

SECTION 02501

CONCRETE SIDEWALKS AND RAMPS

1.0 DESCRIPTION

This item shall consist of Portland cement Concrete sidewalks, driveway ramps and pedestrian ramps constructed on a processed aggregate base course in the locations and to the dimensions and details shown on the plans or as ordered and in accordance with these specifications.

This item shall include furnishing and installing Detectable Warning Strips in the locations and to the dimensions and details shown on the plans or as ordered by the Engineer.

2.0 MATERIALS

Materials for this work shall conform to the requirements of Article M.03.01 of ConnDOT Form 816 for Class "C" Concrete.

a. Portland Cement Concrete

The concrete mix shall conform to Class "C" concrete and shall be proportioned in accordance with the following requirements:

Approximate Proportions by Weight:	1-2-3
Water/Cement Ratio:	0.53
Cement Factor (pounds/cubic yard)	658

b. Air-Entraining Admixtures

Air entraining admixtures conform to the requirements of Article M.03.01 of ConnDOT Form 816.

c. Coarse Aggregate

Coarse aggregate shall be broken stone or gravel consisting of clean, hard, tough, durable fragments of uniform quality throughout; free from soft pieces, mud, dirt, organic or other injurious material and shall contain not more than 1% dust by weight. When tested with magnesium sulphate solution for soundness using AASHTO Method T-104, coarse aggregate shall not have lost more than 10% after 5 cycles; when tested by the Los Angeles machine using AASHTO Method T-96, coarse aggregate shall not have a loss of more than 40%. The required grading shall be obtained by using 100 percent of ¾ inch coarse aggregate.

d. Fine Aggregate

Fine aggregate shall be sand consisting of clean, hard, durable, uncoated particles of quartz or other rock, free from lumps of clay, soft or flaky material, loam, organic or other injurious material. In no case shall sand containing frozen lumps be used. Fine aggregate shall contain not more than 3% of material finer than the #200 sieve, using AASHTO method T-11. When subjected to colorimetric test shall not produce a color darker than Gardner Color Standard No. 11, using AASHTO Method T-21. If the fine aggregate fails to meet this requirement, the provisions of AASHTO M6 Section 5.2 will govern. Fine aggregate shall be uniformly graded from coarse to fine and shall meet the following gradation:

Square Mesh Sieve	3/8"	#4	#8	#16	#30	#50	#100
Percent Passing By Weight	100	95-100	80-100	50-85	25-60	10-30	2-10

e. Portland Cement: Portland cement shall be Type IIA and shall conform to the requirements of AASHTO M-134. Cement having a temperature exceeding 160 degrees F at the time of delivery to the mixer shall not be used.

f. Water: Water shall be reasonably clean, shall not be salty or brackish and shall be free from oil, acid, and injurious alkali or vegetable matter and shall be tested as prescribed by AASHTO T-26.

g. Processed Gravel Base: Coarse and fine aggregates shall be combined and mixed by approved methods so that the resulting material shall conform to the following gradation requirements:

Square Mesh Sieve	2-1/2"	1-3/4"	3/4"	1/4"	#40	#100
Percent Passing By Weight	100	95-100	50-75	25-45	10-25	3-12

h. Welded Wire Mesh Reinforcement: Welded wire mesh reinforcement shall be cold drawn steel wire conforming to the requirements of AASHTO M-55. The type of mesh shall be approved by the Engineer.

- i. Preformed Expansion Joint Filler: Preformed expansion joint filler shall be the bituminous cellular type and shall conform to the requirements of AASHTO M-213.
- j. Detectable Warning Strip: The Detectable Warning Strip shall be a prefabricated detectable warning surface tile for the application designated as manufactured from Engineered Plastics Inc. 300 International Drive, Suite 100 Williamsville, NY 14221, telephone number (800) 682-2525 or the approved equal from ADA Fabricators, INC. P.O Box 179 North Billerica, MA 01862 telephone number (978) 262-9900. The tile shall conform to the dimensions shown on the plans and have a brick red homogeneous color throughout in compliance with Federal Standard 595A Color #22144 or approved equal.

3.0 CONSTRUCTION METHODS

- a. Excavation: Excavation, including removal of any existing sidewalk, shall be made to the required depths below the finished grade, as shown on the plans or as directed. All soft and yielding material shall be removed and replaced with suitable material.
- b. Processed Aggregate Base: The processed aggregate base shall be placed in layers not over 6 inches in depth and to such a depth that after compaction it shall be at the specified depth (eight inches or as directed by the Engineer) below the finished grade of the walk. The base shall be wetted and rolled or tamped after the spreading of each layer. The base shall be placed full depth six (6") inches wider on each side than the neat lines of the concrete.

The finished surface of the base shall be fine graded after compaction to within 3/8" plus or minus of subgrade. The finished base course shall be maintained true to line and grade in a compact condition until placement of the concrete. The completed base must be approved by the Engineer prior to setting of forms.

- c. Forms: Forms shall be standard metal forms or 2" surfaced plank, straight, free from warp and of sufficient strength to prevent springing. At corner radii, thinner material may be used but the material and installation must be approved by the Engineer prior to use. Forms shall be of approved cross-section, have a flat surface on top and shall be of depth equal to the concrete being placed. Forms shall be securely staked, braced and held firmly to the required line and grade and shall be of sufficient strength and tightness to retain plastic concrete. All forms shall be cleaned of mortar and dirt and shall be coated with suitable form oil prior to each use.

Preformed expansion joints shall be held securely in place by means of a steel template or steel pins to true line and grade and shall be 1/4 inch minimum deeper than the concrete trimmed flush with the concrete walk after the curing cycle.

Dummy joints or planes of weakness shall be hand formed, straight and true, and shall consist of grooves formed in the top surface of the concrete at a depth of 1/4 of

the depth of the concrete. Dummy joints shall be located transversely every five (5) feet and as detailed on the plans or as ordered.

d. Mixing and Placing Concrete:

1. Concrete shall be mixed in approved transit mixers (concrete mixed in truck mixer en route to or at point of placement). Transit mixers shall be loaded in approved batching plants. Batching and mixing on job site will not be allowed. Truck mixing shall not be less than four (4) revolutions at mixing speed. Concrete shall be incorporated into the work within 45 minutes after the water was added to the mix. Concrete shall be discharged within 1-1/2 hours from the time the dry aggregates are loaded into the mixture. Truck mixers shall be equipped with accurate gauges to measure the quantity of water incorporated into the mix and with an accurate drum revolution counter.
2. Slump of the concrete, as determined by AASHTO method T-119, shall be not less than two (2) inches nor more than four (4) inches. Concrete shall contain not less than 4 nor more than 6 percent entrained air at the time the concrete is deposited in the forms, as determined by AASHTO Methods T-152 or T-121.
3. Immediately before concrete is placed, the base course shall be moistened. It shall be compact and smooth. The entire base course under the walk to be constructed in that pour shall be complete and accepted prior to beginning or placing of concrete. At no time shall concrete be placed on soft, muddy, frozen, porous or rutted base.
4. Concrete shall be placed only in the presence of an inspector. It shall be deposited in a plastic condition and shall be a homogeneous mass without segregation of aggregates during depositing and spreading. All chutes used to deposit concrete shall be metal or metal lined. Depositing and spreading concrete shall be continuous between transverse joints. Workmen shall not walk in concrete during placing and spreading. Concrete alongside forms and each side of transverse joints shall be thoroughly consolidated. Concrete shall be placed only when the temperature is 40 degrees F and rising, and when it can be expected that the placing and finishing can be accomplished at that temperature or above.
5. Reinforcement shall be placed in the sidewalk at driveway crossings two (2) inches above the bottom surface of the concrete and parallel to the finished grade of the walk. Care shall be taken to hold the reinforcing mesh to the proper line and grade. Successive and adjacent pieces of reinforcing mesh shall be lapped six (6) inches. Reinforcing mesh shall be one (1) inch clear from the side of forms and expansion joints.
6. A 1/4 inch thick preformed expansion joint shall be installed at transverse locations not to exceed twenty longitudinal feet, between curbs and walks, at

structures projecting into and adjacent to the walk and concrete ramps as shown on the plans and details, or as directed by the Engineer.

7. Formed surfaces shall be kept continuously wet for the duration of the curing period (prior to, during, and after form removal) or until curing compound is applied.
 8. If moist curing is discontinued before the end of the curing period, white pigmented curing compound shall be applied immediately, following the procedures specified under "Curing."
- e. Consolidation and Finishing: Consolidation and finishing shall be by hand or mechanical equipment. Experienced concrete finishers shall be used at all times in the finishing of the surface. Concrete shall be struck off by means of a hand screed resting on the side form and weighing not less than 10 pounds per linear foot or by portable non-vibrating screed. Strike off shall bring the concrete to the required grade and contour. Screeding shall be a transverse, sawing motion carrying a roll or mortar in front of it. As soon as possible after screeding, the surface shall be longitudinally floated with a sawing motion commencing at one side and wasting excess material over the other side. Movement ahead in a longitudinal direction shall be one-half the length of the float. The surface irregularities shall be removed by use of a finishing lute. The initial edging shall be performed, then the surface shall be dragged with a clean, wet, stiff bristle broom. Before initial set, the final edging against forms and expansion joints and of dummy joints shall be made. All edging shall be true to line and grade and shall not create depressions in the surface.
 - f. Curing: Liquid curing compound shall be applied immediately following the disappearance of the water sheen following the final finishing and before any marked dehydration of the concrete or surface checking occurs. The compound shall be applied in two even coats of one gallon per 200 square feet, with a continuous even film at right angles to each other and with not more than 30 minutes between coats. Application shall be by pressure sprayer giving a fine uniform spray. Should rain fall on the newly coated surface before it dries, a new application shall be maintained to protect the concrete surface from rain during finishing operations and until the curing compound dries. The walk shall be barricaded and all traffic shall be restricted for at least seven (7) days.
 - g. Removal of Forms and Backfilling: Forms shall not be removed until the concrete has set at least 12 hours unless approved by the Engineer. Care shall be taken in removal so that no damage is done to the edges of the walk and to the surface membrane curing. All honeycomb shall be pointed and the sides sprayed with liquid curing compound if not immediately backfilled.

The sides of the walk and/or ramp shall be backfilled with a suitable material as directed by the Engineer and shall be graded and thoroughly compacted flush with the top of the walk and to meet the existing adjacent grade with no pockets or depressions

to trap water. All surplus material shall be removed, the concrete surface swept clean and the site left in a neat and presentable condition to the satisfaction of the Engineer.

- h. Cold Weather: When, in the opinion of the Engineer, the weather is such that that any concrete work which has not completely cured is liable to be frozen, such concrete shall be protected by covering as soon as it has hardened sufficiently. On top of the curing compound shall be placed 6-8 inches of hay or straw, or an approved thermal blanket. A cover sheet of width sufficient to overlap the edges of the walk or ramp shall then be placed and securely fastened down. The protective material shall remain in place until ordered removed by the Engineer and all material promptly removed from the site. Any concrete placed during cold weather and not properly protected will not be accepted.

- i. Concrete in Hot Weather: When climatic or other conditions are such that the temperature of the concrete may reasonably be expected to exceed 90 degrees F at the time of delivery at the work site, during placement, or during the first 25 hours after placement, the following provisions also apply:
 - 1. The contractor shall maintain the temperature of the concrete below 90 degrees F during mixing, conveying, and placing. Methods used shall conform to “Recommended Practice for Hot Weather Concreting”, ACI Standard 305.
 - 2. The concrete shall be placed in the work immediately after mixing. Truck mixing shall be delayed until only time enough remains to accomplish it before the concrete is placed.
 - 3. Exposed concrete surfaces which tend to dry or set too rapidly shall be continuously moistened by means of fog sprays or otherwise protected from drying during the time between placement and finishing and after finishing.
 - 4. Finishing of exposed surfaces shall be started as soon as the condition of the concrete allows and shall be completed without delay.
 - 5. Concrete surfaces exposed to the air shall be covered as soon as the concrete has hardened sufficiently and shall be kept continuously wet for at least the first 24 hours of the curing period and for the entire curing period unless curing compound is applied as specified under “Curing.”

- j. Water Gates and Gas Gates: All of the water gates and gas gates which are encountered within the limits of the work shall be aligned properly over shutoff and shall be adjusted to meet the grade of the proposed surface. All boxes shall be free of all dirt, rocks, etc. The Contractor shall be responsible for replacing any broken gate boxes. Materials shall be provided by the Meriden Water Department if gate boxes were damaged prior to construction. All labor costs are the Contractor’s responsibility. The Contractor will coordinate with Yankee Gas and Meriden Water Department to obtain replacement boxes.

- k. Detectable Warning Strip: The Detectable Warning Strip shall be set directly in poured concrete according to the plans and the manufacturer's specifications or as directed by the Engineer. The contractor shall place two 25 pound concrete blocks or sandbags on each tile to prevent the tile from floating after installation in wet concrete. The Contractor is responsible for removing any material spatters or debris and repairing any damage to the existing sidewalk arising from the installation of the tile. The protective film on the detectable warning strip shall be removed as soon as the concrete has cured.

4.0 METHOD OF MEASUREMENT

Concrete sidewalk and ramps shall be measured for payment by the total square feet of the top surfaces of the sidewalk, driveway ramps, and pedestrian ramps, excluding the exposed top surface of the concrete curbing.

The Detectable Warning strip will not be measured for payment. All materials, equipment, tools and labor incidental thereto shall be included in the Bid price for Concrete Sidewalk.

5.0 BASIS OF PAYMENT

Payment for concrete sidewalks, driveway ramps, and pedestrian ramps shall be at the contract unit price per square foot of "Concrete Sidewalk", "Concrete Driveway Ramp", or "Concrete Pedestrian Ramp" complete in place and accepted.

Price and payment for Concrete Sidewalk", "Concrete Driveway Ramp", and "Concrete Pedestrian Ramp" in place shall include the removal of all existing sidewalks and curbing, the removal and replacement of all bituminous concrete pavement, all forms necessary for tree pits, grass and brush and all equipment and labor, excavation, backfill (except rock excavation), bedding, and all other miscellaneous items necessary to complete the work, and not listed for separate payment in the bid.