January 1, 2013

To: Licensed Concrete Contractors

Re: Public Sidewalk and Drive Approach and Curb and Gutter Construction

In an effort to promote uniformity of concrete construction and continue the high quality of work being performed, we have prepared the enclosed information together with a copy of the applicable standard details for your reference. These specifications are applicable to all concrete sidewalk, driveway, curb and pavement installations constructed of Portland cement concrete.

We are aware that the requirements for construction vary somewhat from municipality to municipality so the information provided should answer any questions as to what is required by Naperville. Sidewalks, driveways, and curbs provide a safe and efficient avenue for pedestrian and vehicular circulation. They are both costly to construct initially, and repair and maintain in the future; therefore, your attention to these requirements and overall workmanship will help produce a cost effective product that is constructed with a high degree of integrity.

Licenses to perform work will be issued based upon your compliance with these regulations. Any failure on your part to comply will be considered adequate cause to revoke your license. Please read this notice carefully and feel free to contact the Transportation, Engineering and Development (TED) Business Group if there are any questions at 420-6100 Option 4.

Re: Sidewalks/Curbs/Driveway Standards

The City's Advisory Commission on Disabilities, the TED Business Group, and the United States Department of Justice have serious concerns regarding the construction of accessible ramps. These ramps are included in the construction of curbs, gutters, sidewalks and driveways.

Effective immediately, the Illinois State Standards for the construction of curb, gutters, sidewalks and access ramps will be strictly enforced. Please refer to the attached IDOT Standard Details. Particular attention should be given to the geometry and slope of the curb and gutter, the longitudinal and transverse slope, and the requirements for detectable warnings.

These standards are required by the I*llinois Accessibility Code* and the *Americans with Disabilities Act of 1990*. The City abides by the requirements of the following documents:

- Department of Justice (15 September 2010). 2010 Standards for Accessible Design. Online Department of Justice published revised regulations for Titles II and III of the Americans with Disabilities Act of 1990 [www.ada.gov/regs2010ADAStandards/2010ADAStandards_prt.pdf]
- State of Illinois Capital Development Board (24 April 1997). Illinois Accessibility Code. [www.cdb.state.il.us/forms/download/IAC/Web%20Version%20IAC.pdf]
- Access Board (20 January 2011). Public Right-of-Ways Accessibility Guidelines. [www.access-board.gov/prowac/draft.htm]
- Illinois Department of Transportation (Latest Edition). Chapter 58 Special Design Elements [www.dot.state.il.us/desenv/BDE%20Manual/BDE/pdf/Chapter%2058%20Special%20Design%20Elements.pdf]

Work constructed that does not meet these standards will not be acceptable and will be required to be removed and replaced, at the contractor's full expense.

Given the high level of workmanship that licensed sidewalk contractors have produced in the past, we expect few compliance problems. We strongly encourage you to become familiar with these standards and construct all work in strict accordance with them.

Thank you for your attention to this policy clarification. If you have any questions, please contact the Transportation, Engineering and Development (TED) Business Group at 630-420-6100, Option 4.

NOTICE TO CONCRETE CONTRACTORS

All public concrete sidewalks, driveway approaches, curbs, and pavements in the City of Naperville must adhere to the Standards and Specifications as described in the "Standard Specifications for the City of Naperville" (current edition), the Illinois Department of Transportation (IDOT) "Standard Specifications for Road and Bridge Construction" (current edition) and in their associated standard details.

This notice is intended to supplement the abovementioned documents by providing a bulleted list highlighting key information. All references made to sidewalk also generally pertain to all types of concrete construction. The city follows the provisions of the IDOT Standard Specifications, as applied to Portland Cement Concrete sidewalk, curb, driveway and pavement. The applicable sections of the Standard Specifications apply – Section 420, 423, 424, and 606.

- Sidewalk Contractor's License. All concrete contractors performing this work require a sidewalk contractor's license. These are available at the Office of the City Clerk, 400 S. Eagle Street, 630-305-5300. Please note that sidewalk licenses are required to be renewed on an annual basis. Renewal is required prior to the release of any new permits after the start of each calendar year.

- Permit and Maintenance Bond. A permit is required by the City of Naperville in order to perform construction work in the City's right-of-way. Depending upon the extent of the work, the Contractor may be required to provide the City with a maintenance bond, which shall expire one year after the work is completed to guarantee materials and workmanship.

- Concrete Inspection. All public concrete installations require an inspection by the TED Business Group prior to placing the concrete. The inspection must be scheduled a minimum of 48 hours in advance of the day requested, on a first come- first served basis. Schedule your inspection by calling 630-420-6100, Option 1 between the hours of 8 a.m. to 1 p.m. and 2 p.m. to 4 p.m. Monday through Friday. Inspections are performed daily Monday through Friday, excluding Holidays between 8 a.m. and 3 p.m. All work must be ready for inspection on the day and time scheduled or the inspection

will fail. All failed inspections must be followed by scheduling a re-inspection.

- Utility Locates. The Contractor is responsible for contacting JULIE for utility locates prior to starting construction activities. It is also the responsibility of the contractor to locate any private facilities or non-JULE member facilities. Please note that DuPage County and the Illinois Department of Transportation (IDOT) traffic signal equipment are not on the JULIE system. If you are working near a DuPage County or IDOT traffic signal, the Contractor is required to contact the agencies directly for the location of the traffic signal equipment.
- Traffic Control and Protection. Proper barricading and traffic control must be maintained at all times per city ordinances and part VI of the "Manual on Uniform Traffic Control Devices" (MUTCD). For arterial roadways, work in or immediately adjacent to a traffic lane is limited to 9 a.m. to 3 p.m. on weekdays. Work adjacent to an arterial may be completed between 7am and 7pm on weekends. An arrow board is also required for work adjacent to arterial roadways. Any work that impacts a sidewalk may require sidewalk closure signage and a pedestrian detour. A right-of-way permit and/or engineering review of a pedestrian detour may be required.

- Sidewalk ADA Compliance. The sidewalk dimensions, alignments and elevations of the work must conform to the approved final engineering plans and current ADA standards. In case of conflict, the ADA standards prevail. These should be provided to you by the project owner.

- Sidewalk Dimensions.
    - Sidewalks shall have a minimum width of five (5') feet, and may be wider, based on projected pedestrian volumes. Sidewalks shall be constructed in the public right-of way or dedicated sidewalk easement, typically one (1') foot from the property line or easement line. Sidewalks should be a minimum thickness of four (4") inches unless they are constructed through a driveway, in which case the sidewalk shall be a minimum thickness of six (6") inches through a residential driveway or eight (8") inches through a commercial driveway.

- Sidewalk Clearance from Obstructions. Promptly notify the project owner of any obstructions within the proposed alignment of the sidewalk, for example, electrical boxes, fire hydrants, trees, shrubs, etc. The sidewalk will need to be relocated to provide a minimum of one-foot (1') clearance between the sidewalk and the obstruction. A two (2') clearance should be provided where possible.A smooth transition in the alignment should be provided at a minimum of ten feet (10') longitudinally for each foot *laterally of sidewalk.*

- Sidewalk Slope. The cross slope of the sidewalk shall be less than 1:50 (2%). The ramp slope shall be less than 1:12 (8.33%). The running slope of the sidewalk adjacent to a ramp shall be less than 1:20 (5%). All other current ADA requirements shall be met. Refer to the standard detail drawings for specific requirements related to ramp geometry and conditions.

- Detectable Warnings. Detectable warnings shall be installed in compliance with IDOT and the Americans with Disabilities Act (ADA) Accessibility Guidelines (ADAAG). Only prefabricated detectable warnings with brick red color (produced by Armor Tile, ADA Solutions, Detectile or an equal approved by the City Engineer) shall be allowed. The detectable warnings must be twenty-four (24") inches in the direction of travel, shall extend the entire width of the sidewalk ramp, and be set flush with the adjoining concrete. The detectable warning domes should be aligned parallel to the sidewalk direction of travel and meet all ADA requirements. The maximum setback of the panel from the curb shall be as depicted on the standard detail. If detectable warnings are not placed according to ADA requirements, the Contractor shall remove and replace it at their expense. Special products are to be specified and used in the Downtown Streetscape areas with pavers.

- Sidewalk Subgrade Preparation. The subgrade must be uniform, stable, well compacted and be free of unsuitable material. The sub-base must be the required thickness of CA-6 aggregate that is properly and mechanically compacted (minimum two inch thickness for all sidewalks, except sidewalk through commercial driveways, which requires a 4 inch minimum thickness).

- Curing and Damage. All sidewalk and concrete driveway pavements in the City of Naperville shall be cured in accordance with the IDOT "Standard Specifications for Road and Bridge Construction." All provisions of section 1020 shall be employed. All public work must be applied with a cure and seal compound in accordance with the specifications and manufacturer's directions. Cure and Seal 1315F produced by Dayton Superior or an equal approved by the City Engineer shall be allowed. Concrete work which contains graffiti or other defacing markings shall require repair or replacement, as determined by the city, by the contractor and at the contractor's expense.

- Concrete Forms and Expansion Joints. Form boards must be straight, smooth, set to the proper elevation to achieve cross-slope, and be adequately staked. The sub-base material shall be sufficiently backfilled to prevent lateral movement during placement of the concrete and/or removal of the forms. Curves and radius shapes shall be formed full-depth using lumber or formwork which provides smooth arcs and transitions. Expansion joints (1/2") shall be required every 40 linear feet of travel, and on both sides of squares containing structures as detailed below.

- Curb and Gutter Design Standards. All concrete curb and gutter shall be constructed in accordance with City of Naperville Standard Details 590.20 through 590.24 as appropriate and Sections 420, 606 and 1020 of the IDOT Standard Specifications.

- Curb and Gutter Contraction Joints. Contraction joints shall be formed every 15 feet. One way of forming the joint will be to tool the joint while finishing and saw cut these joints minimum of 3 inches deep within 12-24 hours. No caulking is required for forming the joints by this method. The other way to form the joints is to saw cut minimum of 3 inches deep between 12 and 24 hours from the time of pour. These joints must also be cleaned and neatly caulked with a gray or light gray colored urethane polymer sealer compound.

- Curb and Gutter Transverse Joints.
    - *New construction:* 3/4" preformed bituminous expansion joints, with 2- #6 coated smooth dowel bars (3/4" Dia. X 18") with grease caps,

shall be placed every 150 feet, 10' either side of drainage structures, P.C.'s and P.T.'s and back of cul-de-sacs.

- *Removal and Replacement:* When short sections are replaced, the new section of curb and gutter must have a transverse expansion joint as detailed above if there is no expansion joint within 45 feet. The other end of the curb shall have two epoxy coated deformed reinforcement bars of at least 18 inches long and minimum size #5 shall be drilled 9 inches into of the existing curb to tie to the new short section of curb. If no expansion joint is required, then both ends of the existing curb shall receive two epoxy coated #5 bar as outlined before.

- Curb and Gutter ADA Requirements. Where new curb and gutter or the replacement of existing curb and gutter is specified at street intersections, depressed curb and gutter and sidewalk ramps shall be installed for wheelchair access in accordance with the latest ADA specifications for accessible ramps.

- Curb and Gutter Subbase. The curb and gutter shall be constructed on a prepared compacted 4 inch minimum crushed stone (CA-6) subbase.

- Curb and Gutter Over Utility Trenches. Where curb and gutter crosses utility trenches, the curb and gutter shall be constructed with two No. 4 epoxy coated deformed steel reinforcement bars extending a minimum of 3 feet beyond the edges of the trench.
- Curb Construction Adjacent to New Sidewalk. Where new sidewalk is being constructed adjacent to new curb, or for any combination of different types of new concrete work, they must be formed and poured separately.

- Driveway Design Standards. All driveway aprons and approaches shall be constructed in accordance with City of Naperville Standard Details 590.5, 590.6, 590.7 and Section 1020 of the IDOT Standard Specifications.

- Driveway Dimensions.
  - Concrete driveways shall have a minimum thickness of 6 inches for residential driveways and 8 inches for commercial driveways. The driveway shall be constructed on a prepared compacted crushed stone (CA-6) sub-base of 2" for residential driveways and 4" for commercial driveways.

- Residential driveways shall not exceed 20 feet in width measured at the property line. Commercial driveway shall have a minimum width of 24 feet and a maximum width of 35 feet at the property line.

- Parkway Restoration. The sidewalk and parkway shall be promptly backfilled to the required elevation with suitable embankment material and topsoil. The parkway area shall also be restored with seed or sod. The embankment material shall be compacted until firm, the topsoil neatly graded. The work area shall be protected with barricades until the sidewalk and parkway have been fully backfilled.

- Structure Adjustments. Any manhole frames, valve boxes, or other at grade structures must be properly adjusted in accordance with the applicable standards to meet the proposed finished grade of the sidewalk. *A ½" expansion joint must be provided on both sides of the structure.*

- Concrete Mix Design. The concrete mix must be from a certified Ready Mix plant and be class PV or SI. Concrete mix requirements shall meet the requirements of the IDOT Standard Specifications Section 1020. All mixes require 5-8% air entrainment content, a 2"-4" slump (maximum), and contain no calcium chloride. Expansion joints and construction joints must be placed in accordance with the specifications. Concrete mixtures not meeting these requirements will be rejected or removed as directed by the City of Naperville. *Any modification to the mix without the City's approval will be rejected at the site or at the plant.*

- Delivery Tickets. The City reserves the right to request a concrete delivery ticket at the time of each pour. Handwritten tickets will not be allowed and the concrete truck will be rejected. Each ticket shall be computerized and contain, at a minimum, the following information.

  1. Supplier (specific yard used for production), name, address, phone number.
  2. Approved IDOT mix design number
  3. Specific contents of the batch (ex. Cement content, air entrainment, water reducer etc.)

4. Sequentially numbered stamped serial number when applicable

- Construction Season. Public concrete construction can only be performed between April 15 and November 15, weather permitting or as approved by the City Engineer. At no time shall concrete be placed on frozen subgrade or sub-base, or while raining.

- Cold Weather Protection. When low temperatures are predicted, the fresh concrete must be protected for a minimum of 96 hours after placement.

    1. 25° to 32° F- Two (2) layers of polyethylene sheeting, or 1 layer of polyethylene and 1 layer of burlap, or two (2) layers of waterproof paper.
    2. Below 25° - Covered with insulated blankets (preferred method) or six (6") inches of straw covered with one layer of polyethylene sheeting or waterproof paper.
    3. The City reserves the right to require all work to be covered regardless of temperature predictions after October 1st and prior to May 15th.

These improvements are intended to provide safe and efficient avenues for pedestrian and vehicular circulation. Work constructed with defects will require remedy. It is the duty of the sidewalk contractor to adhere to the specifications, standards and these guidelines. Failure to do so will lead to revocation of the sidewalk contractor's license and legal action available by law.

Appendices

Appendix A – Section 424 of the Illinois Department of Transportation *Standard Specifications for Road and Bridge Construction,* January 2012 edition.

Please refer to the link below for the most current version of the document:
www.dot.state.il.us/desenv/hwyspecs.html

Appendix B – Illinois Department of Transportation Standard Details

Please refer to the link below for the most current version of the document:
www.dot.state.il.us/desenv/hwystds/HwyStndIndex.html

Appendix C – City of Naperville Standard Details

Please refer to the link below for the most current version of the document:
www.naperville.il.us/standspecdetails.aspx

APPENDIX A
SECTION 424 OF THE ILLINOIS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
(JANUARY 2012 EDITION)

A current version of the Standard Specifications for Road and Bridge Construction is located at: www.dot.state.il.us/desenv/hwyspecs.html

SECTION 424. – PORTLAND CEMENT CONCRETE SIDEWALK

424.01 Description. This work shall consist of constructing portland cement concrete sidewalk and curb ramps on a prepared subgrade. This work does not include sidewalk that is integrally a part of a structure.

424.02 Materials. Material shall meet the requirements of the following Articles of Section 1000 – Materials:

Item	Article/Section
(a) Portland Cement Concrete	1020
(b) Preformed Expansion Joint Filler	1051

424.03 Equipment. Equipment shall meet the requirements of the following Articles of Section 1100 – Equipment:

Item	Article/Section
(a) Miscellaneous Equipment	1103.17

CONSTRUCTION REQUIREMENTS

424.04 Subgrade Preparation. The subgrade shall be tamped or rolled until thoroughly compacted and at the proper line and grade as shown on the plans. At locations where the sidewalk is constructed at entrances, the sidewalk shall be thickened to the thickness of the adjacent entrance or driveway pavement.

424.05 Forms. Side forms shall be of lumber of not less than 2 in. (50mm) thickness or of steel of equal rigidity. They shall be held securely in place by stakes or braces, with the top edges true to line and grade. Forms for the sidewalk

accessibility ramps shall be set so that the slab will have a uniform fall between the sidewalk roper and the curb grade.

At the Contractor's option, slipforming, using equipment approved by the Engineer, will be allowed

424.06 Placing and Finishing. The subgrade shall be moistened just before the concrete is placed. The concrete shall be placed in successive batches for the entire width of the slab, struck-off, consolidated with a hand vibrator and finished to a true and even surface with floats and trowels. A vibratory screed may be used to strike off, consolidate, and finish the concrete. The final finish shall be done with a wooden float, leaving an even surface. Steel trowels shall not be permitted. After the water sheen has disappeared, the surface shall be given a final finish by brushing with a whitewash brush. The brush shall be drawn across the sidewalk at right angles to the edges of the walk, with adjacent strokes slightly overlapping, producing a uniform, slightly roughened surface with parallel brush marks.

The surface shall be divided by grooves constructed at right angles to the centerline of the sidewalk. These grooves shall extend to ¼ the depth of the sidewalk, shall be not less than 1/8 in. (3 mm) nor more than 1/4 in. (6mm) in width and shall be edged with an edging tool having a 1/4 in. (6 mm) radius. No slab shall be longer than 6ft (1.8 m) nor less than 4ft (1.2 mm) on any one side, unless otherwise ordered by the Engineer. The edges of the slabs shall be edged as described above.

424.07 Expansion Joints. Expansion joints of the thickness specified below shall consist of preformed joint filler. The top of the joint shall be placed 1/4 in. (6 mm) below the surface of the sidewalk.

a. 1/2 in. (13 mm) Thick Expansion Joints. Expansion joints 1/2 in. (13 mm) thick shall be placed between the sidewalk and all structures such as light standards, traffic light standards, traffic poles and subway columns, which extend through the sidewalk.

b. 3/4 in. (20 mm) Thick Expansion Joints. Transverse expansion joints 3/4 in. (20 mm) thick shall be placed at intervals of not more than 100ft (30 m) in the sidewalk. Where the sidewalk is constructed adjacent to pavement or curb having expansion joints, the expansion joints in the sidewalk shall be placed in line with the existing expansion joints as nearly as practicable. Expansion joints shall also be place where the sidewalk abuts existing

sidewalks, between driveway pavement and sidewalk, and between sidewalk and curbs where the sidewalk abuts a curb.

424.08 Curb Ramps. Curb ramps shall be constructed according to the ADAAG, the Illinois Accessibility code and as shown on the plans.

Curb ramps shall be constructed to the same thickness as the adjacent sidewalk with a minimum thickness of 4 in. (100 mm).

424.09 Detectable Warnings. Detectable warnings shall consist of a surface of truncated domes meeting the requirements of the ADAAG and the details shown on the plans.

Detectable warnings shall be installed at curb ramps, medians and pedestrian refuge islands, at-grade railroad crossings, transit platform edges, and other locations where pedestrians are required to cross a hazardous vehicular way. Detectable warnings shall also be installed at alleys and commercial entrances when permanent traffic control devices are present. The installation shall be an integral part of the walking surface and only the actual domes shall project above the walking surface.

The product or method used for installing detectable warnings shall come with the following documents which shall be given to the Engineer prior to use.

a. Manufacturer's certification stating the product is fully compliant with the ADAAG.
b. Manufacturer's five year warranty.
c. Manufacturer's specifications stating the required materials, equipment, and installation procedures.

Products that are colored shall be colored their entire thickness.

The materials, equipment and installation procedures used shall be according to the manufacturer's specifications.

424.10 Backfill. After the concrete has been cured, the spaces along the edges of the sidewalk and ramps shall be backfilled to the required elevation with approved material. The material shall be compacted until firm, and the surface neatly graded.

424.11 Disposal of Surplus Material. Surplus or waste material resulting from the sidewalk construction operations shall be disposed of by the Contractor according to Article 202.03.

424.12 Method of Measurement. This work will be measured for payment in place and the area computed in square feet (square meters). Curb ramps will be measured for payment as sidewalk. No deduction will be made for detectable warnings located within the ramp.

Detectable warnings will be measured for payment in place and the area computed in square feet (square meters).

Earth excavation will be measured for payment according to Article 202.07.

424.12 Basis of Payment. This work will be paid for at the contract unit price per square foot (square meter) for PORTLAND CEMENT CONCRETE SIDEWALK of the thickness specified.

Detectable warnings will be paid for at the contract unit price per square foot (square meter) for DETECTABLE WARNINGS).

Earth excavation required will be paid for according to Article 202.08.

Article 1020 Portland Cement Concrete

1020.13 Curing and Protection. The methods of curing and protection and the length of the curing period vary somewhat, depending on the type of construction involved. A ready reference for the method of curing, curing period and method of protection for each of the various types of concrete constructions is included in the following Index Table.

INDEX TABLE OF CURING AND PROTECTION OF CONCRETE CONSTRUCTION

TYPE OF CONSTRUCTION	CURING METHODS	CURING PERIOD DAYS	LOW AIR TEMPERATURE PROTECTION METHODS
Cast-in-Place Concrete [11/]			
Pavement Shoulder	1020.13(a)(1)(2)(3)(4)(5) [3/ 5/]	3	1020.13(c)

Base Course Base Course Widening	1020.13(a)(1)(2)(3)(4)(5) 2/	3	1020.13(c)
Driveway Median Barrier Curb Gutter Curb & Gutter Sidewalk Slope Wall Paved Ditch	1020.13(a)(1)(2)(3)(4)(5) 4/ 5/	3	1020.13(c) 16/
Catch Basin Manhole Inlet Valve Vault	1020.13(a)(1)(2)(3)(4)(5) 4/	3	1020.13(c)
Pavement Patching	1020.13(a)(1)(2)(3)(4)(5) 2/	3 12/	1020.13(c)
Railroad Crossing	1020.13(a)(3)(5)	1	1020.13(c)
Piles and Drilled Shafts	1020.13(a)(3)(5)	7	1020.13(d)(1)(2)(3)
Foundations & Footings Seal Coat	1020.13(a)(1)(2)(3)(4)(5) 4/ 6/	7	1020.13(d)(1)(2)(3)
Substructure	1020.13(a)(1)(2)(3)(4)(5) 1/ 7/	7	1020.13(d)(1)(2)(3)
Superstructure (except decks)	1020.13(a)(1)(2)(3)(5) 8/	7	1020.13(d)(1)(2)
Deck	1020.13(a)(5)	7	1020.13(d)(1)(2) 17/
Retaining Walls	1020.13(a)(1)(2)(3)(4)(5) 1/ 7/	7	1020.13(d)(1)(2)
Pump Houses	1020.13(a)(1)(2)(3)(4)(5) 1/	7	1020.13(d)(1)(2)
Culverts	1020.13(a)(1)(2)(3)(4)(5) 4/ 6/	7	1020.13(d)(1)(2) 18/
Other Incidental Concrete	1020.13(a)(1)(2)(3)(5)	3	1020.13(c)
Precast Concrete			
Bridge Slabs	1020.13(a)(3)(5) 9/ 10/	As 13/	9/

Piles and Pile Caps Other Structural Members		Required	
All other Precast Items	1020.13(a)(3)(4)(5) [2/ 9/ 10/]	As Required [14/]	9/
Precast, Prestressed Concrete			
All Items	1020.13(a)(3)(5) [9/ 10/]	Until Strand Tensioning Is Released [15/]	9/

Notes – General:

1/ Type I, membrane curing only

2/ Type II, membrane curing only

3/ Type III, membrane curing only

4/ Type I, II and III membrane curing

5/ Membrane Curing will not be permitted between November 1 and April 15.

6/ The use of water to inundate foundations and footings, seal coats or the bottom slab of culverts is permissible when approved by the Engineer, provided the water temperature can be maintained at 45° F (7° C) or higher.

7/ Asphalt emulsion for waterproofing may be used in lieu of other curing methods when specified and permitted according to Article 503.18.

8/ On non-traffic surfaces which receive protective coat according to Article 503.19, a linseed oil emulsion curing compound may be used as a substitute for protective coat and other curing methods. The linseed oil emulsion curing compound will be permitted between April 16 and October 31 of the same year, provided it is applied with a mechanical sprayer according to Article 1101.09(b).

9/ Steam, supplemental heat, or insulated blankets (with or without steam/supplemental heat) are acceptable and shall be according to the Bureau of Materials and Physical Research's Policy Memorandum "Quality Control/Quality Assurance Program for Precast Concrete Products" and the "Manual for Fabrication of Precast, Prestressed Concrete Products".

10/ A moist room according to AASHTO M 201 is acceptable for curing.

11/ If curing is required and interrupted because of form removal for cast-in-place concrete items, recast concrete products, or precast prestressed concrete products, the curing shall be resumed within two hours from the start of the form removal.

12/ Curing maintained only until opening strength is attained, with a maximum curing period of three days.

13/ The curing period shall end when the concrete has attained the mix design strength. The producer has the option to discontinue curing when the concrete has attained 80 percent of the mix design strength or after seven days. All strength test specimens shall remain with the units and shall be subjected to the same curing method and environmental condition as the units, until the time of testing.

14/ The producer shall determine the curing period or may elect to not cure the product. All strength test specimens shall remain with the units and shall be subjected to the same curing method and environmental condition as the units, until the time of testing.

15/ The producer has the option to continue curing after strand release.

16/ When structural steel or structural concrete is in place able slope wall, Article 1020.13(c) shall not apply. The protection method shall be according to Article 1020.13(d)(1).

17/ When Article 1020.13(d)(2) is used to protect the deck, the housing may enclose only the bottom and sides. The top surface shall be protected according to Article 1020.13(d)(1).

18/ For culverts having a waterway opening of 10 sq ft (1 sq m) or less, the culverts may be protected according to Article 1020.13(d)(3).

(a)**Methods of Curing.** Except as provided for in the Index Table of Curing and Protection of Concrete Construction, curing shall be accomplished by one of the following described methods. When water is required to wet the surface, it shall be applied as a fine spray so that it will not mar or pond on the surface. Except where otherwise specified, the curing period shall be at least 72 hours.

(1) **Waterproof Paper Method**. The surface of the concrete shall be covered with waterproof paper as soon as the concrete has hardened sufficiently to prevent marring the surface. The surface of the concrete shall be wetted immediately before the paper is placed. The blankets shall be lapped at least 12 in. (300 mm) end to end, and these laps shall be securely weighted with a windrow of earth, or other approved method, to form a

closed joint. The same requirements shall apply to the longitudinal laps where separate strips are used for curing edges, except the lap shall be at least 9 in. 225 mm). The edges of the blanket shall be weighted securely with a continuous windrow of earth or any other means satisfactory to the Engineer to provide an airtight cover. Any torn places or holes in the paper shall be repaired immediately by patches cemented over the openings, using a bituminous cement having a melting point of not less than 180° F (82° C) The blankets may be reused, provided they are airtight and kept serviceable by proper repairs.

A longitudinal pleat shall be provided in the blanket to permit shrinkage where the width of the blanket is sufficient to cover the entire surface. The pleat will not be required where separate strips are used for the edges. Joints in the blanket shall be sewed or cemented together in such a manner that they will not separate during use.

(2) **Polyethylene Sheeting Method.** The surface of the concrete shall be covered with white polyethylene sheeting as soon as the concrete has hardened sufficiently to prevent marring the surface. The surface of the concrete shall be wetted immediately before the sheeting is placed. The edges of the sheeting shall be weighted securely with a continuous windrow of earth or any other means satisfactory to the Engineer to provide an airtight cover. Adjoining sheets shall overlap not less than 12 in. (300 mm) and the laps shall be securely weighted with earth, or any other means satisfactory to the Engineer, to provide an airtight cover, For Portland cement concrete surface and base course, the polyethylene sheets shall be not less than 100ft. (30 m) in length nor longer than can be conveniently handled, and shall be of such width that, when in place, they will cover the full width of the surface, including the edges, except that separate strips may be used to cover the edges. Any tears or holes in the sheeting shall be repaired. When sheets are no longer serviceable as a single unit, the Contractor may select from such sheets and reuse those which will serve for further applications, provided two sheets are used as a single unit; however, the double sheet units may be rejected when the Engineer deems that they no longer provide an airtight cover.

(3) **Wetted Burlap Method.** The surface of the concrete shall be covered with wetted burlap blankets as soon as the concrete has hardened sufficiently to prevent marring the surface. The blankets shall overlap 6 in. (150 mm). At least two layers of wetted burlap shall be placed on the finished surface. The

burlap shall be kept saturated by means of a mechanically operated sprinkling system. In place of the sprinkling system, at the Contractor's option two layers of burlap covered with impermeable covering shall be used. The burlap shall be kept saturated with water. Plastic coated burlap may be substituted for one layer of burlap and impermeable covering.

The blankets shall be placed so that they are in contact with the edges of the concrete, and that portion of the material in contact with the edges shall be kept saturated with water.

(4) Membrane Curing Method. Membrane curing will not be permitted where a protective coat, concrete sealer, or waterproofing is to be applied or at areas where rubbing or a normal finish is required, or at construction joints other than those necessary in pavement or base course. Concrete at these locations shall be cured by another method specified in Article 1020.13(a) at no additional cost to the department.

After the concrete has been finished and immediately after the water sheen has disappeared from the surface of the concrete, the surface shall be sealed with membrane curing compound of the type specified. The seal shall be maintained for the specified curing period. The edges of the concrete shall, likewise, be sealed immediately after the forms are removed. Two separate applications, applied at least one minute apart, each at the rate of not less than 1 gal/250 sq ft (0.16 L/sq m) will be required upon the surfaces and edges of the concrete. These applications shall be made with the mechanical equipment specified. Type III compound shall be agitated immediately before and during the application.

At locations where the coating is discontinuous or where pin holes show or where the coating is damaged due to any cause and on areas adjacent to sawed joints, immediately after sawing is completed, an additional coating of membrane curing compound shall be applied at the above specified rate. The equipment used may be of the same type as that used for coating variable widths of pavement. Before the additional coating is applied adjacent to sawed joints, the cut faces of the joint shall be protected by inserting a suitable flexible material in the joint, or placing an adhesive width of impermeable material over the joint, or by placing the permanent sealing compound in the joint. Material, other than the permanent sealing compound, used to protect cut faces of te joint, shall remain in place for the duration of the curing period. In lieu of applying the additional coating, the

area of the sawed joint may be cured according to any other method permitted.

When rain occurs before an application of membrane curing compound has dried, and the coating is damaged, the Engineering may require another application be made in the same manner and at the same rate as the original coat. The Engineer may order curing by another method specified, if unsatisfactory results are obtained with membrane curing compound.

(5) Wetted Cotton Mat Method. After the surface of concrete has been textured or finished, it shall be covered immediately with dry or damp cotton mats. The cotton mats shall be placed in a manner which will not mar the concrete surface. A texture resulting from the cotton mat material is acceptable. The cotton mats shall then be wetted immediately and thoroughly soaked with a gentle spray of water. For bridge decks, a foot bridge shall be used to place and wet the cotton mats.

The cotton mats shall be maintained in a wetted condition until the concrete has hardened sufficiently to place soaker hoses without marring the concrete surface. The soaker hoses shall be placed on top of the cotton mats at a maximum 4 ft (1.2 m) spacing. The cotton mats shall be kept wet with a continuous supply of water for the remainder of the curing period. Other continuous wetting systems may be used if approved by the Engineer.

After placement of the soaker hoses, the cotton mats shall be covered with white polyethylene sheeting or burlap-polyethylene blankets.

For construction items other than bridge decks, soaker hoses or a continuous wetting system will not be required if the alternative method keeps the cotton mats wet. Periodic wetting of the cotton mats is acceptable.

For areas inaccessible to the cotton mats on bridge decks, curing shall be according to Article 1020.12(a)(3).

(b) **Removing and Replacing Curing Covering.** When curing methods specified above in Article 1020.13 (a) (1), (2) or (3) are used for Portland cement concrete pavement, the curing covering for each day's paving shall be removed to permit testing of the pavement surface with a profilograph or straightedge, as directed by the Engineer.

Immediately after testing, the surface of the pavement shall be wetted thoroughly and the curing coverings replace. The top surface and the edges of the concrete shall not be left unprotected for a period of more than ½ hour.

(c) **Protection of Portland Cement/Concrete, Other Than Structures, From Low Temperatures.** When the official National Weather Service Center forecast for the construction area predicts a low of 32° F (0° C), or lower, or if the actual temperature drops to 32° F (0° C), or lower, concrete less than 72 hours old shall be provided at least the following protection:

Minimum Temperature	**Protection**
25° F -32° F (-4° C - 0° C)	Two Layers of polyethylene sheeting, one layer of polyethylene and one layer of burlap, or two layers of waterproof paper.
Below 25°F (-4° C)	6 in. (150 mm) of straw covered with one layer of polyethylene sheeting or waterproof paper.

These protective covers shall remain in place until the concrete is at least 96 hours old. When straw is required on pavement cured with membrane curing compound, the compound shall be covered with a layer of burlap, polyethylene sheeting or waterproof paper before the straw is applied.

After September 15, there shall be available to the work within four hours, sufficient clean, dry straw to cover at least two days production of the mixer. Additional straw shall be provided as needed to afford the protection required. Regardless of the precautions taken, the Contractor shall be responsible for protection of the concrete placed and any concrete damaged by cold temperatures shall be removed and replaced.

(d) **Protection of Portland Cement Concrete Structures from Low Temperatures.** When the official National Weather Service forecast for the construction area predicts a low below 45° F (7° C), or if the actual temperature drops below 45° F (7° C), concrete less than 72 hours old shall be provided protection. Concrete shall also be provided protection when placed during the winter period of December 1 through March 15. Concrete shall not be placed until the materials, facilities, and equipment for protection are approved by the Engineer.

When directed by the Engineer, the Contractor may be required to place concrete during the winter period. When winter construction is specified, the Contractor shall proceed with the construction, including excavation, pile driving, concrete, steel erection, and all appurtenant work required for the complete construction of the item, except at times when weather conditions make such operations impractical.

Regardless of the precautions taken, the Contractor shall be responsible for protection of the concrete placed and any concrete damaged by cold temperatures shall be removed and replaced.

(1) **Protection Method I.** The concrete shall be completely covered with insulating material such as fiberglass, rock wool, or other approved commercial insulating material having the minimum thermal resistance R, as defined in ASTM C 168, for the corresponding minimum dimension of the concrete unit being protected as shown in the following table:

Minimum Pour Dimension		Thermal Resistance R
in.	(mm)	
6 or less	(150 or less)	R=16
> 6 to 12	(> 150 to 300)	R=10
> 12 to 18	(> 300 to 450)	R=6
> 18	(> 450)	R=4

The insulating material manufacturer shall clearly mark the insulating material with the thermal resistance R Value.

The insulating material shall be completely enclosed on sides and edges with an approved waterproof liner and shall be maintained in a serviceable condition. Any tears in the liner shall be repaired in a manner approved by the Engineer. The Contractor shall provide means for checking the temperature of the surface of the concrete during the protection period.

On formed surfaces, the insulating material shall be attached to the outside of the forms with wood cleats or other suitable means to prevent any circulation of air under the insulation and shall be in place before the concrete is placed. The blanket insulation shall be applied tightly against the forms. The edges and ends shall be attached so as to exclude air and moisture. If blankets are provided with nailing flanges, the flanges shall be

attached to the studs with cleats. Where tie rods or reinforcement bars protrude, the areas adjacent to the rods or bars shall be adequately protected in a manner satisfactory to the Engineer. Where practicable, the insulation shall overlap any previously placed concrete by at least 1ft (300 mm). Insulation on the underside of floors on steel members shall cover the top flanges of supporting members. On horizontal surfaces, the insulating material shall be placed as soon as the concrete has set, so that the surface will not be marred and shall be covered with canvas or other waterproof covering. The insulating material shall remain in place for a period of seven days after the concrete is placed.

The Contractor may remove the forms providing the temperature is 35°F (2° C) and rising and the Contractor is able to wrap the particular section within two hours from the time of the start of the form removal. The insulation shall remain in place for the remainder of seven days curing period.

(2) **Protection Method II.** The concrete shall be enclosed in adequate housing and the air surrounding the concrete kept at a temperature of not less than 50°F (10°C) nor more than 80°F (27° C) for a period of seven days after the concrete is placed. The Contractor shall provide means for checking the temperature of the surface of the concrete or air temperature within the housing during the protection period. All exposed surfaces within the housing shall be cured according to the Index Table.

The Contractor shall provide adequate fire protection where heating is in progress and such protection shall be accessible at all times. The Contractor shall maintain labor to keep the heating equipment in continuous operation.

At the close of the heating period, the temperature shall be decreased to the approximate temperature of the outside air at a rate not to exceed 15°F (8°C) per 12 hour period, after which the housing may be removed. The surface of the concrete shall be permitted to dry during the cooling period.

(3) **Protection Method III.** As soon as the surface is sufficiently set to prevent marring, the concrete shall be covered with 12 in. (300 mm) of loose dry straw followed by a layer of impermeable covering. The edges of the covering shall be sealed to prevent circulation of air and prevent the cover from flapping or blowing. The protection shall remain in place until the concrete is seven days old. If construction operations require removal, the

protection removed shall be replaced immediately after completion or suspension of such operations.

APPENDIX C
CITY OF NAPERVILLE STANDARD DETAILS
(DECEMBER 2012)

PDF copies of the most current version of these and all of the City of Naperville's Standard Details are located under Section 500 of the City of Naperville Standard Specifications at: www.naperville.il.us/standspecdetails.aspx

Detail Number	Detail Name
590.05 (Pavement 5)	Typical Commercial Driveway Detail
590.06 (Pavement 6)	Typical Residential Driveway Detail
590.07 (Pavement 7)	Typical Right-In/Right-Out Access
590.14 (Pavement 14)	Downtown Streetscape Pavement Section
590.20 (Pavement 20)	B6.12 Barrier Curb and Gutter
590.21 (Pavement 21)	B6.12 Barrier Curb and Gutter at Curb Inlets
590.22 (Pavement 22)	M2.13 Mountable Curb and Gutter
590.23 (Pavement 23)	Type B Barrier Curb
590.24 (Pavement 24)	Curb Replacement
590.30 (Pavement 30)	Sidewalk
590.31	Sidewalk Construction

(Pavement 31)	
590.32 (Pavement 32)	Curb Ramps

The City of Naperville standard details are provided as a supplement to the IDOT standard details in Appendix B. The IDOT standard details should be followed for the installation of ADA features. In case of conflicting information between the City of Naperville and IDOT standard details, please contact the City of Naperville – TED Business Group at (630) 420-6100.

APPENDIX B
ILLINOIS DEPARTMENT OF TRANSPORTATION STANDARD DETAILS
(JANUARY 1, 2013)

Copies of the most current version of these and all of the Illinois Department of Transportation Standard Details are located at: www.dot.state.il.us/desenv/hwystds/HwyStndIndex.html

Detail Number	Detail Name
424001-07	Perpendicular Curb Ramps for Sidewalks
424006-01	Diagonal Curb Ramps for Sidewalks
424011-01	Corner Parallel Curb Ramps for Sidewalks
424016-01	Mid-Block Curb Ramps for Sidewalks
424021-01	Depressed Corner for Sidewalks
424026-01	Entrance/Alley Pedestrian Crossings
424031-01	Median Pedestrian Crossings
606001-05	Concrete Curb Type B and Combination Concrete Curb and Gutter
701801.05	Sidewalk Corner or Crosswalk Closure

For the installation of ADA features, it is important that the information in these standard details is followed during construction. The City standard details provided in Appendix C provide supplemental information. In case of conflicting information between the City of Naperville and IDOT standard details, please contact the City of Naperville – TED Business Group at (630) 420-6100.