New Jersey Department of Transportation
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Baseline Document Change Announcement

Standard Specifications, Controlled Low Strength Material (CLSM)

BDC01S-15

August 30, 2002

SUBJECT: Revisions to the English and Metric *2001 Standard Specifications for Road and Bridge Construction*, Subsections 207.03, 207.06, and 919.22

The revisions to the subject subsections allow for the use of Controlled Low Strength Material (CLSM) as an alternate backfill material for drainage pipe and utility conduit trenches and provide the material requirements of CLSM. The use of CLSM eliminates labor intensive placement and compaction requirements of typical backfill materials. CLSM is a portland cement based slurry material that provides adequate load support and drainage properties, and is easy to excavate when access to pipe and utility conduit is needed.

The following revisions shall be incorporated in the English Unit Standard Input SI2001E1:

SECTION 207 – SUBSURFACE STRUCTURE EXCAVATION

207.03 Bedding Materials.
SUBSECTION HEADING IS CHANGED TO:

207.03 Bedding and Backfill Materials.
THE FOLLOWING IS ADDED:

Controlled Low Strength Material (CLSM) shall conform to Subsection 919.22

207.06 Backfilling.
A. Pipes and Culverts.
THE FOLLOWING IS ADDED AFTER THE FOURTH PARAGRAPH:

CLSM may be used as alternate backfill material when backfilling trenches for drainage pipe and utility conduit. Combining other backfill materials in the same trench as CLSM shall not be permitted. Mixing and placement of CLSM shall begin only when the ambient temperature is at least 30 °F. During placement, the CLSM mixture shall have a temperature of at least 41 °F and shall not be placed on frozen ground. The CLSM mixture shall be discharged directly from the truck into the trench to be filled with care taken to prevent the pipe from becoming displaced. After placement, the CLSM mixture shall be cured and protected to prevent damage from cold weather according to Subsection 405.14. CLSM shall not be used to replace pavement, base courses or drainage layers that form the structure of the roadway.

SECTION 919 – MISCELLANEOUS

THE FOLLOWING NEW SUBSECTION IS ADDED:

919.22 Controlled Low Strength Material (CLSM).

CLSM shall conform to the following:

Fine Aggregate	901.12
Chemical Admixtures	905.02
Portland Cement, Type I, II, III	919.11
Water	919.15

CLSM shall consist of a mixture of portland cement, water, fine aggregate and chemical admixtures. Fly ash shall not be permitted in mixes intended for trench backfilling. The CLSM mixture shall be proportioned to provide a backfill material that is self-compacting and capable of being excavated with hand tools at a later date. CLSM shall be proportioned to produce a 28-day compressive strength of 50 to 150 pounds per square inch. An accelerating admixture shall be used to produce a fast setting flowable mixture as required. The CLSM shall have a permeability of $1.7 \times 10^{-3} \pm 0.2 \times 10^{-3}$ centimeters per second according to ASTM D5084 for backfilling of conduits and piping.

At least 45 days prior to the start of any CLSM placement, trial batches of CLSM shall be prepared of the same materials and proportions proposed for use on the project. Each mix design shall be submitted on portland cement concrete mix design forms furnished by the Department, naming the sources of materials and test data.

Department personnel will be present at the time of verification batching to confirm that the proportions and materials batched are according to the proposed mix designs. At least six 6 X 12 inch compression test cylinders shall be prepared for each batch according to ASTM 5971-96 for 28-day strengths except for fast setting mixes, which shall be tested at the specified cure time.

The following revisions shall be incorporated in the Metric Unit Standard Input SI2001M1:

SECTION 207 – SUBSURFACE STRUCTURE EXCAVATION

207.03 Bedding Materials.

SUBSECTION HEADING IS CHANGED TO:

207.03 Bedding and Backfill Materials.

THE FOLLOWING IS ADDED:

Controlled Low Strength Material (CLSM) shall conform to Subsection 919.22

207.06 Backfilling.

A. Pipes and Culverts.

THE FOLLOWING IS ADDED AFTER THE FOURTH PARAGRAPH:

CLSM may be used as alternate backfill material when backfilling trenches for drainage pipe and utility conduit. Combining other backfill materials in the same trench as CLSM shall not be permitted. Mixing and placement of CLSM shall begin only when the ambient temperature is at least –1 °C. During placement, the CLSM mixture shall have a temperature of at least 5 °C and shall not be placed on frozen ground. The CLSM mixture shall be discharged directly from the truck into the trench to be filled with care taken to prevent the pipe from becoming displaced. After placement, the CLSM mixture shall be cured and protected to prevent damage from cold weather according to Subsection 405.14. CLSM shall not be used to replace pavement, base courses or drainage layers that form the structure of the roadway.

SECTION 919 – MISCELLANEOUS

THE FOLLOWING NEW SUBSECTION IS ADDED:

919.22 Controlled Low Strength Material (CLSM).

CLSM shall conform to the following:

Fine Aggregate	901.12
Chemical Admixtures	905.02
Portland Cement, Type I, II, III	919.11
Water	919.15

CLSM shall consist of a mixture of portland cement, water, fine aggregate and chemical admixtures. Fly ash shall not be permitted in mixes intended for trench backfilling. The CLSM mixture shall be proportioned to provide a backfill material that is self-compacting and capable of being excavated with hand tools at a later date. CLSM shall be proportioned

to produce a 28-day compressive strength of 345 to 1 035 kilopascals. An accelerating admixture shall be used to produce a fast setting flowable mixture as required. The CLSM shall have a permeability of $1.7 \times 10^{-3} \pm 0.2 \times 10^{-3}$ centimeters per second according to ASTM D5084 for backfilling of conduits and piping.

At least 45 days prior to the start of any CLSM placement, trial batches of CLSM shall be prepared of the same materials and proportions proposed for use on the project. Each mix design shall be submitted on portland cement concrete mix design forms furnished by the Department, naming the sources of materials and test data.

Department personnel will be present at the time of verification batching to confirm that the proportions and materials batched are according to the proposed mix designs. At least six 150 X 300 millimeters compression test cylinders shall be prepared for each batch according to ASTM 5971-96 for 28-day strengths except for fast setting mixes, which shall be tested at the specified cure time.

Instructions to Designers

The above specification revision shall be included for all Department projects that have been designed using the English or Metric 2001 Standard Specifications and are to be advertised after September 10, 2002. The specification revision has been incorporated in the Standard Inputs SI2001E1 and SI2001M1 updated as of August 30, 2002.

Designers may access updated versions of the Standard Inputs SI2001E1 and SI2001M1 from the following New Jersey Department of Transportation Web Page:

http://www.state.nj.us/transportation/cpm/StandardInputs/standardinputs.htm.

Distribution and Announcement Access Information

This announcement is being distributed electronically to our in-house staff and various public agencies based on our Standard Specifications distribution list maintained by the Engineering Documents Unit.

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http://www.state.nj.us/transportation/cpm/BaselineDocuments/index1.html.

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