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A Century of Progress with Pride

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2011 National Electrical Code Amendments

I. National Electric Code:

1. Code Adopted: The national electric code, 2011 edition, as published by the National Fire Protection Association, Inc., is adopted as the electric code of the City of Berwyn in the state of Illinois, for the control of properties, buildings and structures electric systems as herein provided; and each and all of the regulations, provisions, penalties, conditions and terms of the national electric code, 2011 edition, are referred to, adopted and made a part hereof, as if fully set out in this subsection, with the additions, insertions, deletions and changes as follows:

A certain document, one copy of which is on file in the office of the village clerk of the City of Berwyn, being marked and designated as the NFPA 70 national electrical code, 2011 edition, as published by the National Fire Protection Association be and is hereby adopted as and shall be known as the electrical code of the City of Berwyn, governing installations of electric conductors and equipment within or on public or private building or other structures, including mobile homes, recreational vehicles, and floating buildings; and other premises such as yards, carnival, parking, and other lots and industrial substations; and each and all of the regulations, provisions, penalties, conditions and terms of the NFPA 70 national electrical code, 2011 edition, are hereby referred to, adopted, and made a part hereof, as if fully set out in this chapter, with the additions, insertions, deletions and changes prescribed in this chapter. It shall be mandatory that all equipment, material, devices, and appliances covered by the provisions of this code shall be tested and listed by a standard testing laboratory, of nationally accepted stature, which performs services equal to, or greater than, in those performed by the Underwriters Laboratories, Inc. In those instances where it is impossible to receive such a listing or label, the department of code administration shall make the determination of acceptability.

a. Definitions: As used in this subsection:

CODE OFFICIAL: The director of public health and safety or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative.

ELECTRICAL CONTRACTOR: Any person, firm, or corporation engaged in the business of installing or altering by contract, electrical equipment for the utilization of electricity supplied for light, heat, or power, not including apparatus, conductors, or other equipment installed for, or by, public utilities, including common carriers which are under the jurisdiction of the Illinois commerce commission for use in their operation as public utilities; but the term "electrical contractor" does not include employees employed by any person, firm, or corporation to supervise such work.

ELECTRICAL EQUIPMENT: Conductors and equipment installed for the utilization of the electricity supplied for light, heat, or power, but does not include radio apparatus or equipment for wireless reception of sounds and signals, and does not include apparatus, conductors and other equipment installed for, or by, public utilities, including common carriers, which are under the jurisdiction of the Illinois commerce commission for use in their operation as public utilities.

OWNER-OCCUPANT: Any person who is the owner and occupant of a single-family detached residence, not being used for any rental purposes, where specific electrical work is to be done.

b. Department Of Code Administration: The department of public health and safety is responsible for enforcing the rules and regulations relating to the installation and alteration and use of all electrical equipment, as herein provided.

c. Permits Required:

(1) Any person, firm or corporation installing or altering electrical equipment shall apply to the department of code administration for an electrical permit. Electrical plans and specifications for proposed installation or alteration of multiple-family dwellings, commercial or industrial, must be submitted to the department of public health and safety for approval and shall be sealed by a registered architect or professional engineer. The approved plans shall be available on the job site at all times.

(2) Permits for work performed under this code may be issued only to registered electrical contractors or to the owner-occupant of single-family detached residences doing their own work, except that all service installations and upgrades shall be done by registered electrical contractors. Electrical contractors shall furnish bona fide proof of their current electrical contractor's registration. Owners shall satisfy the prequalification provisions of the city prior to being granted a permit.

(3) Work on rental property by other than registered and bonded contractors is not permitted.

(4) Contractors should apply for and secure permits rather than require the owner to do it.

(5) Homeowners that are issued a permit and that enlist the services of a contractor for help or assistance are required to use a registered and bonded contractor.

(6) Permits for service upgrades or new services will only be issued to registered electric contractors.

(7) Work shall be defined as the installation of new conduit, tube, pipe, wiring system, replacement of wire within existing pipe, conduit or tubes, installation of new wire or the replacement or enlargement of the service. It shall not include the replacement of a switch, receptacle or fixture.

d. Inspections Required:

(1) **Electrical Work Inspected:** Electrical work shall be inspected prior to being concealed or covered and upon completion. Failure to receive an approved required inspection shall result in the uncovering or opening up for inspection at the direction of the code official. All safety and code compliance of work performed shall be the continuing responsibility of the permit applicant. A final inspection approval is required by the City of Berwyn. The permit shall be responsible for ensuring that a final inspection is completed by the City of Berwyn appropriate inspector immediately upon completion of the permitted project. A permit which does not show any inspection to confirm continuing work for over a six (6) month period, shall be considered expired. A renewal fee may be paid to extend the permit prior to its expiration.

(2) **Service Installation Inspection:** When a temporary or permanent service is installed, the applicant shall request an inspection. The code official shall then notify the local utility upon approval of the work.

(3) **Notice Of Approval:** The department of public health and safety shall be notified eight (8) regular working hours in advance for service, underslab, rough and final inspection. When the work has been approved, a notice of approval will be posted on or in the building.

(4) Required Electric Inspections: The following inspections are required and this text is to be used as a guide. There are potentially more inspections to be performed however they are too numerous to list, so be sure to consult with the electric inspector and/or code official prior to assuming or acting in such a manner as to conceal any work without approvals being provided.

Underground: Open trench - prepour - before backfill and/or concrete is poured. All conduits installed and properly supported.

A safe and hazard free means of access shall be provided to perform the electric underground inspections. A dry means shall be provided for foot traffic to perform the electric underground inspections.

Service: Complete. Meter trim, main panel, service entrance conductors, grounding conductors, bonding conductors, bonding bushings, ground rod, ground identification tags, conduit(s), conduit supports.

If the water meter is not installed at the time of service inspection, conduit shall be installed for water ground and cable shall be installed in said conduit coiled up ready for installation when the water meter is installed.

A safe and hazard free means of access shall be provided to perform the electric service inspection. Basements shall be free of standing water and mud. If this is not possible, a dry means shall be provided for foot traffic to perform the electric inspection.

Ceiling: Before ceiling tile or other ceiling finishes are applied (industrial and commercial).

Rough-In: A rough-in inspection is required after the roof, framing, fire blocking and bracing are in place and all components to be concealed are complete. All wires must be installed at time of rough inspection. The electrical contractor or an electrician employed by the electrical contractor must be present for all electrical inspections.

All conduit(s) shall be installed including the required conduit(s) for low voltage installations.

Final: All electric work complete and all devices connected, installed and functional.

All appliances are to be installed and functional.

Panels shall be labeled legibly and directory shall be affixed to the panel cover.

e. Reinspection Fees: Reinspection fees will be charged for any inspection that is not ready at seven o'clock (7:00) A.M. for A.M. inspections and twelve o'clock (12:00) noon for P.M. inspections.

f. Adoption Of Local Utility Company Information And Requirements For The Supply Of Electric Service:

(1) Installations, Alterations And Use Of Equipment: The provisions of the rules and regulations regarding the installations, alterations, and use of electrical equipment as last adopted by the electrical supply company now supplying the village are hereby made a part of this subsection. A copy of such rules and regulations shall be on file in the department of code administration.

(2) Adoption Of Metering Sequences And Location Of Metering Equipment: The provisions of the rules and regulations regarding the installation, alteration, and use of metering equipment as last adopted by the local utility company now supplying the city and identified as operating instruction are, hereby, made a part of this subsection; a copy of such rules and regulations being now on file in the office of the department of public health and safety.

g. Service Capacity And Equipment; All Occupancies:

(1) Minimum Service Capacity: The minimum service capacity for each single dwelling unit shall be a one hundred (100) amp service with a minimum twenty (20) branch circuit panel. Four (4) spaces for branch circuits shall be

provided for future use. Split bus and tandem breakers are prohibited. Panel schedules and load calculations shall be required for each installation.

(2) Means Of Disconnection: Where the disconnecting means is installed within a building it shall be located within five feet (5') of the point where such conduit enters the building. All commercial services require outdoor disconnects.

(3) Service Entrance Conductors: Service entrance conductors shall be continuous (without splice), from service head to meter fitting and service disconnecting means. Duplex service entrance conductors shall have a minimum ampacity of two hundred amps when a riser is used in an overhead installation. All single-family and duplex dwellings requiring separate riser installation shall have a minimum service capacity of three (3) #3 copper conductors.

(4) Service Risers: Service risers shall be steel rigid metal conduit from service head to disconnecting means. Electrical metallic tubing may be used for temporary services. Service risers shall be a minimum of one and one-fourth inches (1¹/₄") in size and a minimum of two and one-half inches (2¹/₂") in size when used as a support for the service drop. Roof plates shall not be used as a service drop support.

(5) Panels: Panels shall be installed in each occupancy in newly constructed buildings. Each service main breaker must be marked so it is easily identified as to which unit is being served, twenty (20) circuits minimum. Uni-strut must be installed as a vapor barrier behind each panel.

(6) Fittings: There shall be no junction or outlet boxes in a service run. Weathertight fittings shall be used in service runs from service head to meter cabinets. Revision of services shall conform to new service requirements.

h. Grounding:

(1) Services shall be grounded to a metallic cold water pipe and to a supplementary electrode, as provided by the national electrical code. Where this supplementary electrode is a ground rod, the rod shall be minimum five-eighths inch by eight feet (5/8" x 8') one piece copper clad.

(2) Grounding to building fire sprinkler systems is prohibited.

(3) The grounding electrode conductor shall be an insulated copper conductor. This conductor shall be routed to avoid physical damage to the conductor, and connected to street side of water meter. No projections of the ground rod shall be left above to present a hazard. Connection to the ground rod shall be made using a listed direct burial "acorn" type connector (revised pipe clamp connectors should not be used on ground rods).

(4) A bonding conductor shall be installed around the water meter and shutoff valves on all services.

(5) An equipment bonding jumper shall be used to connect the grounding terminal of a grounding type receptacle to a grounded box (NEC 250 .146, deleting exceptions A through D).

(6) Electrical continuity at service equipment where concentric or eccentric knockouts are used shall be assured by the use of bonding type (grounding) buildings.

(7) All raceways in other than residential occupancies shall contain an insulated grounding conductor sized in accordance with the national electrical code and bonded to all metallic boxes, wiring devices, motors, utilization equipment, and all devices requiring grounding.

(8) Spas, hot tubs, hydromassage bathtub pumps and equipment shall be bonded to the nearest continuous metallic cold water pipe. Their dedicated circuits shall be GFCI.

i. Wiring Methods:

(1) The following wiring methods shall be prohibited. Delete the following articles:

Article 320 armored cable.

Article 322 flat cable assemblies: type FC.

Article 324 flat conductor cable: type FCC.

Article 326 integrated gas spacer cable: type IGS.

Article 328 medium voltage cable: type MV.

Article 330 metal clad cable: type MC.

Article 332 mineral insulated, metal sheathed cable: type MI.

Article 334 nonmetallic sheathed cable: types NM, NMC and NMS.

Article 336 power and control tray cable: type TC.

Article 338 service entrance cable: type SE and USE.

Article 340 underground feeder and branch circuit cable: type UF.

Article 352 rigid nonmetallic conduit: type RNC.

Article 353 high density polyethylene conduit: type HDPE.

Article 354 nonmetallic underground conduit with conductors: type NUCC.

Article 355 reinforced thermosetting resin conduit: type RTRC

Article 356 liquidtight flexible nonmetallic conduit: type LNFC.

Article 360 flexible metallic tubing: type FMT.

Article 362 electrical nonmetallic tubing: type ENT.

Article 370 cablebus.

Article 378 nonmetallic wireways.

Article 382 nonmetallic extensions.

Article 388 surface nonmetallic raceways.

Article 394 concealed knob and tube wiring.

Article 396 messenger supported wiring.

Article 398 open wiring on insulators.

Article 604 manufactured wiring systems.

Chapter 9 table 5A.

Open wiring on insulators.

Delete the use of aluminum wiring throughout the code.

(2) When electric services are upgraded in existing residential occupancies, all new wiring in exposed areas shall be installed in conduit. Existing flexible wiring methods concealed in walls may be exposed for a maximum of eighteen inches (18") in exposed areas in order to connect to the new wiring system. Existing electrical systems which are of inadequate capacity shall be replaced with a new system or shall be supplemented with new wiring and equipment, as necessary, to meet the requirements of these guidelines.

j. Outlet Boxes:

(1) An outlet box shall be installed for all types of outlets. All outlet boxes shall be metal and they shall provide at least the minimum free space for the maximum number of wires indicated in the national electrical code. Boxes shall not be less than one and one-half inches (1½") in depth unless it would be impossible, owing to the construction of the building. Boxes shall be fitted with covers and/or plates to form a complete enclosure. Unused and open knockouts shall be securely closed.

(2) All boxes shall be fully accessible in a manner to permit inspection or modification of wiring contained therein without removing any portion of the structure of finished surfaces.

(3) All outlet boxes shall be independently and solidly supported from the structure. Raceways entering boxes shall not be construed as proper support, nor shall the box be the support for the raceway.

(4) A four inch (4") square box shall be used with suitable flush cover as outlet demands. Should it be impossible, owing to construction of the building, a single gem box with the depth not less than one and one-half inches (1½") may be used, provided not more than one raceway enters. Ganging of gem boxes is prohibited in new construction.

(5) A four inch (4") octagon box, minimum depth one and one-half inches (1½"), may be used in unfinished basements or garages for lights, commercial or industrial lighting, when using a four inch (4") porcelain light receptacle or swivel type cover with rigid conduit stem to the light bulb socket, provided that not more than two (2) knockouts are used. A factory made assembly consisting of an octagon box may be used for paddle fans where specifically designed for that purpose.

k. Fixtures And Outlets Required; Residential Occupancies:

(1) The minimum number of outlets for connection of permanent lighting fixtures and convenience receptacles in residential buildings shall be as follows: a light shall be installed directly over every kitchen sink, bathroom lavatory, and utility sink in addition to the general lights in the room. Stairways, halls, passageways, corridors, garages, patios, basements, and rooms accessible by more than entry or exit shall have a ceiling light or outlet controlled by three-way or four-way switches, one lighting outlet for each three hundred (300) square feet, or fraction thereof, in basements or cellars.

(2) All outlet receptacles shall be three (3) pole ground type and shall be installed so that no point along the floor line in any wall space is more than six feet (6'), measured horizontally, from an outlet in that space including any wall space two feet (2') wide or greater, and the wall space occupied by fixed panels in exterior walls. The receptacle outlets shall, insofar as practicable, be spaced equal distances apart. Floor receptacles may be

installed in each hallway, foyer, or stair landing. Outside receptacles shall be watertight (GFCI protected and the proper cover over the cord connection) and approved receptacle to meet load requirement.

(3) Not less than one fixture or wall receptacle in each room shall be controlled by a wall switch adjacent to entry doors.

(4) An outside light fixture controlled by an interior switch or by photocell shall be installed at each entrance and porch.

(5) Garages, attached or detached, shall have switch controlled interior lighting. At least one easily accessible GFCI receptacle shall be provided in each garage.

(6) Each clothes closet or storage area of six (6) square feet, or larger, shall have a ceiling light. Walk-in closets shall have a light controlled by a wall switch.

(7) All new construction shall have at least one general lighting circuit for each five hundred (500) square feet of area, or fraction thereof.

(8) Smoke detectors shall be installed in each sleeping room, outside of each separate sleeping area in the immediate vicinity of the bedrooms and on each additional story of the dwelling, including basements and cellars but not including crawl spaces and uninhabitable attics.

(9) Carbon monoxide detectors shall be installed within 15' of the bedrooms and one on each level.

I. Conductors:

(1) The use of aluminum conductors is prohibited.

Exception: This shall not apply to temporary exterior overhead and direct burial wiring on construction sites covered by a current electrical permit.

(2) All conductors shall be insulated and of a type approved for the purpose for which they are used.

Exception: Un-insulated conductors may be placed in the earth for purposes of forming a grounding grid.

(3) Conductors installed in raceways which are in concrete slabs or walls in direct contact with earth, fill, or are otherwise subject to excessive moisture, shall have not less than type THWN, MTW, and AWM insulation.

(4) Connections of conductors to terminal parts shall be mechanically and electrically secure without damaging the conductors and shall be made by means of pressure connectors (including set screw type), or splices to flexible leads either soldered, brazed, or welded, except that #8 AWG or smaller conductors may be connected by means of clamps or screws with terminal plates having upturned lugs. Terminals for more than one conductor shall be so listed.

(5) Conductors shall be so spliced or joined as to be mechanically and electrically secure. Joints must be soldered with a fusible metal or alloy, brazed, or welded, unless an approved splicing device is used. Insulation piercing type splicing devices shall be prohibited. All splices and joints and the free ends of conductors shall be covered with an insulation equal to that on the conductors. If the power supply wires to individual fixtures are cut, then each separate free conductor (pigtail), a minimum length of six inches (6") each, shall be provided and such splices shall conform to this section.

m. Overcurrent Protection:

(1) Except as may be specifically approved by the electrical inspector, each occupancy shall be provided with fuse or circuit breaker type branch circuit overcurrent devices for the number of circuits as required to serve the minimum loads stated herein, except that for single-family dwellings, the minimum shall not be less than one circuit for every three hundred fifty (350) square feet, or fraction thereof, of floor areas. The floor area shall be computed from the outside dimensions of the building or area involved, including one-half ($\frac{1}{2}$) the area of basement, enclosed porches, garages, and breezeways.

(2) Disconnects shall be installed within sight for all fractional horsepower motors, paddle fans, and water heating equipment. In commercial occupancies, disconnects shall be installed for all water equipment.

(3) On new installations for buildings with new existing four hundred (400) amp or larger services, the permit applicant shall include load and fault current calculations to show methods utilized which will ensure that the available fault current will not exceed the ratings of all devices and equipment.

n. Underground Service:

(1) All detached structures requiring electrical service shall be served by underground conductors installed in an approved manner and shall be protected against physical damage with a minimum one half inch ($\frac{1}{2}$ ") rigid metal conduit buried a minimum of 12" deep.

All existing residential garages must contain a minimum of one 15-amp circuit, with two lamp holders, one wall switch, one ceiling simplex receptacle located for use of each electric door operator per door opening, one weatherproof GFCI exterior outlet, one switched exterior light by service entrance door and one GFCI receptacle inside the garage. All detached garages and/or outbuildings shall be supplied by an underground feeder only, rigid conduit using minimum three (3) no. 12 conductors, one of the three (3) shall be a green conductor. The ground conductor shall be case grounded to the metal junction box at each end, to ensure that the electric system of the garage or outbuilding is sufficiently grounded.

o. Raceways Or Conduit:

(1) Approved Raceways: All interior installations or alterations shall be approved metal raceways. All raceways exposed to the weather shall be rigid steel metal conduit with approved boxes and fittings. Rigid aluminum conduit can only be used by special written permission from the code official.

(2) Raceways In Concrete: Rigid steel metal conduit, and floor duct is the only acceptable raceway types for use in concrete slabs if the slab is in any manner resting on, or contacting, the earth. Any permanently exposed risers emerging from the concrete base or slab shall be rigid steel metal conduit.

(3) Underground Raceways: Rigid steel metal conduit is the only acceptable raceways types for use underground.

(4) Raceway Fittings: All raceway fittings, locknuts, bushings, couplings, or connectors shall provide secure mechanical and electrical joints.

(5) Bushings: Where a raceway enters a box or other fitting, an insulating bushing shall be used to protect the wires from abrasion unless the design of the box or fitting is such as to afford equivalent protection.

(6) Classified Areas: Intermediate metal conduit shall not be allowed in hazardous classified areas.

(7) Temporary Services: Electrical metallic tubing shall be allowed for temporary services.

(8) Fasteners: All raceways shall be securely fastened by means of an approved electrical fastener to the building structure at least every ten feet (10') and within three feet (3') of every box.

p. Electric Signs: All wiring for permanent freestanding electrical signs and billboards shall be installed underground with a means of disconnect.

q. Conflicts With Other Provisions: When the provisions of this subsection conflict with any other provision of the city of Berwyn code regulating the same subject matter, the more stringent or restrictive provision shall apply.

2. Amendments:

a. Requirements Service Upgrade Or Revision a/o Panel Upgrade Or Revision: All existing Greenfield, BX, Romex, knob & tube and the like entering the new panel(s) shall be removed and replaced with properly sized, approved wire and installed in an approved conduit system.

(1) Removal and replacement of the above materials shall be taken back to a point where an approved spliced connection can be made without the removal of finished walls or ceilings.

(2) All current service bonding and grounding codes shall apply to service and/or panel upgrades or revisions.

b. All panels for installations other than residential shall be bolt on breakers and absolutely no aluminum or clad materials shall be utilized. All bus bars and the like shall be copper. All panel boards or distribution centers shall have a main breaker in each panel as well as any other required disconnecting means. In all cases, panel boards, whether primary or secondary, shall have an internal main breaker sized accordingly.

All panel board installations that are installed below grade to a concrete or masonry wall shall be fastened to uni-strut.

c. Notching:

(1) Floor joists, ceiling joist, roof truss, shall not be notched for any electrical installation of materials, equipment or "devices".

(2) Floor joists and/or ceiling joists may be drilled for the purpose of inserting a conduit system, however, it shall be noted that a minimum of two inches (2") of wood shall be remaining on the bottom of said floor joists and/or ceiling joists when the conduit system installation is complete. Any drilling shall be done in complete compliance with the specifications, plans and direction of the manufacturers' design engineer and such documentation shall be provided to the code official as necessary. If, during any inspection review, any floor joists and/or ceiling joists are found to be less than two inches (2") of wood remaining on the bottom of said construction materials, it shall be the responsibility of the electrical contractor, or person(s) for which an electrical permit has been issued, to replace any floor joists and/or ceiling joists to the original construction standards as set forth by the building codes as adopted by the City of Berwyn.

d. Requirements For Exit Lights And Emergency Lights:

(1) All exit signs and/or fixtures shall be a combination type, one hundred twenty (120) volt and a totally self-contained battery operated unit. All new and replacement installations of exit signs devices shall be of LED type fixtures. All exit signs shall be internally illuminated units, which shall consist of an approved LED illumination device, which shall operate one hundred twenty (120) volts and shall be capable of being operated from the internal battery unit.

All exit signs, emergency egress lighting and the associated battery backup systems, are to be defined as components of emergency lighting systems.

All circuit breakers utilized for the emergency system shall either be in a separate sub panel or an isolated, bottom right location, of the service panel.

Lock out clamp on the breaker is mandatory.

Any wires that are associated with any current that supplies electric energy to any of the so defined emergency system shall be independently piped from the source of power to the termination point. No other wires can occupy that raceway or any of its components except by written permission of the building code official of the city.

(2) All exit signs and emergency lighting systems shall be battery operated, self contained units with a minimum of one and one-half ($1\frac{1}{2}$) hour operating period and shall be maintained at all times to provide this requirement.

(3) All wiring systems and/or circuiting installed for the purpose of the emergency system shall be installed in a separate conduit system and shall be completely independent and separate system and shall not intermingle with any other circuiting and/or wiring system that does not pertain to the said emergency system.

(4) There shall be a separated identified neutral conductor installed for each emergency lighting circuit and/or connected to any other electrical device other than the dedicated emergency lighting circuit.

(5) The minimum size of the branch circuit conductors for the entire emergency lighting system and to include the exit lighting system shall be #12 AWG gauge wires size minimum.

(6) Breakers shall be used as the branch circuit protection device(s) of the emergency lighting system.

(7) All branch circuit breakers or branch circuit fuse devices installed for the branch circuit wiring and/or circuiting of the emergency systems shall not exceed fifteen (15) amperes.

(8) All multi-family buildings two units and up required battery back-up emergency lighting in front and rear hallways.

110.8 Wiring Methods. The provisions of the 2011 version of the national electrical code (NFPA 70) for this section are adopted and are further amended by the adoption of the additional following language:

110.8 Wiring Methods.

(A) All branch circuit conductors shall be connected to receptacles, switches, by the means of a screw terminal(s) that are designed and/or manufactured with the said device.

The insertion and/or installation of any conductor into the screw-less terminals of any electrical device shall not be the accepted method of connection and/or installation of the conductor and will not be permitted.

(B) All branch circuit conductors shall be "made up" and/or spliced in such a manner as to provide a single conductor to be connected and/or installed to any electrical device screw terminal as the terminal(s) so designed and manufactured on receptacles, switches, fixtures, etc.

Note: In a typical wiring installation the branch circuit conductor and/or the grounded neutral conductor is required to be cut and/or have open ends at the device, the conductors shall be spliced in such a manner as to provide a "pigtail" to properly attach and/or install the branch circuit conductor and/or the grounded neutral conductor to the said device.

(C) The continuity of any branch circuit conductor including any identified grounded neutral conductor shall not depend upon device connections, such as lamp holders, receptacles, etc., where the removal of such devices would interrupt the continuity.

(D) No more than one (1) conductor shall be connected and/or installed to a single screw terminal on any

electrical device.

110.9 Interrupting Rating (Circuit Breakers). The provisions of the 2011 version of the national electrical code (NFPA 70) for this section are adopted and are further amended by the adoption of the additional following language.

110.9 Interrupting Rating (Circuit Breakers).

(A) All circuit breakers shall be fully sized in dimensions and for proper insertion into the panel board, as set forth by the switchboard and panel board manufacturer and as listed by a recognized laboratory. Substitution in a space designed or previously occupied by a lesser number shall not be approved; (this includes tandem or duplex circuit breakers.)

(B) The application and/or installation of connecting more than one (1) conductor to a circuit breaker terminal or a fuse holder terminal shall not be approved.

(C) In wiring installation where it is required to install parallel sets of conductors, each conductor shall be connected and/or attached to a lug or terminal so designed or sized as to accept not more than one (1) conductor.

(D) Commercial/Industrial: All branch circuit breakers including circuit breakers used for feeders and/or sub-feeders shall be of the bolt on type.

(E) Exception: Existing residential dwellings that may conduct and/or convert a portion of said dwelling for day care services, may be permitted to utilize the existing wiring system and related branch circuiting in said dwelling, provided that said systems is in full compliance with other sections of this code, including bringing all existing non-complying systems to current requirements.

210.8 Ground-Fault Circuit-Interrupter Protection For Personnel. The provisions of the 2011 version of the national electrical code (NFPA 70) for this section are adopted and are further amended by the adoption of the additional following language:

210.8 Ground Fault Circuit-Interrupter Protection For Personnel. GFCI protection for personnel - Note: All GFCI circuits shall be limited to being contained within the room or space of which they are required.

210.8(A)(1) shall further require that when a GFCI or any receptacle protected by a GFCI circuit is installed, it shall not be within 24" of a tub, shower or whirlpool fixture unless separated by walls.

210.8(A)(6) shall be further modified to require when there are three or more outlets/receptacles along any kitchen counter top, the outlets shall be wired in such a fashion as to provide a minimum of two separate circuits and such circuits shall be located at alternating locations along the counter top.

210.11(C) Dwelling Units. The provisions of the 2011 version of the national electrical code (NFPA 70) for this section are adopted and are further amended by the adoption of the additional following language:

210.11(C) Dwelling Units.

(1) Small-Appliance Branch Circuits

(4) Additional 20 amp appliance branch circuits shall be added to the dwelling unit kitchen. One for each of the following:

1. Refrigerator, 2. Microwave 3. Disposal and 4 Dishwasher. These circuits shall not be connected to any other power-consuming device.

Note: Where additional refrigeration equipment (such as freezers, wire coolers etc.) is installed, an additional dedicated twenty - (20) amp rated circuit shall be installed for each appliance.

All permanently installed automatic dishwashers shall be "hard" wired with the use of electrical metallic tubing and a minimum of three eighths ($\frac{3}{8}$ ") trade size flexible metal conduit, which said flexible conduit shall not exceed six feet (6') in length.

Each permanently installed automatic dishwasher shall have an approved disconnecting means for the purpose of disconnecting the ungrounded conductors. The disconnecting means shall be a minimum of twenty (20) ampere rated. There shall be a green ground wire installed in this wiring system.

The disconnecting means shall be installed on the wall of the building structure or on the wall within the circuit and in the immediate vicinity of the automatic dishwasher appliance as approved by the building code official and/or electrical inspector. Disconnecting means installed within the cabinet and the immediate vicinity of the automatic dishwasher shall be mounted on a vertical wall. Disconnecting means mounted horizontally (bottom of said cabinet) will not be accepted.

Disconnect switch for garbage disposal shall be no more than three (3) feet from centerline of disposal unit. A listed "button" type switch may be used on the backsplash if no wall space is available with the approval of the building official or electrical inspector.

Laundry equipment (such as electric dryers) and electric cooking appliances (such as stoves, ranges, cook tops) that require two hundred and twenty (220/240) volts for operations shall be installed on separate and dedicated branch circuits. Said dedicated circuit(s) shall not be connected to and/or serve any other electrical device, appliance, and/or equipment. Said circuit shall be independently piped from source to termination.

Note: The tapping of conductors and/or alteration or de-rating of any dedicated two hundred and twenty (220/240) volt circuit conductor for the purpose of supplying electricity to operate any one hundred and twenty (120) volt device shall not be permitted and will not be accepted.

An identified neutral conductor shall be installed with all branch circuit conductors that operate at one hundred and twenty (120) or two hundred and forty (240) volts between conductors and said neutral conductor shall be sized equal to the rating of said branch circuit conductors.

(3) Bathroom Branch Circuits.

In addition to the number of branch circuits required by other parts of this section, each and every residential bathroom shall have a separate 20-ampere circuit per bathroom to supply bathroom receptacle outlet(s). Such circuits shall have no other outlets.

General lighting for residential bathrooms shall be independent from GFCI protected circuits.

Exception: Lights approved for the purpose directly over spas, whirlpools, steam rooms, showers, bathtubs and the like are required and shall be permitted to be supplied by the GFCI protected receptacle outlet circuit from the load side.

210.12 Arc-Fault Circuit-Interrupter Protection.

Exception: all 120-volt, single phase, 15 and 20 amp branch circuits are only required for bedrooms only.

210.52(D) Bathrooms. Amend this section as follows:

210.52(D) Bathrooms And Powder Rooms.

- (1) In dwelling units, at least one wall receptacle outlet shall be installed in bathrooms and powder rooms adjacent to the basin location.
- (2) An approved exhaust fan shall be installed in each bathroom or other approved proper venting is required.
- (3) Switches to control the proper operation of the exhaust fan(s) and/or receptacles shall not be located and/or installed immediately adjacent to and/or directly over any sink and shall not be located and/or installed within two (2) feet of shower stalls, bath tubs, whirlpools, etc.

210.52(E) Dwelling Units. The provisions of the 2011 version of the national electrical code (NFPA 70) for this section are adopted and are further amended by the adoption of the additional following language:

210.52(E) Outdoor Outlets.

- (1) A minimum of one (1) outdoor weatherproofed GFCI receptacle shall be installed and suitably located at the exterior, front and in the rear of a single family dwelling, apartment unit and/or apartment complex, condominium, townhouse, multifamily structures, etc. In all screened/three season or other recreational rooms attached to any building there shall be GFCI protection for all outlets, interior or exterior.

Note: Weatherproofed GFCI receptacles installed on the front and rear of an apartment unit and/or apartment complex or condominium for general maintenance purposes may not be required to be switched.

- (2) A minimum of one (1) weatherproofed GFCI receptacle shall be installed and suitably located on the exterior of any directly connected porch, patio, balcony, sun room, screened porch or any similar type structure.

210.70(A)(2)(d) Add new section as follows:

210.70(A)(2)(c) Basement Illumination.

- (i) A minimum of one (1) switched lighting fixture shall be installed in the immediate area of the top and bottom stair tread of all staircases that lead to any basement areas.
- (ii) The switch devices that are required to control both upper and lower lighting fixtures shall be installed at readily accessible locations of the staircase.

Note: Said lighting fixtures as noted above may be relocated because of the stair case layout where it may be necessary to provide sufficient illumination on the general stair tread areas as deemed necessary by the building code official and/or the electrical inspector.

- (iii) Panel boards that are installed in basement areas shall have a minimum of one (1) lighting fixture installed within three feet (3') of the panel board cover. Such light shall not be placed upon the other circuits within the basement. It can be placed upon the circuit for the required outlet at the panel.

- (iv) A minimum of one (1) lighting fixture shall be installed within four feet (4') of the furnace and/or heating systems that are installed in basement areas.

- (v) A minimum of one (1) lighting fixture shall be installed over any laundry tub or laundry equipment that is located and/or installed in any basement area.

Note: In installations where the lighting fixture (as required above) are located in areas where the illumination is

obstructed by ducts, beams, etc., said lighting fixtures may require relocation and/or lighting fixtures may be required as per the electrical inspector approval.

(vi) In addition to the lighting fixtures as required there shall be additional lighting installed to provide a minimum of one (1) foot candle of illumination per square foot throughout the entire basement area.

(vii) The entire basement lighting scheme shall not be connected to one (1) individual circuit or phase. The lighting fixtures shall be evenly divided and/or separated as to be connected to more than one (1) individual circuit and on different phases.

210.70(D) Add new section as follows:

210.70(D) Outdoor Lighting Fixtures.

(1) A minimum of one (1) out of door weatherproofed lighting fixture shall be installed on the exterior of the structure at each of the front, rear and side entrances to any single family dwelling, condominium, apartment unit and/or complex, townhouse type structure and multifamily type structure. They shall be switched from within the main building structure of the dwelling complex, apartment unit or townhouse etc.

(2) A minimum of one (1) switched out of door weatherproofed lighting fixture shall be installed on the exterior of all structures such as patios, balconies, sun rooms and screened in porch for the purpose of providing illuminations in the immediate area of the entrance and/or exit to these areas.

(3) Switching devices that are required for these exterior lighting fixtures shall be in a readily accessible location, within the building not to exceed two (2) feet from the entrance and/or exit areas of the residential structure.

Note: Where the switching device(s) is installed in rooms and/or areas that may be subject to weather conditions it shall be installed in a weatherproofed enclosure. And - out of doors lighting fixtures that are installed in an apartment unit and/or apartment complex, condominium, or a multi-family type structure may not be required to be switched providing that said lighting fixtures are controlled by a photo cell or timing device and the circuit(s) originate from a public panel board.

210.70(E) Add new section as follows:

210.70(E) Commercial/Industrial Outlets.

(1) In all commercial and industrial buildings, a minimum of one switched lighting fixture shall be required for any office, ware-house area, sales area, etc.

Note: Where an office and/or warehouse area has more than one entrance and/or exit, three way switching shall be installed.

Exception: Switched lighting fixtures may not be required providing sufficient illumination is maintained from un-switched lighting fixtures that are served from dedicated night lighting circuits. Said lighting circuit shall have a lock out device installed on the circuit breaker.

(2) All switching devices installed in any commercial and/or industrial structure, shall be a minimum of twenty (20) ampere rated.

210.70(F) Add new section as follows:

210.70 (F) Special Use Rooms. In all utility rooms, furnace rooms, refrigeration equipment rooms, areas housing electrical equipment, fire pump rooms, emergency generators, mechanical system rooms, etc. the lighting circuit serving said rooms shall be on a separate circuit from all other circuits in said rooms.

210.70(G) Add new section as follows:

210.70(G) Sleeping Quarters. In all residential applications, any rooms that can be easily utilized as a sleeping room, whether temporary or permanent other than walk in closets of less than 70 square feet, as deemed by a code official shall comply with all applicable codes including smoke alarm protection.

210.70(H) Add new section as follows:

210.70(H) Central Vacuum Systems. Central vacuum systems electrical contact points providing power to vacuum attachments shall be 24 volts or less.

230.1(A) Add new section as follows

Figure 230.1(A) Services. The load on any service entrance conductor, main service disconnect switchgear and panel boards shall not exceed eighty (80) percent of the rating of the service entrance conductor or the main service disconnect means, switchgear or panel boards.

A 100 amp service shall have 3 #3 copper conductors installed in 1¹/₄ inch heavy wall with a #8 copper ground in 1¹/₂ inch EMT.

A 200 amp service shall have 3 #3-0 copper conductors installed in 2 inch heavy wall with a #4 copper ground in 3³/₄ inch EMT.

230.1(B) Add new section as follows:

Prior to any service work being performed, contact Commonwealth Edison or your electrical energy supplier for their rules and regulations.

230.1(c) Add new section as follows

(C) Multiple Services. No single family residential occupancy or property shall have more than one (1) service installed. No exceptions.

314.27(C)(1) Requirements for Paddle Fan Outlets & Supports. Add a new Subsection (C) (1) to read as follows:

(1)

In dwelling units when a ceiling outlet box is supplied in the center or near center of a ceiling footprint (where a paddle fan can be installed) outlet boxes suitable for supporting fans as required by 314.27(c) shall be installed in the following locations:

- a. sleeping rooms,
- b. family rooms,
- c. studies,
- d. dining rooms,
- e.

- great rooms,
- f. living rooms, foyers, and
- g. other similar rooms.

Registration: It shall be unlawful for any person to engage in the business of electrical contractor, without being registered as an electrical contractor, in the manner hereinafter set forth. The electrical contractor shall be required to register with the city clerk and post bond as required in subsection D of this section.

B. Application: Any person desiring to engage in the business of electrical contractor shall apply for registration to the city clerk. Upon filing such application, in the proper form, and the payment of the registration fee set out in subsection C of this section, the city clerk shall register the applicant as an electrical contractor. Providing said contractor's application has passed the electrical board, the village clerk shall issue to the applicant a certificate of registration which will authorize the applicant to engage in such business for the year it is issued.

C. Fee And Certificate Expiration: The fee for registration as an electrical contractor shall be one hundred dollars (\$150.00), per year paid in advance or upon filing the application. The certificate of registration for an annual permit issued thereunder, shall expire on December 31st of the year in which it is issued.

D. Bond: Every person desiring to engage in the business of making any electrical installation in the village, shall execute and file with the director of public health and safety a surety bond, payable to the City of Berwyn in the penal sum of ten thousand dollars (\$10,000.00), conditioned that the applicant shall well and faithfully observe all of the provisions of this code; and other ordinances, and regulations of the village relating to such electrical installations.

ADMINISTRATION AND ENFORCEMENT:

There is hereby established a division, within the building department, which shall be known as the electrical inspection division. Such division shall be the electrical inspection division of the City of Berwyn authorized by statute. Said division shall consist of the director of public health and safety and such other employees as may, from time to time, be appointed by the City of Berwyn council. Such electrical inspection division shall be charged with the duty of enforcing the provisions of this chapter; the rules and regulations thereof; and the standards and specifications for the installation, alteration and use of electrical equipment as herein provided, including the national electrical code adopted.

PERMITS AND INSPECTIONS:

A. Permit Required: No electrical equipment shall be installed, or altered except upon a permit first issued by the electrical inspection division. The electrical inspection division shall issue permits for such installation and alterations of electrical equipment in all cases where application for such permits shall be made in accordance with the rules and regulations applicable thereto; provided, however, that no permit shall be issued for installing or altering, by contract, electrical equipment unless the person applying for such permit is registered as an electrical contractor as required by this chapter.

B. Inspections:

1. The electrical inspection division shall inspect all electrical equipment installed or altered and shall require that it conform to the standards and specifications applicable thereto and adopted. Upon completion of such installation or alteration, in compliance with such standards and specifications, it shall immediately issue a certificate of inspection covering such installation or alteration.
2. The electrical inspection division is hereby empowered to re-inspect any electrical equipment. When such equipment is found to be unsafe to life or property, shall notify the person owning, using or operating same to place the same in a safe, secure condition in compliance with the standards and specifications described herein within such time as the electrical inspection division shall consider just and reasonable. Upon refusal, or willful failure to comply with the requirements of such notification (in addition to the penalties otherwise provided herein), the electrical inspection division may order and compel the cutting off and stopping of such current until such electrical equipment has been placed in a safe and secure condition, in compliance with the standards and specifications referred to herein. A inspection fee shall be charged for such re-inspection. In case it becomes necessary to replace such electrical equipment on account of defects disclosed by such re-inspection, a permit shall be obtained and an inspection fee paid
3. The electrical inspection division shall keep complete records of all permits issued and inspections made, and other official work performed under the provisions of this chapter.

C. Right Of Entry; Removal Of Obstructions: In the discharge of their duties, the electrical inspector and his assistants, shall have the power to enter buildings or premises at any reasonable hour. It shall be competent for them, when necessary, to remove any existing obstructions such as laths, plastering, boarding or partitions which may prevent a perfect inspection of the electrical equipment. It shall be unlawful for any person to interfere with the electrical inspectors in the performance of their duties. Whenever, in the opinion of the electrical inspector, it shall be necessary to call upon the police department for aid and assistance in carrying out or enforcing any of the provisions of this chapter governing the inspection of electrical equipment, he shall have the authority to do so. It shall be the duty of any member of the police department, when called upon by the electrical inspector, to act according to the instructions of and to perform such duties as may be required by the chief electrical inspector in order to enforce or put into effect the provisions of this chapter relating to the inspection of electrical equipment.

D. Exceptions To Inspections: Whenever any electrical equipment has been inspected or altered, no electrical current shall be supplied to or used on such equipment previous to the inspection of such equipment by the electrical inspection division, and the issuance of a certificate of inspection covering such installation or alteration. Provided that, the inspection division may issue a temporary certificate for the use of electrical current during the course of construction or alteration of buildings, which temporary certificate shall expire when the construction or alteration of such building is complete.

PROCEDURE UPON FINDING DEFECTS:

In case the electrical inspector or his assistants find a defect in any electrical apparatus or equipment subject to inspection in the City of Berwyn, such inspector shall report the same in writing to the persons for whom the test is being made, using blanks furnished by the city for that purpose, and giving a description of the character of the defect. If the defect is of a dangerous character necessitating immediate repair, the electrical inspector shall condemn the apparatus or equipment from further use or until the same is removed, repaired or renewed)

If the defect is of a character such that the apparatus or equipment may be safely operated for a period of some

days pending repairs, the electrical inspector shall so report, and name the number of days during which the same may be operated. A duplicate of all such reports shall be promptly filed in the office of the director of building department.

UTILITY POLES:

A. Erection: No poles for the carrying of electric or other wires or cables shall be erected in any street or alley without a permit obtained from the commissioner of public property. All such permits to erect poles in any street or alley hereafter issued, shall provide that the village may use the poles to be erected for the purpose of attaching thereto such necessary cross arms, wires or other electrical appliances deemed necessary by the city authorities, for fire and police signal service of the city.

B. Permit Fees: Before any permit shall issue for the setting or replacing of poles for the support or accommodation of electric conductors of any description whatever; or for the opening of any trench for underground construction, the applicant shall pay a permit fee as set out in section [8-2-3](#) of this title. Provided, nothing herein contained shall be construed as exacting a fee for replacing a pole broken by accident or storms or for shifting poles from one position to another under orders issued by the director of public works.

NOTICE OF WORK:

Any person installing electric wires or equipment in any building in the city, which is to be hidden from view, shall notify the building department director or assistant in writing, of such intended installation at least twenty four (24) hours before the work is to be covered; and no such work shall be covered until inspection thereof has been made as herein required. In all cases where such notice has not been given or such work has been covered without inspection thereof, as herein provided, the building director or assistant is authorized to take down or remove such portions of the building or structure as shall be necessary for the inspection of such electric wires or equipment as herein required. The cost of such taking down and replacing such work so removed by such official shall be borne by the person who has failed to give notice of the installation.

DEAD AND DEFECTIVE WIRES:

A. Dead Wires: The building director or electrical inspector shall have the right to cause all dead wires outside and inside of buildings to be removed at the expense of the owner of such wires, by giving the owner ten (10) days' written notice so to do. If the owner fails or neglects to remove such wires within ten (10) days after receipt of such notice, such person shall be subject to a fine as provided in the general penalty in section [1-3-1](#) of this code, for each and every forty eight (48) hours such wires are permitted to remain in place after expiration of the time fixed in such notice for the removal of same, as aforesaid.

B. Defective Wires: The building director or electrical inspector shall have the right to condemn wires which are defective and dangerous to life or property. He shall notify the owner of such wires, in writing, to remove or replace the same with new wires

NATIONAL ELECTRICAL CODE MODIFICATIONS AND ADDITIONS:

The following rules and regulations for the installation, alteration, repair and use of electrical equipment and

apparatus in the City of Berwyn are hereinafter set forth as modifications and additions to the provisions of the national electrical code, latest edition adopted in section this title and shall apply in lieu of any provisions to the contrary contained in the national electrical code:

A. General Provisions:

1. Wiring for all new construction and open wall remodeling shall be in conduit.
2. Electrically operated equipment such as heating equipment, built-in wall air conditioners, built-in kitchen appliances and laundry facilities shall be on separate circuits.
3. Installation of nonmetallic sheathed cable (Romex), armored cable (BX) or aluminum conductors is not allowed.
4. Armored cable (BX) entering circuit panels shall not be allowed.
5. No.12 circuit conductor minimum for all new and revised installations in commercial buildings.
6. Any subpanel installation shall meet the requirements of feeder size and its main circuit control, but must not overload the total supply system.
7. All residential garages must contain a minimum of one 15- amp circuit, two lamp holders, one wall switch, one ceiling simplex receptacle located for use of each electric door operator per door opening, one weatherproof GFCI exterior outlet, one switched exterior light by service entrance door and one GFCI receptacle inside the garage. All detached garages and/or outbuildings shall be supplied by an underground feeder only, rigid conduit using minimum three (3) no. 12 conductors, one of the three (3) shall be a green conductor. The ground conductor shall be case grounded to the metal junction box at each end, to ensure that the electric system of the garage or outbuilding is sufficiently grounded.
8. Any abandoned or unused wiring shall be removed.

B. All Services New And Revised:

1. Service grounding electrode must be connected to the supply side of the municipal water system and a water meter shunt shall be provided with an approved fitting. All connection surfaces of pipe shall be clean with appropriate tag attached. If this method cannot be achieved, consultation with the electrical inspector is required.
2. Aluminum conductors are not allowed in overhead services.
3. Single meter service requires minimum of no. 3 copper conductor for one hundred (100) amp service, and minimum of one and one-quarter inch (1¹/₄") rigid conduit, with twenty (20) circuit panel. A two hundred (200) amp service requires a minimum no. 3/0 conductor and minimum of two inch (2") rigid conduit, with panel of twenty (20) or more circuits.
4. All services for more than one meter requires minimum of no. 3 copper conductor from meter fittings to panels. Conductor size in riser to service head must be computed and approved.
5. Services, residential and new construction: Service shall be a minimum of one hundred (100) amps and minimum of one and one-quarter inch (1¹/₄") rigid conduit with no. 3 copper conductor, with twenty (20) circuit panel per unit.

6. Services, multi-family (2 to 4 units) - revision/remodeling: service riser shall be a minimum of 200 amps with 2" rigid conduit with three 3/0 copper conductors.
7. Services, multi-family (5 or more units) including commercial units - new construction and revision/remodeling: A Load for each unit shall be computed for size of service and number of circuits required, with allowance for future circuits and additional load.
8. Uni-strut must be installed as a vapor barrier behind each breaker panel. Uni-strut must installed as a vapor barrier behind each panel.

C. Requirements At Change Of Ownership:

1. All appliance circuits in existing buildings shall be upgraded, if necessary, to a minimum of twenty (20) ampere with a minimum of no. 12 gauge conductors, upon sale and change of ownership.
2. Exposed BX over six feet (18") in length shall be terminated in a junction box and then continued in conduit.
3. Knob-and-tube wiring (nongrounded system) shall be removed and upgraded to a grounded system.
4. Nongrounding ("2 prong") receptacles shall be replaced with standard grounded type ("3 prong").
5. Any installed equipment found to have reverse polarity shall be corrected.
6. Residential units with thirty (30) amp or sixty (60) amp service shall be revised and upgraded to minimum of one hundred (100) amps upon change of ownership.
7. In all commercial and/or combination residential-commercial units or any unit of any structure containing electrical power, any portion of a structure that is found to have an overload or unsafe wiring system, including service, shall be corrected upon change of ownership.
8. Any subpanel that does not meet the requirements of feeder size and its main circuit control must be eliminated.
9. Ground-fault receptacle protection shall be required in kitchens, bathrooms, unfinished basements, garages and outside of building, as provided by NEC 210.7 and 210.8.
10. Extension cords are not allowed as a permanent power source.
11. Emergency lighting shall be installed for residential units of 2 or more in the front and rear stair wells.

VIOLATION; PENALTY:  

Any persons owning, controlling or using any electrical apparatus or equipment subject to inspection under the provisions of this chapter for a longer period, pending repairs, than specified in the electrical inspector's report; or who shall use or attempt to use such apparatus or equipment after the same has been condemned by the electrical inspector or his assistant from further use, and before the same has been removed, fully repaired or renewed, and an order for a certificate of inspection obtained thereof, in the manner above prescribed; or who shall refuse the director of public health and safety or assistant admittance to the premises where such apparatus or equipment is located for the purpose of making such inspection or test; or shall needlessly hinder such inspection or test, and any person violating any of the provisions of this chapter, where no other penalty is prescribed, shall be deemed guilty of a misdemeanor and, on conviction thereof, shall be fined as provided in the general penalty in section [1-3-1](#) of this code for each offense.

