Electrical General Notes

Project Information:

1. Unless specifically noted otherwise, it shall be understood that when the words “Owner” or “Client” are used in these drawings they are interchangeable an all refer to Mamaroneck UFSD.
2. Unless specifically noted otherwise, it shall be understood that when the words “Architect”, “Engineer”, or “A/E” are used in these drawings they are interchangeable an all refer to LAN Associates, Engineering, Planning, Architecture Surveying (“LAN”).
3. Unless specifically noted otherwise, it shall be understood that when the word “Contractor” is used in the Electrical (E#.##) drawings and/or Electrical Specification sections it refers to the Electrical Contractor.
4. Where any device or part of equipment is referred to in these drawings in the singular number (e.g., "the switch", “the receptacle”), this reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.
5. Health, safety and critical operating equipment shall not be compromised without owner's authorization. Schedule shutdown during off hours and implement and maintain a temporary operational plan.

Code & Standards Compliance:

6. Code compliance is mandatory. Nothing in these Drawings and Specifications permits work not conforming to these codes. Where work is shown to exceed minimum code requirements, comply with drawings and specifications. When differences in utility specifications or standards, governmental ordinances or codes occur, the more stringent requirements shall govern the installation.
7. The electric installation shall be in accordance with the currently enforced edition of the National Electrical Code (NEC), National Electrical Safety Code (NESC), American Electricians' Handbook, International Building Code (IBC), Americans with Disabilities Act (ADA), NFPA 55 & 99 ASHRAE 90.1 and NEC Standard of installation. Wherever in the documents the word “code” is stated, the more stringent of the above referenced codes is implied.
8. All contractor supplied materials/equipment shall be new and UL Listed or approved by another Nationally Recognized Testing Laboratory (NRTL).
9. The contractor shall pay for and obtain all permits and inspections required by the building and safety codes and ordinances, and the rules and regulations of any legal body having jurisdiction. Permit and inspections shall be include in the base bid and shall not be cause for an extra.
10. Contractor shall confirm to all safety rules and other regulations, etc. pertaining to construction work on the client's premises. Contractor shall be responsible to ensure that all rules and regulations have been met and coordinate this work with responsible client's personnel.
11. All electrical equipment and raceways permanently attached to structures, including supporting structures and attachments to non-building structures, shall be anchored for seismic loading to resist a horizontal force action in any direction. Contractor shall provide seismic restraints for all conduits larger than 2½" trade diameter. Provide sway braces for conduit and equipment suspended from the overhead. Provide anchor bolts for floor and wall mounted equipment. The installation shall meet the requirements of International Building Code (IBC) as it applies to electrical equipment for Earthquake Loads.
12. Contractor shall review code compliance drawings and identify all penetrations through fire/smoke partitions, floor and roofs. Patch compromised partitions to match fire/smoke resistance rating as stated on code compliance drawings.

General Procedures:

13. All equipment shall be as indicated by the Engineer/Architect.
14. The cost incurred by the acceptance of substitutions shall be borne by the contractor. Proof for the equality of the substitutions shall be by the contractor and differences shall be enumerated with the submittal. Submission without the differences noted can be grounds for rejection without review.
15. Electrical components, including but not limited to, conductor size, overcurrent protection device and disconnect switches are based on the power requirements of the equipment shown on the contract documents. All costs (including additional design fees if required) associated with changes to these power requirements shall be the responsibility of the contractor making the change.
16. Obtain shop drawings and wiring diagrams for the proper installation of related electrical work.
17. The contractor shall remove and reinstall ceiling systems as required for the installation of new electrical work and replace in kind, any components damaged by personnel or equipment during performance of the work.
18. Electrical Contractor shall be responsible for the removal of debris generated by his work and workers at the end of each working day and for general good housekeeping by his workers. Electrical Contractor shall provide required refuse containers.
19. Unless otherwise indicated on the mechanical schedules/drawings, the electrical contractor shall provide and install all disconnect switches for all mechanical equipment (i.e., roof top HVAC units, exhaust fans, variable air volume devices, etc.)

Site Conditions/Drawing Coordination:

20. These drawings and specifications illustrate the work to be performed. The Engineer is not responsible for the means, methods, techniques, sequences, and procedures used to do the work, or the safety aspects of constructions, and nothing on these drawings expressed or implied changes this condition. Prior to bidding and/or starting work the contractor shall visit the project site to determine the conditions under which the work is to be performed and shall be responsible for knowing how they affect the work. Schedule site visit with client's representatives. Additionally, the contractor shall field verify all site dimensions and room layouts. Submission of a bid to perform this work is an acknowledgement of these responsibilities, and that they have been fully considered in planning of the work, and the bid price. No claims or extra charges due to these conditions will be forthcoming.
21. The client will occupy the site and existing building during the entire construction period. Cooperate with the client during construction operations to avoid any conflicts. Perform the work so as not to interfere with the client's operations. Schedule all power outages with client's approval for overtime on Sundays and Holidays at no additional cost to the client.
22. Existing project conditions indicated are based on field observations; existing design/construction documents and existing record documents and are intended to indicate the scope of the work affected by this project.
23. Drawings shall not be scaled. Drawings indicate the general arrangement of systems and requirements of the work. Although size and location of equipment is drawn to scale wherever possible, contractor shall make use of all data in all of the contract documents and verify information at the project site.
24. The electrical contractor shall make his own takeoff on all quantities. It shall be his responsibility, at his cost, to include all equipment and material in order to comply with the intent of the drawings.
25. The circuit numbers are for identification only. The contractor shall be responsible for correctly phasing the circuits in panels.
26. Existing Circuit Designations:
    a. All reference to existing circuit designations is based on previous project documentation. The contractor shall consult the engineer in the event that actual conditions do not coincide with the indicated re-distribution or other use of existing circuits as herein indicated.
    b. The total connected load for any general purpose (protected at 20A) branch circuit which is re-distributed as a part of this project shall not exceed 13A.
    c. Any deviation, as may be directed by the engineer, from the indicated circuit structure specified in this drawing set will require both verification by the contractor that the total connected load on the associated supply conductors is within the above specified limit and documentation in the project record (as-built) drawings.
27. The electrical installation shown is represented diagrammatically and indicates the general arrangement of systems and work. The locations and arrangements of equipment, devices, switchboards, panelboards, partitions, openings, etc. are designed to show preferred configurations to suit known conditions but are approximate and are subject to modifications caused by structural conditions and other existing or proposed equipment. The locations are subject to such modifications as may be found necessary or desirable at the time of installation in order to accommodate field conditions and coordination requirements. Contractor shall follow the intent of the drawings in “laying out” the work and coordinate the work with other trades to verify spacing conditions. Contractor shall determine roughing locations required to effect such coordination. The electrical contractor shall coordinate all work and shall make such changes without extra charge.
28. The contract drawings depict the approximate location of all required equipment and if shown, the diagrammatic arrangement of piping, raceways, conduits, feeders, cables, etc, herein after referred to as “conduit.” Conduit runs, if shown, have been depicted with the intention of most clearly indicating the proposed routing. Actual runs may differ if kept within the requirements and provisions of these specifications, and providing that that all modifications have been shown in the shop drawings. Contractor responsible to determine conduit runs and “clear” piping, ductwork, access doors, and other obstructions as applicable. Contractor shall coordinate conduit with work of other trades and alter where necessary to avoid interference. Submit for approval, prior to scaled installation drawings showing the location of all new equipment/devices to be installed and indicating circuitry. Shop drawings shall include all wiring, pull boxes, junction boxes, fittings, wiring devices and dimensioned clearances from the structure and equipment. Coordinate shop drawings with other trades prior to submission.
29. Before the relevant work proceeds, the Contractor shall prepare and submit five (5) copies of shop drawings depicting the proposed conduit routing diagram and equipment layout. Specifically detailed shall be a layout of the switchboard and related equipment in each electric room or electric closet. All equipment layouts shall be drawn to scale and dimensioned. Shop drawings shall be a minimum of 1/8” = 1'-0” and preferably 1/4”=1'-0”, dimensioned, showing construction, sizes, weights, arrangements, operating clearances, performance characteristics and the necessary coordinating trades involved. Shop drawings will not be accepted unless a complete list of deviations from architect's/engineer's proposed plans is included. Exact location of all equipment will be determined in the field and the contractor must secure exact dimensional data before the layout of any work.
30. Routing for feeders, instrumentation and control circuits is not shown on the plan drawings. If indicated on the floor plans, they express the intent of routing. Final location and routing shall be suited for the construction of the building and established by the contractor based on the installation conditions and shall be verified in the field. All feeder information, conduit types and installation requirements shall be in accordance with the specifications, electrical riser diagram and appropriate panel schedules.
31. Any cutting, patching, or finish repair work required for the electrical installation is the responsibility of the contractor.
32. Where mounting heights are not detailed or dimensioned, install electrical services and overhead equipment to provide maximum headroom possible. Connect equipment for ease of disconnecting with minimum interference with other installations.
33. Provide temporary power and lighting as required during the entire duration of demolition and construction utilizing the existing electrical system as a source. The Electrical Contractor shall remove all temporary power and lighting upon the completion of the project.
34. Unless otherwise noted, refer to architectural drawings for elevations and relative positions of equipment, wall, ceiling and floor information and minor architectural differences in each room.
35. Where conflicts exist, provide in the bid proposal the more costly alternative.

Work/Trade Coordination

36. Refer to all other trades' drawings for additional work requirements called out to be performed by the Electrical Contractor. The Electrical Contractor is responsible for all work items pertaining to electric (120V or low voltage), regardless of the drawing location.
37. Coordinate work with other trades to avoid conflict and to provide correct rough in and connection for equipment furnished under trades that require electrical connections. Inform Contractors of other trades of the required access to and clearances around electrical equipment to maintain serviceability and code compliance.
38. The electrical contractor shall verify the size and rating of all approved mechanical equipment prior to the installation of feeder and branch circuit conductors and overcurrent protection devices.
39. AC and Refrigeration Equipment Nameplate Rating: Short circuit and ground fault protection device rating shall not exceed the manufacturer's values marked on the equipment.
40. Sequence, coordinate and integrate installations of electrical materials and equipment for efficient flow of work. Give particular attention to large equipment requiring positioning prior to closing in the building. Coordinate the cutting and patching of building components to accommodated installation of the electrical equipment and materials.
41. Provide coordination drawings for all required access panel locations in gypsum ceiling to architect/engineer for coordination.
42. The Contractor shall coordinate work with the other trades to ensure the minimum safe working clearances around electrical equipment and to ensure access to equipment requiring calibration or maintenance (including motors, controls, instruments, panels, lights, valves, filters, and VAV boxes). Working space and access shall be sufficient for an adult to perform maintenance safely without straddling or removing obstructions and shall conform to NEC requirements (i.e., 110.26 & 110.34). Work that encroaches on working space or that impedes maintenance shall be relocated at the Contractor's expense.

Installation:

43. Grounding shall be installed in accordance with the NEC in accordance with electrode, grounding and bonding requirements for service, equipment and enclosures. Install an insulated equipment ground conductor in each raceway or conduit. Size equipment ground conductor in accordance with NEC Table 250.122. Bond raceways and the frames and enclosures of motors, breakers, switches, and other electrical equipment to the building grounding system. Precaution shall be taken to ensure adequate ground continuity along the conduit or raceway.
44. Provide a separate neutral conductor for each circuit. Install neutral conductors and ground conductors into all switch boxes. Multiple circuits shall not share a common neutral. Neutral shall be sized as large as the phase conductors. Neutral conductors shall not be reduced in size.
45. Arrange connections for single phase circuits to achieve three phase load balance within 20% of the average phase load current. Ungrounded conductors using a common neutral must originate from different phases.
46. The electrical contractor is responsible for maintaining proper phase rotation with all existing three (3) phase electric loads.
47. Phase rotation check: on multi-phase equipment, perform a phase rotation check prior to energizing the equipment. Use Knopp K-3 or equivalent device with red or "A" lead connected to phase A, white or "B" lead connected to phase B, and blue or "C" lead connected to phase C. Note the phase rotation and annotate test documentation with device used, manner connected, rotation observed, date of test, and name of craftsman. Do not energize equipment unless observed rotation matches the requirements of the equipment
48. Contractor shall supply all labor, power cables, conduit boxes, fittings, wiring materials, hardware, supports, and miscellaneous items for a complete electrical installation and connection of the electrical work required, except that the provision for owner supplied equipment shall be only be completed to the point indicated elsewhere on the drawings.
49. The Contractor/Installer shall use a calibrated torque tool to achieve the indicated torque value when the tightening torque numeric values identified on the electrical equipment or in the installation instructions. In the absence of connector or the equipment manufacturer's recommended torque values, the tables in Informative Annex I may be used to correctly tighten screw-type connections for power and lighting circuits. Informative Annex I represents the “Recommended Tightening Torque Tables from UL Standard 486A-B.”
50. All cables, not within conduit (ex., MC type, fire alarm, PA), routed within the ceiling cavity must be secured using Bridle rings, J-hooks, or other appropriate means. The cable must not lay on dropped ceiling panels, be fastened to existing electrical conduits, steam pipes, sprinkler pipes, insulated pipes, or be routed in such a fashion as to obstruct access hatches, doors, utility access panels, mechanical service work areas or fittings and shall not be routed through fire doors, ventilating shafts, or grates.
    a. Unless otherwise provided, MC cables shall be secured at intervals not exceeding 6'. Cables containing four or fewer conductors sized no larger than 10 AWG shall be secured within 12” of every box, cabinet, fitting, or other cable termination.
    b. Type MC cable shall be permitted to be unsupported where the cable: (a) Is fished between access points through concealed spaces in finished buildings or structures and supporting is impractical; or (b) Is not more than 6' in length from the last point of cable support to the point of connection to luminaires or other electrical equipment and the cable and point of connection are within an accessible ceiling. Type MC cable fittings shall be permitted as a means of cable support.
51. All cable trays and electrical conduits shall be independently supported and braced independently of the ceiling.
52. All new wiring is to be run concealed wherever possible. All conductors shall be in a surface mounted metallic raceway in public spaces or metallic conduit in utility locations when not routed concealed in the ceiling/wall cavities. Any locations that do not have accessible or dropped ceilings will require the use of surface mounted metallic raceways. Provide pull-boxes (size per code) and locate in conduit runs as required. No exposed cable may be installed.
53. Surface mounted metallic raceway shall meet the following criteria:
    a. Install in accordance with manufacturer's instructions for system components and approved shop drawings. Coordinate installation with adjacent work to ensure proper clearances and to prevent electrical hazards.
    b. Install in accordance with complete system instruction sheets.
    c. Install enclosures to be mechanically continuous and connected to all electrical outlets, boxes, device mounting brackets, and cabinets, in accordance with manufacturer's installation sheets.
    d. Install enclosures to be electrically continuous and bonded in accordance with the National Electric Code for proper grounding.
    e. Mechanical Security: Raceway systems shall be mechanically continuous and connected to all electrical outlets, boxes, device mounting brackets, and cabinets, in accordance with manufacturer's installation sheets.
    f. Electrical Security: Metal raceway shall be electrically continuous and bonded in accordance with the National Electric Code for proper grounding.
    g. Raceway Support: Raceway shall be supported by 2-hole straps at intervals not exceeding 5 feet or in accordance with manufacturer's installation sheets.
    h. Accessories: Provide accessories as required for a complete installation, including insulated bushings and inserts where required by manufacturer.
    i. Unused Openings: Close unused raceway openings using manufacturer's recommended accessories.
54. Where PVC raceway is indicated to be installed exposed in an external environment, expansion fittings shall be installed to meet the requirements of NEC 352.44.
55. All openings and penetrations shall be sealed upon completion of the electrical installation to prevent the spread of smoke and fire through openings. Seal around conduit and raceway penetrations through interior walls and floor separating areas to restore original fire rating; use a UL classified fire sealant. Seal penetrations through roof and exterior walls to make waterproof. Request inspection of fire seals by electrical inspector from authority having jurisdiction before and after placement of fire seal materials. All openings shall be coordinated with the other trades to limit interference and obstruction.
56. Limit the use of electrical metallic tubing (EMT) to where it will not be subject to physical damage or corrosion. Use intermediate metal conduit (IMC) or rigid galvanized steel conduit (RGS) where raceways are embedded in concrete or exposed to physical damage. Use minimum 3/4” conduit except as follows: 1/2” conduit may be used for 20 amp general light and power circuits and for control circuits; 3/8” flexible metal conduit may be used to connect light fixtures in suspended ceilings. Use liquid tight flexible metal conduit for flexible connection to equipment in mechanical rooms or outdoors.
57. Where raceways contain insulated conductors 4 AWG and larger that enter an enclosure, the conductors must be protected from abrasion during and after installation by a fitting that provides a smooth, rounded insulating surface, such as an insulating bushing as per NEC 300.4(G).
58. Install outdoor equipment to be weatherproof (NEMA 3R).
59. Wherever the length of the secondary conductors of any transformer exceeds ten feet, and enclosed circuit breaker or fused disconnect is required to be provided within ten feet of the transformer secondary terminals in accordance with NEC Article 2401-2(C)(2). This overcurrent device shall have an ampacity rating equal to the ampacity of the panel being served. If this occurs and the panel is in the same room, the panel being fed may be changed to main lug only.
60. All penetrations through exterior walls shall be sealed watertight. Furnish and install seals for conduit and raceways to seal the annular space between the raceway and the building penetration. Furnish and install conduit sealing bushings as manufactured by OZ/Gendy type CSMI or CSMC or approved equal Furnish and install conduit sealing bushings as manufactured by OZ/Gendy type CSBG or approved equal to seal the conductors inside the raceway. Coordinate submittal submission with conductor size, quantity and insulation type.
61. Underground conduits shall be pitched to drain away for them building in manholes.
62. As per 1022.4 of the IBC, no conduit, piping, raceway etc. serving other areas may pass through the stair enclosure. Conduit, piping, raceway etc. must terminate at the stair enclosure.

Wire Information:

63. All wiring shall be copper conductor, 600 volts in EMT raceway with approved fittings unless otherwise indicated. Feeder and branch circuit wiring shall be minimum #12 AWG unless otherwise indicated. Feeder and branch circuit wiring larger than #10 AWG shall be stranded conductor: #10 AWG and smaller, shall be solid conductor. Control wiring shall be #18 AWG THWN. Type of insulation as follows unless noted otherwise:
    a. THHN/THWN insulation for #4 AWG and smaller
    b. THW or THHN/THWN insulation for #2 AWG and larger
    c. THW used for all panel feeder and service conductors
    d. XHHW-2 insulation type shall be used where conductors are installed in conduits exposed to the weather.
64. Use the following conductor color codes:

	208Y/120V	480Y/277V
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Gray
Equip. Ground	Green	Green

Circuit Breakers:

65. Use 600 VAC circuit breakers in 480V and 480Y/277V switchboards, panelboards and motor control centers.
66. Provide circuit breakers with UL listed interrupting rating (RMS symmetrical amperes) greater than the available fault current shown on the electrical one-line diagram. “Series rated” equipment shall not be accepted.
67. Install UL Listed circuit breaker padlocking devices for service and maintenance personnel on all over current protection devices at the main building panel (MDP or equivalent). The device must have provisions for placement of a lock on it to secure the device in the off position. The lock-out device must be part of the disconnect assembly and must remain in place after the padlock is removed, whether it is a fused disconnect switch, a single circuit breaker, or a circuit breaker in a panelboard. A device that is attached to the circuit breaker handle by a set screw is not an acceptable means to serve as a safe method of locking the device in the off position.
68. All circuit breakers shall be molded case thermal magnetic and rated for available short circuit current.
69. Circuit breakers used as switches shall be UL listed for switching duty and marked “SWD” per NEC 240-83(D).

Receptacles:

70. Receptacles and communications outlets shown on drawings shall be mounted 8” apart on center horizontally. Contractor shall coordinate exact location of all boxes in two hour or less rated assemblies such that area of box per wall area and outlets on opposite side wall horizontally spacing comply with state building code regarding fire resistant construction.
71. All receptacles shall be listed tamper-resistant receptacles.
72. All outdoor receptacles shall be mounted 42” above the finished grade, unless noted otherwise. The outdoor receptacles shall be GFCI type with a weatherproof enclosure. The weatherproof enclosure shall have a gasketed hinged outlet cover/enclosure which is suitable for wet locations while in use and UL listed as manufactured by TayMac or approved equal.

Labeling:

73. All switchboards, panelboards, industrial control panels and motor control centers that are in other than dwelling occupancies and are likely to require examination, adjustment, servicing or maintenance while energized shall be field marked to warn qualified persons of potential electric arc flash hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing or maintenance or the equipment. Marking shall be self adhesive, commercial label conforming to NEC 110.16 and ANSI Z535.4. Arc Flash Label shall be Brady (bradyid.com) catalog No. 102308 or equal.
74. Provide identification tags for all new wiring and install at each end and in all intermediate pull/junction boxes, cabinets, housings, etc. Indicate on tags, legibly minimum ¼” high letters, the points of origin and termination of each conduit and conduit run. Label all receptacles and switch covers with panelboard and circuit number. For interior equipment, use Brother P-touch 3 label maker with TC-10 label cartridge or equal. For exterior equipment, use aluminum dymo half-inch tape label with embossed lettering. Abbreviate lettering to provide necessary information with minimum label size (i.e., Panelboard PP1, Circuit 23 should read PP1-23).
75. Label all switchgear, panelboards, and separately-mounted equipment with feeder source and circuit number. For interior equipment, provide white Micarta plate with quarter-inch block lettering. For exterior equipment, provide anodized aluminum plate with quarter-inch embossed block lettering. Attach to equipment using contact cement in a clear space on the upper portion of the equipment cover approximately 66" AFF. Abbreviate lettering or adjust letter size to provide necessary information with minimum label size, (i.e., 227/480V PANEL PP1 FROM MDP CKT 3 or P-1 20 HP PUMP FROM PP1 CKT 3).
76. All panels shall have typed, completed directories indicating equipment served and room number (as indicated on the final building signage) of equipment location, or spare, or space. Identify the purpose of individual circuit breakers, safety switches and motor starters by means of nameplates as indicated. Update directories as panels are altered. Circuit changes shall be reflected on “as-built” drawings.
77. All circuits and circuit modifications must be legibly identified as to their clear, evident, and specific purpose. The identification must include sufficient detail to allow each circuit to be distinguished from all others, and the identification must be on a circuit directory located on the face or inside of the door of a panelboard. Circuit directories containing multiple entries with only ``lights'' or ``outlets'' do not provide the sufficient detail required by the NEC.

Lighting:

78. Support for light fixtures in or on grid-type suspended ceilings: A Seismic Fixture Clamp (SFC) shall be installed as a metal clip to attach recessed fluorescent light fixtures (luminaries) to framing members of metal suspension systems for acoustical and lay-in panel ceilings. One clamp is required at each of the four corners.
79. In mechanical areas, the contractor shall verify locations and make adjustments necessary to clear obstructions and required to suit field conditions.
80. “Wiring” to battery operated exit or emergency luminaries shall be as per the Manufacturer's instructions and in conformance with the UL Listing of the equipment. As per NEC 700-12(F), connect the emergency battery to the line side, ahead of the switch of the area lighting and clearly identify the circuit feeding the unit at the distribution panel.
81. Provide neutral for all lighting circuits.
82. Gang switches together under one faceplate.
83. For installation of light fixtures in areas without a ceiling, contractor shall determine method of support using hanger fittings, threaded rod, and “Unistrut” as applicable. These costs shall be included with the base bid.
84. Lighting controls factory startup:
    a. The contractor, with the assistance of the lighting control system manufacturer or representative, and lighting designer shall program and verify the system performs per the manufacturer's instructions and the lighting designer's intent, sequences of operations, plans, and specifications. This includes properly locating the daylight sensor in the room(s), setting the dimming curves, setting occupancy sensor shut-off delays, setting dimming levels, and addressing all of the components in the lighting control system.

Inspections/Warranty:

85. No work shall be concealed until after inspection and approval by proper authorities. If work is concealed without inspection and approval, the Contractor shall be responsible for all work required to both open and restore the concealed areas in addition to any required modifications.
86. The contractor shall make a final inspection of all electrical equipment to ensure that there are no loose electrical connections or electrical circuits subject to electrical break down due to the presence of foreign material. This shall include inspection of all connections made under this contract.
87. The contractor shall contract with an electrical underwriter to provide third-party electrical inspection services (both "rough" and "final") for issuance of a "Certificate of Completion". All fees and costs shall be the responsibility of the contractor.
88. The contractor shall deliver certificates of electrical and other inspections or copies thereof, to the client at the completion of the project with copies to the Engineer/architect.
89. The contractor shall guarantee all work in writing to the client against any and all defects in material and workmanship for a period of one year, or as indicated in the specification, from date of acceptance and perform all corrective work at no cost to the client.

Electrical Demolition General Notes

THE ELECTRICAL CONTRACTOR SHALL REFER TO THE A1.XX, M1.XX, AND P1.XX SERIES OF DRAWINGS FOR ADDITIONAL SCOPE. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL ELECTRICAL DEMOLITION REQUIREMENTS ON THOSE PLANS.

General Project Info:

1. The demolition drawings are diagrammatic and indicated the general intent and scope. Plans do not attempt to show all electrical demolition items. Unless otherwise noted, devices shown are for information purposes. Field verify all demolition items and the extent of demolition work, conditions under which demolition is to be accomplished along with kind and amount of materials being removed and provide for removal of all devices accordingly prior to bid.
2. Contractor shall include all labor and materials in the base bid including all temporary connections, conduit and wire in order to accommodate construction and provide continuous service to devices. Systems that are to remain temporary or permanently and require the shutdown of the building power shall be performed during overtime and shall be included in the base bid.
3. The contractor is responsible for the sequence of all work and shall include in the base bid all labor and materials required for the extensions, re-routing and relocation of existing system components, equipment, wiring, conduits and cabling to maintain operation of all systems throughout the building during demolition and construction phases.
4. The contractor shall report to the client any and/or all conditions that may interfere with or otherwise affect or prevent the proper execution and completion of the work of this contract.
5. The contractor shall execute all work within the regulations of the building for demolition and removal of debris. Overtime work required will be at no extra cost to the client.
6. All equipment shall be disconnected and removed back to its power source of origination unless otherwise noted (“U.O.N.”) by Existing to Remain (“E”). All disconnected and removed items that are not being reused shall be returned to the owner or disposed off site in an approved method.
7. The contractor shall at all times protect the property of the client and the building owner, including but not limited to windows, finishes, public toilets, elevators, doors, bucks, electrical and air conditioning equipment, convector enclosures, etc.
8. Unless noted otherwise, all of the existing electrical equipment currently located in the areas of demolition, whether specifically indicated on this drawing or not, shall be disconnected and removed from service. The owner has first right of refusal on all removed items. All items not wanted by the owner shall be properly disposed of offsite by the contractor in accordance with the law. Care shall be taken to maintain circuit continuity to all existing electrical devices to remain. Refer to architectural drawings for exact areas of demolition.
9. Relocate or remove all electrical devices in accordance with the applicable codes.
10. Do not disable or disrupt building fire or life safety systems without written permission from the Owner. In all cases, permission shall have been granted not less than ten (10) working days prior to the intended interruption.
11. Before the start of work, the electrical contractor shall check all existing devices, light fixtures, equipment, etc. that is noted or required to be reused to satisfy himself that they are operating properly. Should any of the items not be operating properly, contractor shall report same to the engineer and await his directions. Contractor not comply with the above will be responsible for providing operational items at his expense.
12. Field investigate the existing electrical & low voltage systems installations. All existing installations in the renovation areas that are to remain but are not currently in compliance with current codes shall be corrected, including but not limited to the following: Un-supported wire, conduit and junction boxes laying on top of ceiling tiles, wire, conduit and/or junction boxes supported only by tie-wire. Raise and support conduit with strap per specs. Raise and support wire with bridle rings, J-hooks, or other appropriate means. Provide new conduit/wire as required. Fixtures improperly supported or inadequately supported by device boxes - provide proper support per N.E.C.

Work/Trade Coordination:

13. Electrical Contractor shall coordinate the mechanical equipment demolition with the Mechanical Contractor and mechanical demolition plans and general construction demolition with the General Contractor and architectural demolition plans for all equipment to be demolished and schedule time for electrical demolition.
14. The contractor shall remove all electrical equipment left after wall demolition, including conduit, switch boxes, plates, bridges or any other telephone or electric wiring and equipment. Disconnect all wiring at panels and remove old wiring from plenum.
15. Temporarily relocate electrical equipment as required to accommodate the construction schedule. All areas not under construction must be kept operational during construction. To accomplish this, provide the necessary temporary electrical services. Remove temporary devices upon completion of the project.
16. As part of the base bid, the Electrical Contractor shall provide temporary electric power required for construction activities of all project divisions. All temporary branch circuits shall be supplied by circuits protected by ground fault circuit breakers. All temporary branch circuits shall be in accordance with NEC Article 590.
    a. Complaints concerning power distribution or devices available in a specific area or areas of the project will be reviewed by the AE. If directed by the AE, the Contractor shall provide additional power distribution or connection devices required under this section at no additional cost.
17. As part of the base bid, the Electrical Contractor shall provide temporary lighting with local switch for general illumination and task illumination for the General Contractor, other prime contractors, and for all sub-contractors for the duration of the construction. Lighting levels provided are to be in compliance with applicable workplace standards. All temporary lighting shall be supplied by circuits protected by ground fault circuit breakers. All temporary lighting shall be in accordance with NEC Article 590.
    a. Complaints concerning lighting levels and/or lighting quality in a specific area or areas of the project will be reviewed by the AE. If directed by the AE, the Contractor shall provide additional luminaries and/or additional distribution wiring required at no additional cost.
18. At the conclusion of the construction activities remove all wiring, both exposed and concealed, used for temporary lighting and power distribution.

Demolition Requirements:

19. Remove abandoned electrical equipment, devices and wiring (i.e., distribution equipment, receptacles, data ports, raceway systems) back to the source panelboard, switchboard, switchgear, communications closet, or cabinet. Abandoned wiring and raceways can result from actions that include the following:
    a. Equipment is removed or relocated.
    b. Fixtures are removed or relocated.
    c. System is no longer used.
    d. There is no demonstrable near term future use for the existing circuit or raceway system.
20. Unused electrical equipment and material should only be left in place if one or more of the following conditions exist:
    a. The removal requires the demolition of other structures or equipment that is still in use. An example is conduit embedded in walls or ductbanks.
    b. The cost of removal is excessive due to hazards, construction methods, or restricted access. A final determination for this condition shall be made by the engineer.
    c. If either of the above two cases exist, remove the conduits, including those above accessible ceilings, to the point that building construction, earth, or paving covers them. Cut conduit beneath or flush with building construction or paving. Plug, cap, or seal the remaining unused conduits. Install blank covers for abandoned boxes and enclosures not removed.
21. Inventory each panelboard where circuits are indicated to be reused. Sequentially consolidate existing circuits within each panelboard with regard to area served. Maximize capacity for service to the project area by including existing spares with the group of circuits breakers to be disconnected as a result of this selective demolition. Prepare a current directory, post demolition, for each panelboard as the base upon which the final directories will be compiled.

Extension/Continuity:

22. All thermostats should remain connected until such time that they are relocated. If they are in a wall to be removed, leave them connected and either tuck them into the ceiling or attach to adjacent structure remaining.
23. Extend existing equipment connections using materials and methods compatible with the existing electrical installation and identified in the Electrical Specifications.
24. When relocation or removal of an electrical device interrupts the continuity of a downstream circuit or device to remain, reroute/modify the circuit as required to maintain circuit continuity. Provide new junction boxes, pullboxes, raceways, wiring, etc., as required.
25. When circuits are interrupted by the removal of a panelboard, the Electrical Contractor shall rewire devices to the nearest panelboard of same voltage requirements with available space. Furnish and install new circuit breakers or utilize spare circuit breakers as required.
26. Where an existing device is removed but the raceway and box remains for circuit Continuity, provide an appropriate blank cover plate of material and finish to match the cover plates of the devices in that room.
27. If the continuity of the neutral conductor of a multiwire circuit is interrupted (open), the resultant over or under voltage can cause a fire and/or destruction of electrical equipment. Contractor shall take necessary precautions to preclude the interruption of neutral conductor on a multiwire circuit.
28. Non-demolition areas: Demolition works shall not affect areas not included in demolition. Contractor shall be responsible for the continuity of all services in non-demolition areas. All services shall be maintained at all times. Maintain service by extending, re-routing and/or reconnecting any circuits affected by demolition. Provide additional conduit/wire as required to maintain service. Circuits in non-demolition areas that are connected to demolished panels and/or circuits shall be re-circuited to the existing panels. Provide temporary power as required during change-over to maintain continuous service. Provide temporary power for all relocated circuits as required to maintain continuous service.
29. Where existing outlets are shown to remain, but are indicated with new circuitry perform the following:
    a. Remove existing circuitry. Provide additional conduit, wiring, etc., necessary to maintain circuit continuity to existing devices on the same circuit that are not to be recircuited.
    b. Provide new wiring device and faceplate.
    c. Recircuit devices as indicated.

Patching/Repairing:

30. Restore the original fire rating of floors, walls, and ceilings after electrical demolition using a UL classified fire sealant.
31. Except for areas where partitions or ceilings are to be demolished or where new air conditioning or electric is to be installed, contractor shall replace to the existing condition in area of disturbed ceiling. Any water damaged or broken ceiling tiles as the result of contractor's demolition shall also be replaced.
32. Upon completion of the demolition work, the contractor shall provide that all areas be left broom clean.
33. Furnish and install knockout plugs on all existing panels, equipment, and outlet box openings created by the removal or relocation of existing raceways.
34. Where an existing electrical device, equipment, etc., is being removed from an existing wall and that wall is to remain contractor shall patch existing wall to architects satisfaction.

Hazardous Material Disposal:

35. Disconnect and remove all ballasts from fluorescent light fixtures that do not have a labels stating “BALLAST DOES NOT CONTAIN PCBs” or similar label (BALLAST MAY CONTAIN PCBs). Place PCB ballasts in D.O.T. approved containers. Properly dispose of containers with a federally approved disposal contractor. Disposal shall involve segregation of components for recycling and incineration of PCB contents. All disposal documentation shall be provided to the owner upon completion of the project. Contractor shall maintain an owner approved log sheet for each run.
36. Remove all mercury-containing lamps, do not break or crush. Retain services of a state approved lamp recycling facility able to accept waste D009. Coordinate packaging required and package, secure, and deliver lamps as required by the selected recycling facility to insure minimum lamp breakage. Minimum of 95% of lamp material must be shipped intact. Contractor must comply with all reporting and paperwork requirements of state laws regarding the handling, transportation, and disposal of hazardous waste including but not limited to filing the required paperwork and manifest with the state and owners as required by law. All disposal documentation shall be provided to the owner upon completion of the project.
37. Remove all sealed lead-acid batteries from the site. Return to the battery manufacturer or to a similarly qualified battery processing facility for proper disposal. Obtain a receipt for submission with the close out documents.

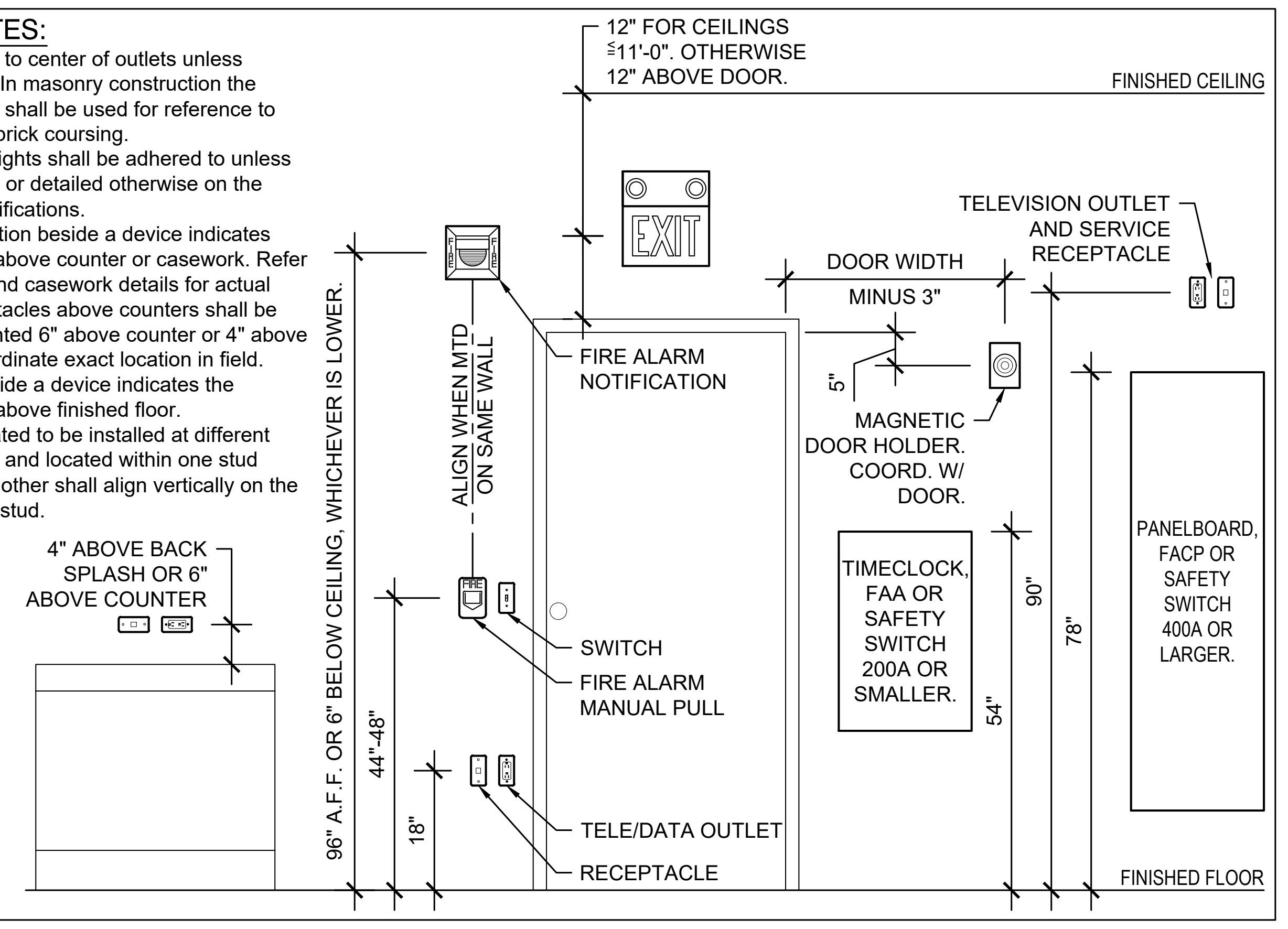
Application of Raceways

RACEWAY TYPE	APPLICATION
Rigid Steel Conduit	Where exposed to mechanical injury, where specifically required, indoors where exposed to moisture, where required by codes and for all circuits in excess of 600 volts.
I.M.C.	Where exposed to mechanical injury, where specifically required, indoors where exposed to moisture, where required by codes and for all circuits in excess of 600 volts.
E.M.T	Use in every instance except where another material is not specified.
Flexible Metal Clad Cables	Lighting and receptacle branch circuits concealed in hollow spaces of building. May not be used in corridors, places of assembly, or where prohibited by Code.
Type MC Flexible Steel	Use in dry areas for connections to lighting fixtures in hung ceilings, connections to equipment installed in removable panels of hung ceilings. At all transformer or equipment raceway connections where sound and vibration isolation is required.
Liquid-Tight Flexible Conduit	Use in areas subject to moisture where flexible steel is unacceptable, at connections to all motors, and all raised floor areas.
Non-Metallic Conduit	1. Schedule 40 - Where raceways are in slab in below grade levels, for raceway duct banks. 2. Schedule 80 - For underground raceways outside of building which are not encased in concrete. Also for secondary conductors of cold cathode lighting systems.
Wireways and Aux Gutters	Where indicated on the Drawings and as otherwise specifically required.

Device Mounting Heights

GENERAL NOTES:

1. Mounting heights to center of outlets unless otherwise noted. In masonry construction the mounting heights shall be used for reference to nearest block or brick coursing.
2. The mounting heights shall be adhered to unless specifically noted or detailed otherwise on the drawings or specifications.
3. A "CTR" designation beside a device indicates device mounted above counter or casework. Refer to architectural and casework details for actual elevation. Receptacles above counters shall be horizontally mounted 6" above counter or 4" above backsplash. Coordinate exact location in field.
4. A "+" symbol beside a device indicates the mounting height above finished floor.
5. All devices indicated to be installed at different mounting heights and located within one stud space from each other shall align vertically on the same side of the stud.



Electrical Grounding Req.

THE CONTRACTOR SHALL PROVIDE A GROUNDING CONDUCTOR FOR ALL BRANCH FEEDERS AND CIRCUITS IN ACCORDANCE WITH THE FOLLOWING CHART:

	GND CDTR SIZE (AWG)			GND CDTR SIZE (AWG)	
OCPD AMPS	COPPER	AL OR CU CLAD AL	OCPD AMPS	COPPER	AL OR CU CLAD AL
15	14	12	60	10	8
20	12	10	100	8	6
30	10	8	200	6	4
40	10	8			

NOTE: WHERE NECESSARY TO COMPLY WITH NEC 250.4(A)(5) OR (B)(4), THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE SIZED LARGER THAN GIVEN IN THIS TABLE. WHERE UNGROUNDED CONDUCTORS ARE INCREASED IN SIZE, EQUIPMENT GROUNDING CONDUCTORS, WHERE INSTALLED, SHALL BE INCREASED IN SIZE PROPORTIONATELY ACCORDING TO THE CIRCULAR MIL AREA OF THE UNGROUNDED CONDUCTORS.
*SEE INSTALLATION RESTRICTIONS IN NEC 250.120

Date	1/10/20
Checked	BH
Drawn	MH

MICHAEL J. McGOVERN, R.A.
Title REGISTERED ARCHITECT
License No. 022257-1

Revisions:
ISSUE TO BID 11/23/20

LAN ASSOCIATES LLP
engineering • planning • architecture • surveying
252 MAIN STREET, GOSHEN, NEW YORK 10924 (845)615-0350

ELECTRICAL COVER SHEET
2019 BOND REFERENDUM
MAMARONECK AVENUE ELEMENTARY SCHOOL
MAMARONECK UNION FREE SCHOOL DISTRICT
850 MAMARONECK AVENUE, MAMARONECK, NY 10543

NYSED PROJECT # 66-07-01-03-0-004-030

Job No. 4.1092.72.2
File No. 10927202E001

E0.01