E. Concrete Work for Water and Sewer Utilities

All cast-in-place concrete work necessary for (or) associated water or sewer utilities shall comply with the requirements of this section.

1. Quality Assurance

a. Comply with the latest published edition of the American Concrete Institute (ACI) and American Society of Testing and Materials (ASTM) standards and codes:

(1) ACI 301-Specification for Structural Concrete for Buildings

(2) ACI 305-Placing Concrete in Hot Weather

(3) ACI 306- Placing Concrete in Cold Weather

(4) ACI 318-Building Code Requirements for Reinforced Concrete

b. The City of Milton reserves the right to require submitted or proposed job mixes, slump tests and compressive strength tests if so desires.

2. Products

a. Portland Cement: ASTM C150, type is required.

b. Fly Ash: ASTM C618, Type C or F.

c. Limit Use of fly ash in concrete mix design to not exceed 25 percent of cement content by weight.

d. Aggregates: ASTM C33, except local aggregates of proven durability may be used when acceptable to Engineer.

3. Water Potable

4. Admixtures

a. Air-Entraining Admixture: ASTM C260

b. Water-Reducing Admixture: ASTM C494, type as required to suit project conditions. Only use admixtures which may have been tested and accepted in mix design, unless otherwise acceptable.

5. Related Materials

a. Waterstops: Flat dumbbell or centerbulb type, size to suit joints, of either rubber (CRD C513 or PVC (CRD C572).

b. Moisture Barrier: Clear eight mils thick polyethylene; polyethylene-coated barrier paper; or 1/8 inch thick asphalt core membrane sheet.

c. Membrane-Forming Curing Compound: ASTM C309, Type I.

d. Joint Fillers:

(1) Joint Sealer: Hot poured, non-extruding, elastic, ASTM D1190.
(2) Preformed Expansion Joint Filler Non-extruding, bituminous fiber, ASTM D1751.

e. Provide form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.

6. Reinforcing Materials

a. Deformed Reinforcing Bars: ASTM A615, Grade 60, unless otherwise indicated.

b. Welded Wire Fabric: ASTM A185.

7. Forming and Placing Concrete

a. Job-Site Mixing

Use drum type batch machine mixer, mixing lot less than 1-1/2 minutes for one cubic yard or smaller capacity. Increase mixing time at least 15 seconds for each additional cubic yard or fraction thereof. Batch time not to exceed 1 ½ hours.

b. Ready-Mix Concrete: ASTM C94.

c. Formwork

Construct so that concrete members and structures are of correct size, shape, alignment, elevation and position.

(1) Provide openings in formwork to accommodate work of other trades. Accurately place and securely support items built into forms.
(2) Clean and adjust forms prior to concrete placement. Apply form release agents or wet forms as required. Retighten forms during concrete placement if required to eliminate mortar leaks.

d. Placement of Reinforcement

Position, support, and secure reinforcement against displacement. Locate and support with metal chairs, runners, bolsters, spacers, and hangers as required. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. Install welded wire fabric in as long lengths as practicable, lapping at least one mesh at both ends and sides. Tie or interlace at laps.

e. Joints

Provide construction, isolation, and control joints as indicated or required. Locate construction joints so as to not impair strength and appearance of structure. Locate isolation and control joints in slabs-on-ground to accommodate differential settlement and prevent random cracking.

f. Installation of Embedded Items

Set and build into work anchorage devices and other embedded items required for other work that is attached to , or supported by cast-in-place concrete. Use setting diagrams templates and instructions provided by others for locating and setting.

g. Concrete Placement

Comply with ACI, placing concrete in a continuous operation within planned joints or sections. Do not begin placement until work of other trades affecting concrete is completed. Consolidate concrete sing mechanical vibrating equipment, hand rodding and tamping, so that concrete is well compacted around reinforcement and other embedded items and into forms. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement and curing. In cold weather, comply with ACI 306. In hot weather, comply with ACI 305.

8. Concrete Finishes

a. Exposed-to-View Surfaces

Provide a smooth finish for exposed concrete surfaces and surfaces that are to be covered with a coating or covering material applied directly to concrete. Remove fins and projections, patch defective areas with cement grout and rub smooth.

b. Slab Trowel Finish

Apply trowel finish to monolithic slab surfaces that are exposed-to-view or are to be covered with resilient flooring, paint or other thin film coating. Consolidate concrete surfaces by floating, then finish troweling, free of trowel marks and uniform in texture and appearance.

c. Broom Finish

Apply broom finish to monolithic slab surfaces that are exposed-to-view and subject to vehicular or pedestrian traffic. Consolidate concrete surfaces by floating and troweling prior to applying broom finish.

d. Curing

Begin initial curving as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72 hours. Continue curing by use of moisture retaining cover or membrane-forming curing compound. Cure formed surfaces by moist curing until forms are removed. Provide protection as required to prevent damage to exposed concrete surfaces.