North Carolina Department of Transportation

Materials and Tests Unit

Cementitious Materials Program

March 2026

i. Revisions

4/25/2012	Added link to section 3 for approved cement sources.
6/7/2012	Added the option for Optimum SO_3 in Hydraulic Cement to allow using 24hr, 3 day, or 7 day compressive strength
2/18/2013	Added cement for latex concrete and cement for bag mix sampling frequencies
2/26/2024	In-depth revision. Added Table of Contents. Modified scope. Introduced new definitions (producers, suppliers, sources (mills), and terminals). Added details on use of Cementitious Materials service account and updated submittal items necessary for approval. Provided additional details on storage requirements. Incorporated requirements for producers/suppliers to participate in AASHTO Audit program. Added cement sampling guide table. Added copy of Memo distributed in October, 2023 requiring producers/suppliers to participate in the AASHTO Audit program.
3/18/2026	Changed the manual name from “Hydraulic Cement Acceptance Program Manual” to “Cementitious Materials Program” to be inclusive of supplementary cementitious materials, such as fly ash, silica fume, slag, etc. This change included modifying “hydraulic cement” to “cementitious materials” in several locations throughout the manual. The requirement for producers/suppliers to participate in the AASHTO Portland and Blended Cement Audit Program was updated to note that the scope of the audit plan does not include supplementary cementitious materials (SCMs), as such, producers/suppliers of SCMs must follow the same NCDOT acceptance protocols as required for cement, only without participation in the AASHTO Audit program.

ii. Table of Contents

1. Scope

1.1. The NCDOT Cementitious Materials Program establishes the procedures and criteria for evaluating sources of hydraulic cement and supplementary cementitious materials that will be utilized in various products and applications as specified by the North Carolina Department of Transportation (NCDOT). The responsibilities of the respective parties, including producers/suppliers, end-users, and NCDOT personnel, are provided herein.

1.2. This program ensures cementitious materials adhere to Section 1024 of the NCDOT Standard Specifications. The referenced requirements are listed below.

1.2.B Hydraulic Portland and Blended Cements - AASHTO M 85 and M 240

1.2.C Fly Ash – ASTM C618 and does not exceed Loss on Ignition of 4%

1.2.D Ground Granulated Blast Furnace Slag (Grade 100) – AASHTO M302

1.2.E Silica Fume – Tables 1,2,3, of ASTM C1240

1.2.F Natural Pozzolans – ASTM C618 (Type N) and do not exceed Loss on Ignition of 4%

1.3. This program establishes handling and storage protocols for hydraulic cement and supplementary cementitious materials.

1.4. Compliance with the requirements of this program does not relieve the cement of concrete producer of the responsibility of complying with all requirements of the *NCDOT Standard Specifications for Roads and Structures*, hereinafter referred to as "NCDOT Standard Specifications."

2. Manual Organization

2.1. Section A of this manual describes the responsibilities, duties, and requirements of individual cement producers and the NCDOT as they pertain to the manufacture, testing, shipment of hydraulic cements, and documentation thereof.

2.2. Section B of this manual describes the responsibilities and duties of cement users and the NCDOT as they pertain to the purchase, storage, use, and documentation of cement used in the production of concrete and concrete products.

3. Terminology

3.1 **End-Users**: Those facilities or manufacturers that utilize cement as a component for the production of a final product, including, but not limited to the following:

- **Precast Concrete Producers** – Facilities utilizing reusable molds or forms to cast concrete in a controlled environment. Materials included, but not limited to box culverts, box beams, manholes, wing walls, junction boxes, inlets, utility boxes, panels, and traffic barriers.

- **Prestressed Concrete Producers** – Facilities utilizing tendons to overcome concretes weakness in tension. Materials include, but are not limited to piles, girders, box beams and cored slabs.

- **Ready Mixed Concrete Producers** – A central batching plant that manufactures concrete according to a pre-determined mix design.

- **Mobile Batch Producers** – Temporary plants producing concrete on or near the jobsite. Typical applications are concrete pavement.

- **Geotechnical** – Typical applications include soil stabilization and cement treated base course.

- **Point of Use** – The point where cement is incorporated into the final product.

3.2. **Producer:** A manufacturer that processes raw materials into a finished, ready-to-use cement product.

3.3. **Source (or Mill):** A manufacturing facility whereby the raw materials for creating cement are processed and ground with other additives to produce a cement product for sale/distribution.

3.4. **Supplier:** An entity that supplies cement to end-users but may or may not produce the cement.

3.5. **Terminal:** An operations facility whereby cement is received, stored, and sub-divided for distribution to end-users.

Section A – Cement Producer/Supplier Responsibilities

4. Approved Cement Producer/Supplier List

4.1. Cement producers/suppliers must comply with the requirements outlined in Section A.

4.2. Cementitious material producers/suppliers shall become prequalified as an approved source for NCDOT projects.

4.3. The Materials and Tests Unit shall maintain an Approved Producer/Supplier list of all cement sources that comply with the Cementitious Materials Program. The Approved Producer/Supplier list can be found via the NCDOT Materials and Tests website, or at the following:

https://apps.ncdot.gov/vendor/approvedproducts/Producer.aspx

5. Participation

5.1. Producers and suppliers of hydraulic cements seeking NCDOT approval shall participate in the AASHTO Product Evaluation & Audit Solutions – Portland and Blended Cement (PBC) Audit program (hereinafter referred to as the AASHTO Audit program). Program details are available on the AASHTO website at:

https://transportation.org/product-evaluation-and-audit-solutions/technical-committees/portland-and-blended-cement-pbc/

Additional details and requirements for AASHTO Audit program participation are provided below in Section 6. The requirement to participate in the PBC Audit program does not apply to supplementary cementitious materials as they are not within the scope of the PBC Audit program.

5.2. The cement producer/supplier shall submit a formal request to NCDOT to apply for inclusion on the approved producer/supplier list in accordance with the Cementitious Materials Program. The information provided in Section 5.3 shall accompany the request. Submit requests and associated documentation to the Cementitious Materials Service Account:

cementitiousmaterials@ncdot.gov

5.3. Supporting Information

- Submit a copy of the Quality Control Plan or Manual for the specific facility under consideration.

- Submit records or correspondence indicating active participation in the AASHTO Audit program.

- Submit copies of the last six months of mill reports of production for each type of cement proposed for use from the specific facility. The data shall represent test results for at least 30 separate samples. For new sources without six months of prior data, this requirement is waived, however physical and chemical test data accumulated for samples shall be submitted to the Department on the first of each month for the first six months of production.

- For cements with sulfur trioxide (SO_3) levels above the prescribed limits in C150, submit an optimum sulfur trioxide report (ASTM C563) and expansion results (ASTM C1038) indicating excessive expansion does not occur as a result of the higher sulfate content.

- Submit a one-gallon prequalification sample of each type of cementitious material proposed for use to the address below:

  North Carolina Department of Transportation
  Materials and Tests Unit
  1801 Blue Ridge Road
  Raleigh, NC 27607
  Attn: Structural Materials Workgroup

5.4. NCDOT shall conduct a review of the application to determine compliance with the requirements set forth in Sections 6 and 7. If omissions or discrepancies are identified regarding the required information, the Department will provide written notification to the cement producer detailing said omissions or discrepancies. The cement producer shall resubmit a revised application addressing the omissions or deficiencies. Upon satisfactory compliance with the requirements of the application, the cement producer will receive confirmation stating their inclusion on the Approved Producer/Supplier list.

5.5. Cement suppliers approved under this plan that may provide hydraulic cement from sources other than their own manufacturing facilities (either domestic or imported) shall assume all responsibility for compliance of the subject hydraulic cement to meet applicable NCDOT specifications. The materialsupplier of record shall have in their Quality Control Plan/Manual procedures for addressing notification to the NCDOT of the composition and any changes thereof of the purchased cement in accordance with Section 7.

6. AASHTO Audit Program Requirements

6.1. The AASHTO Audit program is utilized by the NCDOT to verify a producer or supplier's compliance with quality control (QC) and product testing. Participation in the AASHTO Audit program also benefits producers/suppliers by providing a one-stop-shop where all participating state DOTs can access relevant QC data, audit results, and mill reports for a participating producer/supplier.

6.2. Since the AASHTO Audit program is administered by AASHTO, please review the current "PBC Work Plan" document posted via the link provided in Section 5.1 or contact the technical committee liaison listed on the website for questions regarding audit program details.

6.3. It is important to note that NCDOT distinguishes between producers and suppliers (see Section 3 "Terminology") where AASHTO defines suppliers as "any mill or terminal that manufactures and/or distributes Portland or blended cement to customers." Both producers and suppliers are subject to the AASHTO Audit program requirements.

6.4. NCDOT requires producers to register domestic cement sources to participate in the AASHTO Audit program. When domestic sources participate in the AASHTO Audit program, intermediate terminals that serve as distribution points between the source and the end-user are not required to register for the AASHTO Audit program.

6.5. For instances where suppliers providing cement from foreign sources do not participate in the AASHTO Audit program, NCDOT requires the terminal of import to participate in the AASHTO Audit program. Subsequent terminals, beyond the terminal of import, utilized for distribution to the end-user are not required to register for the AASHTO Audit program.

6.6. For instances where a supplier acts as a third-party distributor of another producer's domestic source, that supplier shall register their terminal with the AASHTO Audit program, even if the producer's source is an active AASHTO Audit program participant.

6.7. AASHTO Audit program procedures do not include a determination of facility QC acceptability. Audit documents only report a facility's compliance with the items provided on the audit checklist, which is provided on the AASHTO Audit program website. NCDOT will review these audit documents upon completion to determine the acceptability of a producer/supplier facility to obtain initial acceptance or maintain approved producer/supplier status.

6.8. Continued annual participation in the AASHTO Audit program is required to remain on the approved producer/supplier list.

6.9. In the event a producer/supplier applies for a new cement source approval and the current year AASHTO Audit program registration window has closed, the new source can still be submitted for acceptance with confirmation of an AASHTO DataMine account and pending participation in the following year AASHTO Audit cycle.

6.10. Producers/Suppliers shall upload monthly mill reports to the AASHTO DataMine Industry Document Repository (IDR). The mill report shall indicate that the cement meets AASHTO M 85 or M 240 Standards depending on the type of cement approved.

6.11. A copy of the NCDOT Memo distributed October 2, 2023 notifying cement producers/suppliers of the requirement to participate in the AASHTO Audit program is included in the appendices.

7. Cement Producer/Supplier Requirements

7.1. **Quality Control Plan** - The cement producer must have a written quality control plan approved by the NCDOT for the specific manufacturing facility. The plan must provide a general description of the manufacturing process used to produce (or purchase), handle, store, and control the quality of cementitious materials to assure that the applicable NCDOT specification requirements are met. The Quality Control Plan/Manual must meet, in principle, the following:

- Identify the ownership of the manufacturing facility, to include the legally traded name and the address of the company, corporation, or LLC.
- Contact information for the specific manufacturing source to include:
    - Mailing and physical address of the Specific Facility
    - Responsible Facility Management Personnel
        - Quality Control Supervisor/Manager
        - Plant Management
        - Contact information for the above to include phone numbers and email addresses
- Identify the physical address of the source, including a description of the property site and reference to the nearest identifiable points such as highways and towns.
- Describe procedures for random sampling and testing of the material in accordance with AASHTO R38.
- Indicate the sampling and testing frequency.
- Include the method of identification for each type of material including tracking from point of manufacture to the transfer of ownership to the purchaser.
- Describe the methods by which the products are to be stored, loaded, and shipped including safeguards against loading improper materials, contamination, and degradation of the cement. Safeguards for the prevention of contamination and degradation shall include

protection from moisture by storing cement in a closed building or sealed and enclosed containers.

- NCDOT does not recognize "super sacks" as suitable sealed containers. Use of super sacks is permitted for handling purposes but shall be stored in a closed building.
- Ensure all products are accurately identified.
- Indicate how all QC processes will be monitored, documented, and tracked.
- Describe how the producer plans to initiate an immediate investigation regarding samples deemed to be in non-compliance with the applicable specification requirements and what corrective action(s) are to be taken to remedy the non-compliance.

Include a copy of either the latest onsite CCRL inspection report, proof of current AASHTO Accreditation, or approved equivalent for the laboratory used to perform sample testing.

7.2. **Approved Laboratory** – The laboratory conducting tests on hydraulic cements shall be adequately equipped and staffed with personnel competent to perform said test. Satisfactory documentation of laboratory competence shall be met by submission of the most recent CCRL inspection report and responses to any deficiencies found. A laboratory that is AASHTO accredited may submit documentation thereof without submission of the CCRL data. The laboratory must retain records of the analysis of samples for at least five years.

7.3. **Approved Quality Control Technician Supervisor/Manager** – The facility shall have an approved quality control supervisor/manager who is responsible for assuring all technicians under their charge are adequately trained and competent in execution of the respective tests.

7.4. **Annual Facility Update** - The cement producer/supplier must submit a request to remain on the approved cement producer list by December 31 of each year. Requests shall be submitted to the cementitious materials service account provided in Section 5.2. A summary of any changes to the quality control plan is acceptable in lieu of a complete submittal.

7.5. Random inspection by NCDOT may occur at any time to verify compliance with the program requirements.

8. Cement Producer/Supplier Reporting Requirements

8.1. For each type of cement on the Approved Producer/Supplier list, producers/supplier shall submit to the NCDOT Cementitious Materials Service Account:

- An annual declaration of the anticipated maximum alkali content of the hydraulic cement produced from the respective manufacturing facility.
- A written notification to NCDOT, within 30 days, should the alkali content exceed the maximum stated in the annual declaration of alkali content.
- An annual test report of the following:
    - A written notification of changes in raw material or other major production changes
    - Annual test reports, if applicable, for:
        - ASTM C563, Test Method for Optimum SO_3 in Hydraulic Cement Using 24-hr, 3 day, or 7 day Compressive Strength.
        - ASTM C1038, Test Method for Expansion of Portland Cement in Mortar Bars Stored in Water
        - If applicable, ASTM C465, Standard Specification for Processing Additions for Use in the Manufacture of Hydraulic Cements

8.2. The material supplier must submit a mill certification with each shipment of cement. The mill certification shall contain the chemical and physical analysis of the hydraulic cement and shall contain additional information that will comply with that shown in Exhibit C. The certification may be added to the bottom of the Bill of Lading or supplied as a separate certificate. Mill certification must be signed by a representative of the manufacturer and signed by the responsible Quality Control Supervisor/Manager identified in the Quality Control Plan/Manual.

9. Shipping Requirements

9.1. Shipments of cementitious materials shall include a "Bill of Lading" (BOL) and "Mill Certification." These documents will be required with every cement tanker and/or railcar when delivered to an approved NCDOT concrete producer and/or facility. This requirement also applies for cement delivered directly to a project site. The BOL shall identify the seller and manufacturing location in a clear and easily recognized manner. (Note: this location will utilize the term "Manufactured In" (city, state (and country if applicable)).

10. Sampling and Testing

10.1. NCDOT reserves the right to conduct random verification sampling of materials for testing and to perform random audits of test reports. Department representatives may sample material from the plant, terminal, or transportation container to inspect for compliance with the specifications.

10.2. NCDOT reserves the right to reclassify cements as high alkali (cement with a Na_2O_{Eq} of 0.6 – 1.0% in the following instances:

- If two, repeat verification tests find a Na_2O_{Eq} of at least 0.65%
- If a six-month rolling average of Na_2O_{Eq} values trend above 0.60%
- If three consecutive mill reports from the producer have a Na_2O_{Eq} greater than or equal to 0.60%.

11. Removal from Approved Producer/Supplier List

11.1. NCDOT may suspend a cement producer or supplier from the Cementitious Materials Program for the following reasons:

- Cementitious material does not meet the specification requirements as prescribed by the NCDOT Specifications.

- Failure to comply with the Cementitious Materials Program.

Note: Before removal occurs, NCDOT will provide written notification of deficiencies. The producer will respond in writing with an explanation and corrective actions. NCDOT will hold a meeting discussing findings and actions when deemed necessary.

11.2. No suspension shall occur until such time that the NCDOT has provided written notification to the responsible Quality Control Manager/Supervisor of the manufacturer identified in the QC Plan for the respective cement supplier of pending suspension and the reasons thereof. The producer will have 30 calendar days to respond in writing to NCDOT with an explanation and corrective actions proposed. If satisfactory resolution(s) to the discrepancies are provided, the cement producer/supplier will not be removed from the approved producer/supplier list.

12. Reinstatement

12.1. The requirements for reinstatement only apply when a resolution in accordance with section 11 have not been met.

12.2. For requalification, submit a written request to the Cementitious Materials service account detailing the corrections or changes made that support reinstatement. If disqualification has been longer than one year, submit the following in addition to the written request:

- A one-gallon sample of each type of cement with a representative test report including the properties shown in the Producer Reporting Requirement section of this program.
- A summary of changes to the quality control plan is acceptable in lieu of a complete submittal.

Section B – End-User Responsibilities

13. Cement End-User Requirements

13.1. Cement end-users shall maintain documentation as to the types, sources, and tracking of cements purchased. All end users are required to obtain a “Bill of Lading” (BOL) and “Mill

Certification" for every tanker and/or railcar of cement delivered to an approved NCDOT Concrete producer, project site, and/or facility. It is the responsibility of the end-user to verify that the documentation, location, and type of cement correspond with the approved NCDOT mix design.

13.2. During plant visits, routine inspections, or sampling operations, the certified batcher or facility manager will be required to furnish this documentation if requested. Copies of all documentation shall remain onsite or easily accessible for at least three years after the project has been completed.

13.3. Any end-user found not complying with this program may be removed from the NCDOT Approved Producer/Supplier list.

Note: Before removal occurs, NCDOT will provide written notification of deficiencies. The producer will respond in writing with an explanation and corrective actions. NCDOT will hold a meeting discussing findings and actions when deemed necessary.

14. NCDOT Plant Inspection Random Sampling

14.1. **Precast Concrete Plant:** For Concrete supplied by the precaster, the NCDOT plant inspector or representative will obtain at least one random, 1-gallon audit sample per year for acceptance testing and one random, 1-cup (0.25-pound) sample biannually for verification testing. The annual audit sample does not replace either of the biannual verification samples and should be taken at different times.

- During routine inspections, NCDOT will conduct a review of all cement delivery tickets to confirm that cement usage corresponds to the requirements of the NCDOT approved mix designs.

- The plant inspector will conduct additional sampling during low strength investigations.

14.2. **Prestressed Concrete Plant:** For Concrete supplied by the prestresser, the NCDOT representative will obtain one random, 1-gallon audit sample per year for each cement source at the plant for acceptance testing, and one random, 1-cup (0.25-pound) sample per month for verification testing. The monthly sample can be skipped for the month the annual sample is taken.

- During routine inspections, NCDOT will conduct a review of all cement delivery tickets to confirm that cement usage corresponds to the requirements of the NCDOT approved mix designs.

- The plant inspector will conduct additional sampling during low strength investigations.

14.3. **Ready Mixed Concrete Plant:** For Concrete supplied by the Ready Mixed concrete producer, the NCDOT representative will obtain one random 1-gallon sample per year and one random, 1-cup (0.25-pound) sample for brand identification per year for each cement source at the plant. The 1-gallon and 1-cup samples are to be taken no sooner than 3 months apart.

- During routine inspections, NCDOT will conduct a review of all cement delivery tickets to confirm that cement usage corresponds to the requirements of the NCDOT approved mix designs.

- The plant inspector will conduct additional sampling during low strength investigations.

15. Point of Use Sampling

15.1. Portland Cement Used in Concrete:

Acceptance:

Concrete Pavement: From each actively producing facility per project, Resident Engineer's personnel shall take one, 1-gallon sample from the concrete facility for every 1,250 tons of cement used in concrete pavement.

Latex Modified Concrete: From each active project, Resident Engineer's personnel shall take one, 1-gallon sample from the tanker/truck for every 100 cy of concrete used in latex modified concrete.

Miscellaneous Project Onsite/Bag Mixes: From each active project Resident Engineer's personnel shall take one, 1-gallon sample from each source for every 25 tons of cement used.

Verification:

Structural Concrete: Materials and Tests personnel obtains at least one – 1 cup sample for source identification from each actively producing concrete plant randomly during the life of the project or if questionable material is an issue.

15.2. Portland Cement Used in Geotechnical Applications:

Acceptance:

Soil Stabilization or Cement Treated Base Course: Project inspector take one, 1-cup (0.25-pound) ample per 1,250 tons of cement used.

Exhibit A – Producers/Supplier Shipment Certification

I. Introduction

Cement Producers or Suppliers must submit the following additional certification with each shipment of cement. This will act as an affidavit that the cement meets or exceeds NCDOT

specifications. If this certificate is not physically contained on the BOL it must also contain lot/batch number, date manufactured and project or facility destination.

II. Example Certification

This is to certify that the shipment of (_____ Tons) of Portland cement manufactured by _____(Company Name) and meets the requirements of AASHTO M-85 for Type ____ cement. Tests were conducted in accordance with AASHTO procedures and reports are on file.

BY PROVIDING THIS DATA UNDER MY SIGNATURE, I ATTEST TO THE ACCURACY AND VALIDITY OF THE DATA CONTAINED ON THIS FORM AND CERTIFY THAT NO DELIBERATE MISREPRESENTATION OF THE TEST RESULTS, IN ANY MANNER, HAS OCCURRED

Signed:_____ Dated: _____

Authorized Officer

Of Supplier

Exhibit B – Sampling Method

SAMPLING HYDRAULIC CEMENT, GROUND GRANULATED BLAST-FURNACE SLAG, FLY ASH AND/OR OTHER POZZOLANIC MATERIALS

1. SCOPE

1.1 This method covers the procedure for sampling hydraulic cement, ground granulated blast-furnace slag, fly ash and/or other pozzolanic materials in the field for use in Portland Cement Concrete and other applications.

1.2 This procedure does not purport to address all of the safety concerns associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

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2. REFERENCED DOCUMENTS

2.1 North Carolina Department of Transportation *Standard Specifications for Roads and Structures*

2.2 North Carolina Department of Transportation Cementitious Materials Program

2.3 North Carolina Department of Transportation Field Test of Portland Cement for Contamination

2.4 AASHTO Standards:

- T127, Standard Method of Test for Sampling and Amount of Testing of Hydraulic Cement

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3. SAMPLING EQUIPMENT

3.1 Clean Scoop, Shovel, or Tube

3.2 Clean Plastic Gallon Size Sampling Bags

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4. SAMPLING PROCEDURE

4.1 General Requirements:

4.1.1 Samples shall be taken by a NCDOT employee or by a concrete producer representative and witnessed by a NCDOT employee.

4.1.2 The concrete producer is responsible for ensuring that the samples are obtained without contamination.

4.1.3 The sample shall be representative of the material being used on the project.

4.1.4 Annual audit samples shall be approximately 1-gallon and designated for “Acceptance” in the HiCAMS Testing Category. The sample bag shall be as full as possible to minimize air space in the sealed bag.

4.1.5 Monthly or check samples shall be approximately 1-cup (0.25-pound) and designated for "Verification" in the HiCAMS Testing Category.

4.1.6 Do not obtain samples from the ground.

4.1.7 Ensure samples do not become contaminated with sand, air-entraining admixtures, or other materials not representative of the sample.

4.1.8 Deliver the sample as soon as possible to the testing facility to minimize aeration, contamination, and moisture absorption.

4.2 Sampling from a Transport Truck:

4.2.1 From Top of Truck: Take a sample from the top of the truck. Prior to unloading, brush back the top foot of material and obtain sample using a tube sampler meeting the requirements of AASHTO T127.

4.2.2 From Discharge Line of Truck **(Ideal Method)**: If the discharge line is equipped with a sampling valve, take the sample at the halfway point of unloading or after the flow of material is well established and the line is purged of old material.

4.3 Sampling from Concrete Plant Storage:

4.3.1 Sampling from Storage Silo **(Ideal Method)**: Take sample from storage silo through draw off port using a tube sampler meeting the requirements of AASHTO T127.

4.3.2 Sampling from Weigh Hopper: Take sample from weigh hopper through draw off port using a tube sampler meeting the requirements of AASHTO T127.

4.4 Sampling from Packaged Material:

4.4.1 Insert a sampler tube meeting the requirements of AASHTO T127 diagonally into the valve opening of the bag. Take small samples from several bags of the lot and combine until the required amount of material has been obtained.

Exhibit C – Cement Sampling Guide

	Source:	Frequency:	HiCAMS Details			Amount:		Tested By:
			Comment:	Material:	*Testing Category:	1 Gal.	1 Cup	
Resident's Office	Concrete Pavement	One sample per 1250 tons of cement delivered	*No Standard Comment Required*	Cement, Portland Cement for Concrete Pavement	Acceptance	☑	☐	Phy & Chem
	Latex Modified Concrete	One sample per 100 cubic yards of concrete	*No Standard Comment Required*	Cement, Portland	Acceptance	☑	☐	Phy & Chem
	Soil Stabilization	One sample per 1250 tons of cement delivered	*No Standard Comment Required*	Cement, Portland for Soil Stabilization	Acceptance	☑	☐	Physical
	On-Site Specific Applications	One sample per 25 tons of cement delivered	*No Standard Comment Required*	Cement, Portland	Acceptance	☑	☐	Phy & Chem
Materials & Tests Personnel	Ready Mix Concrete							
	(Annual)	Once per year	Annual Facility Audit	Cement, Portland	Acceptance	☑	☐	Phy & Chem
	(Biannual)	Twice per year	Biannual Verification	Cement, Portland	Verification	☐	☑	Chemical
	Prestressed Concrete							
	(Annual)	Once per year	Annual Facility Audit	Cement, Portland	Acceptance	☑	☐	Phy & Chem
	(Monthly)	Once per month	Monthly Verification	Cement, Portland	Verification	☐	☑	Chemical
	Precast Concrete							
	(Annual)	Once per year	Annual Facility Audit	Cement, Portland	Acceptance	☑	☐	Phy & Chem
	(Biannual)	Twice per year	Biannual Verification	Cement, Portland	Verification	☐	☑	Chemical
	Low Strength Investigations	Per Investigation	Investigation	Cement, Portland	Verification	☐	☑	Chemical

*All samples for Acceptance should be submitted to "Central Lab Struct Mtls - Physical" in HiCAMS. Samples for Verification should be submitted to "Central Lab Struct Matls - Chemical"

Exhibit D – Sample Mill Report

ABC Portland Cement Company
Qualitytown, NJ

Plant Example Cement Type II(MH) Date March 9, 2002

Production Period March 2, 2002–March 8, 2002

STANDARD REQUIREMENTS

M 85, Tables 1 and 3

CHEMICAL

Item	Spec. Limit	Test Result
SiO_2 (%)	[a]	20.6
Al_2O_3 (%)	6.0 max	4.4
Fe_2O_3 (%)	6.0 max	3.3
CaO (%)	[a]	62.9
MgO (%)	6.0 max	2.2
SO_3 (%)	3.0 max	3.2
Loss on ignition (%)	3.0 max	2.7
Na_2O (%)	[a]	0.19
K_2O (%)	[a]	0.50
Insoluble residue (%)	0.75 max	0.27
CO_2 (%)	[a]	1.5
Limestone (%)	5.0 max	3.5
$CaCO_3$ in limestone (%)	70 min	98
Inorganic processing addition (ground, granulated blast-furnace slag)	5.0 max	3.0
Potential phase compositions (%)[d]		
C_3S	[a]	59
C_2S	[a]	11
C_3A	8 max	6
C_4AF	[a]	10
$C_4AF + 2(C_3A)$	[a]	20
$C_3S+4.75\ C_3A$, (%)	100 max	83

PHYSICAL

Item	Spec. Limit	Test Result
Air content of Mortar (volume %)	12 max	8
Fineness (m^2/kg) (Air permeability)	260 min 430 max	377
Autoclave expansion (%)	0.80 max	0.04
Compressive strength (MPa)	Min:	
1 day	[a]	
3 days	7.0	23.4
7 days	12.0	29.8
28 days	[a]	
Time of setting (minutes) (Vicat)		
Initial	Not less than 45 Not more than 375	124
Heat of hydration (kJ/kg) 7 days	[b]	300
ASTM C1038 mortar bar expansion (%)	[c]	0.010[e]

[a] Not applicable.

[b] Test result represents most recent value and is provided for information only.

[c] Required only if percent SO_3 exceeds the limit in Table 1, in which case expansion shall not exceed 0.020% at 14 days

[d] Adjusted per Annex A1.6.

[e] Test result for this production period not available. Most recent test result provided.

OPTIONAL REQUIREMENTS

M 85, Tables 2 and 4

CHEMICAL

Item	Spec. Limit	Test Result
Equivalent alkalies (%)	[f]	0.52

[f] Limit not specified by purchaser. Test result provided for information only.

PHYSICAL

Item	Spec. Limit	Test Result
False set (%)	50 min	82
Compressive strength (MPa)		
28 days	28.0 min	39.7[e]

We certify that the above-described cement, at the time of shipment, meets the chemical and physical requirements of M 85-xx or (other) _____ specification.

Signature: _____ Title: _____

Exhibit E – July 2010 Memo to Cement Producers; BOL and Mill Cert Requirements

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

Materials and Tests Unit
July 15, 2010

Dear Cement Manufacturers and Producers:

The Materials and Tests Unit has performed a review regarding our current sampling frequency and test results for Portland cement utilized by the Department over the last several years. Evaluations of the samples were obtained from Ready Mix facilities, Prestress facilities, Precast facilities, soil stabilization, and concrete pavement operations.

Numerous incidents relating to failing samples revealed an incorrect manufacturer, or no supporting documentation for the cement's origin. The Department has concerns regarding the potential for Alkali Silica Reactivity (ASR), and verification of raw materials being used in the production of concrete products. The need to maintain accurate and current records is essential for the integrity of our program.

To help correct these concerns from occurring in the future, and to ensure the quality of cement used in products delivered to the Department, the following tasks will be the responsibility of all approved cement producers:

1. A "Bill of Lading" (BOL), and "Mill Certification" will be required with every cement tanker and/or railcar when delivered to an approved NCDOT Concrete producer and/or facility. This requirement also applies if the cement is delivered directly to a project site (i.e. to be used in soil stabilization or concrete pavement).

2. The manufacturing location will be clear, easily observed, and recorded on the BOL. This location will be noted utilizing the term "Manufactured In (city, state or city, country)".

3. All BOL's and Mill Certifications shall have traceability to the associated load of cement.

Implementation of this policy will begin immediately. Any facility found not complying with this policy or not recording this information may be removed from the Department's Approved Producer List. Thank you for your cooperation in this matter.

Sincerely,

Christopher A. Peoples, P.E.
State Materials Engineer

Exhibit F – July 2010 Memo to Cement End-Users; BOL and Mill Cert Requirements

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

Materials and Tests Unit
July 15, 2010

Dear Ready Mix, Prestress, and Precast Concrete Producers:

The Materials and Tests Unit has performed a review regarding our current sampling frequency and test results for Portland Cement utilized by the Department over the last several years. Evaluations of the samples were obtained from Ready Mix facilities, Prestress facilities, Precast facilities, soil stabilization, and concrete pavement operations.

Numerous incidents relating to failing samples revealed an incorrect manufacturer, or no supporting documentation for the cement's origin. The Department has concerns regarding the potential for Alkali Silica Reactivity (ASR), and verification of raw materials being used in the production of concrete products. The need to maintain accurate and current records is essential for the integrity of our program.

To help correct this from occurring in the future, and to ensure the quality of cement usage for the Department, the following tasks will be completed by all concrete producers listed on the NCDOT Approved Producer List:

4. All "approved" cement manufacturers/producers are required to produce a "Bill of Lading" (BOL), and "Mill Certification" for every cement tanker and/or railcar when delivered to an approved NCDOT Concrete producer and/or facility. This requirement also applies if the cement is delivered to a project site (i.e. to be used in soil stabilization or concrete pavement).

5. Located on every BOL, the cement manufacturing location will be recorded clearly and easily observed. This location will be noted utilizing the term "Manufactured In (city, state or city, country)". It is the responsibility of the concrete producer's certified batcher to verify the documentation, location, and type of cement corresponds with the approved mix design utilized for NCDOT usage.

6. During plant visits, routine inspections, or sampling operations, the certified batcher or facility manager will be required to furnish this documentation if requested. Copies of all documentation shall remain onsite or easily accessible for at least three years after the project has been completed.

7. All BOL's and Mill Certifications shall have accurate and recent traceability to the associated load of cement. It is the responsibility of the concrete producer's facility manager or his representative to verify the documentation.

Implementation of this policy will begin immediately. Any facility found not complying with this policy or not recording this information may be removed from the Department's Approved Producer List. Thank you for your cooperation in this matter.

Sincerely,

Christopher A. Peoples, P.E.
State Materials Engineer

Exhibit G – October 2023 Memo to Cement Producers/Suppliers; AASHTO Audit

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J.R. "JOEY" HOPKINS
SECRETARY

DATE: October 2, 2023

TO: Cement Producers

FROM: Todd W. Whittington, PE
State Materials Engineer

SUBJECT: Implementation of AASHTO Product Evaluation & Audit Solutions (formerly NTPEP) Portland and Blended Cement Audit Program

Dear Cement Producers:

The AASHTO Product Evaluation & Audit Solutions (formerly NTPEP) Portland and Blended Cement (PBC) committee has transitioned from a product evaluation program to a facility audit program. The North Carolina Department of Transportation (NCDOT) endorses this program and beginning January 1st, 2024, will require all cement producers to enroll in the program annually to remain active on the Department's Approved Producer/Supplier list. This requirement will be utilized in conjunction with the existing NCDOT Hydraulic Cement Acceptance Program.

AASHTO will open enrollment for the 2024 audit cycle on Monday, November 6th, 2023, and will close the application window on Thursday, November 30th, 2023. Producers must apply during this enrollment period to remain active January 1, 2024. Producers are encouraged to review the audit workplan, PBC-22-01 *Evaluation of Portland Blended Cement (PBC) Suppliers*, through the following link: https://transportation.org/product-evaluation-and-audit-solutions/technical-committees/portland-and-blended-cement-pbc/

The AASHTO Audit Enrollment will be hosted on the following webpage when the application window opens: https://transportation.org/product-evaluation-and-audit-solutions/submit-a-product/

In addition to annual enrollment, NCDOT will also require the following:

1. Cement producers must submit monthly mill reports to NTPEP for uploading to the DataMine site. This will replace the requirement to have monthly mill reports submitted directly to the NCDOT Cementitious Materials service account (cementitiousmaterials@ncdot.gov).

2. New cement producers seeking addition to the Approved Producer/Supplier list after November 30th, 2023, will be required to enroll in the audit program during the subsequent application period.
3. Once implemented, cement producers that are enrolled in the audit program and are on the Approved Producer/Supplier list that wish to obtain approval for a new cement product (e.g. a new blended cement) will still be required to send a formal request to the NCDOT Cementitious Materials service account and submit a physical sample for testing to the NCDOT Materials & Tests Unit - Central Laboratory. Contact the NCDOT Cementitious Materials service account for details.

For cement suppliers that procure cement from a foreign source that does not participate in the audit program, it is incumbent upon the supplier to enroll the domestic terminal of receipt and specific foreign cement received in the audit program. The NCDOT requirements listed above apply to the specific terminal location and the approved cement handled at that facility.

cc: Mr. Brian Hunter, PE
Mr. Joshua Law, PE
Mr. Eric Fazekas
Mr. Ronald Lichtenwalner, PE

Exhibit H – Form FHWA-1022

U.S. Department of Transportation
Federal Highway Administration

NOTICE

The highway construction underway at this location is a Federal or Federal-aid project and is subject to applicable State and Federal laws, including Title 18, United States Code, Section 1020, which reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or the cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the costs thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction of any highway or related project submitted for approval to the Secretary of Transportation; or

"Whoever knowingly makes any false statement, false representation, false report, or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

"Whoever knowingly makes any false statement or false representation as to a material fact in any statement, certificate, or report submitted pursuant to the provisions of the Federal-Aid Road Act approved July 11, 1916 (39 Stat. 355), as amended and supplemented,

"Shall be fined under this title or imprisoned not more than five years, or both."

Any person having reason to believe this statute is being violated should report the same to the agency representative(s) named below. (Federal-aid project only) (Both Federal and Federal-aid projects)

(Federal-aid project only)
State Highway Department
Terry R. Gibson, PE
919-733-7384

(Both Federal and Federal-aid projects)
Federal Highway Administration
John Sullivan, PE
919-747-7000

(Both Federal and Federal-aid projects)
Department of Transportation
Office of Inspector General
Toll Free Hotline: 1-800-424-9071

Form FHWA-1022 (Rev Sept 1994)