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Construction Material Testing and Documentation Policy

The City of Wilmington promotes the development of sustainable infrastructure and provides the following guidance on construction materials testing (CMT) and documentation practices for roadway and underground utility construction.

Materials Testing and Documentation Guide

This policy will help guide quality control (QC) efforts during construction by providing the minimum expectations for where testing will be applied, i.e. quality assurance (QA). Generally, CMT services shall be provided by the Utility/Owner separate from the construction contractor, i.e. 3rd party. The various testing reports and materials documents shall be complimentary so as to provide complete assurance. Other unique conditions or design specifications such as NC DOT may apply and would supersede this policy. Without other specific instructions, the following guidelines include:

- Table 1 is attached as a minimum guide to assist with a CMT plan and managing testing resources on a project. Other needs not listed may exist.
- Utility/Owner may submit a CMT plan for review by the City.
- Utility/Owner shall provide oversight of testing activities and ensure coordination of test schedules and outcomes with City Inspector or other responsible personnel.
- Utility/Owner shall manage failing/non-passing tests to rectify situation with contractor(s) and ensure a passing result is obtained.
- Where failing tests occur or no conclusive passing tests exist, the City reserves the right to require further testing or retests, at no costs to the City.
- As part of construction/permitting compliance, copies of test reports and documents shall be furnished to the City upon request. Such reports shall be professional, organized and shall typically contain the following:
    - Written Summary (owner, scope, schedule)
    - Test Reports- (compiled/quantified by test type, time, etc)
    - Materials Received Reports – (submittals, certifications, truck tickets, etc)
- This guide does not release the utility, owner or contractor from completing all the necessary construction steps, inspection and testing necessary to meet the standard details, policies and specifications required for materials.

Table 1 - Materials Testing and Documentation Guide					
Test Type:	**Location For:**	**Test Target:**	**Spec:**	**Frequency and Test Sections:**	**Documentation:**
Soils					
Soil Proctors	For use with soil density tests	Optimum Moisture and maiximum dry density results	Standard Proctor - ASTM D698-A	each project; where soils change	Soil Profile Tests (lab)
Density - Nuclear Gauge	embankments	≥ 95% compaction	Nuclear Gauge - ASTM D6938	1 / block or every 500'	On delivery - collect tickets Density reports.
	pipe trench and overfill	≥ 95% compaction		Per lift (12" max) every 100'	
	subbase (final 12" fill)	≥ 98% compaction		4 / block or every 500' where pvmt < 32' width or 8 / block or every 500' where pvmt > 32' width	
Density - alternates	for all, see above	see above	Sand Cone Method - ASTM D1556 or; Ballon Density- ASTM D2167	see above	Density reports.
Proofroll	subbase at grade	visual check of stability / moisture	Loaded Tandem Truck	all areas under road	Proofroll Report.
Dynamic Cone Penetrometer	excavation backfills	# blows per 1.75" (Typ. 25-30)	ASTM D6951	any area to check for relative compaction	Report.
Stone Base					
ABC Gradation	stockpile or in place	NCDOT Section 1005	AAHSTO T27	every 2000 Tons	Gradation Reports. On delivery - collect tickets
Density - Nuclear Gauge	road base (ABC)	each ≥ 95% with avg. ≥ 98%	Nuclear Gauge - ASTM D6938	4 / block or every 500' where pvmt < 32' width or 8 / block or every 500' where pvmt > 32' width	Density reports.
	curblines (ABC)	each ≥ 95% with avg. ≥ 98%		4 / block or every 500'	
Proofroll	stone base at grade	visual check of stability / moisture	Loaded Tandem Truck	all areas under road	Proofroll Report.
Concrete					
Sampling, Making & Curing Test Specimens	curbing, sidewalks, driveways	Proper collection and curing in field and laboratory	Sampling Concrete - ASTM C172; ASTM C31; ASTM C39	4 cylinders per day/batch for every 50 Cubic Yards	Form 312U Mix design. Verify JMF on-site.
Air Test	see above	up to 8%, per mix design	Pressure Air Meter - ASTM C231	Truck #1; air, slump, temp, cylinders	NCDOT M&T 903 (Batch Tix)
Slump Test	see above	up to 5", per mix design	Slump Test - ASTM C143	Trucks #2-4; air Truck #5; air, slump	250 Daily Plant Report when needed
Compressive Strength	curbing, sidewalks, driveways	breaks results ≥ required strength (i.e 3000psi)	ASTM C39	7 day break (typ ≥ 75% of strength), 28 day break ≥ design strength	Concrete Break Reports.
Asphalt					
Asphalt Mix (Job Mix Formulae)	roadway/path	surface up to 3" depth intermediate up to 4" depth base up to 8" depth	Pvmt Design or City Policy	For Control Strip when needed, ref. NCDOT 2012 Standard Specifications Section 609-7	Verify JMF on-site. On delivery - collect tickets Asphalt Roadway Daily Report - (NCDOT M&T 605 form)
Asphalt Temperature	air temparture surface temparture	40° in the shade and rising, 50°	NCDOT Section 610-4	test before placement Also, no wet pavement affecting bonding	
Density - Nuclear Gauge Control with Core checks	roadway/path	90% compaction - 9.5A	Nuclear Density Tests- ASTM D2950	QC = 5 Nuclear Gauge shots per 500'/each paver laydown width / lot QA = verification, test requests and location	Forms - City or NCDOT QC-5, 516QC, QA-515, etc
(Core control and control strips when needed)		92% compaction-surface other, intermdiate, base	Bulk Density (Cores) - ASTM D2726	QC = 1 core check per 500'/each paver laydown width. Primarily in base layers. Use core control when requested.	Certifications: Gauge calibration QMS RoadwayTechnician, Nuclear Gauge Operator, etc