AB	BREVIATIONS	
ACH AFF AG AHJ AIC A, AMP ATR ATS AWG	ABOVE COUNTER HEIGHT ABOVE FINISHED FLOOR ABOVE GRADE AUTHORITY HAVING JURISDICTION AMPS INTERRUPTING CAPACITY AMPERE ALL THREAD ROD AUTOMATIC TRANSFER SWITCH AMERICAN WIRE GAUGE	
CB CKT CMSD CTB	CIRCUIT BREAKER CIRCUIT COMBINATION MOTOR STARTER DISCONNECT COMMUNICATIONS TERMINAL BOARD	
DED DTT DW	DEDICATED DRY TYPE TRANSFORMER DISHWASHER	
E EA EC EWC	EXISTING, (E) EXISTING EACH ELECTRICAL CONTRACTOR ELECTRIC WATER COOLER	
FA FBOIC FI	FIRE ALARM FURNISHED BY OTHERS, INSTALLED BY CONTRACTOR FILM ILLUMINATOR	
g, gnd Gfep Gfi, gfci Gen	EQUIPMENT GROUNDING CONDUCTOR GROUND FAULT EQUIPMENT PROTECTION GROUND FAULT CIRCUIT INTERRUPTER GENERATOR	
HP	HORSEPOWER	
IG IH	ISOLATED GROUND INSTA-HOT WATER DISPENSER	
J-BOX	JUNCTION BOX	
MBJ MC MCC MCB MLO MMS MRS MW	MAIN BUILDING JUMPER MECHANICAL CONTRACTOR MOTOR CONTROL CENTER MAIN CIRCUIT BOARD MAIN LUG OUT MANUAL MOTOR STARTER MOTOR RATED SWITCH MICROWAVE	
N NEC NIC	NEUTRAL (GROUNDED CONDUCTOR) NATIONAL ELECTRICAL CODE NOT IN CONTRACT	
PH OR Ø	PHASE	
PNL	PANEL	
RECEPT REF	RECEPTACLE REFRIGERATOR	
SCH SCCR SPECS SW SWBD	SCHEDULE SHORT CIRCUIT CURRENT RATING SPECIFICATIONS SWITCH SWITCHBOARD	<u>·</u>
TELE TLR TSP TYP	TELEPHONE TWIST LOCK RECEPTACLE TWISTED SHIELDED PAIR TYPICAL	
V VFD VP	VOLT VARIABLE FREQUENCY DRIVE VANDALPROOF	
W WC WP	WATT WARMING CABINET WEATHERPROOF	
XFMR	TRANSFORMER	
		$ \sim$

GENERAL ANNOTATION

DEMO ELECTRICAL WORK			
		NEW ELECTRICAL WORK	
	×	- DETAIL OR DIAGRAM NUMBER	
ţ	×	– SHEET NUMBER WHERE DETAIL/DIAGRAM SHOWN	
		- SECTION LETTER - SHEET NUMBER WHERE SECTION SHOWN	
ſ	×]		
	x	- PLAN NUMBER - SHEET NUMBER WHERE, PLAN SHOWN	
5	$\sim \sqrt{x}$	- REVISION NUMBER - DENOTES NUMBER AND DATE WHEN REVISION OR ISSUE OCCURRED	
Ľ	\sim)—	- REVISION CLOUD - DENOTES AREA OF CHANGE	
	-		
		WITH NUMBER AND SHEET LOCATION	
	$\langle X \rangle$	DRAWING NOTE REFERENCE	
FI	FCTRICA		
		- NEC CODE REQUIRED CLEAR WORKING SPACE	
X		- EQUIPMENT DESIGNATION	
X X		– ELECTRICAL INFORMATION – EQUIPMENT DISCONNECT	
		AD-AMP DISCONNECT AF-AMP FUSES	
< <u>x</u>		- EQUIPMENT LOW VOLTAGE DESIGNATION	
	CIF	RCUITS	
- 1111 -	HOME RUN TO PANEL OR LOCATION NOTED. RACEWAY CONCEALED IN CEILING OR WALL. HASH MARKS INDICATE NUMBER OF WIRES. #12 AWG WIRE UNLESS OTHERWISE NOTED. THREE WIRES IF NO HASH MARK SHOWN. 3/4" CONDUIT IF NO CONDUIT SIZE SHOWN. LONG HASH MARK DENOTES		
	IS ALLOWED ONLY WHER	E NOTED.	
	RACEWAY BELOW SLAB		
F			
0		ON SURFACE OF WALL OR GEILING	
	RACEWAY UP		
	RACEWAY DOWN		
]	RACEWAY STUB-OUT WIT	TH BUSHING	
{	CIRCUIT CONTINUATION		
~~~•	VENDOR FURNISHED CA	BLES / CORDS	
Û	JUNCTION BOX		
	PULL BOX		
EQUIPMENT			
	PANELBOARD		
	DISTRIBUTION PANEL OR	MOTOR CONTROL CENTER	
EPO	EPO EMERGENCY POWER OFF SWITCH		
$\otimes$	EQUIPMENT CONNECTION		
Ń	MOTOR CONNECTION		
4 <u>VFD</u>	4VFD VARIABLE FREQUENCY DRIVE, HANDLE INDICATES INTEGRAL DISCONNECT		
Т	TRANSFORMER		
TVSS	TVSS TRANSIENT VOLTAGE SURGE SUPPRESSOR		
CB	CIRCUIT BREAKER		
CP	MAIN CONTROL PANEL		
	KEUUKL		

MCKINSTRY ELECTRICAL CONTRACTOR SHALL PRODUCE ACCURATE RECORD DRAWINGS AND PANEL SCHEDULES REFLECTING CHANGES DEVIATING FROM CONSTRUCTION DOCUMENTS.

RECORD DRAWINGS SHALL BE RETURNED TO MCKINSTRY ENGINEERING WHEN COMPLETED.

## LIGHTING

	FLUORESCENT FIXTURE, DRAWN TO SCALE ON PLANS LETTER IN FIXTURE INDICATES SWITCH LEG CONTROL		
⊢⊶	FLUORESCENT STRIP FIXTURE, DRAWN TO SCALE		
0	CEILING MOUNTED FIXTURE, HALF-SHADE WALL WASH		
<u> </u>	WALL MOUNTED FIXTURE		
44	BATTERY PACK		
	FIXTURE SUPPLIED FROM EMERGENCY CIRCUIT		
⊗ ⊦⊗	EXIT SIGN - DIRECTIONAL ARROWS AS INDICATED, SHADED SIDES ILLUMINATED		
)-● []-●	EXTERIOR SITE LIGHTING FIXTURE(S), POLE & BASE		
ID	LIGHT FIXTURE ID TAG - SEE FIXTURE SCHEDULE		
tag \$	SWITCHa,b, etc.,DENOTES CIRCUIT CONTROLLED SINGLE POLE SUBSCRIPTS33-WAY SWITCH44-WAY SWITCHDTDIGITAL TIMER (WATT-STOPPER #TS-400)OS1OCCUPANCY SENSORXPEXPLOSION PROOF		
®	RELAY - NEC CLASS II		
T	LOW VOLTAGE TRANSFORMER		
©\$	OCCUPANCY SENSOR		
PC	SWITCH - PHOTO CELL		
PP	POWER PACK		
<b>P</b> Δ07			

OVERRIDE PROVIDED BY BUTTON 'A' ON LOW VOLTAGE SWITCH '16' RA07 S16A

## CONTROL

$\Box$	FUSED DISCONNECT SWITCH (FUSE RATING INDICATED)
--------	-------------------------------------------------

- $\Box$ DISCONNECT SWITCH
- $\boxtimes$ MAGNETIC MOTOR STARTER
- MANUAL STARTER
- $\boxtimes_{\mathbf{r}}$ COMBINATION MOTOR STARTER DISCONNECT SWITCH
- $\overline{}$ ENCLOSED CIRCUIT BREAKER
- $\square$ THERMOSTAT
- TC TIME CLOCK
- ┲ CONTACTOR
- RELAY CONTROL TYPE ®
- PUSH BUTTON CONTROL STATION
- Э AUTO DOOR PUSHPLATE
- MOTOR RATED SWITCH \$м
- RIB (RELAY-IN-A-BOX) TOGGLE SWITCH, W/ PILOT LIGHT \$R
- С MOTORIZED SHADE CONTROLLER

# **RECEPTACIES**

	NEULI IAULUS			
Φ	SIMPLEX RECEPTACLE 120V			
rag ∯	DUPLEX RECEPTACLE 120V AC ABOVE COUNTER SP SURGE PROTECTOR TYPE IG ISOLATED GROUND TYPE S SAFETY TYPE GFCI GROUND FAULT CIRCUIT INTERRUPTER TYPE WP WEATHER PROOF XP EXPLOSION PROOF +44" MOUNTED 44" ABOVE FINISHED FLOOR			
<b>\</b>	DOUBLE DUPLEX RECEPTACLE 120V			
Ø	DUPLEX RECEPTACLE 120V, EMERGENCY CIRCUIT			
•	DOUBLE DUPLEX RECEPTACLE 120V, EMERGENCY CIRCUIT			
$\oplus$	SPLIT WIRED RECEPTACLE, 120V, TOP SWITCHED			
<b>\</b>	COMBINATION RECEPTACLE 120/208V, 120/240V			
<b>(</b>	SPECIAL RECEPTACLE, SEE PLANS FOR ADDITIONAL INFORMATION			
Φ	FLUSH FLOOR OUTLET (DEVICES AS INDICATED)			
	FLOOR OUTLET - POKE THROUGH (DEVICES AS INDICATED)			
	TELEPHONE / POWER POLE			
<u>\$\$\$</u>	MULTI-OUTLET ASSEMBLY - LENGTH PER PLAN, DEVICE(S) AS INDICATED			
TV Ø	COMBINATION OUTLET (DEVICES AS INDICATED)			





IMPACTED ELECTRICAL EQUIPMENT.

BOZEMAN, MT BUILDING DEPARTMENT: 2020 NATIONAL ELECTRICAL CODE 2021 INTERNATIONAL ENERGY CONSERVATION CODE

# COMMUNICATIONS

	SUPPORTS, DEVICES, AND CABLING BY OTHERS. UNLESS OTHERWISE NOTED, E.C. TO PROVIDE AND INSTALL 4" SQUARE JUNCTION BOX, COVER PLATE, MUD-RING, AND 3/4" CONDUIT WITH PULL STRING TO NEARBY ACCESSIBLE CEILII SPACE. COORDINATE INSTALLATION REQUIREMENTS, ADDITIONAL SCOPE, AND PRICING WITH OWNER AND TELECOMM DESIGNER PRIOR TO ROUGH-IN.
CR	CARD READER
ES	ELECTRIC STRIKE
►	COMMUNICATION/ DATA OUTLET, 18" AFF TO CENTER OF DEVICE
S	CEILING MOUNTED SPEAKER
$\mathbf{v}$	COMBINATION POWER/ DATA FLOOR BOX

# GENERAL ELECTRICAL SCOPE:

ELECTRICAL SCOPE OF WORK INVOLVES A SMALL TENANT IMPROVEMENT AT THE MSU APPLIED RESEARCH LAB. PROJECT WILL RESULT IN A NET INCREASE IN ELECTRICAL LOAD. AS-BUILT DRAWINGS WERE USED TO ESTABLISH CURRENT ELECTRICAL DEMAND(S) FOR THE



McKINSTRY Co, LLC

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www.mckinstry.com

# MONTANA STATE UNIVERSITY

ARL BUILDING LAB 114 FIT OUT

### 2380 TECHNOLOGY BLVD BOZEMAN, MT 59718

CONSULTANTS:

PROJECT:



# DRAWING INDEX

ELECTRICAL		
SHEET	TITLE	
E001	ELECTRICAL LEGEND, VICINITY MAP, AND DRAWING INDEX	
E002	ELECTRICAL SHEET SPECIFICATIONS	
E003	EXISTING ONE-LINE DIAGRAM	
E004	LOAD CALCULATIONS	
ED101	FIRST FLOOR LAB 114 ELECTRICAL DEMOLITION PLAN	
EL101	FIRST FLOOR LAB 114 LIGHTING PLAN	
EP101	FIRST FLOOR LAB 114 POWER AND SYSTEMS PLAN	

#### **DIVISION 26 - ELECTRICAL**

- SECTION 26 00 00 ELECTRICAL WORK
- 1. ALL PROVISIONS OF THE CONTRACT APPLY TO THIS WORK. THIS DIVISION CONSISTS OF THE ELECTRICAL WORK FOR THIS PROJECT. COORDINATE ALL WORK WITH OTHER TRADES AND CRAFTS FOR PROPER
- INSTALLATION AND TIMELY EXECUTION OF CONSTRUCTION. 2. BEFORE THE SUBMITTING A PROPOSAL OR BID FOR THIS WORK, CONTRACTOR SHALL EXAMINE THE COMPLETE SET OF PROJECT DOCUMENTATION FOR ALL TRADES AND SHALL VISIT THE JOB SITE TO
- DETERMINE EXISTING CONDITIONS. 3. SUBMITTING A PROPOSAL OR BID ACKNOWLEDGES THE CONTRACTOR IS FULLY AWARE OF THE SCOPE, THE EXISTING CONDITIONS AND IS ABLE TO COMPLETE ALL WORK IDENTIFIED. CONTRACTOR SHALL NOT BE ENTITLED TO ADDITIONAL COMPENSATION FOR FAILURE TO ALLOW FOR ALL EXISTING CONDITIONS PRESENT AT INSPECTION.
- 4. ALL MATERIALS, APPLIANCES, EQUIPMENT, TOOLS AND APPARATUS NECESSARY TO CONSTRUCT A COMPLETE WORKING SYSTEM SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR. 5. EQUIPMENT AND DEVICES FURNISHED AND INSTALLED BY OTHER DIVISIONS (OR BY OWNER) THAT REQUIRE ELECTRIC POWER (50V OR GREATER) SHALL BE CONNECTED BY THIS DIVISION. OBTAIN AND REVIEW ALL
- SUBMITTALS AND SHOP DRAWINGS OF THIS EQUIPMENT.
- 6. ALL WORK SHALL COMPLY WITH THE LATEST ADOPTED ELECTRICAL CODE. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY IF PROJECT DOCUMENTATION OR EXISTING CONDITIONS IMPLIES OR REQUIRES DEVIATION FROM APPLICABLE BUILDING CODES.
- 7. UNLESS INSTRUCTED OTHERWISE, CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY LICENSES, PERMITS AND FEES REQUIRED. COORDINATE INSPECTIONS AS REQUIRED WITH THE AUTHORITY HAVING JURISDICTION (AHJ). PROVIDE WRITTEN EVIDENCE OF FINAL ACCEPTANCE BY THE AHJ UPON PROJECT COMPLETION.
- 8. RECORD DRAWINGS SHALL BE CONTINUOUSLY MAINTAINED IN THE FIELD, SUBJECT TO REVIEW BY THE OWNER AND THE ENGINEER ON A REGULAR BASIS. AT COMPLETION OF WORK, CLEAN, CLEARLY MARKED REPRODUCIBLE COPIES OF CONSTRUCTION DRAWINGS WILL BE PROVIDED TO THE ENGINEER.

#### SECTION 26 00 10 - BASIC ELECTRICAL REQUIREMENTS

- 1. DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL FEATURES OF WORK. INSTALL AS NECESSARY TO AVOID INTERFERENCES, EASE INSTALLATION AND PROVIDE MAINTENANCE ACCESS AS REQUIRED AND IN ACCORDANCE WITH CODE.
- 2. VERIFY LOCATION OF ALL EQUIPMENT PRIOR TO ROUGH IN. LOCATION OF ELECTRICAL DEVICES SHOWN ON MECHANICAL DRAWINGS TAKE PRECEDENCE OVER LOCATIONS SHOWN ON ELECTRICAL DRAWINGS. 3. DRAWINGS AND SPECIFICATIONS ARE COMPLIMENTARY AND WHAT IS REQUIRED IN EITHER IS REQUIRED AS IF CALLED FOR IN BOTH. DRAWING SYMBOLS AND/OR SPECIFICATION SECTIONS INCLUDED IN THE
- CONTRACT DOCUMENTS MAY INCLUDE ITEMS NOT REQUIRED IN THE SCOPE OF WORK.
- 4. CIRCUITING IS DIAGRAMMATIC AND DOES NOT REPRESENT RACEWAY ROUTING. EXPOSED RACEWAY SHALL BE RUN PARALLEL OR AT RIGHT ANGLES TO WALLS. CONTRACTOR IS RESPONSIBLE FOR CIRCUITING AND CONNECTIONS PER INDUSTRY BEST PRACTICES.
- 5. LOAD HORSEPOWER AND/OR WATTAGES INDICATED ON THE PLANS ARE ESTIMATED REQUIREMENTS; VERIFY WITH MECHANICAL SUBMITTAL DRAWINGS BEFORE ROUGH-IN. ADVISE ENGINEER OF EQUIPMENT CIRCUIT REQUIREMENTS THAT DEVIATE FROM SUBMITTALS.
- 6. NOTIFY ENGINEER OF ANY CONFLICTS OR ISSUES IN THE DRAWINGS OR SPECIFICATIONS.

#### SECTION 26 00 40 - EXISTING SYSTEMS

- 1. DEMOLISH EXISTING ELECTRICAL AS REQUIRED. PROTECT EXISTING SYSTEMS TO REMAIN OR BE REUSED. 2. NO ELECTRIC SYSTEM OPERATION SHALL BE INTERRUPTED UNLESS SCHEDULED WITH THE OWNER IN ADVANCE. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR UNSCHEDULED INTERRUPTIONS AND EXPEDITE REPAIR
- 3. MATERIALS REMOVED AS REQUIRED BY THIS CONTRACT SHALL REMAIN THE PROPERTY OF THE OWNER. MATERIALS SUITABLE FOR REUSE SHALL BE MADE AVAILABLE FOR OWNER 'S INSPECTION. MATERIAL NOT SELECTED FOR RETENTION BY THE OWNER AND ALL DEBRIS SHALL BE DISPOSED OF BY THE GENERAL CONTRACTOR.
- SECTION 26 00 50 BASIC ELECTRICAL MATERIALS AND METHODS 1. PROVIDE ALL ELECTRICAL COMPONENTS, PARTS AND MATERIALS SHOWN AND REQUIRED BY CODE FOR EQUIPMENT FURNISHED UNDER THIS AND OTHER DIVISIONS OF THESE SPECIFICATIONS TO FORM A
- COMPLETE AND OPERABLE SYSTEM.
- 2. MATERIALS SHALL BE NEW, OF THE BEST QUALITY AND FREE FROM DEFECTS AND DESIGNED TO ENSURE SATISFACTORY OPERATION IN ENVIRONMENTAL CONDITIONS WHICH PREVAIL. ALL ELECTRICAL COMPONENTS SHALL BE LISTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY. 3. SUBMITTALS REQUIRED ONLY WHERE SPECIFIED BELOW. WHERE SUBMITTALS ARE REQUIRED, THE PARTICULAR COMPONENT BEING SUBMITTED SHALL BE CLEARLY IDENTIFIED. GENERIC CATALOG PAGES WILL
- NOT BE ACCEPTABLE. ENGINEER TO REVIEW. COMPONENTS ARE SIZED APPROPRIATELY FOR THE LOAD TO BE SERVED AND TEST TO VERIFY CONDITION. CONTRACTOR TO PROVIDE AND REPLACE ALL COMPONENTS THAT CANNOT BE REUSED.
- 4. WHERE EXISTING COMPONENTS ARE IDENTIFIED FOR REUSE, VERIFY SUITABILITY AND CONDITION. ENSURE 5. INSTALL MATERIAL AND EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, INSTRUCTIONS AND INSTALLATION DRAWINGS. WORKMANSHIP SHALL COMPLY WITH THE NATIONAL
- ELECTRICAL CONTRACTORS ASSOCIATION (NECA) NATIONAL ELECTRICAL INSTALLATION STANDARDS. PROVIDE FIREPROOFING FOR ALL PENETRATIONS OF FIRE RATED ASSEMBLIES MADE UNDER THIS CONTRACT
- FIREPROOFING TO BE REVIEWED AND APPROVED BY MCKINSTRY. 7. ALL NEW OR REUSED ELECTRICAL EQUIPMENT MOUNTED OUTDOORS, INCLUDING VARIABLE FREQUENCY DRIVES, SHALL BE INSTALLED IN SUITABLE WEATHERPROOF ENCLOSURES AND PROTECTED AGAINST

### TEMPERATURE EXTREMES OUTSIDE MANUFACTURER 'S RECOMMENDATIONS.

SECTION 26 05 19 – LOW VOLTAGE WIRES AND CABLES 1. SUBMITTAL: REQUIRED

- 2. PRODUCTS: A. COPPER, INSULATED FOR 600V. CONDUCTORS SMALLER THAN #12 SHALL NOT BE USED. CONDUCTOR INSULATION TO BE TYPE THWN/THHN 90°C.
- TYPE NM OR "ROMEX" CONDUCTORS SHALL NOT BE USED. D. DESIGN ASSUMES THAT CONDUCTOR INSULATION IN RACEWAYS EXPOSED TO HEATING BY THE SUN SHALL BE XHHW-2 90°C. CONTACTOR MAY USE THWN/THHN ONLY WHERE PROPER TEMPERATURE ADJUSTMENT FOR SOLAR HEATING HAS BEEN MADE PER NEC 310.15(B)(3)(c).
- E. ALUMINUM CONDUCTORS NOT PERMITTED FOR ANY BRANCH CIRCUIT. ALUMINUM MAY BE CONSIDERED FOR LARGE FEEDERS WITH ENGINEERING APPROVAL.

- 3. EXECUTION:
- A. INSTALL WIRING IN RACEWAY UNLESS SPECIFICALLY AUTHORIZED OTHERWISE. B. CONDUCTORS FROM #12 TO #1 OR USED IN CIRCUITS RATED 100A OR LESS SHALL BE SIZED AS 60°C UNLESS TERMINATIONS AT BOTH ENDS OF THE CONDUCTOR ARE RATED AT 75°C.
- C. CONDUCTORS LARGER THAN #1 OR FOR CIRCUITS RATED OVER 100A SHALL BE SIZED AS 75°C
- CONDUCTORS. D. 90°C AMPACITY MAY BE USED FOR AMPACITY CORRECTION AND/OR ADJUSTMENT PER NEC 110.14(C)(1).
- E. UNLESS OTHERWISE NOTED, BRANCH CIRCUITS SHALL BE (2) #12 WITH (1) #12 EGC IN ½ " CONDUIT. F. EGC MAY BE SHARED BY THE UNGROUNDED CONDUCTORS IN A MULTI-WIRE BRANCH CIRCUIT BUT EACH PHASE CONDUCTOR MUST HAVE A DEDICATED NEUTRAL. WHEN APPROVED BY THE OWNER, SHARED NEUTRALS ARE ALLOWED WHEN PROTECTED BY A MULTI-POLE OVERCURRENT PROTECTION DEVICE. DISCONNECTING MEANS MUST COMPLY WITH NEC 210.4(B).
- G. LONGER BRANCH CIRCUITS: BRANCH CIRCUITS INDICATED TO BE #12 AWG (BY DESIGNATION OR STANDARD SYMBOL) ON PLANS AND WHICH ARE GREATER IN CONDUCTOR LENGTH (MEASURED FROM PANEL BOARD TO BEGINNING OF THE LAST TAP) THAN THE FOLLOWING SCHEDULE SHALL BE CHANGED TO #10 AWG:
  - a. 120 VOLT: 75 FT. b. 277 VOLT: 150 FT.
- SECTION 26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
- 1. SUBMITTAL: NOT REQUIRED GROUNDING ELECTRODE SYSTEM
- A. SOLIDLY-GROUNDED ELECTRODE SYSTEM SHALL BE PROVIDED TO GROUND THE SERVICE ENTRANCE EQUIPMENT. GROUNDING ELECTRODE SYSTEM SHALL BE PROVIDED AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE NEC.
- B. ALL MATERIALS LISTED OR LABELED BY NRTL. EXOTHERMIC OR NON-REVERSIBLE COMPRESSION FITTINGS
- C. GROUND CONDUCTORS BROUGHT THROUGH THE FLOOR OR WALLS SHALL BE IN PVC CONDUIT SLEEVES. GROUND CONDUCTORS SHALL NOT BE LOCATED IN TRAFFIC AREAS OR WHERE SUBJECT TO
- DAMAGE D. TEST USING THE THREE-POINT FALL OF POTENTIAL METHOD. INSTALL ADDITIONAL GROUNDING
- ELECTRODES AS REQUIRED TO REACH A RESISTANCE OF 10 OHMS OR LESS TO GROUND. 3. EQUIPMENT GROUNDING CONDUCTOR:
- A. EQUIPMENT GROUND CONDUCTOR (EGC) FOR EACH NEW FEEDER AND BRANCH CIRCUIT SHALL BE A SEPARATE WIRE IN THE RACEWAY AND SIZED IN ACCORDANCE WITH NEC.
- B. USE OF METALLIC RACEWAY AS EQUIPMENT GROUNDING CONDUCTOR SHALL BE PERMITTED ONLY BY PRIOR WRITTEN APPROVAL OF ENGINEER AND OWNER.
- C. WHERE NEW CONDUCTORS ARE BEING RE-PULLED IN EXISTING METALLIC CONDUIT SERVING AS EGC. PROVIDE A SEPARATE WIRE EGC WITH THE NEW CONDUCTORS UNLESS PRECLUDED BY CONDUIT SIZE
- SECTION 26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS SUBMITTAL: NOT REQUIRED
- PRODUCTS: BRACKETS, FRAMES, AND HANGERS FABRICATED FROM STANDARD ROLLED STRUCTURAL STEEL SHAPES OR PREFABRICATED STRUCTURAL SYSTEMS.
- 3. EXECUTION: A. INSTALL SO THAT SUPPORT INSTALLATION DOES NOT WEAKEN OR OVERLOAD BUILDING STRUCTURE. B. ELECTRICAL SYSTEM HANGERS AND SUPPORTS SHALL BE INDEPENDENT OF PARTITION AND CEILING
- SYSTEM SUPPORTS C. NO OTHER TRADES SHALL HANG OR SUPPORT HVAC EQUIPMENT, DUCTWORK, OR PIPING FROM ELECTRICAL SYSTEM HANGERS AND SUPPORTS.
- D. CONTRACTOR SHALL COMPLY WITH ALL SEISMIC ANCHORAGE AND BRACING REQUIREMENTS IN COMPLIANCE WITH BUILDING CODES. PROVIDE DOCUMENTATION OF CALCULATIONS AND DETAILS TO ENGINEER AND/OR AHJ FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
- E. ANY MOUNTING BRACKETS THROUGH THE EXTERIOR WALLS OR THROUGH HISTORIC MATERIALS SHALL BE PLANNED AND EXECUTED TO PROTECT HISTORIC ELEMENTS.
- SECTION 26 05 33 RACEWAY AND BOXES
- SUBMITTAL: NOT REQUIRED, EXCEPT FOR SURFACE METAL RACEWAY AS NOTED BELOW. PRODUCTS:
- A. ALL RACEWAY TYPES LISTED IN THE NATIONAL ELECTRICAL CODE ARE ALLOWED, PROVIDED THEIR APPLICATION IS ONE OF THE 'USES PERMITTED' IN THE CODE.
- B. FLEXIBLE CONDUIT: INDUSTRY STANDARD (ALUMINUM OR THIN WALL FLEX NOT PERMITTED). PROVIDE TO EQUIPMENT SUBJECT TO VIBRATION, MOVEMENT OR LIGHTING FIXTURES.
- C. LIQUID TIGHT FLEXIBLE CONDUIT: USE FOR MOTORS, TRANSFORMERS, PUMPS OR EQUIPMENT REGULARLY WASHED DOWN OR IN DAMP LOCATIONS.
- D. RIGID METAL CONDUIT (RMC): USE GALVANIZED STEEL UNLESS OTHERWISE INDICATED. ALUMINUM RMC WHERE INDICATED OR IN SIZES 4 " AND LARGER WHERE APPROVED BY ENGINEER.
- E. RIGID NONMETALLIC CONDUIT (RNC): PVC-40 PERMITTED IN UNDERGROUND APPLICATIONS AND IN CONCRETE DUCT BANKS. UNDERGROUND TURNS OF 90 DEGREES OR GREATER SHALL BE MADE USING LONG RADIUS WITH A MINIMUM TURN RADIUS OF TEN TIMES THE CONDUIT DIAMETER. F. SURFACE METAL RACEWAY: PLASTIC RACEWAY NOT PERMITTED. WIREMOLD OR EQUAL. SUBMITTAL
- REQUIRED.
- G. CONDULETS: a. OBROUND TYPE FOR 3/4 " AND 1" SIZES
- b. FORM 7 FOR 11/2" THROUGH 2" SIZES
- H. ELECTRICAL GUTTERS AND PULL BOXES: CODE-GAUGE GALVANIZED OR PAINTED SHEET STEEL. FLUSH OR SURFACE MOUNTED AS INDICATED.
- 3. EXECUTION: A. DEVICE MOUNTING HEIGHTS TO THE TOP OF THE BOX:

OUTLET MOUNTING	HEIGHT (TYPICAL)	
SPECIAL OUTLET HEIGHTS ARE SHOWN ON THE ELECTRICAL DRAWINGS OR ON THE ARCHITECTURAL DRAWINGS. IF SPECIAL OUTLET HEIGHTS ARE NOT SHOWN OR REQUIRED, THEN LOCATE OUTLETS AS NOTED BELOW. OUTLET HEIGHTS ARE MEASURED FROM THE FINISHED FLOOR TO THE UPPER OR LOWER EDGE OF THE BOX AS NOTED BELOW.		
RECEPTACLES	15" AFF TO BOTTOM OF BOX	
LIGHT SWITCHES	48" AFF TO TOP OF BOX	
PANELBOARDS	72" AFF TO TOP OF PANELBOARD	
TELEPHONE OUTLET - DESK	15" AFF TO BOTTOM OF BOX	
TELEPHONE OUTLET - WALL	48" AFF TO TOP OF BOX	
COMPUTER OUTLET - DESK	15" AFF TO BOTTOM OF BOX	

B. COORDINATE LOCATIONS WITH WORK OF OTHER TRADES TO AVOID CONFLICTS, MAINTAIN FIRE RATINGS, AND MAINTAIN ACCESS.

3.	PRO A.	PROVIDE NEA CONTRACT. I
	В.	NAMEPLATES
4.	EXE	CUTION: SECU
<b>SEC</b> 1. 2. 3.	SCO SUB PRO A. B. C. EXE	26 27 26 - WIR PE: PROVIDE MITTALS: NOT DUCTS: ALL DEVICES ALL ELECTRIC ALL WIRING D CUTION: REFE
SEC	TION	26 28 00 – LO
1.	SCO FUR	PE: PROVIDE
2.	SUB	MITTALS: REQ
3.	PRO	DUCTS:
	A. B	SUITABLY HO
	2.	a. FUSES: I
	C.	b. BREAKEF FUSES:
		a. CLASS R
	_	c. CLASS K
	D.	MOLDED CAS
	E.	EACH BREAK
4.	EXE	(SERIES RATI
	A.	INSTALL IN AF
	в. С.	PROVIDE ENG
	•	SERVED, VOL
SEC	TION	26 51 00 - INT
1.		11TTALS: REQU
	IN	CLUDE DATA
C	B. IN	STALLATION II
Ζ.	A. LI	GHTING FIXTU
	a.	COMPLY WIT
	b.	SINGLE-STE

- 3. EXECUTION:
- A. LIGHTING FIXTURES:
- B. TEMPORARY LIGHTING:

- C. SUSPENDED LIGHTING FIXTURE SUPPORT:

c. LBD TYPE FOR 2" AND LARGER SIZES

#### SECTION 26 05 53 – IDENTIFICATION ELECTRICAL SYSTEMS

#### 1. SUBMITTAL: NOT REQUIRED 2. SCOPE: LABEL RECEPTACLES, JUNCTION BOXES, DISCONNECTS, MCC CUBICLES AND OTHER EQUIPMENT. (MATCH EXISTING LABELS ON ASSOCIATED EQUIPMENT)

ATLY TYPED PANEL SCHEDULES INSIDE EACH EXISTING PANEL BOARD AFFECTED BY THIS LETTERS SHALL BE BLACK AND A MINIMUM OF 1/8 " HIGH ON A WHITE BACKGROUND. S TO BE ENGRAVED AND CONSTRUCTED OF 1/260 INCH THICK PHENOLIC LAMINATED ETTERS SHALL BE A MINIMUM OF 1/4 " HIGH. URELY ATTACH PHENOLIC LABELS AND NAMEPLATES WITH SCREWS OR RIVETS.

RING DEVICES

WIRING DEVICES AS INDICATED. REQUIRED.

S TO BE 20 AMP SPECIFICATION GRADE, UNLESS OTHERWISE NOTED. CAL ENCLOSURES AND CABINETS TO BE NEMA RATED FOR APPROPRIATE APPLICATION. DEVICES SHALL BE NEW AND RATED FOR THE SERVICE IN WHICH THEY ARE TO BE USED. ER TO SECTION 26 05 33 FOR BOX MOUNTING HEIGHTS.

#### OW VOLTAGE CIRCUIT PROTECTIVE DEVICES

DISCONNECTS, FUSED AND UNFUSED, SHOWN AND REQUIRED BY CODE FOR EQUIPMENT R THIS AND OTHER DIVISIONS OF THESE SPECIFICATIONS. QUIRED FOR STANDALONE (IE. OUTSIDE OF PANEL BOARDS AND SWITCHBOARDS) ROTECTION DEVICES RATED 100A AND LARGER

RSEPOWER RATED FOR MOTOR LOADS. RFRS:

BUSSMANN, LITTELFUSE, OR MERSEN RS: GE. EATON. SQUARE D. OR SIEMENS.

R REJECTION TYPE. 1 FOR ALL EXCEPT MOTOR CIRCUITS

5 MOTOR LOAD TYPE FOR MOTORS. E CIRCUIT BREAKERS OF THERMAL-MAGNETIC OR MAGNETIC ONLY TYPE WHERE

BOLT-IN TYPE ONLY. KER TO BE "FULLY RATED" FOR THE FAULT CURRENT AVAILABLE AT ITS LINE-SIDE TERMINAL INGS NOT ACCEPTABLE).

PPROPRIATE EQUIPMENT WITH TRIP RATINGS AS SHOWN.

IDLY TO WALL OR APPROVED MOUNTING FRAME. GRAVED PHENOLIC NAMEPLATES WITH THE FOLLOWING INFORMATION: LOAD AND AREA LTAGE, PHASE, AND FUSE SIZE AND TYPE

#### ERIOR LIGHTING

: FOR EACH TYPE OF LIGHTING FIXTURE, ARRANGED IN ORDER OF FIXTURE DESIGNATION. ON FEATURES, ACCESSORIES, AND FINISHES.

INSTRUCTIONS. AS INDICATED.

JRE SUPPORT COMPONENTS

ITH DIVISION 26 SECTION "HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS". M HANGERS: 1/2-INCH STEEL TUBING WITH SWIVEL BALL FITTINGS AND CEILING CANOPY. E AS FIXTURE.

c. TWIN-STEM HANGERS: TWO, 1/2-INCH STEEL TUBES WITH SINGLE CANOPY DESIGNED TO MOUNT A SINGLE FIXTURE. FINISH SAME AS FIXTURE.

d. WIRES: ASTM A 641/A 641M, CLASS 3, SOFT TEMPER, ZINC-COATED STEEL, 12 GAGE. e. ROD HANGERS: 3/16-INCH MINIMUM DIAMETER, CADMIUM-PLATED, THREADED STEEL ROD.

a. SET LEVEL, PLUMB, AND SQUARE WITH CEILINGS AND WALLS UNLESS OTHERWISE INDICATED. b. INSTALL LAMPS IN EACH LUMINAIRE.

a. IF IT IS NECESSARY, AND APPROVED BY ARCHITECT, TO USE PERMANENT LUMINAIRES FOR TEMPORARY LIGHTING, INSTALL AND ENERGIZE THE MINIMUM NUMBER OF LUMINAIRES NECESSARY. WHEN CONSTRUCTION IS SUFFICIENTLY COMPLETE, REMOVE THE TEMPORARY LUMINAIRES, DISASSEMBLE, CLEAN THOROUGHLY, INSTALL NEW LAMPS, AND REINSTALL.

a. PENDANTS AND RODS: WHERE LONGER THAN 48 INCHES BRACE TO LIMIT SWINGING.

b. STEM-MOUNTED. SINGLE-UNIT FIXTURES: SUSPEND WITH TWIN-STEM HANGERS. CONTINUOUS ROWS: USE TUBING OR STEM FOR WIRING AT ONE POINT AND TUBING OR ROD FOR

SUSPENSION FOR EACH UNIT LENGTH OF FIXTURE CHASSIS, INCLUDING ONE AT EACH END. d. DO NOT USE GRID AS SUPPORT FOR PENDANT LUMINAIRES. CONNECT SUPPORT WIRES OR RODS TO BUILDING STRUCTURE.



McKINSTRY Co, LLC

SEATTLE 5005 3RD AVENUE S PO BOX 24567 **SEATTLE, WA 98124** 1-800-669-6223

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# MONTANA STATE UNIVERSITY

# ARL BUILDING LAB 114 FIT OUT

### 2380 TECHNOLOGY BLVD BOZEMAN, MT 59718

CONSULTANTS:

PROJECT:

#### REGISTRATION:



ISSUES: NO DATE DESCRIPTION **OWNER REVIEW SET** 03/07/202 **ISSUED FOR PERMIT** 

DESIGNED: DRAWN:

CHECKED:

JOB NO:

Z. CONLEY P. HIGHLEY

MSU-ARL-TI-114



J. COULTER, Z. CONLEY

SHEET NUMBER:



 $\begin{pmatrix} 1 \end{pmatrix}$ E003

SCALE: NONE



McKINSTRY Co, LLC

SEATTLE: 5005 3RD AVENUE S PO BOX 24567 SEATTLE, WA 98124 1-800-669-6223

www.mckinstry.com

## GENERAL NOTES

A. UNLESS OTHERWISE NOTED, WORK SHOWN ON ONE-LINE DIAGRAM IS EXISTING AND IS NOT IMPACTED UNDER THIS SCOPE OF WORK.

### KEYED NOTES (#)

1. EXISTING EQUIPMENT IS IMPACTED UNDER THIS SCOPE OF WORK. REFER TO ELECTRICAL PLANS AND LOAD CALCULATION SCHEDULE(S) FOR ADDITIONAL INFORMATION.

### PROJECT: MONTANA STATE UNIVERSITY

ARL BUILDING LAB 114 FIT OUT

### 2380 TECHNOLOGY BLVD BOZEMAN, MT 59718

CONSULTANTS:

#### 600V FEEDER SCHEDULE (COPPER CONDUCTORS)

NUMBER SETS	CONDUIT SIZE	PHASE CONDUCTOR	NEUTRAL CONDUCTOR	GROUND CONDUCTOR	NOTES
1	3/4"	#8	-	#10 EG	-
1	1-1/4"	#2	-	#8 EG	-
1	2"	#3/0	#3/0	#6 EF	-
1	2"	#3/0	#3/0	#6 EG #6 IG	-
1	3"	#500	-	#3 EG	-
1	3-1/2"	#500	#500	#3 EG	-
4	3"	#400	#400	#3/0 EG	-
4	4 ⁿ	CONDUC	TORS BY UTILITY O	COMPANY	-



ISSUES:				
NC	DATE	DESCRIPTION		
-	01/27/2023	OWNER REVIEW SET		
-	03/07/2023	ISSUED FOR PERMIT		

DESIGNED:	J. COULTER, Z. CONLEY
DRAWN:	Z. CONLEY
CHECKED:	P. HIGHLEY
JOB NO:	MSU-ARL-TI-114

### SHEET TITLE: EXISTING ONE-LINE DIAGRAM

E003

SHEET NUMBER:

COLTION         UTILITY COR. SIDE         PARE EED FROM         PARE EED FROM         PEED FROM         NA         PAGE         3         MICE         2           DEX XGE         201 XGE         SIGN XGE	PROJECT:		MSU APPLIED RESEARCH LAB			METERING	/ CALC. PT				PANEL NA	ME:		L	1 (BEFORE
NOLCACE         287/100/         PAUE         3         MP         4         4         7         NO         7         NO         7         NO         7         1         NO         7         1         NO         7         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1	LOCATION: UTILITY CORF		UTILITY CORR. 130ME	Y CORR. 130ME PANEL FED FROM:		MAIN MDB			FEED-THRU TO:		N/A		PAGE: 1 OF 1		
M2D. M.C.         M2M. M.C. <t< td=""><td colspan="2">BUS AMPERES: 225A VOLTAGE</td><td>VOLTAGE:</td><td colspan="3">208Y/120V</td><td></td><td colspan="3">PHASE: 3</td><td></td><td colspan="2"> WIRE: 4</td><td></td></t<>	BUS AMPERES: 225A VOLTAGE		VOLTAGE:	208Y/120V				PHASE: 3				WIRE: 4			
CFI         D39         DSCREPTOR:         (D0)         DSP         CSP         DSP         CSP         CSP <th< td=""><td>MLO / MCB</td><td>:</td><td>200A MLO</td><td>MOUNT:</td><td></td><td>SURFACE</td><td></td><td></td><td>NEMA:</td><td></td><td>1</td><td></td><td>AIC: 22,000</td><td></td><td></td></th<>	MLO / MCB	:	200A MLO	MOUNT:		SURFACE			NEMA:		1		AIC: 22,000		
ONE         DESCRIPTION         DAD         CAPD															
NOME         Corport         Corport         Priorit         Corport         C							0000								
No.         ITTE         Visc.         AV         POC         A         POC         DOC         DOC <thdoc< th=""> <thdoc< th=""> <thdoc< th=""></thdoc<></thdoc<></thdoc<>								PHASE							
3         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2 <th2< th=""> <th2< th=""> <th2< th=""> <th2< th=""></th2<></th2<></th2<></th2<>	NU. 1				(KVA)			Δ			(KVA)				
*         N         Control Transe Equineerit (r)          0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 </td <td></td> <td></td> <td></td> <td></td> <td>0.12</td> <td>20</td> <td>1</td> <td></td> <td>20</td> <td></td> <td>0.30</td> <td></td> <td></td> <td></td> <td></td>					0.12	20	1		20		0.30				
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3         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	7		EQUIP - FUTURE EQUIPMENT (1)			20	1		20		0.30	CO LAB 114			0
1         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	0					20	1		20		0.30				0
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17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     17     <	15		SPARE			20	1	B	20	1		SPARE			16
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21         SPARE         20         1         3         20         1         SPARE         22           23         SPARE         20         1         C         20         1         SPARE         22           23         SPARE         20         1         A         20         1         SPARE         22           23         SPARE         20         1         A         20         1         SPARE         28           24         SPARE         20         1         A         20         1         SPARE         20           23         SPARE         20         1         A         20         1         SPARE         20           23         SPARE         20         1         A         20         1         SPARE         20           23         SPARE         20         1         A         20         1         SPARE         40           24         SPARE         20         1         B         20         1         SPARE         40           25         SPARE         20         1         B         20         1         SPARE         40           26<	19		SPARE			20	1		20	1		SPARE			20
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25         SPARE         20         1         A         20         1         SPARE         25           27         SPARE         20         1         GPARE         20         1         SPARE         20           28         SPARE         20         1         C         20         1         SPARE         20           29         SPARE         20         1         C         20         1         SPARE         20           31         SPARE         20         1         C         20         1         SPARE         30           33         SPARE         20         1         C         20         1         SPARE         31           35         SPARE         20         1         A         20         1         SPARE         38           36         SPARE         20         1         C         20         1         SPARE         48           41         SPARE         20         1         C         20         1         SPARE         48           42         PROVISION         4         4         PROVISION         42         45           51         PROVISION<	23		SPARE			20	1	C C	20	1		SPARE			24
27     SPARE     20     1     6     20     1     SPARE     23       28     SPARE     20     1     4     20     1     SPARE     52       33     SPARE     20     1     4     20     1     SPARE     52       33     SPARE     20     1     6     20     1     SPARE     53       33     SPARE     20     1     C     20     1     SPARE     53       33     SPARE     20     1     C     20     1     SPARE     53       34     SPARE     20     1     C     20     1     SPARE     53       35     SPARE     20     1     R     20     1     SPARE     53       35     SPARE     20     1     R     20     1     SPARE     40       41     SPARE     20     1     R     20     1     SPARE     42       42     PROVSION     0     A     0     PROVSION     44       43     PROVSION     0     A     0     PROVSION     45       44     PROVSION     0     A     0     PROVSION     45       5	25		SPARE			20	1	A	20	1		SPARE			26
29         SPARE         20         1         C         20         1         SPARE         532           31         SPARE         20         1         A         20         1         SPARE         532           33         SPARE         20         1         B         20         1         SPARE         532           33         SPARE         20         1         B         20         1         SPARE         532           33         SPARE         20         1         B         20         1         SPARE         532           33         SPARE         20         1         A         20         1         SPARE         532           34         SPARE         20         1         A         20         1         SPARE         532           34         SPARE         20         1         C         20         1         SPARE         42           43         PRCVISION         4         A         PRCVISION         442         442           44         PRCVISION         4         C         PRCVISION         442           44         PRCVISION         4         A	27		SPARE			20	1	B	20	1		SPARE			28
31     SFARE     20     1     A     20     1     SPARE     34       33     SFARE     20     1     B     20     1     SPARE     34       35     SFARE     20     1     C     20     1     SPARE     33       36     SFARE     20     1     A     20     1     SPARE     33       36     SFARE     20     1     A     20     1     SPARE     33       36     SFARE     20     1     A     20     1     SPARE     40       41     SFARE     20     1     A     1     SPARE     42       43     PROVSKM     20     1     A     1     SPARE     42       44     PROVSKM     0     A     1     PROVSKM     44       45     PROVSKM     0     A     1     PROVSKM     60       46     PROVSKM     0     A     1     PROVSKM     60       55     PROVSKM     0     C     1     PROVSKM     60       56     PROVSKM     0     C     PROVSKM     62     64       57     PROVSKM     0     C     PROVSKM     62 </td <td>29</td> <td></td> <td>SPARE</td> <td></td> <td></td> <td>20</td> <td>1</td> <td>C</td> <td>20</td> <td>1</td> <td></td> <td>SPARE</td> <td></td> <td></td> <td>30</td>	29		SPARE			20	1	C	20	1		SPARE			30
33     SPARE     20     1     8     20     1     SPARE     36       35     SPARE     20     1     A     20     1     SPARE     36       37     SPARE     20     1     A     20     1     SPARE     36       37     SPARE     20     1     A     20     1     SPARE     36       38     SPARE     20     1     A     20     1     SPARE     40       41     SPARE     20     1     A     20     1     SPARE     42       43     SPCMSON     20     1     A     20     1     SPARE     42       43     PRCMSON     3     C     PRCMSON     44     45       44     SPARE     20     1     A     20     1     SPARE     42       43     PRCMSON     3     C     PRCMSON     44     45       44     PRCMSON     3     B     PRCMSON     45       51     PRCMSON     1     3     PRCMSON     52       53     PRCMSON     1     3     PRCMSON     56       54     PRCMSON     1     4     PRCMSON     56	31		SPARE			20	1	A	20	1		SPARE			32
35     SPARE     20     1     C     20     1     SPARE     58       37     SPARE     20     1     A     20     1     SPARE     40       38     SPARE     20     1     B     20     1     SPARE     40       39     SPARE     20     1     B     20     1     SPARE     42       41     SPARE     20     1     C     20     1     SPARE     42       43     PROVISION     20     1     A     20     1     SPARE     42       43     PROVISION     20     A     20     1     SPARE     42       44     PROVISION     0     A     PROVISION     44       45     PROVISION     0     A     PROVISION     52       51     PROVISION     0     A     PROVISION     55       56     PROVISION     0     64     55     56       57     PROVISION     0     64     56       56     PROVISION     0     64     56     56       57     PROVISION     0     64     56     56       58     PROVISION     0     74     70	33		SPARE			20	1	В	20	1		SPARE			34
37     SPARE     20     1     A     20     1     SPARE     38       39     SPARE     20     1     B     20     1     SPARE     40       41     SPARE     20     1     C     20     1     SPARE     42       43     PROVISION     1     A     1     SPARE     42       44     FROVISION     1     A     1     SPARE     42       45     PROVISION     1     A     1     PROVISION     44       46     PROVISION     1     A     1     PROVISION     44       47     PROVISION     1     A     1     PROVISION     44       48     PROVISION     1     A     1     PROVISION     44       49     PROVISION     1     A     1     PROVISION     45       51     PROVISION     1     A     1     PROVISION     55       57     PROVISION     1     A     1     PROVISION     55       59     PROVISION     1     A     1     PROVISION     55       59     PROVISION     1     A     10     PROVISION     56       51     PROVISION	35		SPARE			20	1	С	20	1		SPARE			36
38         SPARE         20         1         8         20         1         SPARE         40           41         SPARE         20         1         C         20         1         SPARE         42           43         PROVISION         20         1         C         20         1         SPARE         42           43         PROVISION         0         6         PROVISION         44         44           45         PROVISION         0         A         PROVISION         44           46         PROVISION         0         A         PROVISION         44           47         PROVISION         0         A         PROVISION         44           48         PROVISION         0         A         PROVISION         52           53         PROVISION         0         A         PROVISION         55           57         PROVISION         0         A         PROVISION         56           58         PROVISION         0         A         PROVISION         63           56         PROVISION         0         CON <load< td="">         CON<load< td="">         PROVISION         64           5</load<></load<>	37		SPARE			20	1	A	20	1		SPARE			38
41       SPARE       20       1       C       20       1       SPARE       42         43       PROVISION       20       1       C       20       1       SPARE       42         43       PROVISION       20       1       C       20       1       SPARE       42         44       46       PROVISION       28       PROVISION       44         46       PROVISION       48       PROVISION       48         47       PROVISION       28       PROVISION       52         53       PROVISION       251       PROVISION       52         53       PROVISION       26       PROVISION       55         57       PROVISION       26       PROVISION       53         59       PROVISION       26       27       PROVISION       53         59       PROVISION       26       27       PROVISION       54         59       PROVISION       26       27       PROVISION       54         61       PROVISION       26       27       PROVISION       54         65       PROVISION       27       27       27       27       27	39		SPARE			20	1	В	20	1		SPARE			40
43       PROVISION       44       PROVISION       44         45       PROVISION       46       47         47       PROVISION       48       PROVISION       48         48       PROVISION       48       PROVISION       48         48       PROVISION       48       PROVISION       48         49       PROVISION       48       PROVISION       50         51       PROVISION       48       PROVISION       51         53       PROVISION       48       PROVISION       52         54       PROVISION       64       74       PROVISION       54         55       PROVISION       64       74       PROVISION       53         57       PROVISION       63       PROVISION       53       56         58       PROVISION       64       74       74       74         661       PROVISION       64       74       74       74       74         65       PROVISION       64       74       74       74       74         65       PROVISION       74       74       74       74       74       74         64       PROVIS	41		SPARE			20	1	С	20	1		SPARE			42
45         PROVISION         46           47         PROVISION         64           49         PROVISION         64           49         PROVISION         65           51         PROVISION         65           53         PROVISION         65           56         PROVISION         65           57         PROVISION         65           59         PROVISION         65           59         PROVISION         65           61         PROVISION         65           63         PROVISION         65           63         PROVISION         65           63         PROVISION         65           1         CONN         1040         CONN LOAD           1         CONN LOAD         CONN LOAD         PROVISION         66           1         FREX KVA         0.00 KVA         0.00 KVA         0.00 KVA         0.00 KVA           1         LOAD         CONN LOAD	43		PROVISION					A				PROVISION			44
47       PROVISION       48       C       PROVISION       48         49       PROVISION       A       PROVISION       50         51       PROVISION       C       PROVISION       52         53       PROVISION       A       PROVISION       55         57       PROVISION       56       PROVISION       55         57       PROVISION       8       PROVISION       56         61       PROVISION       60       7       7       STORM       56         61       PROVISION       6       8       PROVISION       56         61       PROVISION       6       6       PROVISION       56         63       PROVISION       6       6       PROVISION       64         65       PROVISION       6       6       6       66         COAD       CONN LOAD       CONN LOAD       CONN LOAD       PROVISION       64         65       PROVISION       12       KA       0.00 KVA       102K       0.00 KVA	45		PROVISION					В				PROVISION			46
49         PROVISION         A         PROVISION         50           51         PROVISION         8         PROVISION         52           53         PROVISION         63         PROVISION         54           55         PROVISION         4         PROVISION         56           57         PROVISION         4         PROVISION         58           59         PROVISION         4         PROVISION         56           61         PROVISION         4         PROVISION         60           63         PROVISION         4         4         PROVISION         62           63         PROVISION         4         4         PROVISION         62           63         PROVISION         4         6         PROVISION         62           10AD         CONN.LOAD         CONN.LOAD         CONN.LOAD         CONN.LOAD         CONN.LOAD           TYPE         DESCRIPTION         THIS SECTION         DOWNSTREAM         162 KVA         PROVISION         64           R         RECEPTACLES         152 KVA         000 KVA         162 KVA         100%         004 KVA         164           FOR         TOTAL         FOTR	47		PROVISION					С				PROVISION			48
51         PROVISION         52           53         PROVISION         6         C         PROVISION         54           55         PROVISION         6         C         PROVISION         56           57         PROVISION         6         PROVISION         56           57         PROVISION         60         60           63         PROVISION         60         60           63         PROVISION         62         62           65         PROVISION         62         62           65         PROVISION         62           65         PROVISION         62           65         PROVISION         64           7YPE <desciption< td="">         CONLIDAD         CONLIDAD         CONLIDAD         CONLIDAD         CONLOAD           10AD         CONLIDAD         CONLIDAD         CONLIDAD         CONLIDAD         CONLIDAD         CONLIDAD         CONLIDAD         CONLIDAD           17PE<desciption< td="">         THIS SECTION         DOMNSTREAM         1052 KVA         NEC280.44         162 KVA         0.04 KVA         7.00 AMPS           1         LIGHTING         0.12 KVA         0.00 KVA         0.00 KVA         0.00 KVA         0</desciption<></desciption<>	49		PROVISION					A				PROVISION			50
53         PROVISION         64         PROVISION         65           55         PROVISION         68         67         PROVISION         68           59         PROVISION         62         PROVISION         68           61         PROVISION         62         PROVISION         62           63         PROVISION         62         PROVISION         62           63         PROVISION         62         PROVISION         62           63         PROVISION         62         PROVISION         66           64         PROVISION         62         PROVISION         64           65         PROVISION         62         PROVISION         66           65         PROVISION         62         PROVISION         66           704         CON         CON         LOAD         CON         CON         LOAD         PROVISION         66           7074         PROVISION         162         V/A         0.00 KVA         1.02 KVA         PROVISION         68           1040         CONN_LOAD         CONN_LOAD         CONN_LOAD         TOTAL         FCTR         TOTAL         PHASE A:           1040         0.00 KVA <td>51</td> <td></td> <td>PROVISION</td> <td></td> <td></td> <td></td> <td></td> <td>В</td> <td></td> <td></td> <td></td> <td>PROVISION</td> <td></td> <td></td> <td>52</td>	51		PROVISION					В				PROVISION			52
55         IPRCV/SION         A         PROVISION         56           57         PROVISION         B         PROVISION         56           59         PROVISION         C         PROVISION         50           61         PROVISION         A         PROVISION         62           63         PROVISION         B         PROVISION         62           63         PROVISION         B         PROVISION         64           65         PROVISION         B         PROVISION         64           65         PROVISION         B         PROVISION         64           65         PROVISION         B         PROVISION         66           10AD         CONN LOAD         CONN LOAD         CONN LOAD         PROVISION         66           10AD         CONN LOAD         CONN LOAD         CONN LOAD         DOWNSTREAM         TOTAL         (CONN LOAD         (CONN LOAD)           17YPE         DESCRIPTION         THS SECTION         DOWNSTREAM         162 KVA         NEC22044         162 KVA         PHASE BALANCE           1         162 KVA         0.00 KVA         0.00 KVA         100 KVA         0.00 KVA         0.00 KVA         0.00 KVA         0	53		PROVISION					С				PROVISION			54
57         PROVISION         60         PROVISION         60           59         PROVISION         C         PROVISION         60           61         PROVISION         A         PROVISION         62           63         PROVISION         B         PROVISION         63           65         PROVISION         C         PROVISION         64           65         PROVISION         C         PROVISION         65           104D         LOAD         CONN. LOAD <td>55</td> <td></td> <td>PROVISION</td> <td></td> <td></td> <td></td> <td></td> <td>A</td> <td></td> <td></td> <td></td> <td>PROVISION</td> <td></td> <td></td> <td>56</td>	55		PROVISION					A				PROVISION			56
59         PROVISION         60           61         PROVISION         62           63         PROVISION         62           63         PROVISION         64           65         PROVISION         64           65         PROVISION         64           65         PROVISION         66           104D         CON         CON         CON         64           65         PROVISION         66         66           104D         CON         CON         CON         CON         66           104D         CON         CON         CON         LOAD         PROVISION         66           104D         CON         CON         LOAD         CON         LOAD         PROVISION         66           104D         CON         CON         LOAD         CON         LOAD         PROVISION         66           104D         PROVISION         THIS SECTION         OUN KIA         CON         LOAD         PHASE BALANCE         (CON         LOAD         LOAD         0.00 KVA         0.00	57		PROVISION					B				PROVISION			58
61         PPROVISION         62           63         PPROVISION         64           65         PROVISION         64           66         CONN. LOAD         CONN. LOAD         PROVISION           1         CONN. LOAD         CONN. LOAD         TOTAL         FCTR         TOTAL           R         RECEPTACLES         1.62 KVA         0.00 KVA         1.62 KVA         PROVISION         0.34 KVA         7.00 AMPS           E         EQUIPMENT         0.00 KVA         0.00 KVA         0.00 KVA         100%         0.00 KVA         0.34 KVA         4.50 AMPS           C         COCINIL OAD         0.00 KVA         0.00 KVA         100%         0.00 KVA         0.36 KVA         4.50 AMPS           K         KITCHEN         0.00 KVA         0.00 KVA         100%         0.00 KVA         0.36 KVA         4.50 AMPS           SPARE (%)         0.00 KVA         1.74 KVA         1.77 KVA         1.77 KVA         4.52 AMPS <td>59</td> <td></td> <td>PROVISION</td> <td></td> <td></td> <td></td> <td></td> <td>C</td> <td></td> <td></td> <td></td> <td>PROVISION</td> <td></td> <td></td> <td>60</td>	59		PROVISION					C				PROVISION			60
63         PROVISION         64           65         PROVISION         64           65         PROVISION         66           LOAD         CONN. LOAD         CONN. LOAD         CONN. LOAD         PROVISION         66           LOAD         CONN. LOAD         CONN. LOAD         CONN. LOAD         PROVISION         66           LOAD         CONN. LOAD         CONN. LOAD         CONN. LOAD         PROVISION         66           R         RECEPTACLES         162 KVA         CONN. LOAD         CONN. LOAD         PROVISION         PHASE BALANCE           L         LIGHTING         0.12 KVA         0.00 KVA         1.02 KVA         NEC220.44         1.62 KVA         PHASE A:           L         LIGHTING         0.12 KVA         0.00 KVA         <	61		PROVISION					A				PROVISION			62
65         IPROVISION         C         IPROVISION         66           LOAD         LOAD         CONN.LOAD         CONN.LOAD         DOWNSTREAM         TOTAL         PROVISION         PHASE BALANCE         (CONN.LOAD)         CONN.LOAD         TOTAL         FCTR         TOTAL         PHASE BALANCE         (CONN.LOAD)         CONN.LOAD         TOTAL         PHASE BALANCE         (CONN.LOAD)         CONN.LOAD         TOTAL         PHASE BALANCE         (CONN.LOAD)         CONN.LOAD         TOTAL         PHASE BALANCE         (CONN.LOAD)         (CONN.LOAD)         CONN.LOAD         PHASE BALANCE         (CONN.LOAD)         CONN.LOAD         PHASE BALANCE         (CONN.LOAD)         CONN.LOAD         PHASE BALANCE         (CONN.LOAD)         OLOAD         PHASE BALANCE         (CONN.LOAD)         OLOAD         PHASE BALANCE         (CONN.LOAD)         PHASE BALANCE         (CONN.LOAD)         OLOAD         PHASE BALANCE         (CONN.LOAD)         OLOAD         OLOAD </td <td>63</td> <td></td> <td colspan="2">PROVISION</td> <td></td> <td></td> <td></td> <td>B</td> <td></td> <td></td> <td></td> <td>PROVISION</td> <td></td> <td></td> <td>64</td>	63		PROVISION					B				PROVISION			64
LOAD         LOAD         CONN. LOAD         CONN. LOAD         CONN. LOAD         TOTAL         PEM. LOAD-         PHASE BALANCE         (CONN. LOAD)           TYPE         DESCRIPTION         THIS SECTION         DOWNSTREAM         TOTAL         FCTR         TOTAL         PLOAD-         (CONN. LOAD)         (CONN. LOAD)         (CONN. LOAD)         (CONN. LOAD)         TOTAL         FCTR         TOTAL         PLOAD-         (CONN. LOAD)         (CONN VA	65		PROVISION					C				PROVISION			66
LOAD         LOAD         CONN. LOAD         CONN. LOAD         DMND         DEW. LOAD         PTAGE SEX           TYPE         DESCRIPTION         THIS SECTION         DOWNSTEAM         TOTAL         FCTR         TOTAL         (CONN. LOAD)         PLASE A:           L         LIGHTING         0.12 KVA         0.00 KVA         0.12 KVA         1.62 KVA         NEC220.44         1.62 KVA         PLASE A:         0.84 KVA         7.00 AMPS           L         LIGHTING         0.12 KVA         0.00 KVA         0.00 KVA         0.00 KVA         0.00 KVA         0.84 KVA         7.00 AMPS           H         HEATING ONLY         0.00 KVA							0.0010						DUAC		
THE         DESCRIPTION         DOWNS REAM         TOTAL         PCTR         TOTAL         PCTR         TOTAL         PLASE A:           L         LIGHTING         0.12 KVA         0.00 KVA         0.12 KVA         102 KVA         102 KVA         0.08 KVA         0.12 KVA         100%         0.01 KVA         0.08 KVA         0.00 K												DEWI. LUAD -			
N       NEUCH VALUES       1.02       NVA       1.00       NVA       1.00 <thv< td=""><td></td><td></td><td></td><td></td><td>1 1 60</td><td></td><td></td><td></td><td>162</td><td></td><td></td><td></td><td></td><td>N. LUAD)</td><td></td></thv<>					1 1 60				162					N. LUAD)	
L       LONA       0.01 KVA       1.00 KVA       0.00 KVA </td <td></td> <td></td> <td>GLES</td> <td></td> <td>0.13</td> <td></td> <td>0.00</td> <td></td> <td>0.12</td> <td></td> <td>125%</td> <td></td> <td></td> <td>7.00</td> <td></td>			GLES		0.13		0.00		0.12		125%			7.00	
L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L       L <thl< th=""> <thl< th=""> <thl< th=""></thl<></thl<></thl<>	L 				0.12		0.00		0.12		100%		0.04 NVA	7.00	AIVIES
In Incluint       0.00 KVA       0.00 KVA       0.00 KVA       120%       0.00 KVA	<u> </u>				0.00		0.00		0.00	KVA KVA	125%		PHASE B.		
Color Note:       Color N/N       Color N/N <td>C</td> <td></td> <td></td> <td></td> <td>0.00</td> <td></td> <td>0.00</td> <td></td> <td>0.00</td> <td>KVA</td> <td>100%</td> <td></td> <td></td> <td>4 50</td> <td></td>	C				0.00		0.00		0.00	KVA	100%			4 50	
X       EXISTING LOAD       0.00 KVA       0.00 KVA       100%       0.00 KVA       PHASE C:         LARGEST MOTOR FLA       0.00 KVA       0.00 KVA       100%       0.00 KVA       0.00 KVA       0.36 KVA       3.00 AMPS         LARGEST MOTOR FLA       0.00 KVA       1.74 KVA       0.00 KVA       1.74 KVA       0.00 KVA       1.74 KVA         TOTAL KVA       1.74 KVA       0.00 AMPS       4.83 AMPS       1.77 KVA       4.92 AMPS         SPARE (%)       0%       1.77 KVA       1.77 KVA       4.92 AMPS       4.92 AMPS         TOTAL AMPS WITH SPARE       1.77 KVA       1.77 KVA       4.92 AMPS       *** EXISTING DEMAND         NOTES: SCOPE OF WORK IS SHOWN IN BOLD. (D) = CIRCUIT BEING REMOVED. REFER TO AFTER SCHEDULE.       1.77 KVA       4.92 AMPS       *** EXISTING DEMAND         (1) EXISTING CIRCUIT BEING REVISED OR MODIFIED. REFER TO AFTER SCHEDULE.       (1) EXISTING CIRCUIT BEING REVISED OR MODIFIED. REFER TO AFTER SCHEDULE.       (2)         (3)       (4)       (4)       (4)       (1)       (1)       (1)       (1)	ĸ	KITCHEN			0.00		0.00	) K\/A	0.00	KVA	100%	0.00 KVA		4.00	
A         ONO NOT         ONO	X	FXISTING	IOAD		0.00		0.00	) KVA	0.00	KVA	100%	0.00 KVA	PHASE C:		
LARGEST MOTOR FLA       0.00 KVA       25%       0.00 KVA         TOTAL KVA       1.74 KVA       0.00 KVA       1.74 KVA         TOTAL AMPS       4.83 AMPS       0.00 AMPS       4.83 AMPS         SPARE (%)       0%       4.83 AMPS       4.92 AMPS         TOTAL KVA WITH SPARE       1.77 KVA       4.92 AMPS         TOTAL AMPS WITH SPARE       1.77 KVA       4.92 AMPS         NOTES: SCOPE OF WORK IS SHOWN IN BOLD. (D) = CIRCUIT BEING REMOVED. REFER TO AFTER SCHEDULE.       4.92 AMPS         (1) EXISTING CIRCUIT BEING REVISED OR MODIFIED. REFER TO AFTER SCHEDULE.       4.92 AMPS         (2)       (3)       (4)					0.00		0.00		0.00		10070		0.36 KVA	3.00	AMPS
TOTAL KVA       1.74 KVA       0.00 KVA       1.74 KVA       1.77 KVA         TOTAL AMPS       4.83 AMPS       0.00 AMPS       4.83 AMPS       4.92 AMPS         SPARE (%)       0%       1.77 KVA       1.77 KVA         TOTAL KVA WITH SPARE       1.77 KVA       4.92 AMPS         TOTAL AMPS WITH SPARE       1.77 KVA       4.92 AMPS         NOTES: SCOPE OF WORK IS SHOWN IN BOLD. (D) = CIRCUIT BEING REMOVED. REFER TO AFTER SCHEDULE.       4.92 AMPS       *** EXISTING DEMAND         (1) EXISTING CIRCUIT BEING REVISED OR MODIFIED. REFER TO AFTER SCHEDULE.		LARGEST	MOTOR FLA	0.00 KVA							25%	0.00 KVA			
TOTAL AMPS       4.83 AMPS       0.00 AMPS       4.83 AMPS         SPARE (%)       0%       1.77 KVA         TOTAL KVA WITH SPARE       1.77 KVA         TOTAL AMPS WITH SPARE       4.92 AMPS         NOTES: SCOPE OF WORK IS SHOWN IN BOLD. (D) = CIRCUIT BEING REMOVED. REFER TO AFTER SCHEDULE.       4.92 AMPS         (1) EXISTING CIRCUIT BEING REVISED OR MODIFIED. REFER TO AFTER SCHEDULE.       4.92 AMPS         (2)       (3)         (4)       (4)		TOTAL KV	A		1.74	4 KVA	0.00	KVA	1.74	KVA		1.77 KVA			
SPARE (%)       0%         TOTAL KVA WITH SPARE       1.77 KVA         TOTAL AMPS WITH SPARE       4.92 AMPS         NOTES: SCOPE OF WORK IS SHOWN IN BOLD. (D) = CIRCUIT BEING REMOVED. REFER TO AFTER SCHEDULE.       4.92 AMPS         (1) EXISTING CIRCUIT BEING REVISED OR MODIFIED. REFER TO AFTER SCHEDULE.       1.77 KVA         (2)       (3)         (4)       (4)	TOTAL AMPS			4.83	3 AMPS	0.00	AMPS	4.83	AMPS	1	4.92 AMPS				
TOTAL KVA WITH SPARE       1.77 KVA         TOTAL AMPS WITH SPARE       4.92 AMPS         NOTES: SCOPE OF WORK IS SHOWN IN BOLD. (D) = CIRCUIT BEING REMOVED. REFER TO AFTER SCHEDULE.       4.92 AMPS         (1) EXISTING CIRCUIT BEING REVISED OR MODIFIED. REFER TO AFTER SCHEDULE.       1         (2)       (3)         (4)       (4)		SPARE (%		0%	1								7		
TOTAL AMPS WITH SPARE       4.92 AMPS         NOTES: SCOPE OF WORK IS SHOWN IN BOLD. (D) = CIRCUIT BEING REMOVED. REFER TO AFTER SCHEDULE.       (1) EXISTING CIRCUIT BEING REVISED OR MODIFIED. REFER TO AFTER SCHEDULE.         (2)       (3)         (4)       (4)		TOTAL KV	A WITH SPARE		1							1.77 KVA	7		
NOTES: SCOPE OF WORK IS SHOWN IN BOLD. (D) = CIRCUIT BEING REMOVED. REFER TO AFTER SCHEDULE. (1) EXISTING CIRCUIT BEING REVISED OR MODIFIED. REFER TO AFTER SCHEDULE. (2) (3) (4)	TOTAL AMPS WITH SPARE				1							4.92 AMPS			
(1) EXISTING CIRCUIT BEING REVISED OR MODIFIED. REFER TO AFTER SCHEDULE. (2) (3) (4)	NOTES: S	COPE OF W	/ORK IS SHOWN IN BOLD. (D) = CIR	CUIT BEING RE	MOVED. R	EFER TO AFT	ER SCHED	ULE.				-	_		
(2) (3) (4)	(1)	EXISTING	CIRCUIT BEING REVISED OR MODIF	IED. REFER TO	O AFTER SC	HEDULE.									
(3) (4)	(2)														
(4)	(3)														
	(4)														

# DEMAND SUMMARY: (E) MAIN MDB (1200A, 208Y/120V, 3PH, 4W)

DESCRIPTION EXISTING DEMAND: (E) MDB

_____

NET LOAD CHANGE ADDED DEMAND: (E) PANEL L1 - LAB 114 T.I.

NEW CALCULATED DEMAND

ROJECT:		MSU APPLIED RESEARCH LAB			METERING	G / CALC. PT				PANEL NA	ME:		05.4	L1 (AFTER)
OCATION		UTILITY CORR. 130ME	PANE	L FED FROM:	MAIN MDB			FEED-THR	U TO:	N/A		PAGE: 1	OF 1	
BUS AMPE	RES:	225A	VOLT	AGE:	208Y/120V			PHASE:		3		WIRE: 4		
ILO / MCB	:	200A MLO	MOUN	NI:	SURFACE			NEMA:		1		AIC: 22	2,000	
0.1/7						0.000			0.000					
	LOAD	DESCRIPTION /		LOAD	OCPD	OCPD	PHASE	OCPD		LOAD	DESCRIPTION /		LOAD	CKI.
NO.	IYPE			(kVA)	AMP	POLE		AMP	POLE	(kVA)				NO.
1	L	LTS - LAB 114		0.61	20	1	A	20	1	0.36	CO - LAB 114		R	2
3	R	CO - TELECOM CABINET		0.18	20	1	В	20	1	0.36	CO - LAB 114		R	4
5	E	LAB 114 INTRUSION DETECTION	PANEL	0.60	20	1	C	20	1	0.36	CO - LAB 114		R	6
7	E	LAB 114 HVAC CONTROLS CABI	NET	0.60	20	1	A	20	1	0.36	CO - LAB 114		R	8
9		SPARE			20	1	В	20	1	0.50	LAB 114 MOTORIZED S	CREEN	E	10
11		SPARE			20	1	C	20	1	0.60	REC - LAB 114 CEILIN	G PROJECTOR	R	12
13		SPARE			20	1	A	20	1		SPARE			14
15		SPARE			20	1	В	20	1		SPARE			16
17		SPARE			20	1	C	20	1		SPARE			18
19		SPARE			20	1	A	20	1		SPARE			20
21		SPARE			20	1	В	20	1		SPARE			22
23		SPARE			20	1	C	20	1		SPARE			24
25		SPARE			20	1	A	20	1		SPARE			26
27		SPARE			20	1	B	20	1		SPARE			28
29		SPARE			20	1	C	20	1		SPARE			30
31		SPARE			20	1	A	20	1		SPARE			32
33		SPARE			20	1	В	20	1		SPARE			34
35		SPARE			20	1	C	20	1		SPARE			36
37		SPARE			20	1	A	20	1		SPARE			38
39		SPARE			20	1	В	20	1		SPARE			40
41		SPARE			20	1	C	20	1		SPARE			42
43		PROVISION					A				PROVISION			44
45		PROVISION					В				PROVISION			46
47		PROVISION					С				PROVISION			48
49		PROVISION					A				PROVISION			50
51		PROVISION					В				PROVISION			52
53		PROVISION					С				PROVISION			54
55		PROVISION					A				PROVISION			56
57		PROVISION					В				PROVISION			58
59		PROVISION					С				PROVISION			60
61		PROVISION					A				PROVISION			62
63		PROVISION					В				PROVISION			64
65		PROVISION					С				PROVISION			66
				I	-			I		-	•			•
LOAD	LOAD			CON	N. LOAD	CONN	I. LOAD	CONN.	LOAD -	DMND	DEM. LOAD -	F	PHASE BALANCE	
TYPE	DESCRIPT	ION		THIS	SECTION	DOWNS	STREAM	ТО	TAL	FCTR	TOTAL		(CONN. LOAD)	
R	RECEPTA	CLES		2.2	2 KVA	0.00	) KVA	2.22	KVA	NEC220.44	2.22 KVA	PHASE A:	· · · ·	
L	LIGHTING			0.6	1 KVA	0.00	) KVA	0.61	KVA	125%	0.77 KVA	1.93 K	VA 16.1	0 AMPS
E	EQUIPMEN	NT		1.7	0 KVA	0.00	) KVA	1.70	KVA	100%	1.70 KVA			
Н	HEATING (	ONLY		0.0	0 KVA	0.00	) KVA	0.00	KVA	125%	0.00 KVA	PHASE B:		
С	COOLING	ONLY		0.0	0 KVA	0.00	) KVA	0.00	KVA	100%	0.00 KVA	1.04 K	VA 8.6	7 AMPS
K	KITCHEN			0.0	0 KVA	0.00	) KVA	0.00	KVA	100%	0.00 KVA			
Х	EXISTING	LOAD		0.0	0 KVA	0.00	) KVA	0.00	KVA	100%	0.00 KVA	PHASE C:		
												1.56 K	VA 13.0	0 AMPS
	LARGEST	MOTOR FLA	0.00 KVA							25%	0.00 KVA			
	TOTAL KV	A		4.5	3 KVA	0.00	) KVA	4.53	KVA		4.69 KVA			
	TOTAL AM	PS		12.5	9 AMPS	0.00	AMPS	12.59	AMPS	-	13.01 AMPS			
	SPARE (%	)	0%											
	TOTAL KV	A WITH SPARE									4.69 KVA			
	TOTAL AM	PS WITH SPARE		———							13.01 AMPS		D	
OTES: S	COPE OF W	ORK IS SHOWN IN BOLD. UPDAT	ECIRCUIT	IRECTORY CAR	DACCORDI	NGLY.								
(1)														
(2)														
(3)														
(4)														
()														

		CALCULATED KVA	AMPS
		310.11	861.42
	EXISTING: TOTAL	310.11	861.42
EXISTING KVA	NEW KVA	ADDED KVA	AMPS
1.77	4.69	2.92	8.10
NI	ET CHANGE: TOTAL	2.92	8.10
		KVA	AMPS
	310.11	861.42	
	2.92	8.10	
NE	W DEMAND: TOTAL	313.03	869.52



SEATTLE: 5005 3RD AVENUE S PO BOX 24567 SEATTLE, WA 98124 1-800-669-6223

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### PROJECT: MONTANA STATE UNIVERSITY

# ARL BUILDING LAB 114 FIT OUT

### 2380 TECHNOLOGY BLVD BOZEMAN, MT 59718

CONSULTANTS:

#### REGISTRATION:



ISSUES:								
NO	DATE	DESCRIPTION						
-	01/27/2023	OWNER REVIEW SET						
-	03/07/2023	ISSUED FOR PERMIT						

DESIGNED:	J. COULTER, Z. CONLEY
DRAWN: CHECKED:	P. HIGHLEY
JOB NO:	MSU-ARL-TI-114
SHEET TITLE:	CALCULATIONS

SHEET NUMBER:





03/07/2023 3:33pm zacc - C:\Users\zacc\OneDrive - McKinstry\Desktop\MSU ARL\Elec\00 AutoCAD, BIM_MSU ARL - ED101.dwg

SCALE: 1/8"=1'-0"



EL101



EP101 SCALE: 1/8"=1'-0"

16'

0 2' 4' 8'

**EP101**