

CONCRETE REPLACEMENT

SPECIFICATIONS FOR REPLACEMENT OF CONCRETE CURBS AND SIDEWALKS (A MANUAL FOR PROPERTY OWNERS)

Prepared For

**BOROUGH OF BIRDSBORO
BERKS COUNTY, PA**

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Introduction

In accordance with the Code of Ordinances of the Borough of Birdsboro, the repair and replacement of concrete curbs, sidewalks and driveway aprons along the streets of the Borough of Birdsboro shall be made by the owner of the lot abutting thereon in accordance with details and specifications enacted by the borough. The following information has been prepared to guide borough property owners in the replacement of concrete curbs, sidewalks and driveway aprons. These specifications describe minimum borough requirements that must be followed by property owners and/or their contractors when performing this work. All work will be subject to inspection and approval by the Borough Engineer. Please contact the Borough Engineer with any questions.

Concrete Curb Replacement

Curbing in unsatisfactory condition must be removed and replaced as described in this section. This section also applies to combination curb & gutter—concrete gutter level with the roadway surface immediately adjacent the curb, typically two feet wide—and combination roll type curb & gutter—a shallow concrete depression for carrying stormwater runoff, located adjacent the edge of the roadway with an elevated edge or curb along the outside edge.

Prior to starting work, mark out work area with barricades, sawhorses, traffic cones, warning tape or similar to adequately warn pedestrian and vehicular traffic.

Break up and remove existing section(s) of curb to be replaced. A sledgehammer and pry bar or jackhammer can be used for this task. Legally dispose of rubble. Remove only full sections of curbing unless otherwise allowed below. A full section of curb is defined as the entire length of curb between two existing joints (score joint, expansion joint or construction joint), one at each end of the portion of curb being replaced. A partial section of curb may be removed only if all of the following parameters can be met: (1) a section no less than three linear feet of curbing is to be removed and replaced, (2) a minimum of three linear feet of existing curbing in good condition will remain adjacent each side of the area of curbing being removed and replaced, and (3) no more than one area of replacement is required along the length of curbing between two existing joints. Using a concrete saw with a masonry blade, provide clean saw cuts through the curb for the area of curb being replaced. If unable to saw cut through the entire depth of concrete, chisel/break off concrete below the saw cut to make the edge vertical to prevent overhang and irregular feathered edges, which are prone to chip off. Saw cutting should not be needed at a construction/expansion joint, which should run through the entire depth of the curb.

Compact the base upon which the new curb is to be constructed to a firm, even surface. If additional stone backfill is needed to adjust the elevation of the subbase, utilize 2A-modified stone and compact thoroughly.

Construct new vertical curb in accordance with Borough details using PennDOT Class A Cement Concrete (minimum 3,000 PSI 28-day compressive strength, air-entrained to have an air content of 6-percent by volume in the plastic state). Securely prepare formwork prior to pouring concrete. If necessary, the dimensions and profile of the new curb may be adjusted to match and blend with the existing curb being filled in. Place ½-inch preformed, resilient expansion joint filler material (a tar-impregnated black felt-like material) adjacent existing curb prior to pouring concrete for new curb. Where sidewalk abuts the curb, provide ½-inch wide expansion joint filler material between the curb and sidewalk adjacent the entire length (expansion joint material shall extend the full depth of the sidewalk slab). When replacing multiple, continuous segments of curbing, ½-inch expansion joints shall be placed at 20-foot intervals along the curb with intermediate vertical

score/control joints saw cut midway between the expansion joints, thereby creating a joint pattern every 10 linear feet alternating between expansion joints and control joints. When placing curbing adjacent existing sidewalk, expansion joints and intermediate score joints should align with the closest corresponding joints in the sidewalk.

A smooth unblemished finish shall be provided on all exposed concrete surfaces. Before the concrete is 36 hours old, wet and rub faces of curb with a very stiff brush, carborundum (Silicon carbide) rubbing brick or other abrasive until a uniform color and texture are produced.

Concrete placement must not occur when the descending air temperature falls to 40 degrees Fahrenheit or if the temperature of the stone base cannot be maintained below 115 degrees by sprinkling water on the stone to moisten and cool the surface temperature of the base course. The temperature of the concrete must be between 50 and 90 degrees Fahrenheit when placed. Concrete must not be placed on frozen base.

Concrete must retain sufficient moisture for a period of 96 hours to allow proper curing to occur in order to achieve maximum compressive strength. This may be accomplished by securing polyethylene plastic sheeting over and in contact with the concrete surface creating a tight seal for the full curing period or placing two layers of wet burlap overtop the concrete surface and maintaining wet for the full curing period. Alternatively, an appropriately selected curing compound may be applied over the entire exposed concrete surface at the rate specified by the product manufacturer. Curing compounds must be applied immediately after finishing once the free water has left the concrete surface and while the surface is still damp.

Backfill areas of excavation adjacent curb no sooner than 72 hours after placing concrete, rake smooth and seed. Restore asphalt roadway surface adjacent curb if damaged during curb replacement. Temporarily patch minor areas of asphalt damage with minimum 2-inch depth of compacted cold patch blacktop with top flush with adjacent road surface. Restoration of extensive areas of damage shall be discussed with the Borough Engineer. Remove barricades/warning devices upon conclusion of all work, inclusive of backfill, roadway restoration and removal of curing blankets.

Concrete Sidewalk/Driveway Apron Replacement

Areas of sidewalk and driveway aprons shall be maintained in good condition for the safety of the public. Those in unsatisfactory condition must be removed and replaced as described in this section. This section applies to concrete sidewalks and also concrete driveway aprons, which are commonly located between the concrete curb and asphalt or stone driveway. The driveway apron is also part of the public sidewalk system where the roadside sidewalk crosses the driveway.

Prior to starting work, mark out work area with barricades, sawhorses, traffic cones, warning tape or similar to adequately warn pedestrian and vehicular traffic.

Using a concrete saw with a masonry blade, saw cut the concrete along the joint lines of the square(s) to be replaced. If unable to saw cut through the entire depth of concrete, chisel/break off concrete below the saw cut to make the edge vertical to prevent overhang and irregular feathered edges which are prone to chip off.

Break up and remove existing section(s) of sidewalk/apron to be replaced. A sledgehammer and pry bar or jackhammer can be used for this task. Legally dispose of rubble. Remove full squares of concrete only. A concrete square is defined by the grid of joints (score joints—surface joints tooled into the concrete—and/or construction/expansion joints—full depth joints filled with expansion joint filler material) built into the concrete surface during construction. Partial removal of concrete squares is not permitted.

Compact the base upon which the new sidewalk is to be constructed to a firm, even surface. If additional stone backfill is needed to adjust the elevation of the subbase, utilize 2B stone and compact thoroughly. The stone subbase should be 4 inches lower than the finished surface of the sidewalk and 8 inches lower for driveway aprons.

Construct and secure formwork (typically using 1"x4"/1"x8" or 2"x4"/2"x8" pieces of lumber) to retain outside edges of sidewalk/apron repair prior to pouring concrete. Construction shall match the existing conditions. The width of new sidewalks shall match those being replaced.

Construct new sidewalks/aprons with PennDOT Class A Cement Concrete (minimum 3,000 PSI 28-day compressive strength, air-entrained to have an air content of 6-percent by volume in the plastic state) placed over the compacted stone base. Concrete thickness for sidewalks shall be 4 inches. Driveway aprons and sidewalks crossed by driveways shall be 8 inches in thickness. Place ½-inch wide preformed, resilient expansion joint filler material (a tar-impregnated black felt-like material) for the full depth of the concrete pavement between areas of new sidewalk and rigid permanent vertical elements—including but not limited to curbs, buildings, footings, utility boxes, and existing sidewalk—opposite expansion joints in adjacent curb, and across the full width of the sidewalk at approximately 20 foot intervals along the new walk's length. Lightly moisten stone base prior to placing concrete. Place concrete and level with a 2"x4" screed board, being careful to achieve the proper surface elevation and ¼" per foot slope toward the street. Avoid overworking the concrete.

Finish the concrete surface. Using a radius edging tool, draw it along all outside top edges that were formed and alongside the top edge adjacent any expansion joints to prepare the edges for final finishing. Use a steel finishing trowel, and first work it straight across the top to bring water to the surface to seal the concrete and then take the steel trowel and work it in arcs, with each new arc removing the heel mark from the arc before.

Utilizing a broom or stiff brush, draw it across the new concrete surface transverse to (opposite of) the direction of travel to impart a light broom finish, which creates traction to make the sidewalk less slippery for pedestrians. Repeat the edging procedure, drawing it along all outside top edges that were formed and alongside the top edge adjacent any expansion joints. Last, using a jointing tool install score joints (the grid marks or score lines in a sidewalk) to match the existing score joint pattern in the sidewalk/apron and in accordance with standard borough details. Generally, this equates to a score joint grid pattern equal to the sidewalk width, but not exceeding six feet on-center. Score joints shall also be provided where sidewalks intersect and at other areas typically subject to cracking stresses. Score joints shall be 1/8-inch wide by 1/4 to 1/3 the depth of the concrete slab (1 to 1-1/3 inches for 4 inch slab and 2 to 2-2/3 inches for 8 inch slab) and shall include a ½-inch radius along both sides of the top edge to prevent future chipping.

Concrete placement must not occur when the descending air temperature falls to 40 degrees Fahrenheit or if the temperature of the stone base cannot be maintained below 115 degrees by sprinkling water on the stone to moisten and cool the surface temperature of the base course. The temperature of the concrete must be between 50 and 90 degrees Fahrenheit when placed. Concrete must not be placed on frozen base.

Concrete must retain sufficient moisture for a period of 96 hours to allow proper curing to occur in order to achieve maximum compressive strength. This may be accomplished by securing polyethylene plastic sheeting over and in contact with the concrete surface creating a tight seal for the full curing period or placing two layers of wet burlap overtop the concrete surface and maintaining wet for the full curing period.

Alternatively, an appropriately selected curing compound may be applied over the entire exposed concrete surface at the rate specified by the product manufacturer. Curing compounds must be applied immediately

after finishing once the free water has left the concrete surface and while the surface is still damp.

Backfill areas of excavation adjacent sidewalk/apron no sooner than 72 hours after placing concrete, rake smooth and seed. Leave barricades/warning devices in place no less than 3 days for sidewalks receiving only pedestrian traffic but at least 7 days when the repair is subject to vehicular traffic, such as driveway aprons and sidewalks crossing driveways. Remove barricades/warning devices upon conclusion of all work, inclusive of backfill, roadway restoration and removal of curing blankets.