

ELECTRICAL NOTES AND SPECIFICATIONS

GENERAL

- CONTRACTOR SHALL PERFORM ALL WORK AS TO CONFORM TO LOCAL, STATE AND NATIONAL CODES AND THE REQUIREMENTS OF LOCAL AUTHORITIES HAVING JURISDICTION.
- ALL WORK SHALL BE IN STRICT CONFORMANCE WITH THE STATE OF NEW JERSEY UNIFORM FIRE CODE (NJAC 15:28), THE STATE OF NEW JERSEY "FIRE PREVENTION CODE" AND THE NATIONAL ELECTRICAL CODE (NECA #10).
- ALL NUMERICAL "NEC" REFERENCES SITED HEREIN ARE DERIVED FROM THE NATIONAL ELECTRICAL CODE, 2001 EDITION.
- CONTRACTOR TO EXAMINE THE SITE TO DETERMINE THE EXACT CONDITIONS EFFECTING THE ELECTRICAL WORK.
- DRAWINGS INDICATE THE GENERAL SCHEME OF THE INSTALLATION AND ARE DIAGRAMMATIC IN SCOPE. THE ENGINEER RESERVES THE RIGHT TO CHANGE THE LOCATION OF OUTLETS, CONDUIT, EQUIPMENT, APPARATUS, ETC. TO A REASONABLE EXTENT AS THE BUILDING CONDITIONS MAY DICTATE PRIOR TO THEIR INSTALLATION WITHOUT EXTRA COST TO THE OWNER. THE EXACT LOCATION AND ARRANGEMENT OF ALL EQUIPMENT AND PARTS SHALL BE DETERMINED AS THE WORK PROGRESSES.
- DETAILS OF CONSTRUCTION AND OF WORKMANSHIP WHERE NOT SPECIFICALLY DESCRIBED HEREIN OR INDICATED ON THE DRAWINGS SHALL BE SUBJECT TO THE ENGINEER'S APPROVAL. IT IS THE INTENT OF THESE SPECIFICATIONS TO PROVIDE COMPLETE SYSTEMS, LEFT IN GOOD WORKING ORDER, READY FOR OPERATION.
- SCRAP AND DEBRIS, EXCEPT AS OTHERWISE SPECIFIED, SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THIS CONTRACTOR.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR START-UP OF ALL SYSTEMS.
- ALL WORK SHALL BE DONE WITH A MINIMUM OF DUST AND DIRT. PROVIDE SUFFICIENT FIREPROOF TAPPLING AND COVER ALL EQUIPMENT IN WORK AREA WITH SAME DURING WORK OPERATIONS.
- CONTRACTOR SHALL FURNISH SHOP DRAWINGS AND EQUIPMENT CUTS TO THE ARCHITECT FOR APPROVAL (MINIMUM 50 COPIES).
- COORDINATE PRIMARY CONNECTIONS TO STREET WITH LOCAL UTILITY COMPANIES).
- CONTRACTOR SHALL FILE, SECURE AND PAY FOR ANY NECESSARY APPROVALS, PERMITS AND INSPECTIONS.
- PRIOR TO TESTING, CONTRACTOR SHALL MAKE ALL SYSTEM ADJUSTMENTS REQUIRED FOR PROPER OPERATION. ADJUSTMENTS SHALL INCLUDE TRANSFORMER TAPS, CIRCUIT BREAKER MAGNETIC SETTINGS, GROUND FAULT "TRIP" SETTINGS, BALLAST TAP SETTINGS, ETC.
- ALL WORK SHALL BE GUARANTEED TO BE FREE FROM DEFECT FOR ONE YEAR AFTER ACCEPTANCE OF WORK.
- ALL ELECTRICAL SYSTEMS SHALL BE TESTED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE STATE OF NEW JERSEY FIRE PREVENTION CODE. CONTRACTOR TO COORDINATE TESTS WITH LOCAL OFFICIALS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR DISCONNECTING AND MAKING SAFE ALL ELECTRICAL FACILITIES IN EXISTING STRUCTURE PRIOR TO DEMOLITION.

PANEL BOARDS AND CIRCUIT BREAKERS

- EQUIPMENT INTERRUPTING RATINGS SHOWN ON SCHEDULES ARE BASED ON UL LISTED SERIES RATINGS FOR 50000A AVAILABLE SHORT CIRCUIT CURRENT AT THE SERVICE. CONTRACTOR SHALL INCREASE INTERRUPTING RATINGS AS REQUIRED FOR NON-SERIES RATED EQUIPMENT.
- PANELBOARDS SHALL BE OF DEAD FRONT CONSTRUCTION WITH AUTOMATIC OVERCURRENT DEVICES. VOLTAGE AND CURRENT RATINGS AS SHOWN. CIRCUIT BREAKERS SHALL BE LOCATED ON TYPE LESS THAN 1000V. PANELBOARDS SHALL BE UL LISTED AS MANUFACTURED BY SQUARE D, GE OR WESTINGHOUSE.
- ALL CIRCUIT BREAKERS SUPPLYING HVAC EQUIPMENT SHALL BE UL LISTED TYPE HACR.

SAFETY SWITCHES

- SAFETY SWITCHES SHALL BE GENERAL DUTY, RATED OR UNRATED, RATINGS AS SHOWN ON THE DRAWINGS.
- ALL SWITCHES SHALL BE QUICK-MAKE, QUICK-BREAK OPERATION AND SHALL HAVE PROTECTING PROVISIONS.
- ALL SWITCHES SHALL BE FURNISHED IN NEW ENCLOSURES SUITABLE FOR USE IN THE LOCATION SHOWN. SWITCHES SHALL BE AS MANUFACTURED BY SQUARE D, GENERAL ELECTRIC, WESTINGHOUSE OR EQUAL.

BOXES

- BOXES FOR BRANCH CIRCUIT WIRING DEVICES AND BRANCH CIRCUIT SPLICES SHALL BE AS INDICATED BELOW.

	#12	#10	#8
120V, 1 PHASE, 15A	55"	65"	125"
120V, 1 PHASE, 20A	40"	65"	95"
208V, 1 PHASE, 20A	65"	110"	175"
208V, 3 PHASE, 20A	75"	125"	200"

THE ABOVE LENGTHS REPRESENT "ONE-WAY" CIRCUIT LENGTHS (NOT WIRE LENGTH) AND INCLUDE ALL VERTICAL RISES AND DROPS.

	120/208V	277/480V
PHASE A	BLUE	BROWN
PHASE B	RED	ORANGE
PHASE C	BLACK	YELLOW
NEUTRAL	WHITE	WHITE
GROUND	GREEN	GREEN

WHERE CONDUCTORS ARE NOT AVAILABLE WITH COLOR CODED INSULATION, COLORED TAPES SHALL BE APPLIED TO THE ENTIRE EXPOSED LENGTH OF CABLES IN PULL BOXES, SWITCHBOARDS, EQUIPMENT, ETC.
- CONTROL CABLE CONDUCTORS SHALL BE COLOR CODED IN ACCORDANCE WITH ICEA STANDARDS.
- LIGHTING**
 - COORDINATE FIXTURE LOCATIONS WITH INSTALLED DUCTWORK, SPRINKLERS, ARCHITECTURAL SOFFITS, ETC.
 - FIXTURES INSTALLED IN CLOSETS SHALL COMPLY WITH NEC ARTICLE #410-8 FOR LOCATION AND TYPE OF CONSTRUCTION.
 - ALL FIXTURES WEIGHING IN EXCESS OF 50 LBS. SHALL BE SUPPORTED INDEPENDENTLY OF THE OUTLET BOX (SEE NEC).
 - WHERE TROFFERS ARE INSTALLED IN SUSPENDED CEILINGS, FIXTURES SHALL BE SECURELY FASTENED TO GRID WITH CONCEALED BOLTS, SCREWS, RIVETS, OR TEE BAR CLIPS. WHERE CEILING SUPPORT IS NOT ADEQUATE, ONE WIRE IN EACH CORNER OF THE FIXTURE, SUPPORT FIXTURE HOUSING INDEPENDENTLY OF THE GRID.
 - ALL RECESSED INCANDESCENT FIXTURES SHALL BE THERMALLY PROTECTED.
 - FIXTURE HOUSINGS SHALL NOT BE USED AS RACEWAYS, EXCEPT THOSE DESIGNED FOR INSTALLATION IN CONTINUOUS ROYS. MAKE BRANCH CIRCUIT SPLICES IN 4" SQUARE BOXES WITH BLANK COVER PLATES (NEC #410-3).
 - ALL CEILING PENDANT MOUNTED AND WALL BRACKET MOUNTED FIXTURES SHALL BE PROVIDED WITH DECORATIVE CANOPIES MATCHING THE FIXTURE AND PENDANT FINISH.
 - RECESSED FIXTURES SHALL MAINTAIN A MINIMUM CLEARANCE OF 1/2" TO COMBUSTIBLE CONSTRUCTION AND 3" TO THERMAL INSULATION (UNLESS UL LISTED FOR DIRECT CONTACT WITH THESE MATERIALS (SEE NEC)).
 - PROTECT ALL LAMPS, LENSES AND LOUVERS DURING CONSTRUCTION. ALL LAMPS, FIXTURE HOUSINGS, LENSES AND LOUVERS SHALL BE CLEANED UPON COMPLETION OF WORK BY ALL TRADES. REPLACE DEFECTIVE OR DAMAGED LAMPS, LENSES, LOUVERS AND BALLASTS AS REQUIRED AT THE TIME OF CLEANING.
 - LIGHTING SHALL BE MOUNTED ON STRIKE SIDE OF DOOR WITH TOP OF FIXTURE ALIGNED WITH THE TOP OF THE DOOR.
- PULL AND JUNCTION BOXES SHALL BE GAGE GAUGE BRAVELED STEEL, NEMA "1" WITH SOREX FASTENED COVERS WHEN USED IN INDOOR, DRY AREAS. STEEL GAUGE SHALL BE IN ACCORDANCE WITH NEC ARTICLE #134.40.
- PULL AND JUNCTION BOXES UTILIZED IN INDOOR AREAS WHICH MAY BECOME DAMP (BOILER ROOMS, UTILITY ROOMS, CONNECTIONS TO UNDERGROUND RACEWAYS, ETC.) SHALL BE GALVANIZED TYPE NEMA "1".
- PULL AND JUNCTION BOXES FOR USE OUTDOORS SHALL BE GALVANIZED AND OF NEMA "3R" CONSTRUCTION.
- ALL PULL BOXES FASTENED TO EXTERIOR BLOCKS OR MASONRY WALLS SHALL BE PROVIDED WITH 1 1/2" CHANNEL FRAMING SPACERS ORIENTED VERTICALLY AT REAR OF ENCLOSURE TO ENSURE AIR CIRCULATION BEHIND ENCLOSURE.
- OUTLET, SWITCH AND JUNCTION BOXES FOR BRANCH CIRCUIT WORK SHALL BE SIZED IN ACCORDANCE WITH NEC ARTICLE #134.40-#134.50.
- FULLBOXES AND LARGER JUNCTION BOXES SHALL BE SIZED IN ACCORDANCE WITH NEC ARTICLE #134.
- WHERE USE OF KNOCKOUTS IS DISCONTINUED BY CHANGES IN WORK, INSTALL PROPERLY SIZED KNOCKOUT SEALS BY THOMAS AND BETTS, RACOR, APPLETON OR EQUAL.

CONDUCTORS

- UNLESS OTHERWISE NOTED, CONDUCTOR TYPES SHALL BE AS INDICATED BELOW.

LOCATION	CONDUCTORS
BRANCH CIRCUITS AND FEEDERS IN CONDUIT	THINWALL
CONCEALED BRANCH CIRCUITS	TYPE "AC" CABLE
UNDERGROUND OUTDOORS	RANWTHINW
UNDERGROUND SERVICE ENTRANCE	RHWUSE
FIXTURE CONNECTIONS	SF-2
TEMPORARY LIGHT AND POWER	TYPE "NM" CABLE
- ALL WIRE AND CABLE SHALL BE COPPER CONDUCTORS. CONDUCTORS ROUNDS AND SMALLER MAY BE SOLID; CONDUCTORS LARGER THAN ROUNDS SHALL BE STRANDED.
- CONDUCTORS ROUNDS AND SMALLER MAY BE SPLICED USING NYLON SELF-INSULATED WIRE NITS AS MANUFACTURED BY 3M (SCOTCHLOCK). IDEAL "WIRE-NUT" OR APPROVED EQUAL.
- CONDUCTORS LARGER THAN ROUNDS SHALL BE SPLICED USING SPLIT BOLT CONNECTIONS WITH TAPED JACKET, PREMANUFACTURED SPLICES BY LSCO OR MAC PRODUCTS OR BY HYDRAULICALLY APPLIED COMPRESSION SPLICES. MANUFACTURERS TOOLING, DYES AND RECOMMENDATIONS SHALL GOVERN HYDRAULICALLY APPLIED COMPRESSION SPLICES.
- EXCEPT WHERE EQUIPMENT, SUCH AS MOLDED CASE CIRCUIT BREAKERS, ARE SUPPLIED WITH FACTORY INSTALLED SET SCREW LUGS, ALL CONNECTIONS FOR CABLES 4/0 AND LARGER SHALL BE MADE USING NEMA 2 BOLT COMPRESSION LUGS. LUGS SHALL BE HYDRAULICALLY APPLIED USING MANUFACTURERS TOOLING, DIES AND RECOMMENDED PROCEDURES.
- CONTROL WIRING FOR HVAC EQUIPMENT UTILIZING CONTROL CIRCUIT VOLTAGES OF LESS THAN 60VAC SHALL BE RHWAN MULTI-CONDUCTOR NEG. TYPE "12/2", WHEN INSTALLED IN ENVIRONMENTAL AIR FLEWINGS, LOW VOLTAGE CONTROL WIRING SHALL BE NEG. TYPE "12/2P". LOW VOLTAGE CONTROL WIRING SHALL BE INSTALLED IN ACCORDANCE WITH NEC ARTICLE #125.
- CONTROL WIRING FOR HVAC EQUIPMENT AND OTHER EQUIPMENT UTILIZING 120V CONTROLS SHALL BE RHWAN TYPE THINWALL INSTALLED IN RACEWAYS.
- WHERE ISOLATED GROUND RECEPTACLES ARE INDICATED ON THE DRAWINGS, INSTALL AN INSULATED GREEN GROUND CONDUCTOR WITH THE BRANCH CIRCUIT. IN CONCEALED LOCATIONS, TYPE "MC" CABLE SHALL BE UTILIZED FOR SUPPLY OF ISOLATED GROUND OUTLETS.
- UNLESS OTHERWISE INDICATED ON THE DRAWINGS, ALL BRANCH CIRCUITS AND HOME RUNS ARE 2 #12ANS AND 1 #12ANS GROUND.
- ADJUST BRANCH CONDUCTOR SIZES AS REQUIRED FOR VOLTAGE DROP. MAXIMUM BRANCH CIRCUIT LENGTHS SHALL BE AS FOLLOWS (UNLESS OTHERWISE NOTED):

	#12	#10	#8
120V, 1 PHASE, 15A	55'	65'	125'
120V, 1 PHASE, 20A	40'	65'	95'
208V, 1 PHASE, 20A	65'	110'	175'
208V, 3 PHASE, 20A	75'	125'	200'

THE ABOVE LENGTHS REPRESENT "ONE-WAY" CIRCUIT LENGTHS (NOT WIRE LENGTH) AND INCLUDE ALL VERTICAL RISES AND DROPS.
- CONDUCTOR INSULATIONS SHALL BE COLOR CODED AS FOLLOWS:

	120/208V	277/480V
PHASE A	BLUE	BROWN
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PHASE C	BLACK	YELLOW
NEUTRAL	WHITE	WHITE
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- CONTROL CABLE CONDUCTORS SHALL BE COLOR CODED IN ACCORDANCE WITH ICEA STANDARDS.

LIGHTING

- COORDINATE FIXTURE LOCATIONS WITH INSTALLED DUCTWORK, SPRINKLERS, ARCHITECTURAL SOFFITS, ETC.
- FIXTURES INSTALLED IN CLOSETS SHALL COMPLY WITH NEC ARTICLE #410-8 FOR LOCATION AND TYPE OF CONSTRUCTION.
- ALL FIXTURES WEIGHING IN EXCESS OF 50 LBS. SHALL BE SUPPORTED INDEPENDENTLY OF THE OUTLET BOX (SEE NEC).
- WHERE TROFFERS ARE INSTALLED IN SUSPENDED CEILINGS, FIXTURES SHALL BE SECURELY FASTENED TO GRID WITH CONCEALED BOLTS, SCREWS, RIVETS, OR TEE BAR CLIPS. WHERE CEILING SUPPORT IS NOT ADEQUATE, ONE WIRE IN EACH CORNER OF THE FIXTURE, SUPPORT FIXTURE HOUSING INDEPENDENTLY OF THE GRID.
- ALL RECESSED INCANDESCENT FIXTURES SHALL BE THERMALLY PROTECTED.
- FIXTURE HOUSINGS SHALL NOT BE USED AS RACEWAYS, EXCEPT THOSE DESIGNED FOR INSTALLATION IN CONTINUOUS ROYS. MAKE BRANCH CIRCUIT SPLICES IN 4" SQUARE BOXES WITH BLANK COVER PLATES (NEC #410-3).
- ALL CEILING PENDANT MOUNTED AND WALL BRACKET MOUNTED FIXTURES SHALL BE PROVIDED WITH DECORATIVE CANOPIES MATCHING THE FIXTURE AND PENDANT FINISH.
- RECESSED FIXTURES SHALL MAINTAIN A MINIMUM CLEARANCE OF 1/2" TO COMBUSTIBLE CONSTRUCTION AND 3" TO THERMAL INSULATION (UNLESS UL LISTED FOR DIRECT CONTACT WITH THESE MATERIALS (SEE NEC)).
- PROTECT ALL LAMPS, LENSES AND LOUVERS DURING CONSTRUCTION. ALL LAMPS, FIXTURE HOUSINGS, LENSES AND LOUVERS SHALL BE CLEANED UPON COMPLETION OF WORK BY ALL TRADES. REPLACE DEFECTIVE OR DAMAGED LAMPS, LENSES, LOUVERS AND BALLASTS AS REQUIRED AT THE TIME OF CLEANING.
- LIGHTING SHALL BE MOUNTED ON STRIKE SIDE OF DOOR WITH TOP OF FIXTURE ALIGNED WITH THE TOP OF THE DOOR.

RACEWAYS

- UNLESS OTHERWISE NOTED, RACEWAY TYPES SHALL BE AS INDICATED BELOW.

LOCATION	RACEWAY
1. OUTDOORS, ABOVE GRADE. . .	GALVANIZED RIGID STEEL (GRS)
2. INDOOR FEEDERS AND SUBFEEDERS NOT EXPOSED TO PHYSICAL DAMAGE. . .	ELECTRICAL METALLIC TUBING (EMT)
3. INDOOR BRANCH CIRCUITS EXPOSED IN UTILITY AREAS. . .	ELECTRICAL METALLIC TUBING (EMT)
4. INDOOR BRANCH CIRCUITS CONCEALED. . .	(SEE "CONDUCTORS" SECTION)
5. INDOOR FIXTURE AND VIBRATING EQUIPMENT CONNECTIONS. . .	FLEXIBLE METALLIC CONDUIT
6. INDOOR AND OUTDOOR MOTOR CONNECTIONS. . .	LIQUID-TIGHT FLEXIBLE METAL CONDUIT
7. MOTOR CONNECTIONS IN ENVIRONMENTAL AIR FLEWINGS. . .	FLEXIBLE METAL CONDUIT
8. UNDERGROUND. . .	TYPE "TR", SCHEDULE 40 RIGID (PVC), NON METALLIC CONDUIT
9. UNDERGROUND PENETRATION. . .	GALVANIZED RIGID STEEL (GRS) THIRD GRADE

- GALVANIZED RIGID STEEL CONDUIT SHALL BE MANUFACTURED IN ACCORDANCE WITH ANSI #C80.1 AND UL #4. INSTALLATION OF GALVANIZED RIGID STEEL CONDUIT SHALL BE IN STRICT CONFORMANCE WITH NEC ARTICLE #344.
- EMT SHALL BE MANUFACTURED IN ACCORDANCE WITH ANSI #C80.3 AND UL #31. INSTALLATION OF ELECTRICAL METALLIC TUBING SHALL BE IN STRICT CONFORMANCE WITH NEC ARTICLE #358. BENDING RADII SHALL NOT BE LESS THAN REQUIRED BY NEC TABLE #554.24. SUPPORT SPACING SHALL NOT EXCEED 10'-0". ALL EMT COUPLINGS AND CONNECTORS SHALL BE OF THE CONCRETE-TIGHT AND RAIN-TIGHT TYPE. SET SCREW CONNECTORS SHALL NOT BE USED.
- FLEXIBLE METAL CONDUIT SHALL BE MANUFACTURED IN ACCORDANCE WITH UL #1. INSTALLATION OF FLEXIBLE CONDUIT SHALL BE IN STRICT CONFORMANCE WITH NEC #348 AND SHALL BE LIMITED TO 8'-0" MAXIMUM LENGTHS FOR CONNECTIONS TO LIGHTING FIXTURES AND VIBRATING EQUIPMENT. BENDING RADII FOR FLEXIBLE METAL CONDUIT SHALL NOT BE LESS THAN THOSE SPECIFIED FOR CONDUCTOR BENDING RADII. CONNECTORS FOR FLEXIBLE METAL CONDUIT SHALL BE OF SINGLE SCREW MALLEABLE IRON CLAMPING TYPE (THOMAS & BETTS SERIES #250). FLEXIBLE METAL CONDUIT AND CONNECTORS SHALL BE UL LISTED AND APPROVED FOR SHEATH GROUNDING FOR BRANCH CIRCUITS OF 20A OR LESS IN LENGTHS NOT TO EXCEED 6'-0". PROVIDE A GROUNDING CONDUCTOR SIZED TO MEET NEC TABLE #250.122 WHERE A CIRCUIT OVERCURRENT PROTECTION EXCEEDS 20A.
- LIQUID-TIGHT FLEXIBLE METAL CONDUIT SHALL BE INSTALLED IN STRICT CONFORMANCE WITH NEC ARTICLE #350 AND SHALL BE LIMITED TO 8'-0" LENGTHS FOR CONNECTIONS TO MOTORS, OUTDOOR VIBRATING EQUIPMENT AND OTHER EQUIPMENT IN WET AREAS. LIQUID-TIGHT FLEXIBLE METAL CONDUIT AND FITTINGS SHALL BE APPROVED FOR GROUNDING PURPOSES. PROVIDE A SEPARATE EXTERNAL BONDING CONDUCTOR WHERE ANY OF THE FOLLOWING CONDITIONS EXIST:
 - CONDUIT SIZE EXCEED 1/4" NPT TRADE SIZE.
 - 1/2" CONDUIT HOUSES A CIRCUIT PROTECTED IN EXCESS OF 20A.
 - 3/4" THRU 1/4" CONDUIT HOUSES A CIRCUIT PROTECTED IN EXCESS OF 60A.FITTINGS FOR LIQUID-TIGHT FLEXIBLE METAL CONDUIT SHALL BE THOMAS & BETTS "VERSA-GROUND" WITH OR WITHOUT EXTERNAL GROUND LUGS AS REQUIRED ABOVE.
- INTERMEDIATE METAL CONDUIT, MANUFACTURED IN ACCORDANCE WITH UL #1242 MAY BE SUBSTITUTED FOR GALVANIZED RIGID STEEL CONDUIT IN ABOVE GRADE, INDOOR APPLICATIONS, INC. SHALL NOT BE PERMITTED IN ABOVE OR BELOW GRADE OUTDOOR APPLICATIONS. ALL OTHER REQUIREMENTS FOR GALVANIZED RIGID STEEL SHALL APPLY.
- USE OF LIQUID-TIGHT FLEXIBLE METAL CONDUIT OR LIQUID NON- METALLIC SHALL NOT BE PERMITTED IN ENVIRONMENTAL AIR FLEWINGS, INCLUDING RETURN AIR CEILING FLEWINGS.
- EXCEPT FOR SURFACE METAL AND SURFACE NON-METALLIC, ALL RACEWAYS SHALL BE INSTALLED CONCEALED WITH THE EXCEPTION OF BOILER ROOMS, UTILITY ROOMS, GARAGES AND OTHER AREAS SPECIFICALLY APPROVED BY THE ARCHITECT.

GROUNDING

- SERVICE ENTRANCE GROUNDING ELECTRODES SHALL INCLUDE THE FOLLOWING:
 - REINFORCING BARS IN FOOTINGS.
 - DOMESTIC WATER SERVICE.
 - AT LEAST ONE 3/4" X 10' COPPERHELD GROUND ROD DRIVEN OUTSIDE BUILDING AS NEAR TO SERVICE ENTRANCE EQUIPMENT AS POSSIBLE.
- GROUNDING ELECTRODE CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH NEC TABLE #250.66 AND NEC ARTICLE #250.102(C).
- PROVIDE GROUNDING JUMPER AROUND WATER METER. JUMPER TO BE BARE STRANDED COPPER SIZED TO MATCH GROUNDING ELECTRODE CONDUCTOR SIZE. GROUNDING CLAMPS FOR WATER PIPES SHALL BE THOMAS AND BETTS SERIES #300 "V" BOLT CLAMP. PROVIDE MALLEABLE IRON CONDUIT HUB WHERE CONDUCTOR IS HOUSED IN CONDUIT FOR PHYSICAL PROTECTION.
- ALL GROUNDING CONNECTIONS TO REINFORCING BARS AND GROUND RODS AND ALL UNDERGROUND GROUNDING CABLE SPLICES SHALL BE EXOTHERMIC WELDS BY CADWELD OR APPROVED EQUAL.
- THE FOLLOWING COMPONENTS SHALL BE BONDED WITH A BARE COPPER CONDUCTOR SIZED IN ACCORDANCE WITH NEC TABLE #250.66:
 - SERVICE RACEWAYS.
 - METER ENCLOSURES.
 - SERVICE DISCONNECT ENCLOSURE.
 - GROUNDING ELECTRODES.SERVICE RACEWAYS SHALL BE BONDED BY USE OF GROUNDING BUSHINGS AT ALL TERMINATIONS UP TO AND INCLUDING THE SUPPLY SIDE OF SERVICE DISCONNECT(S).
- WHERE MULTIPLE SERVICE DISCONNECTING MEANS ARE PROVIDED, THE GROUNDING ELECTRODE CONDUCTOR SHALL BE EXTENDED TO AND BONDED TO THE ENCLOSURE OF EACH DISCONNECTING MEANS.
- THE FOLLOWING ITEMS SHALL BE BONDED TO THE SERVICE EQUIPMENT GROUND BUS USING CABLES SIZED IN ACCORDANCE WITH NEC TABLE #250.66:
 - INTERIOR STEEL FRAME.
 - STRUCTURAL STEEL FRAME.
 - METAL SIDING (WHERE APPLICABLE).
- GROUNDING OF ELECTRICAL EQUIPMENT AND ENCLOSURES DOWNSIDE OF THE SERVICE DISCONNECT SHALL BE LOCATED BY THE METALLIC RACEWAY SYSTEM WHERE PERMITTED BY THE NEC. PROVIDE SUPPLEMENTARY GROUNDING CONDUCTORS WHERE REQUIRED DUE TO LENGTHS OF FLEXIBLE METAL CONDUIT, DISCONTINUOUS ENCLOSURES, ETC.
- RECEPTACLE MOUNTING YOE SHALL NOT BE USED FOR GROUNDING PURPOSES WITH RECESSED OUTLET BOXES. PROVIDE INSULATED GROUNDING JUMPER FROM OUTLET BOXES TO RECEPTACLE GROUNDING TERMINAL (DOES NOT APPLY FOR ISOLATED GROUND RECEPTACLES).

WIRING DEVICES

- ALL WIRING DEVICES SHALL BE SPECIFICATION GRADE UNLESS OTHERWISE INDICATED. THE FOLLOWING WIRING DEVICES ARE RECOMMENDED. DISREGARD DEVICES NOT REQUIRED FOR PROJECT. MODEL NUMBERS IN PARENTHESES DESIGNATE "DECORATOR" STYLES. CHOOSE STANDARD OR DECORATOR.
- UNLESS OTHERWISE INDICATED ON THE DRAWINGS, WIRING DEVICES USED SHALL BE AS SPECIFIED BELOW OR APPROVED EQUAL.

DEVICE	MANUFACTURER & MODEL NUMBER
DUPLEX RECEPTACLE 120V, 20A, GROUNDED NEMA #5-20R.	DECORA LEVITON #N362-E (BLACK) LEVITON #5026 (STAINLESS STEEL)
GFI RECEPTACLE 120V, 20A, GROUNDED NEMA #5-20R.	DECORA LEVITON #5194-E (BLACK) LEVITON #5026 (STAINLESS STEEL)
QUAD RECEPTACLE 120V, 20A, GROUNDED NEMA #5-20R.	DECORA LEVITON #N362-E (BLACK) LEVITON #5026 (STAINLESS STEEL)
ROCKER SWITCH, 1 POLE 120/277V, 20A	DECORA LEVITON #563-2E (BLACK) LEVITON #5026 (STAINLESS STEEL)
ROCKER SWITCH, 2 POLE 120/277V, 20A	DECORA LEVITON #563-2E (BLACK) LEVITON #5026 (STAINLESS STEEL)
- WHERE SINGLE POLE, 3-WAY OR 4-WAY SWITCHES ARE GROUPED WITH DIMMERS OR FAN SPEED CONTROLS, PROVIDE LINEAR SLIDE SWITCHES BY LUTRON AS SPECIFIED ABOVE. PROVIDE MULTI-GANG COMMON HALLPLATE BY LUTRON. INDIVIDUALLY MOUNTED CONTROLS SHALL NOT BE ACCEPTED. CONTRACTOR SHALL OPERATE DIMMERS IN ACCORDANCE WITH MANUFACTURERS PROCEDURE FOR GANGED INSTALLATIONS.
- WHERE GANGED RECEPTACLES INCLUDE A GROUND FAULT CIRCUIT INTERRUPTER, PROVIDE DECORATOR STYLE CONVENIENCE OUTLETS AND MULTI-GANG DECORATOR COVERPLATE.
- WIRING DEVICE MOUNTING HEIGHTS SHALL BE AS FOLLOWS:

DEVICE	MOUNTING HEIGHT
RECEPTACLES (GENERAL AREAS)	1'-3" AFF. TO BOTTOM
RECEPTACLES (ABOVE COUNTERS)	6" ABOVE BACKSPLASH
RECEPTACLES (UTILITY AREAS)	4'-0" AFF. TO TOP
LIGHT SWITCHES (ALL AREAS)	4'-0" AFF. TO TOP
THERMOSTAT (HVAC CONTROLS)	4'-0" TO TOP

MOUNTING HEIGHTS FOR OTHER DEVICES NOT SPECIFIED ABOVE SHALL BE IN ACCORDANCE WITH NJAC #5-23-1, "BARRIER FREE SUBCODE".
- ALL RECEPTACLES INSTALLED WITHIN 6'-0" OF SINKS OR LAVATORIES SHALL BE PROVIDED WITH GROUND FAULT PROTECTION OR GROUND FAULT FEED THRU.
- ALL RECEPTACLES INSTALLED IN TOILET ROOMS SHALL BE PROVIDED WITH GROUND FAULT PROTECTION OR GROUND FAULT FEED THRU.
- ALL RECEPTACLES INSTALLED IN UNFINISHED BASEMENTS, GARAGES, CRAWL SPACES AND OUTDOORS AT GRADE SHALL BE PROVIDED WITH GROUND FAULT PROTECTION OR GROUND FAULT FEED THRU.
- COVERPLATES FOR SURFACE MOUNTED WIRING IN UTILITY AREAS SHALL BE OF THE RAISED COVER TYPE AS MANUFACTURED BY MUEBERRY, RACOR OR APPROVED EQUAL.
- COVERPLATES FOR WEATHERPROOF DUPLEX RECEPTACLES SHALL BE BELL #223-V WITH GASKET. COVERPLATES FOR WEATHERPROOF SWITCH SHALL BE BELL #224-V WITH GASKET.
- ALL SWITCHES SHALL BE MOUNTED AT THE STRIKE SIDE OF DOORS. COORDINATE FINAL DOOR SWINGS WITH THE ARCHITECTURAL DRAWINGS.
- WHERE OUTLETS ARE LOCATED IN COLUMN CLOSURES, PANELED WALLS, CUSTOM CABINETS, ETC., COORDINATE WITH ARCHITECTURAL ELEVATION DRAWINGS TO ENSURE THAT OUTLETS ARE CENTERED IN PANELS AND LOCATED ON FLAT PANELS.

SYMBOLS

NEH

Ⓢ

NEH

120V DUPLEX RECEPTACLE

NEH

Ⓢ

NEH

120V DUPLEX ISOLATED GROUND RECEPTACLE

ETR

Ⓢ

ETR

EXISTING 120V DUPLEX RECEPTACLE TO REMAIN

REL

Ⓢ

REL

EXISTING 120V DUPLEX RECEPTACLE TO BE RELOCATED

TRR

Ⓢ

TRR

EXISTING 120V DUPLEX RECEPTACLE TO BE REMOVED

NEH

Ⓢ

NEH

120V DUPLEX, 1/6, RECEPTACLE

NEH

Ⓢ

NEH

EXISTING 120V DUPLEX, 1/6, RECEPTACLE TO REMAIN

TRR

Ⓢ

TRR

EXISTING 120V DUPLEX, 1/6, RECEPTACLE TO BE REMOVED

NEH

Ⓢ

NEH

120V QUAD RECEPTACLE

ETR

Ⓢ

ETR

EXISTING 120V QUAD RECEPTACLE TO REMAIN

TRR

Ⓢ

TRR

EXISTING 120V QUAD RECEPTACLE TO BE REMOVED

NEH

Ⓢ

NEH

DATA OUTLET

ETR

Ⓢ

ETR

EXISTING DATA OUTLET TO REMAIN

TRR

Ⓢ

TRR

EXISTING DATA OUTLET TO BE REMOVED

NEH

Ⓢ

NEH

NEW TELEPHONE OUTLET FOR DESK PHONE

ETR

Ⓢ

ETR

EXISTING TELEPHONE OUTLET FOR DESK PHONE TO REMAIN

NEH

Ⓢ

NEH

NEW TELEPHONE OUTLET FOR WALL PHONE

ETR

Ⓢ

ETR

EXISTING TELEPHONE OUTLET FOR WALL PHONE TO REMAIN

TRR

Ⓢ

TRR

EXISTING TELEPHONE OUTLET TO BE REMOVED

NEH

Ⓢ

NEH

NEW COMBINATION TELEPHONE/DATA OUTLET

ETR

Ⓢ

ETR

EXISTING COMBINATION TELEPHONE/DATA OUTLET TO REMAIN

TRR

Ⓢ

TRR

EXISTING COMBINATION TELEPHONE/DATA OUTLET TO BE REMOVED

TRR

Ⓢ

TRR

EXISTING FLOOR RECEPTACLE TO BE REMOVED

TRR

Ⓢ

TRR

EXISTING FLOOR TELEPHONE/DATA OUTLET TO BE REMOVED

NEH

Ⓢ

NEH

NEW CATV OUTLET

NEH

Ⓢ

NEH

NEW JUNCTION BOX

ETR

Ⓢ

ETR

EXISTING JUNCTION BOX TO REMAIN

TRR

Ⓢ

TRR

EXISTING JUNCTION BOX TO BE REMOVED

NEH

Ⓢ

NEH

NEW LIGHT SWITCH (120 OR 277V)

ETR

Ⓢ

ETR

EXISTING 120V OR 277V TOGGLE SWITCH TO REMAIN

TRR

Ⓢ

TRR

EXISTING 120V OR 277V TOGGLE SWITCH TO BE REMOVED

REL

Ⓢ

REL

RELOCATE

TRR

Ⓢ

TRR

EXISTING CARBON MONOXIDE DETECTOR TO BE REMOVED

TRR

Ⓢ

TRR

EXISTING SMOKE DETECTOR TO BE REMOVED

TRR

Ⓢ

TRR

EXISTING HEAT DETECTOR TO BE REMOVED

TRR

Ⓢ

TRR

EXISTING FIRE ALARM HORN/STROBE TO BE REMOVED

TRR

Ⓢ

TRR

EXISTING FIRE PULL STATION TO BE REMOVED

NEH

Ⓢ

NEH

NEW LIGHT SWITCH (120 OR 277V)

ETR

Ⓢ

ETR

EXISTING 120V OR 277V TOGGLE SWITCH TO REMAIN

TRR

Ⓢ

TRR

EXISTING 120V OR 277V TOGGLE SWITCH TO BE REMOVED

REL

Ⓢ

REL

RELOCATE

TRR

Ⓢ

TRR

EXISTING CARBON MONOXIDE DETECTOR TO BE REMOVED

TRR

Ⓢ

TRR

EXISTING SMOKE DETECTOR TO BE REMOVED

TRR

Ⓢ

TRR

EXISTING HEAT DETECTOR TO BE REMOVED

TRR

Ⓢ

TRR

EXISTING FIRE ALARM HORN/STROBE TO BE REMOVED

TRR

Ⓢ

TRR

EXISTING FIRE PULL STATION TO BE REMOVED

INTERIOR RENOVATIONS
AT THE
SCIENCE - H RESIDENCE



505 Ramapo Valley Road
Mahwah, New Jersey 07430-1680

Client



505 Ramapo Valley Road
Mahwah, New Jersey 07430-1680



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Cert./Lic. No.
Date 02-03-15 Scale AS NOTED
Drawn By MD Checked By SG

Dwg. Title
ELECTRICAL NOTES, SPECIFICATIONS,
AND SYMBOLS

Work Order No. Dwg. No.

4698H E001