Transportation's (HDOT) recognition of its responsibility and commitment to ensure materials incorporated into highway construction projects conform to the requirements of the plans and specifications, including approved changes. The Materials Testing and Research Branch (MTRB) Quality Assurance Manager will manage the MQA Program. The Quality Assurance Officers are responsible for implementing the Materials Quality Assurance Program within their Districts and Counties. The MQA Program is composed of the following seven core elements:

1. Agency Acceptance
2. Laboratory Accreditation
3. Personnel Qualification
4. Independent Assurance
5. Contractor Quality Control
6. Material Testing Dispute
7. Letter of Materials Certification

Refer to Appendix 1 for a flow diagram showing the core elements.

The following procedures and guidelines are provided to ensure the quality of materials for all State highway construction projects and County Federal-aid projects on the National Highway System, according to Title 23, Code of Federal Regulations, part 637, subpart B, Quality Assurance Procedure for Construction.

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II. DEFINITIONS

Agency Acceptance. The system used by the agency to verify and accept the quality of materials, construction workmanship and evaluate the degree of compliance with contract requirements.

Central Laboratory. Hawaii Department of Transportation, Highways, Materials Testing and Research Branch (MTRB).

Engineer. The Administrator of Highways or the Director or Chief Engineer responsible for County roads, acting directly or through a duly authorized representative.

Independent Assurance (IA). An Independent Assurance Program ensures sampling and testing are performed correctly, and the testing equipment used in the program operates correctly and remains calibrated. It involves a separate and distinct schedule of sampling, testing, and observation.

Materials Engineer. The Materials Testing and Research Engineer for Highways also serves as Quality Assurance Manager.

Proficiency Samples. Homogeneous samples produced for testing by two or more laboratories or technicians. Test results are compared to ensure laboratories or technicians are obtaining results within acceptable limits.

Project Engineer. The HDOT or County representative responsible for day-to-day operations on a construction project.

Qualified Laboratories. Laboratories meeting requirements defined in the Laboratory Qualification Program.

Qualified Sampling and Testing Personnel. Personnel qualified in one or more sampling and testing procedures identified in the Personnel Qualification Program. Personnel are generally qualified lab technicians or field sampling and testing personnel.

> **Field Sampling and Testing Personnel.** District personnel who have successfully completed one or more of the respective sampling and testing procedures in the Field Sampling and Testing Qualification Program (FSTQP) or approved program and pass the annual Independent Assurance testing to maintain their qualification.
>
> **District Laboratory Technician**. District personnel qualified in one or more of the Aggregate, Asphalt, Concrete, or Soil modules who perform laboratory testing for a district laboratory and pass the annual Independent Assurance

testing to maintain their qualification.

Quality Assurance. All planned and systematic actions necessary to provide confidence that a product or service will satisfy given requirements for quality.

Quality Assurance Manager. Materials Engineer or their designated representative to manage the Materials Quality Assurance program for Highways.

Quality Assurance Officer. District Construction Engineer or their designated representative responsible for administering the Materials Quality Assurance program within the District or County. The designated representative must be identified in writing and sent to the Materials Engineer.

Quality Control. All Contractor/Vendor operational techniques and activities performed or conducted to fulfill contract requirements.

Random Sample. A sample drawn from a lot in which each increment in the lot has an equal probability of being chosen.

Split Sample. Two or more equal parts from a homogeneous sample.

Verification Sampling and Testing. The State or County performs sampling and testing to validate contractor test data when Contractor Quality Control sampling and testing are used in the Agency Acceptance Program. This is allowed only when specified in the contract documents.

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III. ACRONYMS

AASHTO – American Association of State Highway and Transportation Officials

ASTM – American Society for Testing and Materials

FHWA – Federal Highway Administration

FSTQP – Field Sampling and Testing Qualification Program

HDOT – Hawaii Department of Transportation

HWY – Highway

IA – Independent Assurance

MQA – Materials Quality Assurance

MTRB – Materials Testing and Research Branch

WAQTC – Western Alliance for Quality Transportation Construction

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IV. AGENCY ACCEPTANCE PROGRAM

A. Purpose. This program provides uniform, statewide sampling, testing, and inspection procedures to ensure the quality of materials incorporated into the project conforms with the plans and specifications.

B. Scope. The program applies to all Federal-aid projects on the National Highway System. All testing laboratories and sampling and testing personnel under this program shall be qualified according to the Laboratory Accreditation Qualification and Personnel Qualification Programs and subject to the requirements of the Independent Assurance Program. To avoid the appearance of a conflict of interest, any qualified non-state laboratory shall perform only one of the following types of testing on the same project: Contractor Quality Control (QC) sampling and testing, Verification sampling and testing, Dispute Resolution sampling and testing, acceptance sampling and testing, or Independent Assurance. The Sampling and Testing Guide for Acceptance and Verification (Appendix 3) identifies the material, lot size, frequency, and location in the construction or production operation at which sampling is done and the specific attributes tested that reflect the quality of the finished product.

C. Acceptance Sampling and Testing. The Materials Engineer manages the Agency Acceptance Program. District and County Quality Assurance Officers are responsible for implementing the Agency Acceptance Program within their Districts and Counties. Quality Assurance Officers ensure only sampling and testing by qualified personnel and laboratories are used in the Agency Acceptance Program. Acceptance sampling and testing for a project may be accomplished by either one or both of the following methods:

1. Acceptance Sampling and Testing by District or County personnel or their designated agents.

Quality Assurance Officers for Districts and Counties are responsible for acceptance sampling and testing requirements within their jurisdictions.

Oahu District (HWY-O): Field samples obtained for laboratory testing will be sent to the Materials Testing and Research Branch (MTRB) or a qualified laboratory.

Hawaii, Kauai, and Maui Districts, and all Counties: When the District or County cannot perform laboratory testing, samples may be sent to MTRB or a qualified laboratory for required testing.

a. Samples will be selected according to ASTM D 3665, Random Sampling of Construction Materials.

b. Location and frequency for acceptance sampling and testing will be according to the Sampling and Testing Guide for Acceptance and Verification (Appendix 3). Samples will be maintained by the sampling technician until submitted to the appropriate laboratory to prevent tampering and differing curing conditions. The project engineer may select additional sample locations at their discretion.

c. Samples, test data, and certificates of compliance will be submitted to the MTRB electronically through the appropriate eConstruction platform. (Form MTRB JC-1 or JC-1a — Appendix 2). The MTRB will review all project data to ensure materials incorporated in the construction work conform to approved plans and specifications.

2. Quality Control Sampling by the Contractor used in the Acceptance Program with verification by the District or County or their designated agents. This method is permitted when specified in the contract.

a. Contractor QC Sampling and Testing.

(1) The minimum sampling, testing, and location of samples shall be according to the requirements in the Sampling and Testing Guide for Acceptance and Verification (Appendix 3).

(2) The Contractor shall designate a Quality Control (QCM) Manager responsible for managing, controlling, and documenting all activities to ensure the material complies with the contract plans and specifications.

(3) The Contractor shall prepare and submit a Quality Control Plan for projects over $1,000,000 to the Project Engineer. The Project Engineer will provide the Quality Control Plan to MTRB for acceptance.

(4) Laboratory Qualification, Personnel Qualification, and Independent Assurance are required when Contractor QC sampling and testing is used in the Acceptance Program.

(5) Samples shall be selected according to ASTM D 3665, Random Sampling of Construction Materials.

(6) The Project Engineer will transmit the Contractor's test results electronically through the appropriate eConstruction platform (Form MTRB CJC-2 or CJC-2a — Appendix 2) to the MTRB through the District Quality Assurance Officer.

b. Verification Sampling and Testing of Contractor Quality Control Tests.

(1) The District, County, or their designated agent will validate product quality through verification sampling and testing when contractor quality control sampling and testing is used in material acceptance. Verification sampling and testing will be performed by qualified sampling and testing personnel employed by the State, County, or their designated agent.

When the Contractor and verification test results differ by more than the allowable standards established by the MTRB, the Contractor can utilize the dispute resolution procedures in Section IX, Materials Testing Dispute Resolution.

(2) Verification Sampling and Testing frequency shall be according to the requirements in the Sampling and Testing Guide for Acceptance and Verification (Appendix 3).

(3) Verification samples will be random samples (ASTM D 3665) taken from the same sublot or lot as the Contractor's QC sample.

(4) Verification samples or test data will be transmitted electronically through the appropriate eConstruction platform (Form MTRB VJC-3 or VJC-3a — Appendix 2) to the MTRB through the District Quality Assurance Officer.

(5) Contractors shall certify and maintain quality control records for three years.

D. Submittals. Acceptance, Contractor, and Verification Test data and any Dispute Resolution reports shall be submitted to the MTRB. MTRB will review all project test data to ensure that materials incorporated in the construction work conform to approved plans and specifications. Based on this information, the MTRB will issue a materials certification to FHWA for each construction project that is subject to FHWA construction oversight activities (see Section X, Letter of Materials Certification)

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V. LABORATORY ACCREDITATION QUALIFICATION PROGRAM

A. Purpose. This program provides uniform, statewide procedures for ensuring laboratory facilities and equipment can perform materials testing according to the methods used in the Materials Quality Assurance Program.

B. Scope. Laboratories that perform testing and furnish test data for use in the Materials Quality Assurance Program shall be recognized and qualified by the MTRB annually according to the following procedures. This includes but is not limited to the following types of laboratories:

1. Non-State Qualified Laboratories

a. Commercial laboratories,

b. Contractor laboratories,

c. County laboratories,

2. State District Laboratories.

C. Responsibility. The Materials Testing and Research Branch (MTRB), accredited under the AASHTO Accreditation Program, oversees the statewide Laboratory Accreditation Qualification Program.
The District Quality Assurance Officer ensures qualified non-state laboratories performing sampling and testing for District Federal-aid projects are accredited according to part D. 2. Of this section.

D. Qualification Procedures.

1. To qualify State District Laboratories, the MTRB will:

a. Verify that current editions of references are available to use to perform tests.

b. Document whether laboratories have the required equipment to perform tests.

c. Verify sampling and testing personnel are qualified according to Section VI — Personnel Qualification Program.

d. Verify a list or record of all laboratory equipment requiring calibration/verification is maintained and accurate, and calibrations are current.

Check that calibration, verification, and maintenance records for each piece of equipment include:

(1) Description of equipment

(2) Identification of individual(s) performing calibration

(3) Frequency of calibration required, date of calibration, and date of last calibration

(4) The calibration or verification procedure used

(5) Identification of any calibration/verification device or traceable standards used

(6) Results of work performed

(7) History of equipment maintenance

(8) Procedure used to identify non-compliant equipment

e. Verify the laboratory is performing only the tests they have been qualified to perform.

2. To qualify non-state Laboratories such as commercial, contractor, or county laboratories, the MTRB will verify the following**:**

a. Laboratories shall be accredited for applicable test methods by the AASHTO Accreditation Program or comparable accreditation program approved by FHWA.

b. Personnel in accredited laboratories are considered qualified for the applicable test methods as documented by technician training and evaluation under AASHTO R18.

c. Additionally, equipment may be subject to calibration, verification, or inspection by the MTRB.

(1) The equipment shall be calibrated according to the

calibration standards and frequencies specified in the applicable test methods for which the equipment is intended. Calibration/verification is required whenever the laboratory or equipment is moved.

(2) Any equipment in a qualified laboratory failing to meet specified equipment requirements for a given test method shall be identified and not used for that test method.

E. **Disqualification**. A laboratory that does not meet or maintain qualification requirements is subject to disqualification. Test results from disqualified laboratories shall not be used in the Materials Quality Assurance Program.

F. **Documentation Maintenance**. The MTRB will be responsible for maintaining documentation on all laboratories it qualifies. Qualified laboratories shall be responsible for maintaining equipment calibration, verification, and maintenance records.

G. **Disputes**. Disputes concerning the calibration and verification of equipment will be resolved by the Materials Engineer, who will have final authority.

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VI. PERSONNEL QUALIFICATION PROGRAM

A. Purpose. This program provides uniform, statewide procedures for ensuring HDOT District personnel and their consultants can perform materials sampling and testing according to methods used in the Materials Quality Assurance (MQA) Program.

B. Scope.

District Laboratory Technician – The MTRB qualifies personnel in District laboratories.

Field Sampling and Testing Personnel – The MTRB provides training through the Field Sampling and Testing Qualification Program (FSTQP) to qualify individuals who are or will be performing field sampling and testing in the districts.

Contractor QC Sampling and Testing Personnel – Personnel Qualification also applies to Contractor QC sampling and testing technicians when those results will be used as part of the acceptance program.

Accredited Laboratory Personnel – Personnel in accredited laboratories are considered qualified for the applicable test methods documented by technician training and evaluation under AASHTO R18. See Section V, Laboratory Accreditation Qualification Program, part D. 2. B.

C. Responsibility.

The Materials Testing and Research Branch (MTRB) administers the statewide Personnel Qualification Program.

The District Quality Assurance Officer is responsible for ensuring personnel performing field sampling and testing for the District on Federal-aid projects are certified in the appropriate modules.

D. Test Methods.

1. All District laboratory personnel performing material testing in any of the modules listed below shall be qualified by the MTRB in the respective laboratory sampling and testing procedures:

District Lab Modules		Test Methods	
a.	Aggregate	AASHTO:	R76, R90, T11, T27, and T176
b.	Asphalt	AASHTO:	R47, T30, T166, T209, T275, and T308
		ASTM:	D3549
c.	Concrete	AASHTO:	R100, T22, , T97, T119, T121, R60, T152, and T231
		ASTM:	C1064
d.	Soil	AASHTO:	R58, T89, T90, T99, T180, and T265
		ASTM:	D1140 and D2487
		HDOT:	TM5

2. All District personnel and their consultants performing field sampling and testing will be qualified through the FSTQP or approved program in the respective field sampling and testing procedures. Additional testing and equipment may be added to the program as appropriate:

Field Modules		Test Methods	
a.	Bituminous (Asphalt) Materials Unit	AASHTO:	R66, R97
b.	Soils and Aggregate Materials Unit	AASHTO:	R90
		HDOT:	TM 1, TM 3
c.	Concrete Materials Unit (ACI); State and County Personnel Only	AASHTO:	R60, R100, T119, T121, T152, T196, T309
		ASTM:	C31, C138, C143, C172, C173, C231, C1064

Sampling and testing personnel will be qualified for a maximum period of five years based on completing both the written and performance examinations. Personnel must reapply before expiration to maintain certification.

3. The following personnel (evaluator/examiner) may qualify an individual to perform sampling and testing on materials by administering the required written and performance examinations:

a. The MTRB personnel who obtained the appropriate FSTQP certificate, have subject matter experience and are authorized by the Materials Engineer.

b. State or consultant personnel who obtained the appropriate FSTQP certificate, have subject matter experience and are authorized by the Materials Engineer.

The MTRB will schedule FSTQP qualification examinations (written and performance) at least two times a year. A schedule will be posted on the MTRB website. Schedule and registration information can be found on the website.

District Laboratory Technician qualification examinations will be scheduled on an as-needed basis.

Individuals qualified by the Western Alliance for Quality Transportation Construction (WAQTC), American Concrete Institute (ACI) for concrete, or other independent sources acceptable to the Materials Engineer shall be exempted from the MTRB qualification procedure for the applicable module. However, notification in writing of such qualification shall be made to the Materials Engineer, who will verify and approve such qualification and maintain a record of qualified individuals.

E. Qualification Procedures. To qualify, an individual shall pass the written and performance examinations of all the applicable test methods in that module. The exams can take place in the order that provides the most efficient use of time and equipment for the evaluator/examiner.

1. Written examination.

a. The examination will require detailed knowledge of the test method procedures and basic reading comprehension. The examination will be a closed-book exam. Calculations may be required for some questions. The examination will be administered within a specified time frame by an evaluator authorized by the Materials Engineer. The examination may be online or on paper. The examiner will collect all examination papers and used scratch paper.

b. Field Sampling and Testing scores required to pass the written examination for each test method in a unit can be found on the website. If the participant fails the written test (or retest if applicable) for any of the three units, the participant will not obtain qualification for that unit and must wait until the next qualification program. The MTRB determines the Lab Technician scoring threshold.

2. Performance examination.

a. The examination will be a closed-book exam. Each examination shall be completed within the time limit designated by the MTRB for that test method. Performance qualification will be based on performing the required procedures correctly for each test method.

b. The scores required to pass the written examination for each test method in a unit can be found on the website. The MTRB determines the district Lab Technician scoring threshold.

3. Any disputes, complaints, or protests regarding an examination or examiner shall be immediately submitted, in writing, to the Materials Engineer. A written complaint shall contain the examination date, the name of the examiner, and a description of the dispute, complaint, or protest. Written disposition of the dispute, complaint, or protest will be made by the Materials Engineer, whose decision will be final.

4. If an individual fails to be qualified, or if the qualification is revoked or terminated, the individual may reapply to take the next scheduled examination by submitting a new registration form and paying any required registration/examination fee.

5. Notification of an individual's successful or unsuccessful completion of the qualification requirements will be mailed by the Materials Engineer.

6. Qualified personnel are subject to the requirements of the Independent Assurance Program.

F. Personnel Documentation.

The MTRB will be responsible for maintaining documentation of all individuals qualified under its authority.

The Quality Assurance Officer shall also maintain a list of qualified individuals performing sampling and testing on projects under their supervision. The retention period for documentation will follow HDOT project document retention policies for Federal-aid highway projects.

G. Suspension and Revocation of Qualification.

1. The Materials Engineer may revoke the qualification issued by the MTRB at any time for just cause. A notice of revocation will be sent to the individual in writing, along with the individual's right to appeal the revocation. Revocation is effective on receipt of notice by the individual. Reasons for qualification revocation or suspension are negligence or abuse of responsibilities. A Qualification Revocation Committee appointed by the Materials Engineer will review all appeals and recommend its findings to the Materials Engineer. The decision of the Materials Engineer will be final.

2. Negligence is defined as unintentional deviation from approved procedures, which may or may not cause erroneous results. Penalties for negligence are the following:

a. First offense of negligence will result in a letter of reprimand being sent to both the employee and the employer.

b. Second offense will result in a one-year suspension of qualification.

3. Abuse is defined as intentional deviation from approved procedures. The first offense for a finding of abuse will result in a penalty ranging from a one-year suspension to permanent revocation of an individual's qualification. Any subsequent finding of abuse will result in permanent ineligibility for any future type of MTRB qualification.

4. Revocation or suspension for abuse or negligence in one module will be considered revocation or suspension in all modules held by the individual.

5. If warranted, the Materials Testing and Research Engineer may deviate from the above penalties.

H. Rights and Responsibilities of Qualification. Qualification carries inherent rights and responsibilities. These rights include being exclusively sanctioned to conduct sampling, testing, and reporting test results for the Material Quality Assurance Program. These responsibilities include conducting and reporting tests accurately and precisely according to required test procedures. The qualified individual shall also be aware that both State and Federal laws may govern construction projects, including Title 18, United States Code, Section 1020, which, in brief, states anyone making falsifications on Federal-aid projects “shall be fined not more than $10,000 or imprisoned not more than five years, or both.”

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VII. INDEPENDENT ASSURANCE PROGRAM

A. Purpose. This program provides uniform, statewide procedures to ensure personnel qualified under the Personnel Qualification Program can perform sampling and testing correctly and ensure equipment is checked and calibrated.

B. Scope. The program applies to all Federal-aid projects.

This program evaluates samplers, testers, and testing equipment in the modules listed in the Personnel Qualification Program. The program also applies to Contractor QC sampling and testing technicians when those results will be used as part of the acceptance program.

The MTRB personnel and test equipment covered under an accredited laboratory quality management system are exempt from the Independent Assurance (IA) Program.

C. Responsibility. The MTRB administers the IA Program.

The MTRB personnel or the MTRB's designated agents acting as IA inspectors, coordinators, evaluators, and reference testers will be referred to as "IA inspectors." When split sampling or split sample testing is performed, the MTRB equipment or designated agents' equipment will be used as IA reference equipment.

The District Engineer or designated representative within Highways will be the Quality Assurance Officer. The Quality Assurance Officer is responsible for coordinating the IA activities with the MTRB and administering these activities within the District and County.

Each Quality Assurance Officer shall maintain qualified District personnel's competency, ensure District field and laboratory testing equipment is calibrated and verified, and resolve any deficiencies noted by the IA evaluations.

The District Quality Assurance Officer will also ensure that consultants, qualified non-state laboratories, and other agencies who perform sampling and testing for the District on Federal-aid projects meet the IA requirements.

The District Quality Assurance Officer may require the County to provide a Quality Assurance Officer. However, all coordination with the MTRB,

including County projects, shall be done through the District Quality Assurance Officer.

MTRB will provide an annual report summarizing the results of the IA program to the FHWA Hawaii Division office as required in 23 CFR 637.207(a)(2)(iv).

D. Frequency of Evaluation.

1. Laboratory Technicians and Equipment:

a. Qualified laboratory technicians from the State District laboratories will be evaluated annually on the four modules (Aggregate, Asphalt, Concrete, and Soil) in the Personnel Qualification Program.

b. Laboratory technicians working for qualified non-state labs who are qualified under any of the Asphalt, Concrete, Soil, and Aggregate modules and the testing equipment used shall be evaluated by an approved accreditation agency at a frequency established by that agency. However, the Materials Engineer may, at their discretion, conduct unscheduled site visits or require split or proficiency sample testing.

c. An approved accreditation agency shall evaluate equipment in qualified non-state laboratories at the frequency established by that agency. However, at their discretion, the Materials Engineer may conduct unscheduled site visits, require equipment record review, or split or proficiency sample testing.

d. District laboratory testing equipment will be evaluated at least once every year.

2. Field Sampling and Testing Personnel and Equipment:

a. A portion of the personnel qualified in the Personnel Qualification Program Field Sampling and Testing module and their equipment will be evaluated annually. All active samplers are requested to attend IA evaluation annually by the Materials Engineer.

b. If Field Sampling and Testing Personnel do not attend their

scheduled IA evaluation, their certification(s) will temporarily be suspended until they successfully complete an IA evaluation.

c. Individuals qualified by independent sources acceptable under the Personnel Qualification Program, such as the WAQTC and ACI, who are not evaluated by an accreditation agency approved under the Laboratory Qualification Program, will be included in the pool of personnel described in 2.a. above.

E. Method of Evaluation.

1. Laboratory Equipment: District laboratory testing equipment will be evaluated by using one or more of the following:

a. Review of calibration and verification records and/or

b. Split or proficiency sample testing using equipment being evaluated and IA reference equipment.

2. Field Sampling and Testing Equipment: The field sampling and testing equipment shall be evaluated by using one or more of the following:

a. Calibration checks as appropriate,

b. Physical condition checks or

c. Split or Proficiency Samples

3. Field Sampling and Testing Personnel and District Lab Technicians:

a. Sampling Personnel. Sampling personnel will be evaluated by observation, written exam, or verbal discussion.

b. Testing Personnel. Testing personnel will be evaluated by the following:

(1) Observation and.

(2) Split or proficiency sample testing by personnel and IA inspector.

F. Evaluation Procedures. The IA evaluation will focus on sampling and testing procedures routinely performed by the personnel to be evaluated. Materials used in IA evaluations are not required to be project specific. IA test results shall not be used to verify specification compliance on construction projects. Therefore, IA tests shall not be used for acceptance.

1. Evaluation by Observation.

a. Personnel evaluation of qualified laboratory technicians from the State District laboratories and qualified Field Sampling and Testing personnel will be coordinated by the MTRB with the District Quality Assurance Officer.

b. Observation of qualified District laboratory technicians will be performed at the respective District laboratory or MTRB based on available personnel.

c. Observation of personnel qualified in the Field Sampling and Testing module will be performed at an appropriate location, determined by the IA inspector upon discussion with the Quality Assurance Officer or Project Engineer. The IA inspector will consider the availability of materials, location of personnel, and impact on construction testing when determining the appropriate site. Sites may include a test site prepared by the District for this evaluation.

d. Using a checklist, the IA inspector will observe the person performing the sampling or testing procedure and note any deficiencies during the demonstration. After the demonstration is completed, the IA inspector will discuss with the person those deficiencies observed during the demonstration.

e. The IA inspector will summarize the results of the IA evaluation and report any deficiencies to the Quality Assurance Officer. When deficiencies are reported, the Quality Assurance Officer shall follow the procedures of Subsection G — Procedures When Deficiencies Are Reported.

2. Evaluation by Split Sample.

a. Split samples may be used to evaluate personnel and testing equipment.

b. A material sample will be split into two equal portions, with one portion to be used by the tester and the other by the IA inspector.

c. IA samples shall be placed in a container or sample bag, which shall be sealed to prevent tampering. Samples shall be submitted. Each IA container and sample bag shall be labeled and identified as an "IA" sample. The identification shall also include a tag with the following information:

(1) IA sample number and source of the sample.

(2) Date of split sample.

(3) Address where each split sample was sent.

(4) Name of the tester.

d. The tester shall perform the required test and submit test results to the IA inspector within two working days unless otherwise agreed upon. Test data shall be submitted.

e. The tester's results will be compared to the results of the IA inspector. The difference will be subject to the standards established by the MTRB. The IA inspector will summarize the results of the IA evaluation and report any deficiencies to the Quality Assurance Officer. When deficiencies are reported, the Quality Assurance Officer shall follow the procedures of Subsection G — Procedures When Deficiencies Are Reported.

3. Evaluation by Proficiency Sample.

a. Proficiency samples may be used to evaluate laboratory personnel and testing equipment.

b. Proficiency samples are provided by the MTRB and sent to the laboratories and testing personnel to be tested.

c. The tester shall perform the required test and submit test results to the IA inspector within the agreed-upon timeframe. Test data shall be submitted with a sample card

d. The tester's results are compared to the results of the laboratory providing the proficiency samples. The difference will be subject to the standards established by the MTRB. The IA inspector will summarize the results of the IA evaluation and report any deficiencies to the Quality Assurance Officer. When deficiencies are reported, the Quality Assurance Officer shall follow the procedures of Subsection G — Procedures When Deficiencies Are Reported.

4. Equipment Evaluation by Calibration and Verification.

a. Calibration and Verification checks shall ensure equipment covered in AASHTO R-18 and HDOT test methods is within the specified tolerances. Each piece of equipment shall be checked at the specified frequency and clearly marked with an identification number.

b. The Quality Assurance Officer shall have a program to ensure equipment verification and calibration are done at the required frequency. Records of test equipment verification and calibration shall be kept on file.

c. The IA inspector will review equipment records and may, at their discretion, inspect any equipment for conformance.

d. The IA inspector will summarize the results of the IA evaluation and report any deficiencies to the Quality Assurance Officer. When deficiencies are reported, the Quality Assurance Officer shall follow the procedures of Subsection G — Procedures When Deficiencies Are Reported.

G. Procedures When Deficiencies are Reported. The Quality Assurance Officer shall use one of the following procedures, as appropriate:

1. When Deficiencies Are Reported During Evaluation by Observation.

a. Discuss each procedural deficiency with the tester and review the proper procedure.

b. Observe the technician re-perform the test correctly.

c. Prepare a memorandum of record summarizing corrective action taken.

d. Submit a memorandum of record to the MTRB.

2. When Deficiencies Are Reported for Poor Results from Split or Proficiency Samples.

a. Determine if the data reported was correctly entered.

b. Determine if the test results were transferred correctly to the submitted data sheet.

c. Determine if all calculations leading to the test results obtained were correct.

d. Determine if equipment conformed to specifications.

e. Determine if proper test procedures were followed.

f. Take corrective action to repair or replace defective equipment or review proper procedures with the tester.

g. Prepare a memorandum of record summarizing investigation results, identifying the cause of deficiencies, and describing any corrective action taken.

h. Submit a memorandum of record to the MTRB.

3. When Deficiencies Are Reported on Equipment.

a. Determine if equipment conformed to specifications.

b. If the equipment is defective, take corrective action or identify it as non-conforming until it is repaired or replaced.

c. Prepare a memorandum of record summarizing the results of the investigation and any corrective action taken.

d. Submit a memorandum of record to the MTRB.

VIII. CONTRACTOR QUALITY CONTROL

A. Purpose. This section provides expectations for Contractors to monitor construction quality and ensure materials and products meet contract requirements.

B. Scope. The program applies to all State Department of Transportation Highway projects and County Federal-aid projects on the National Highway System.

C. Components of Quality Control. Quality control on construction projects can be complex, so putting quality control procedures in place helps ensure compliance with contract documents. The following is a list of components the contractor should include in their Quality Control Plan.

1. Construction project plan. The construction project plan should describe the methods, personnel, equipment, schedule, budget, and monitoring to meet the project goals of the Contractor and the State or County.

2. Inspection plan. The Contractor develops the inspection plan for their employees to ensure the work meets requirements before State or County inspections. It's a proactive approach to monitoring construction, including what items will be inspected, when they will be inspected, and who will perform the inspection. The inspection plan provides the Contractor with confidence the contract is being satisfied. Ideally, it allows time to rework items as necessary before the State or County does their inspection for acceptance.

3. Quality Control Checklist. The quality control checklist supports the inspection plan. It is a checklist for conducting inspections and can be used to brief contractor staff before beginning each work item on the inspection plan. The checklist highlights the essential steps in the item of work and makes it less likely a step will be overlooked.

4. Correct Work. When an inspector (Contractor or State/County) identifies an item that does not meet the contract's requirements, mark the work as deficient, make the correction, document it, and ensure it meets the requirements.

5. Review and Revise. When an item does not meet requirements, review the construction project plan, inspection plan, and quality control checklist to understand what happened and why. Discuss with

your team to avoid repeating the problem and revise the construction project plan, inspection plan, and quality control checklist to ensure the problem doesn't occur elsewhere.

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IX. MATERIAL TESTING DISPUTE RESOLUTION

A. Purpose. This section provides procedures for resolving material testing or other non-test-related material quality disputes.

B. Scope. The program applies to all Federal-aid projects on the National Highway System.

C. Dispute Resolution Procedures. Conflicts between the Engineer and the Contractor resulting from discrepancies in testing or non-test-related material quality disputes, shall be resolved using the steps outlined below. Non-test-related disputes may include segregation, workmanship, flushing, open joints, non-uniform mats, and other issues. If mutually agreed to by the disputed parties, other forms of resolution may be used. Any deviations from the following procedures shall be agreed to in writing by the Engineer and the Contractor.

1. Test Related Disputes:

a. Step I: Project Investigation.

Personnel responsible for the Contractor Sampling and Testing and Verification Sampling and Testing shall review sampling procedures, testing procedures, testing equipment, and computations. This investigation ensures proper procedures were followed, the equipment used is properly calibrated and functioning, and computational errors are ruled out. If problems are found, corrective action shall be taken.

If Step I does not resolve the conflict, procedures in Step II shall be followed.

b. Step II: Third-Party Investigation.

The third-party investigation shall be conducted by the MTRB or a non-state accredited laboratory designated by the Engineer. The designated non-state laboratory shall be accredited in the applicable test by the AASHTO Accreditation Program or by a comparable laboratory accreditation program approved by the FHWA, with testing personnel

qualified according to the accreditation agency. The non-state laboratory third party shall not, in any way, be involved in the Contractor Sampling and Testing, Verification Sampling and Testing, or Independent Assurance Sampling and Testing on the disputed project.

The designated third party shall examine the following:

(1) Past comparisons for the disputed item to identify any trends.

(2) Results of the project-level investigation.

(3) Results of the Independent Assurance Program.

A sample shall be split among the Contractor, Engineer, and third party to compare test results. The third party may perform additional verification testing, at the project-level, as necessary.

Results obtained from split or new samples and verification testing shall be evaluated to decide whether initial test results obtained by the Contractor or the Engineer more accurately represent the material property. The third party shall submit a written report describing the dispute, all subsequent actions, and a final recommendation to the Materials Engineer.

If this investigation shows the Engineer's tests are correct, the Contractor shall pay for the cost of the third-party investigation. Similarly, if the investigation shows the Contractor's tests are accurate, the Engineer will pay the cost of the third-party investigation.

2. Non-Test Related Disputes:

a. Step I: Project Investigation.

The Contractor and the Engineer will jointly quantify the dispute (e.g., the area of segregation, etc.), its severity, and its impact on facility performance. When testing is required to assist in dispute resolution, all parties shall agree to the sampling and testing plan, testing agency, and disposition of

these findings before starting.

If Step I does not resolve the dispute to the satisfaction of all parties within a previously agreed time, procedures in Step II shall be followed.

b. Step II: Third-Party Investigation.

A resolution shall be arbitrated by an unbiased third party designated by the Engineer. The third party shall submit a written report describing the dispute, all subsequent required actions, and a final recommendation to the Materials Engineer.

When disputes are resolved by an unbiased third party, the Engineer and the Contractor shall share the cost of the third-party investigation. Conclusions and recommendations made by any unbiased third party shall be binding.

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X. LETTER OF MATERIALS CERTIFICATION

A. **Purpose.** A letter of materials certification is issued for federally funded projects on the NHS to attest that materials incorporated in the project conform substantially to requirements of the approved plans and specifications, including approved changes.

B. **Scope.** A letter of materials certification will be submitted to the Federal Highway Division Administrator for each project subject to FHWA construction oversight activities.

C. **Procedure.**

1. Project Engineer.

a. The Project Engineer will review all project records, such as sampling and testing reports, material certificates, and certified test results, to ensure that materials incorporated into the project conform with the approved plans and specifications. Records for material items listed in the Project Proposal Schedule will be substantially documented and submitted to the MTRB during project construction.

b. The Project Engineer will request a letter of materials certification using Form MTRB MC — Appendix 2, Materials Certification Documentation. All applicable sections of this form will be completed properly. Materials tracking summaries utilized by the project may be submitted to expedite the review process for issuing the letter of materials certification.

2. Materials Testing and Research Branch.

a. The MTRB will review the project documents on file at the MTRB. When deficiencies are noted, the project engineer will be contacted for a resolution.

b. The Materials Engineer will prepare and submit a letter of materials certification and supporting documentation to the FHWA upon a satisfactory review.

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APPENDIX 1 – FLOWCHARTS

Agency Acceptance

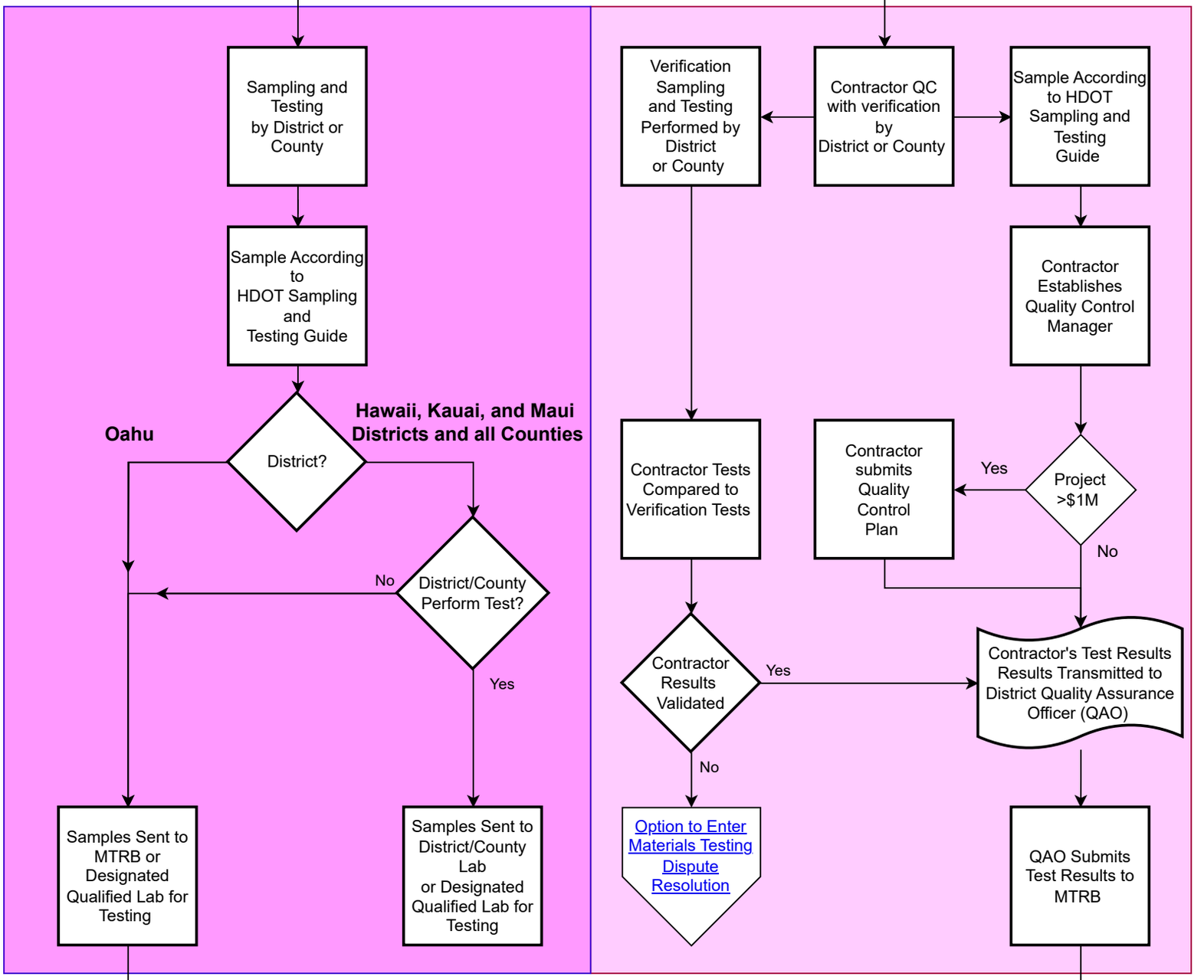
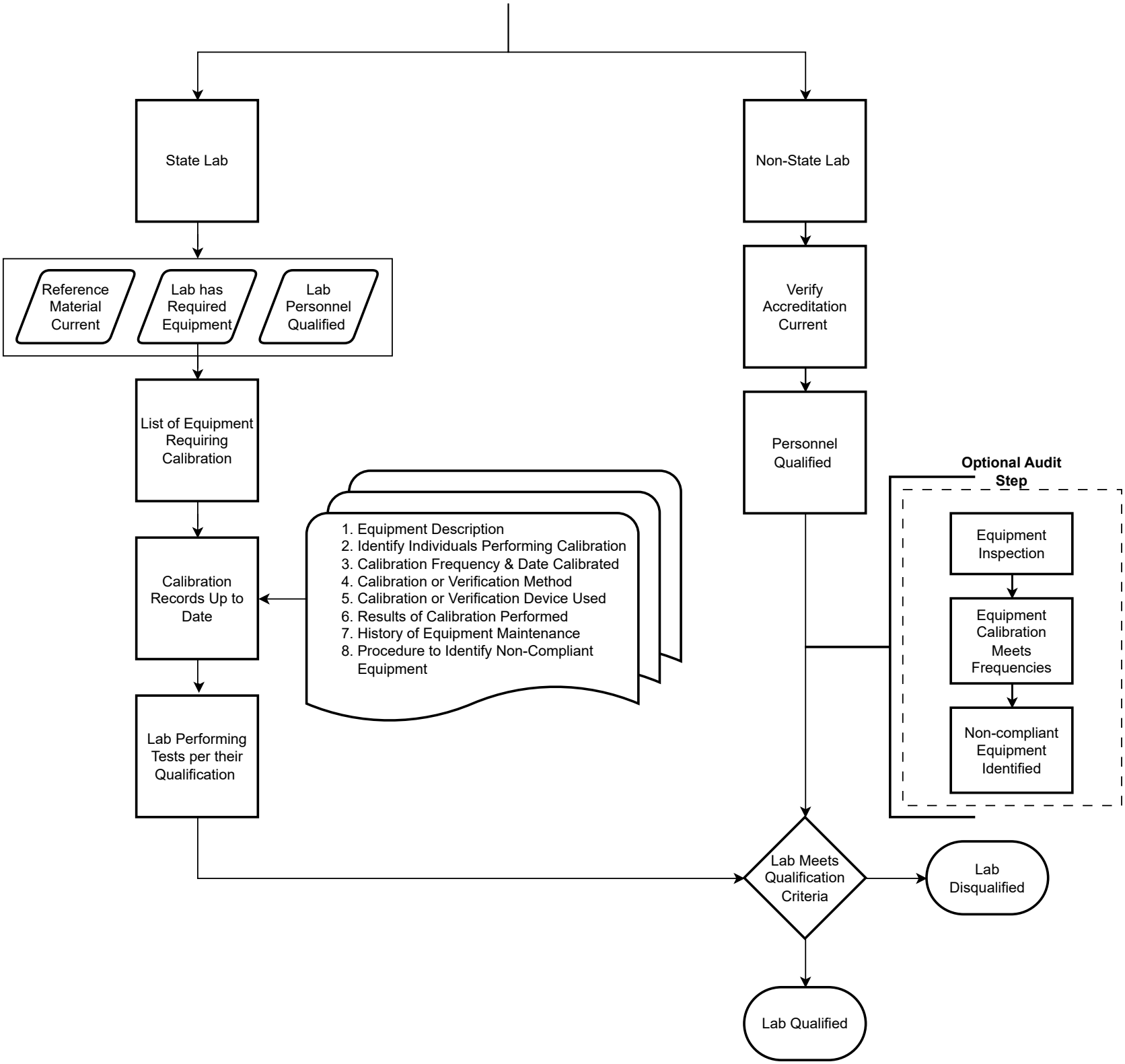


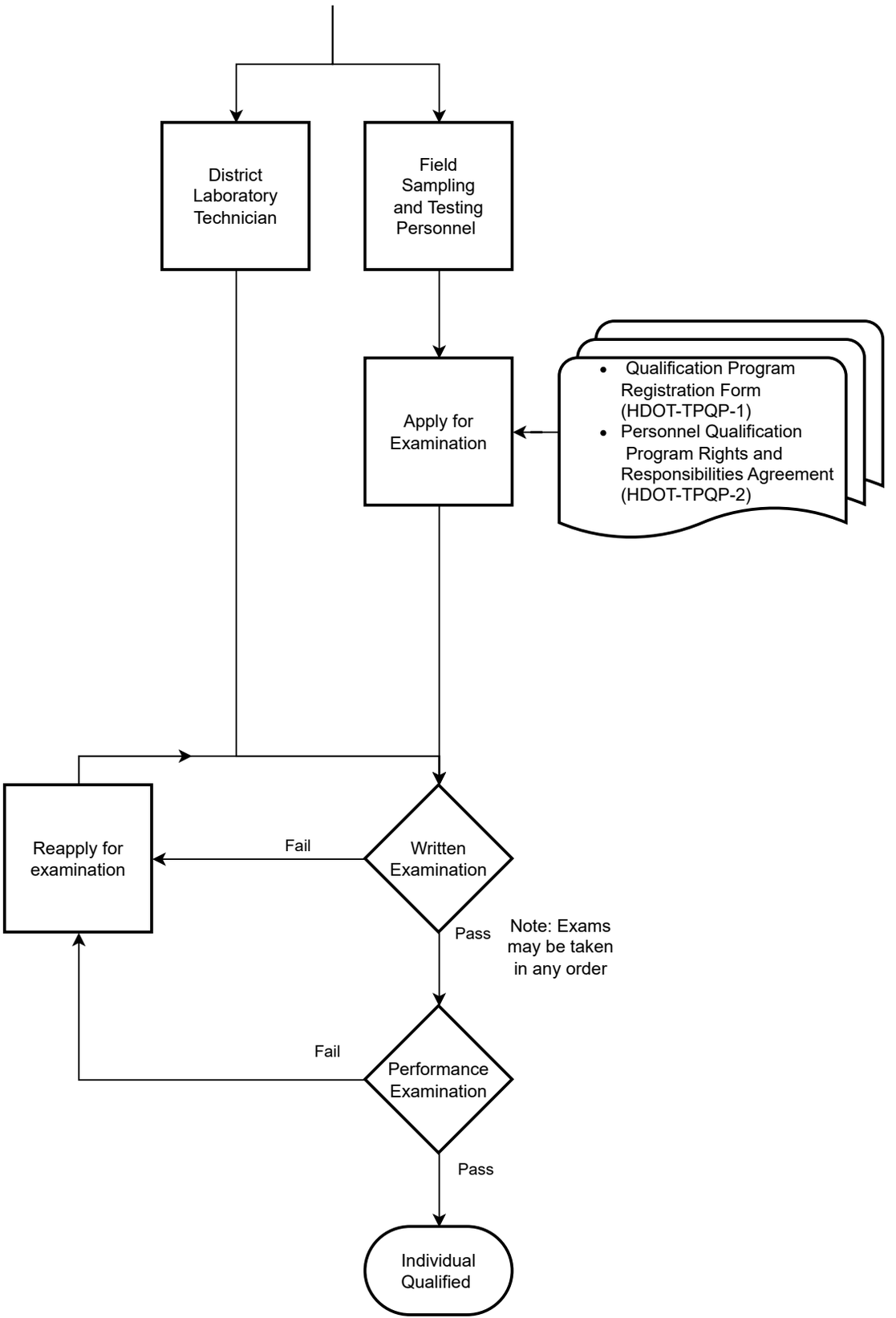
Diagram Key

- Standard Process
- Alternate process if allowed per contract specifications

Laboratory Accreditation Qualification



Personnel Qualification Certification



Independent Assurance

Diagram Key

- Personnel
- Equipment

District Lab

Lab Technicians

Evaluate by Observation

Procedure Satisfactory

No → Correct Deficiencies → Evaluate by Observation

Yes → Evaluate by Split or Proficiency Sample

Testing Satisfactory

No → Correct Deficiencies → Evaluate by Split or Proficiency Sample

Yes → Submit memo to MTRB

Lab Equipment

One or More:

- Records
- Split Sample
- Proficiency Sample

Evaluate Equipment

Equipment Satisfactory

No → Correct Deficiencies → Evaluate Equipment

Yes → Submit memo to MTRB

Non-State Lab

Lab Technicians

Lab Equipment

Evaluated by Accreditation Agency

Accreditation Agency posts results

Field Sampling & Testing

Field Personnel

Testing Personnel

Evaluate by Observation

Correct Deficiencies

Testing Method Satisfactory

No → Correct Deficiencies → Evaluate by Observation

Yes → Evaluate by Split or Proficiency Sample

Testing Results Satisfactory

No → Correct Deficiencies → Evaluate by Split or Proficiency Sample

Yes → Submit memo to MTRB

Sampling Personnel

Evaluate by Observation, Written Exam or Verbal Discussion

Evaluation Satisfactory

No → Correct Deficiencies → Evaluate by Observation, Written Exam or Verbal Discussion

Yes → Submit memo to MTRB

Field Equipment

One or More:

- Calibration Check
- Physical Condition Check
- Split or Proficiency Sample

Evaluate Equipment

Equipment Satisfactory

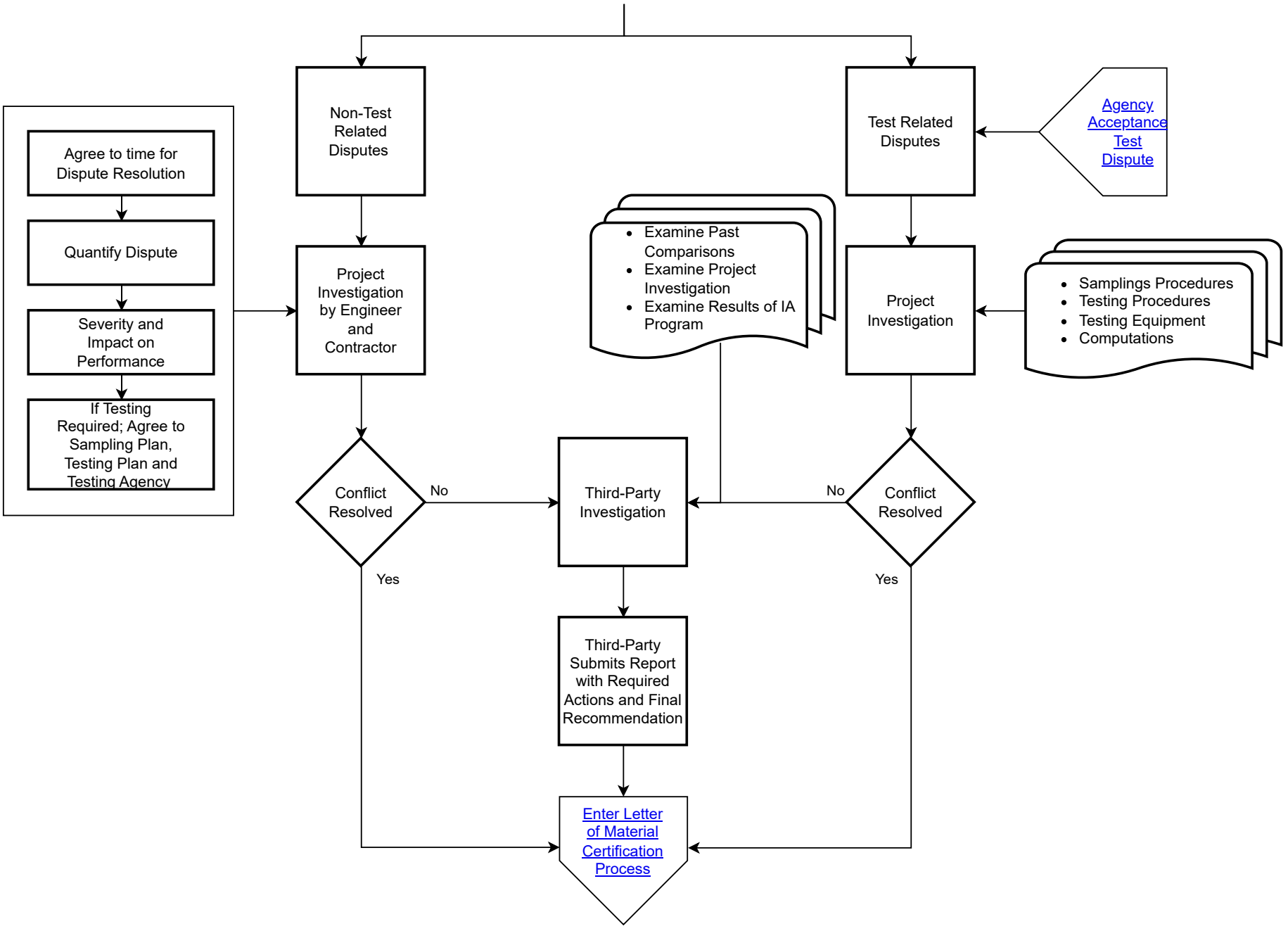
No → Correct Deficiencies → Evaluate Equipment

Yes → Submit memo to MTRB

Identify equipment as non-conforming

Submit memo to MTRB

Material Testing Dispute Resolution



Letter of Materials Certification