City of Duluth, Minnesota

Public Works & Utilities Department - Engineering Division

2015 Edition

Standard Construction Specifications

APPENDIX B

Schedule for Materials Testing

SCHEDULE FOR MATERIALS TESTING
CITY OF DULUTH STREET AND UTILITY PROJECTS

The Engineer will perform materials testing for acceptance and quality assurance at these minimum rates. When deemed appropriate, the Engineer will perform additional testing to determine acceptance. Additional testing and retesting shall be at the Contractor's expense.

Specified Method	Sampling & Testing	Sampling Notes	Compaction Testing	Compaction Notes
UTILITY COMPACTION				
Specified Density	• One sieve and proctor for each backfill borrow material at source and one for each different classification of onsite native material.	Materials to be tested: • Course filter aggregate • Granular backfill • Native material from site Note: If material looks like it changed, test again.	• Take moisture of native material on first day of utility work. • Take densities at rate of; One per each 200' of mainline pipe, One per each 4 service laterals, and One per each 4 manholes at every 3 feet in depth. • Required compaction is 100% around manholes full depth; 100% in the top 3 feet of utility trench below top of subgrade; 95% in utility trench below the top 3 feet.	• Compact backfill in 8" lifts. • Additional tests where inspector notes rutting or pumping; additional moistures after wet weather. • Most common problem is too much moisture in native backfill; may require granular borrow backfill to be used. • Retest at contractor's cost.
SELECT GRANULAR BORROW				
Specified Density	• One sieve and proctor from source.	• Take additional samples if material changes or source changes, at contractor's cost	• Take densities at rate of: Four per Block prior to Class 5. • Compact in 8" layers or less. • Required density is 100%.	• Take additional densities where rutting is noted. • The most common problem with select granular is not enough moisture or more than 7%. • Retest at contractor's cost.
CLASS 5				
Specified Density	• One sieve and proctor at source.	• Take additional samples if material changes or source changes, at contractor's cost.	• Take densities at rate of: Two per Block prior to curb and gutter and/or paving. • Required density is 100%.	• Excavate and re-compact areas where visible rutting. • Most common problem is segregation of aggregates; replacement/blending as directed by the Engineer. • Retest at contractor's cost.

CONCRETE CURB & GUTTER, SIDEWALK AND APRONS			
Field Testing	**Cylinders**	**Plant Inspection**	**Concrete Aggregate Graduations**
• Test two trucks early in the day (first 2 trucks if possible) for air and slump. • Test air & slump 2 times per Block, one on each side. • Note: If less than 200 ft., no test required.	• Two sets per Block, one on each side.	• One inspection per project on either curb & gutter or sidewalk.	• One test/aggregate pile for the mix placed during the plant inspection.
• Test two trucks early in the day (first two trucks if possible) for air and slump. • Two tests per Block, one on each side.	• Two tests per Block, one on each side.	• One inspection per project on either curb & gutter or sidewalk.	• One test/aggregate pile for the mix placed during the plant inspection.

BITUMINOUS	
Quality Assurance Testing (Owner's Testing Agency)	**Quality Control Testing (Suppliers Testing)**
• For S.I.P. projects, one companion sample (split with contractor) per mix placed per project. Test for asphalt content, gradation, and air voids. • No plant inspection required by owners testing agency on S.I.P projects. • One companion core for density from contractor per lot per lift. One lot for 300–600 tons, two lots for 601-1000 tons, three lots for 1001–1600 tons, four lots for 1601 – 3600 tons.	• Percent crushing - two per/mix/day at start-up, then sample daily, test minimum of one weekly. • Plant aggregate gradation – one/1000 tons at start-up, then one/2000 tons. • Asphalt content and air voids– one/500 tons/mix for first 2000 tons, then one/1000 tons. • Core density – three cores per lot per lift (see QA for lot determination). Two tested by supplier and one forwarded to owner's testing agency.

*Cores for Bituminous Quality Assurance Testing shall be provided by the Contractor.