DIVISION 16 – ELECTRICAL

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. BASIC ELECTRICAL REQUIREMENTS

B. INTENT IS TO PROVIDE AND INSTALL ALL MATERIALS & LABOR TO IMPLEMENT THE DESIGN AS INTENDED FOR COMPLETE WORKING ELECTRICAL SYSTEMS, AS REQUIRED TO ACCOMMODATE THE NEW WORK AND ALTERATIONS.

1.2 PERFORMANCE REQUIREMENTS

A. CONFORM TO REQUIREMENTS OF THE LATEST EDITION OF ANSI/NFPA 70 NEC.

B. CONFORM TO REQUIREMENTS OF ALL LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS, PLUS LOCAL ELECTRIC UTILITY COMPANY'S RULES, AND THE FIRE UNDERWRITERS' REQUIREMENTS.

C. FURNISH PRODUCTS LISTED AND CLASSIFIED BY UNDERWRITERS' LABORATORIES, INC. (U.L.) AS SUITABLE FOR PURPOSE SPECIFIED AND SHOWN.

D. SECURE AND PAY FOR ALL PERMITS AND CERTIFICATES AS REQUIRED BY LOCAL, STATE AND FEDERAL LAWS.

E. REQUEST INSPECTIONS FROM AUTHORITY HAVING JURISDICTION.

F. CIRCUITS SHALL BE BALANCED AND LOADS AND CAPACITIES SHALL BE IN ACCORDANCE WITH N.E.C. CRITERIA AND NATIONAL BOARD OF FIRE UNDERWRITERS.

G. EXACT LOCATIONS OF ALL EQUIPMENT SHALL BE VERIFIED AT THE SITE, WITH THE OWNER AND ARCHITECT.

H. THE ENTIRE ELECTRICAL SYSTEM SHALL BE PERMANENTLY AND EFFECTIVELY GROUNDED IN ACCORDANCE WITH CODE REQUIREMENTS.

1.3 SEQUENCING AND SCHEDULING

A. SCHEDULE AND COORDINATE ALL WORK WITH THE CONSTRUCTION MANAGER AND THE OWNER.

B. ARRANGE TO EXECUTE THE WORK AT SUCH TIMES AND IN SUCH LOCATIONS AS MAY BE REQUIRED TO PROVIDE UNINTERRUPTED SERVICES FOR THE ENTIRE BUILDING, AND ALL STRUCTURES ON THE SITE.
1. SERVICES INCLUDE BUT NOT LIMITED TO: POWER, LIGHTING, FIRE ALARM, TELEPHONE, AND LIFE SAFETY SYSTEMS AS REQUIRED TO MAINTAIN SAFE OCCUPANCY.
2. IF NECESSARY, INSTALL TEMPORARY WORK TO PROVIDE FOR THIS CONDITION. AUTHORIZATION FOR INTERRUPTING SERVICES FOR ANY PORTIONS OF THE BUILDING SHALL BE OBTAINED, IN WRITING, FROM THE OWNER.
3. COSTS FOR OVERTIME WORK AND TEMPORARY WORK SHALL BE INCLUDED IN THE BID.

PART 2 – PRODUCTS

2.1 DEVICES

A. RECEPTACLES SHALL BE NEMA 5–20R. SWITCHES SHALL BE 277 VOLT RATED.

B. ALL DEVICES SHALL BE SPECIFICATION GRADE (HUBBELL HBL1221, 5362, GF8300, ETC..).

2.2 WIRE AND CABLE

A. MINIMUM WIRE SIZE SHALL BE #12 AWG. #12 AND #10 AWG WIRING SHALL BE SOLID COPPER, THWN/THHN, COLOR CODED AS INDICATED BELOW. ALL WIRING #8 AWG AND ABOVE SHALL BE STRANDED COPPER, THWN/THHN, COLOR CODED AS INDICATED BELOW. ALL CONDUCTORS SHALL BE IN CONDUIT OR SHALL BE TYPE MC CABLE AND SHALL BE PROPERLY SUPPORTED FROM BUILDING STRUCTURE.

B. WIRE COLOR CODE SHALL BE AS FOLLOWS:

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

C. DISCONNECT SWITCHES SHALL BE HEAVY DUTY TYPE, HORSE POWER RATED. IN EXTERIOR AND WET LOCATIONS PROVIDE SWITCHES WITH NEMA 3R RATING.

2.3 BRANCH PANELBOARD BREAKERS

A. MATCH EXISTING TYPE AND INTERUPTING CURRENT RATING.

2.4 INDIVIDUALLY MOUNTED CIRCUIT BREAKERS

A. MOLDED CASE CIRCUIT BREAKERS: AS SPECIFIED ABOVE IN ITEM BRANCH CIRCUIT PANELBOARDS.

B. ENCLOSURE: NEMA TYPE 1 GENERAL PURPOSE EXCEPT AS NOTED.

2.5 INDIVIDUALLY MOUNTED CONTACTOR

A. CONTACTOR RATINGS SHALL BE AS INDICATED ON DRAWINGS.

B. ENCLOSURE: NEMA TYPE 1 GENERAL PURPOSE EXCEPT AS NOTED.

2.6 HEAT TRACE CABLES

A. SUPPLY AND INSTALL COMPLETE DE–ICING SYSTEM AS FOLLOWS:
1. DE–ICING CABLE SHALL BE EASY HEAT ZH8–1–CBR ELECTRIC CONSTANT WATTAGE HEATING CABLE FOR USE ON 120 VOLTS.
2. THE HEATING CABLE SHALL CONSIST OF TWO 16 AWG STRANDED COPPER CONDUCTORS (BUS WIRES) INSULATED WITH THERMOPLASTIC ELASTOMER TPE INSULATION, A NICHROME WIRE HEATING ELEMENT SOLDERED PARALLEL BUS CONNECTION EVERY 24 INCHES, A FLAME–RETARDANT, MOISTURE–RESISTANT THERMOPLASTIC RUBBER (TPR) OUTER JACKET WITH ULTRAVIOLET SCREEN.
3. EACH CABLE SHALL DISSIPATE 8 WATTS PER LINEAL FOOT WHEN ENERGIZED WITH 120 VOLTS.
4. ALL INSTALLATION FITTINGS AND CONNECTION KITS SHALL BE SUPPLIED BY EASY HEAT, INC., SPECIFICALLY FOR USE WITH ZH ROOF AND GUTTER CABLE.

B. DE–ICING SYSTEM SHALL BE AUTOMATICALLY CONTROLLED BY ENVIRONMENTAL TECHNOLOGY, INC. GUTTER ICE DETECTION SYSTEM APS–3B CONTROL PANEL) AND GIT–1 SENSORS (MINIMUM OF TWO) LOCATED AT ROOF DRAINS.

2.7 TIME SWITCH

A. TIME CLOCK CONTROL: TORK #7200L–SERIES WITH RESERVE POWER. MOTOR VOLTAGE TO MATCH VOLTAGE INDICATED. DPDT 40 AMPERE CONTACTS.

2.8 PHOTOCELL

A. PHOTOELECTRIC CONTROL: TORK # MODEL 2101 FOR 120 VOLTS AND MODEL 2104 FOR 277 VOLTS.
1. ADJUSTABLE ON/OFF: ON RANGE FROM 2 TO 50 F/C.
2. RATED 2000 WATTS TUNGSTEN AT 120, 240 AND 277 VOLTS.
3. ENCLOSURE: DIE–CAST ZINC, GASKETED FOR EXTERIOR USE.
4. CELL: CADMIUM SULFIDE, 1" DIAMETER.

PART 3 – EXECUTION

3.1 WORKMANSHIP AND INSTALLATION

A. EXECUTE ALL WORK IN A NEAT MANNER ACCEPTABLE TO THE LOCAL AND STATE ELECTRICAL INSPECTOR. FOLLOW MANUFACTURER'S INSTALLATION RECOMMENDATIONS.

B. PERFORM ALL ELECTRICAL WORK BY LICENSED ELECTRICIANS WELL SKILLED IN THE TRADE AND SUPERVISED BY A MASTER ELECTRICIAN.

3.2 INSTALLATION

A. UPDATE PANEL SCHEDULES & PANEL LABELS ON ALL PANELS SHOWN MODIFIED REFLECTING CHANGES, PLUS TEST AND VERIFY ALL REMAINING CIRCUITS IN PANELS. CIRCUIT NUMBERS ARE SHOWN TO INDICATE QUANTITIES. ADJUST NUMBERS PER JOB CONDITIONS. AT END OF JOB, EACH PANEL SHOWN WITH MODIFICATIONS SHALL HAVE NEW ENGRAVED NAMEPLATE AND NEW TYPED DIRECTORY SCHEDULE IDENTIFYING TYPE OF LOAD AND AREA SERVED.

B. PROVIDE AND INSTALL BONDING CONDUCTOR TO EACH ELECTRICAL ITEM AND OTHERS AS INDICATED.

C. ALL WIRING SHALL BE CONCEALED.

D. IN AREA WITH NO CEILING, ALL WIRES SHALL BE RUN IN CONDUIT, MC CABLE WILL BE ALLOWED CONCEALED IN WALLS AND ABOVE CEILINGS. ALL SPARE WIRES SHALL HAVE BOTH ENDS TAGGED (INDICATING LOCATION OF OTHER END), MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS INDICATED OTHERWISE.

E. ALL WIRING TO LIGHTING FIXTURES SHALL BE IN CONDUIT EXCEPT DROPS TO FIXTURES. DROPS (WHIPS) TO LIGHT FIXTURES SHALL BE FLEXIBLE MC CABLE, MAXIMUM 6' LONG.

F. ALL PENETRATIONS THROUGH WALLS & CEILINGS SHALL BE SEALED. FIRE STOP SEALANTS SHALL BE USED TO MEET RATINGS OF WALLS & CEILINGS BEING PENETRATED.

G. INSTALL HEAT TRACE IN LOCATIONS INDICATED. HEAT TRACE SHALL BE INSTALLED IN DRAIN LINE TO BELOW GROUND FROST LEVEL.

H. PROVIDE AND INSTALL MULTI–POLE RELAYS AS REQUIRED TO FACILITATE CONTROL OF HEAT TRACE. WIRE INDIVIDUAL GUTTER HEAT TRACE CABLE CIRCUITS THROUGH MULTI–POLE RELAYS, LOCATE IN COMMON ELECTRICAL SPACE. CONTROL SHALL BE VIA HEAT TRACE CONTROLLER.

I. PROVIDE TIME CLOCK AND PHOTOCELL TO EACH RETAIL SPACE INCLUDED BUT NOT LIMITED TO:
1. VACATED CB SULLIVAN SPACE
2. TD BANKNORTH
3. VACATED BLACKBEAR MEDICAL SPACE
4. PRATT ABBOTT CLEANERS
5. HAIR SALON

J. LOCATE PHOTOCELL HIGH ON EXTERIOR WALL IN SUCH LOCATION AS TO NOT BE AFFECTED BY LIGHTS.

3.3 TESTING AND ADJUSTING

A. THE INSTALLATION SHALL BE FREE FROM SHORT CIRCUITS AND IMPROPER GROUNDS. TEST IN THE PRESENCE OF THE ARCHITECTS OR THEIR REPRESENTATIVES.

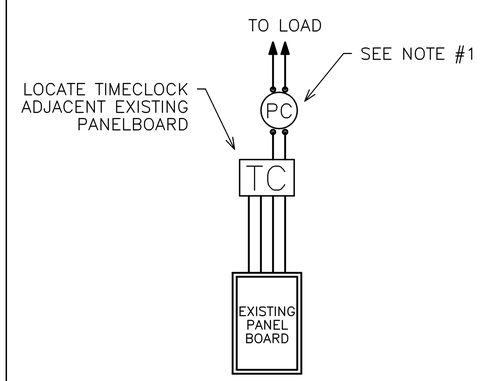
B. TEST EACH SYSTEM FOR PROPER OPERATION AND MAKE ADJUSTMENTS AS REQUIRED TO SATISFY THE CONSTRUCTION MANAGER, ENGINEER AND THE OWNER.

SPECIFICATIONS			##
NO SCALE		REF: NA	

LEGEND

LP–1,3	HOMERUN TO PNLBRD – ARROWS INDICATE NUMBER OF CIRCUITS. CROSS LINES INDICATE NUMBER OF CONDUCTORS OTHER THAN TWO PLUS BOND.
	CIRCUIT NUMBER(S)
	PANEL DESIGNATION
	WIRING CONCEALED IN WALL OR CEILING
	WIRING IN EXPOSED RACEWAY
	WIRING IN RACEWAY CONCEALED UNDER FLOOR
– UG –	WIRING IN RACEWAY CONCEALED UNDERGROUND
	2' x 4' FLUORESCENT FIXTURE
	1' x 4' FLUORESCENT FIXTURE
	1' x 8' FLUORESCENT FIXTURE
	4' x 6" FLUORESCENT FIXTURE
	8' x 6" FLUORESCENT FIXTURE
	2' x 2' FLUORESCENT FIXTURE
	WALL MOUNTED FIXTURE
	WALL MOUNTED FIXTURE
	EXIT SIGN WITH ARROWS AS INDICATED
S	SINGLE POLE SWITCH – MOUNTED UP 4'–0"
S3	THREE–WAY SWITCH – MOUNTED UP 4'–0"
S4	FOUR–WAY SWITCH – MOUNTED UP 4'–0"
SP	SWITCH AND PILOT LAMP – MOUNTED UP 4'–0"
SK	KEYED SWITCH
S	WATERPROOF SERVICE SWITCH
	SIMPLEX RECEPTACLE – MOUNTED AS INDICATED
	DUPLEX RECEPTACLE – MOUNTED UP 1'–6"
	QUAD RECEPTACLE – MOUNTED AS INDICATED
	DUPLEX RECEPTACLE MOUNTED UP 7'–0"
	DUPLEX RECEPTACLE – MOUNTED UP 4'–0", 4'–6" IN EMPLOYEE LOUNGE OR 6" ABOVE COUNTER
	GFCI DUPLEX RECEPTACLE – MOUNTED UP 4'–0" OR 6" ABOVE COUNTER
X	GFCI DUPLEX RECEPTACLE – MOUNTED UP 1'–6"
	SPECIAL OUTLET AS INDICATED – MOUNTED AS INDICATED
	CIRCLE AROUND RECEPTACLE INDICATES PENDANT MOUNTED
	PLUGMOLD WITH RECEPTACLES – MOUNTED 6" ABOVE COUNTER OR AS INDICATED
	VOICE OUTLET
	VOICE/DATA OUTLET – MOUNTED UP SAME AS ASSOCIATED RECEPTACLE
M	ELECTRICAL MOTOR
	MOTOR CONTROL EQUIPMENT
	NON–FUSED DISCONNECT SWITCH – SIZE AS REQUIRED OR AS INDICATED
	FUSED DISCONNECT SWITCH – SIZE AS REQUIRED OR AS INDICATED
	TELEPHONE BACKBOARD – SIZE AS INDICATED
	UTILITY COMPANY METER
	CT CABINET
	LIGHTING/POWER PANELBOARD 208V
	LIGHTING/POWER PANELBOARD 480V
J	JUNCTION BOX – SIZE AS REQUIRED OR AS INDICATED
T	DRY TYPE TRANSFORMER
	EMERGENCY LIGHTING BATTERY UNIT – WALL MOUNTED UP 7'–6". SEE SPEC FOR DC WIRE SIZES.
	EMERGENCY LIGHTING REMOTE HEAD WITH NUMBER OF HEADS AS INDICATED – MOUNTED UP 7'–6".
PC	PHOTOELECTRIC CELL
TC	TIME CLOCK
R	RELAY OR CONTACTOR – SIZE AS REQUIRED OR AS INDICATED
WP	WEATHER PROOF
#1#	KEYNOTE TAG
	ALL DEVICE MOUNTING HEIGHTS ARE ON CENTER

LEGEND			##
NO SCALE		REF: NA	



NOTES:

1. LOCATE PHOTOCELL HIGH ON WALL SO AS NOT TO BE AFFECTED BY LIGHTS.

TENANT SIGN LIGHTING CONTROLS
NOT TO SCALE

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STATE OF MAINE PHILIP R. MORRISSETTE No. 3917 LICENSED PROFESSIONAL ENGINEER

Project Title

WESTGATE SHOPPING CENTER

PORTLAND, ME

HA Project No.	07182

Key Plan

Mark	Date	Description
–	03–10–08	ISSUED FOR BID

Issue Dates

Drawing Status

Drawing Title

LEGEND DETAILS & SCHEDULES

PA / PE: PRM	Drawn By: DSH

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