Ways To More Effectively Utilize REVIT For Electrical Design

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A Little About Me

Stephanie P. Elliott, PE, LEED AP BD+C, GGP

- Licensed electrical engineer for Jacobs Engineering Group Inc.
- LEED AP BD+C and a Green Globes Professional.
- Revit MEP 2015 and Revit Electrical 2016 Certified Professional
- Serves a dual role as the Building Information Modeling (BIM) coordinator as well as being an electrical engineer.
- Working in Revit software since 2007 and has
- Experience in Revit projects such as aviation, convention centers, data centers, education, federal, high-rise office towers, hospitality, and specialty facilities.
- BIM consultant for Revit projects that span 1 million square feet, as well as for campus projects with a central plant.

Class summary

This class will discuss and present ways to more effectively utilize REVIT for electrical design by better utilizing the data already in the model to perform calculations and checks. Rather than spending days working on the energy code calculation counting the fixtures and space square footages, imagine if you could print out a REVIT schedule with all the information needed to fill out COMCheck in a matter of minutes. REVIT can also be used to help the senior engineers and the QA/QC teams quickly to check the electrical backbone of a building for things like over and under-loading of electrical panels/transformers as well as branch circuit loading to check breaker size, wire size, and load classification with all the information exactly as it is currently modeled. A series of schedules can also compare the current Mechanical/plumbing schedules with the current electrical design load to ensure they match. Filters can be used to check for un-circuited items as a quick back-check.

Key learning objectives

At the end of this class, you will be able to:

- Utilize schedules to perform energy code calculations
- Utilize schedules to better coordinate electrical circuitry with mechanical and plumbing loads
- Utilize schedules to check electrical design at the panel and breaker level
- Utilize view filters to catch un-circuited electrical items as well as other disciplines that require power

Energy Code Calculations

Energy Code Calculations-Old School Style

ENERGY CODE CALCULATIONS

	Type of Fixture	Watts/Fixture	# of Fixtures - 1st	# of Fixtures - 2nd	# of Fixtures - 3rd	# of Fixtures - 4th	Tunnel	Total 1st	Total 2nd	Total 3rd	Total 4th	Tunnel
A	2' x 4' Fluorescent Troffer	110	317	267	242	221	0	34,870	29,370	26,620	24,310	-
B	2' x 4' Fluorescent Troffer	70	86	83	85	76	0	6,020	5,810	5,950	5,320	-
C	4' Fluorescent Cove Light	70	0	5	0	0	0	-	350	-	-	-
D	4' Fluorescent Strip	70	44	30	30	30	4	3,080	2,100	2,100	2,100	280
E	Open Fluorescent Downlight	50	30	60	63	60	0	1,500	3,000	3,150	3,000	-
F	2' x 2' Fluorescent Troffer	70	80	103	76	109	0	5,600	7,210	5,320	7,630	-
G	Compact Fluorescent Wall Bracket	20	4	0	0	0	2	80	-	-	-	40
H	1' x 4' Flanged Fluorescent Troffer	70	4	14	4	4	0	280	980	280	280	-
J	Open Fluorescent Wallwasher	50	10	20	20	20	0	500	1,000	1,000	1,000	-
K	Fluorescent Wraparound	70	31	12	12	9	0	2,170	840	840	630	-
L	4' Corner Mount Fluorescent	70	0	0	10	10	39	-	-	700	700	2,730
M	Open Fluorescent Downlight	50	57	56	41	41	0	2,850	2,800	2,050	2,050	-
N	Fluorescent Straggered Strip	70	35	68	68	68	0	2,450	4,760	4,760	4,760	-
N2	Fluorescent Straggered Strip	40	2	7	7	7	0	80	280	280	280	-
S	Direct / Indirect Linear Fluorescent	110	13	20	18	18	0	1,430	2,200	1,980	1,980	-
SN1	HID Uplight	215	0	3	0	0	0	-	645	-	-	-
SN2	HID Uplight	480	0	5	0	0	0	-	2,400	-	-	-
SP	Area Light, Vertical Lamp	2,300	0	0	0	0	0	-	-	-	-	-
SQ	HID In-Grade Uplight	175	10	0	0	0	0	1,750	-	-	-	-
SR	HID Wall Light	70	0	0	0	0	0	-	-	-	-	-

Total Actual Watts:	62,660	63,745	55,030	54,040	3,050
Overall Building:	235,475				
Total SF/Floor:	48,075	48,075	44,150	44,150	4,598
Overall Building:	189,048				
Allowed Ratio:	1.40				
Total Allowed Watts:	264,667				
Actual Ratio:	1.25				
Difference:	(29,192)				

Energy Code Calculations-Old School Style

Energy Code Calculations- REVIT Style

ASHRAE Energy Code Calculations

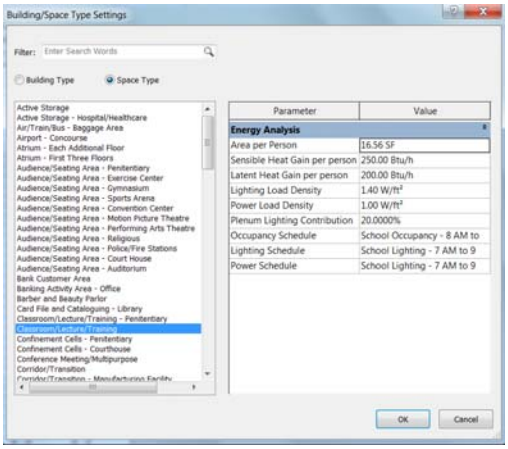
<ASHRAE ENERGY CODE CHECK>

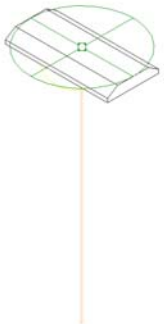
A	B	C	D	E	F	G	H
Number	Name	Square Footage	Space Type	Specified Lighti	Specified Lighting	Actual Lighting	Actual Lighting
I1130	JAN. CLOSET	40 SF	Active Storage	0.80 W/ft²	32 VA	1.60 W/ft²	64 VA
I1108	INSULATION STORAGE	1978 SF	Active Storage	0.80 W/ft²	1582 VA	0.59 W/ft²	1176 VA
I1114	HAND TOOL SECURE STORAGE	270 SF	Active Storage	0.80 W/ft²	216 VA	1.18 W/ft²	320 VA
I1128	CONFERENCE / BREAK ROOM	384 SF	Conference Meeting/Multipurpos	1.30 W/ft²	500 VA	0.56 W/ft²	216 VA
I1107	CORRIDOR	923 SF	Corridor/Transition	0.50 W/ft²	461 VA	0.24 W/ft²	220 VA
I1901	MECHANICAL / COMPRESSOR	252 SF	Electrical/Mechanical	1.50 W/ft²	378 VA	1.53 W/ft²	384 VA
I1903	ELECTRICAL / COMM.	151 SF	Electrical/Mechanical	1.50 W/ft²	227 VA	1.27 W/ft²	192 VA
I1902	IT	64 SF	Electrical/Mechanical	1.50 W/ft²	97 VA	1.99 W/ft²	128 VA
I1126	OFFICE	96 SF	Office - Enclosed	1.10 W/ft²	106 VA	0.75 W/ft²	72 VA
I1124	OFFICE	94 SF	Office - Enclosed	1.10 W/ft²	103 VA	0.77 W/ft²	72 VA
I1122	OFFICE	98 SF	Office - Enclosed	1.10 W/ft²	107 VA	0.74 W/ft²	72 VA
I1110	BUILDING MAINTENANCE	1213 SF	Office - Enclosed	1.10 W/ft²	1334 VA	0.97 W/ft²	1176 VA
I1120	OFFICE	96 SF	Office - Enclosed	1.10 W/ft²	106 VA	0.75 W/ft²	72 VA
I1118	COPY / SUPPLY RM	122 SF	Office - Enclosed	1.10 W/ft²	134 VA	0.59 W/ft²	72 VA
I1102	MEN'S	195 SF	Restrooms	0.90 W/ft²	175 VA	0.88 W/ft²	172 VA
I1101	WOMEN'S	82 SF	Restrooms	0.90 W/ft²	74 VA	1.04 W/ft²	86 VA
I1104	INSULATION SHOP	812 SF	Workshop - Workshop	1.90 W/ft²	1543 VA	1.45 W/ft²	1176 VA
I1106	INSULATION SHOP	1299 SF	Workshop - Workshop	1.90 W/ft²	2467 VA	0.91 W/ft²	1176 VA
I1112	CARPENTER SHOP	2041 SF	Workshop - Workshop	1.90 W/ft²	3879 VA	0.86 W/ft²	1764 VA
I1116	DUST COLLECTOR	68 SF	Workshop - Workshop	1.90 W/ft²	129 VA	0.80 W/ft²	54 VA
Grand total					13650 VA		8664 VA

ASHRAE Energy Code Calculations – Model Setup

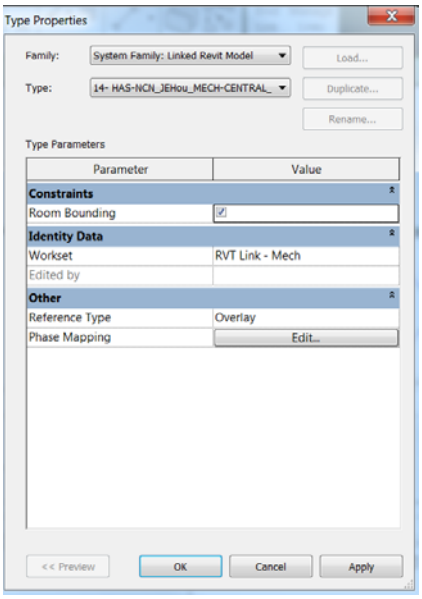
<ASHRAE ENERGY CODE CHECK SPACES DEFINITIONS>

A	B	C	D	E
Number	Name	Space Type	Limit Offset	Room Limit Off
10190	TT - FUTURE EXPAN	<Building>	8' - 0"	8' - 0"
10203	TT - MEN'S LOCKER	<Building>	8' - 0"	8' - 0"
10204	TT - CIRCULATION	<Building>	8' - 0"	8' - 0"
10206	TT - OFFICE	<Building>	8' - 0"	8' - 0"
10206	TELEPHONE COMM	<Building>	8' - 0"	8' - 0"
10207	TT - CUBICLE	<Building>	8' - 0"	8' - 0"
10208	TT - BREAKROOM	<Building>	8' - 0"	8' - 0"
10217	CONFERENCE ROO	<Building>	8' - 0"	8' - 0"
10252	TT WOMEN'S LOCK	<Building>	8' - 0"	8' - 0"
10401	TRAINING CLASSRO	<Building>	10' - 0"	8' - 0"
10402	STORAGE	<Building>	10' - 0"	8' - 0"
10404	STAIR 1	<Building>	10' - 6"	10' - 6"
10405	INSTRUCTOR WOR	<Building>	8' - 0"	8' - 0"
10406	TRAINING CLASSRO	<Building>	10' - 0"	10' - 6"
10407	BREAKROOM	<Building>	8' - 0"	10' - 6"
10408	STORAGE	<Building>	8' - 0"	8' - 0"
10409	TRAINING CLASSRO	<Building>	10' - 0"	10' - 6"
10410	ELEC.	<Building>	10' - 0"	10' - 6"
10411	OFFICE	<Building>	8' - 0"	10' - 6"
10412	OFFICE	<Building>	8' - 0"	10' - 6"
10413	TRAINING CORRIDO	<Building>	10' - 0"	10' - 6"
10414	CUBICLE	<Building>	8' - 0"	10' - 6"
10415	TRAINING CLASSRO	<Building>	10' - 0"	10' - 6"
10416	WOMEN'S RESTRO	<Building>	8' - 0"	8' - 0"
10417	JANITOR	<Building>	8' - 0"	8' - 0"
10418	TRAINING CLASSRO	<Building>	10' - 0"	10' - 6"
10419	COPY ROOM	<Building>	8' - 0"	8' - 0"
10420	MEN'S RESTROOM	<Building>	8' - 0"	8' - 0"
10501	SWITCHGEAR	<Building>	10' - 0"	10' - 6"
10502	MECHANICAL	<Building>	10' - 0"	10' - 6"
10503	CORRIDOR	<Building>	8' - 0"	8' - 0"
10504	CORRIDOR	<Building>	8' - 0"	8' - 0"





ASHRAE Energy Code Calculations – Model Setup



ASHRAE Energy Code Calculations

<ASHRAE ENERGY CODE CHECK>

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Number	Name	Square Footage	Space Type	Specified Lighti	Specified Lighting	Actual Lighting	Actual Lighting
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I1126	OFFICE	96 SF	Office - Enclosed	1.10 W/ft²	106 VA	0.75 W/ft²	72 VA
I1124	OFFICE	94 SF	Office - Enclosed	1.10 W/ft²	103 VA	0.77 W/ft²	72 VA
I1122	OFFICE	98 SF	Office - Enclosed	1.10 W/ft²	107 VA	0.74 W/ft²	72 VA
I1110	BUILDING MAINTENANCE	1213 SF	Office - Enclosed	1.10 W/ft²	1334 VA	0.97 W/ft²	1176 VA
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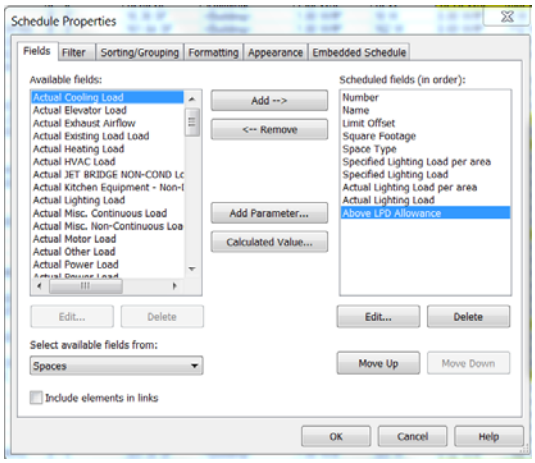
Grand total					13650 VA		8664 VA

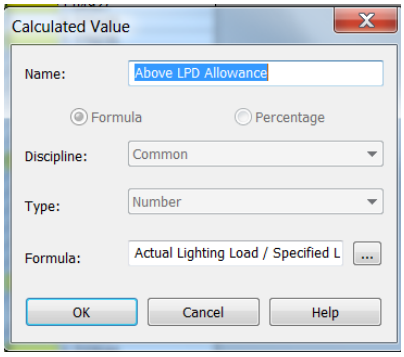
ASHRAE Energy Code Calculations

<ASHRAE ENERGY CODE CHECK>

A	B	C	D	E	F	G	H	I	J
Number	Name	Limit Offset	Square Footage	Space Type	Specified Lighti	Specified Lig	Actual Lightin	Actual Lightin	Above LPD Allowance
10177	CORRIDOR	8' - 0"	429.41 SF	<Building>	1.00 W/ft²	429 W	0.00 W/ft²	0 W	0
10182	CHASE	8' - 0"	18.38 SF	<Building>	1.00 W/ft²	18 W	0.00 W/ft²	0 W	0
10183	CHASE	8' - 0"	18.38 SF	<Building>	1.00 W/ft²	18 W	16.76 W/ft²	308 W	16.761652
10184	CHASE	8' - 0"	18.38 SF	<Building>	1.00 W/ft²	18 W	16.76 W/ft²	308 W	16.761652
10185	CHASE	8' - 0"	18.38 SF	<Building>	1.00 W/ft²	18 W	0.00 W/ft²	0 W	0
10190	TT - FUTURE EXPAN	8' - 0"	161.64 SF	<Building>	1.00 W/ft²	162 W	0.69 W/ft²	112 W	0.692885
10203	TT - MEN'S LOCKER	8' - 0"	260.73 SF	<Building>	1.00 W/ft²	261 W	0.43 W/ft²	112 W	0.429556
10204	TT - CIRCULATION	8' - 0"	349.57 SF	<Building>	1.00 W/ft²	350 W	0.64 W/ft²	224 W	0.64078
10205	TT - COMPUTER TR	0' - 0"	0.00 SF	<Building>	1.00 W/ft²	0 W	0.00 W/ft²	0 W	
10206	TT - OFFICE	8' - 0"	164.32 SF	<Building>	1.00 W/ft²	164 W	0.68 W/ft²	112 W	0.681613
10207	TT - CUBICLE	8' - 0"	174.55 SF	<Building>	1.00 W/ft²	175 W	0.32 W/ft²	56 W	0.320822
10208	TT - BREAKROOM	8' - 0"	319.11 SF	<Building>	1.00 W/ft²	319 W	0.70 W/ft²	224 W	0.701951
10252	TT WOMEN'S LOCK	8' - 0"	213.48 SF	<Building>	1.00 W/ft²	213 W	1.05 W/ft²	224 W	1.04927
10401	TRAINING CLASSRO	10' - 0"	764.06 SF	<Building>	1.00 W/ft²	764 W	0.78 W/ft²	594 W	0.777429
10402	ELEV. EQUIP.	10' - 0"	109.38 SF	<Building>	1.00 W/ft²	109 W	1.17 W/ft²	128 W	1.170235
10404	STAIR 1	8' - 0"	323.15 SF	<Building>	1.00 W/ft²	323 W	0.69 W/ft²	224 W	0.69318
10405	INSTRUCTOR WOR	8' - 0"	349.10 SF	<Building>	1.00 W/ft²	349 W	0.41 W/ft²	144 W	0.412491
10406	TRAINING CLASSRO	10' - 0"	773.01 SF	<Building>	1.00 W/ft²	773 W	0.77 W/ft²	594 W	0.768428
10407	BREAKROOM	8' - 0"	424.88 SF	<Building>	1.00 W/ft²	425 W	0.53 W/ft²	224 W	0.527203

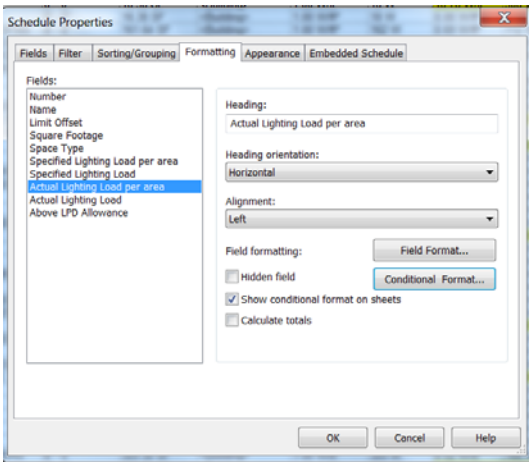
ASHRAE Energy Code Calculations

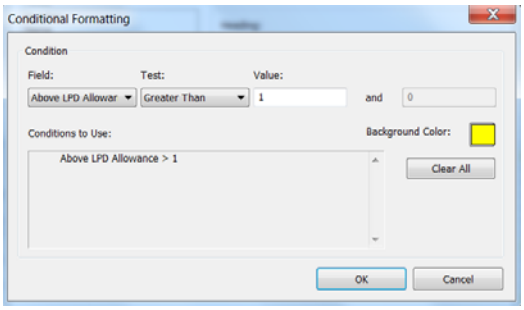




Above LPD Allowance=
Actual Lighting Load / Specified Lighting Load

ASHRAE Energy Code Calculations





COMCheck Information

<LIGHTING ENERGY CODE>

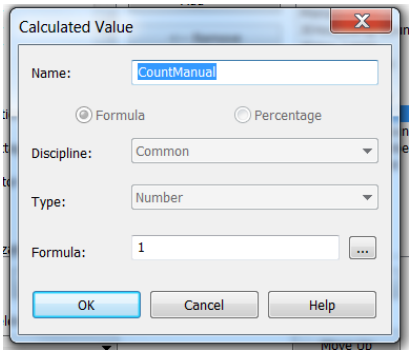
A	B	C	D	E	F	G
TYPE MARK	TYPE, MANUFACTURER AND MODEL NUMBER	JEHou Lamp C	LAMP TYPE	LAMP WATTA	Watts per Type	Count
J	EXTERIOR WALL PACK, LITHONIA DSXW1 LED-20C-700-40K-T4M-MVOLT-DWHXD	1	LED	47 W	47	1
K	EXTERIOR WALL PACK, LITHONIA DSXW2 LED-30C-700-40K-T4M-MVOLT-DWHXD	1	LED	71 W	852	12
L-10E	6" DIA. RECESSED LED DOWN LIGHT, LITHONIA LDN6 35/10 LO6AR 277 EL	1	LED	18 W	18	1
ME	EXTERIOR WALL PACK, LITHONIA DSXW1 LED-10C-530-40K-T3M-MVOLT-ELCW-DWHXD	1	LED	20 W	60	3
X	LITHONIA LIGHTING EXG LED EL M6	1	LED	3 W	3	1
Active Storage						
B	LITHONIA LIGHTING C 2 32 MVOLT GEB10PS	2	F32T8	32 W	256	4
BE	LITHONIA LIGHTING C 2 32 MVOLT GEB10PS EL. EMERGENCY LIGHT WITH BATTERY PACK.	2	F32T8	32 W	128	2
G4	2'X4' FLUORESCENT HIGH BAY LIGHT LITHONIA LIGHTING IBZ 454L WD WGX	4	F54T5HO/841/EA/ALT	54 W	864	4
G4E	2'X4' FLUORESCENT HIGH BAY LIGHT LITHONIA LIGHTING IBZ 454L WD EL14 WGX	4	F54T5HO/841/EA/ALT	54 W	432	2
X	LITHONIA LIGHTING EXG LED EL M6	1	LED	3 W	3	1
Conference Meeting/Multipurpose						
D	VOLUMETRIC TROFFER 2X2 LED LAY-IN, LITHONIA 2VTL2 - 33L-ADP-MVOLT-EZ1-LP835-N100	1	LED	33 W	165	5
DE	VOLUMETRIC TROFFER 2X2 LED LAY-IN, LITHONIA 2VTL2 - 33L-ADP-MVOLT-EZ1-LP835-N100-EL14L	1	LED	33 W	33	1
Corridor/Transition						
C	VOLUMETRIC TROFFER 2X2 LED LAY-IN, LITHONIA 2VTL2 - 20L-ADP-MVOLT-EZ1-LP835-N100	1	LED	20 W	100	5
CE	VOLUMETRIC TROFFER 2X2 LED LAY-IN, LITHONIA 2VTL2 - 20L-ADP-MVOLT-EZ1-LP835-N100-EL14L	1	LED	20 W	120	6
X	LITHONIA LIGHTING EXG LED EL M6	1	LED	3 W	6	2
Electrical/Mechanical						
B	LITHONIA LIGHTING C 2 32 MVOLT GEB10PS	2	F32T8	32 W	320	5
BE	LITHONIA LIGHTING C 2 32 MVOLT GEB10PS EL. EMERGENCY LIGHT WITH BATTERY PACK.	2	F32T8	32 W	384	6
Office - Enclosed						
D	VOLUMETRIC TROFFER 2X2 LED LAY-IN, LITHONIA 2VTL2 - 33L-ADP-MVOLT-EZ1-LP835-N100	1	LED	33 W	297	9
DE	VOLUMETRIC TROFFER 2X2 LED LAY-IN, LITHONIA 2VTL2 - 33L-ADP-MVOLT-EZ1-LP835-N100-EL14L	1	LED	33 W	33	1
G4	2'X4' FLUORESCENT HIGH BAY LIGHT LITHONIA LIGHTING IBZ 454L WD WGX	4	F54T5HO/841/EA/ALT	54 W	864	4
G4E	2'X4' FLUORESCENT HIGH BAY LIGHT LITHONIA LIGHTING IBZ 454L WD EL14 WGX	4	F54T5HO/841/EA/ALT	54 W	432	2
Restrooms						
A	LITHONIA LIGHTING WL4 41L D43 LP835 NX	1	LED	43 W	172	4
AE	LITHONIA LIGHTING WL4 41L D43 LP835 NX EL14L. EMERGENCY LIGHT WITH BATTERY PACK.	1	LED	43 W	86	2
Workshop - Workshop						
G4	2'X4' FLUORESCENT HIGH BAY LIGHT LITHONIA LIGHTING IBZ 454L WD WGX	4	F54T5HO/841/EA/ALT	54 W	3240	15
G4E	2'X4' FLUORESCENT HIGH BAY LIGHT LITHONIA LIGHTING IBZ 454L WD EL14 WGX	4	F54T5HO/841/EA/ALT	54 W	1296	6
W	4' STRIP FLUORESCENT LITHONIA LIGHTING FEN4 1 54T5HO BMPCL MVOLT GEB10PS90	1	F54T5HO/841/EA/ALT	54 W	54	1
X	LITHONIA LIGHTING EXG LED EL M6	1	LED	3 W	9	3
Grand total: 108					10274	

COMCheck Information

<Lighting COMCheck>

A	B	C	D	E	F	G	H	I
Type Mark	Manufacturer	JEH	JEHou_Lamp	JEHou_Wattag	Watts Per Type	CountManual	CoveWholeNum	Combined Count
F1	RECESSED CONTINUOUS LINEAR LED "DOT-LINE" DOW	1	LED	8127 W	27	301	447	447
F2	SURFACE MOUNTED CONTINUOUS LINEAR LED ADJUS	1	LED	649 W	11	59	905	905
F2a	SIMILAR TO TYPE F2 BUT LOWER OUTPUT WITH A WID	1	LED	1295 W	7	185	1000	1029
F3	SURFACE MOUNTED CONTINUOUS LINEAR RGBW-COL	1	LED	264 W	11	24	252	252
F3a	SIMILAR TO TYPE F3 BUT WITH A NARROW GRAZING O	1	LED	99 W	12.4	8	280	280
F4-2	RECESSED LED (2)-HEAD ADJUSTABLE DOWNLIGHT SL	2	LED XICATO	3132 W	58	108	0	108
F4-3	RECESSED LED (3)-HEAD ADJUSTABLE DOWNLIGHT SL	3	LED XICATO	7917 W	87	273	0	273
F5	RECESSED LED PINHOLE ADJUSTABLE DOWNLIGHT, 2.	1	LED	7160 W	20	358	0	358
F6	SURFACE MOUNTED CONTINUOUS LINEAR LED LENSE	4	LED	472 W	11.24	168	168	168
F7	INGRADE LED ADJUSTABLE UPLIGHT, 8" NOMINAL APER	1	LED	1200 W	15	80	0	80

COMCheck Information

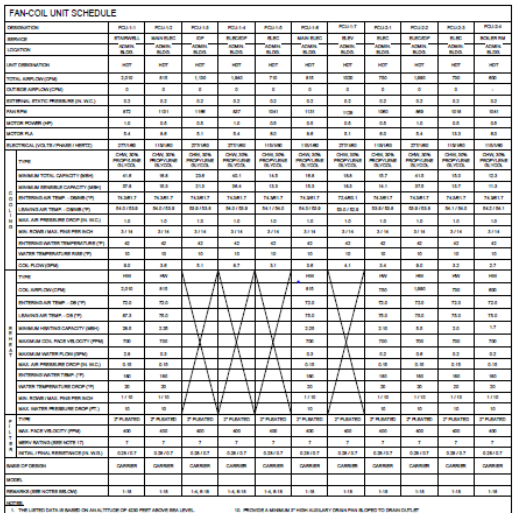


COMBINED COUNT

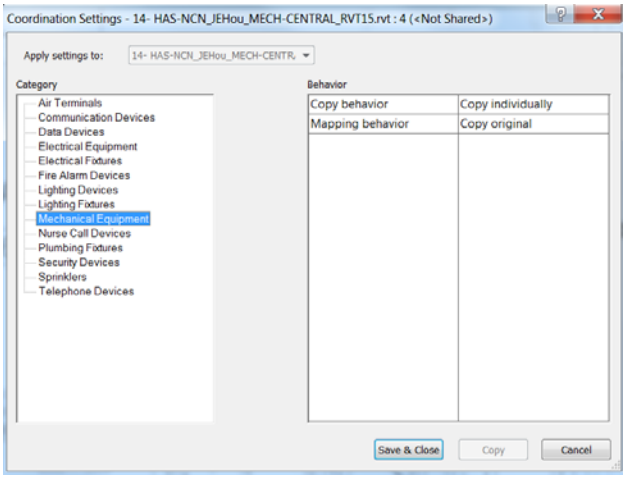
if(Cove Fixture Count > 1, CoveWholeNumber, CountManual)

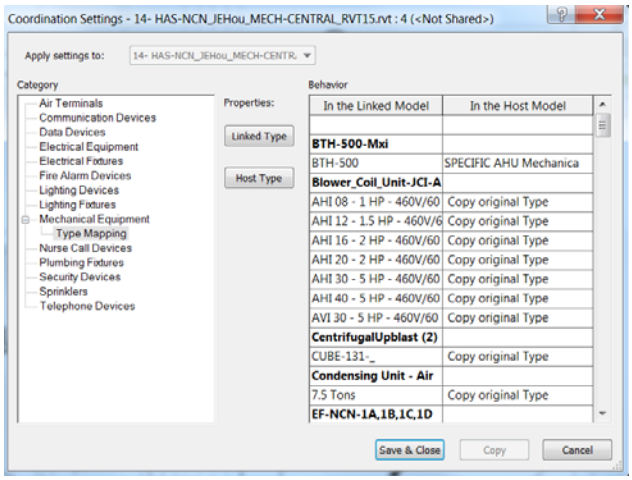
Mechanical Equipment Checks

Mechanical Equipment Checks-Old School Style

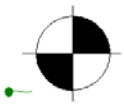

FAN-COIL UNIT SCHEDULE

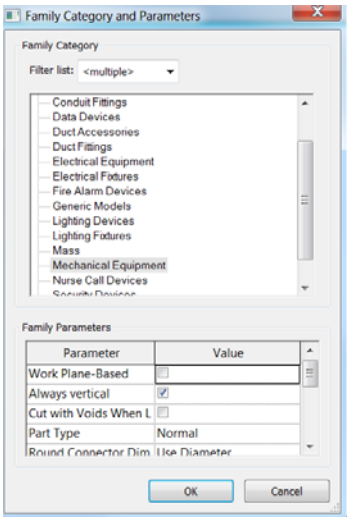
Mechanical Equipment Checks-REVIT Style





Mechanical Equipment Checks-REVIT Style

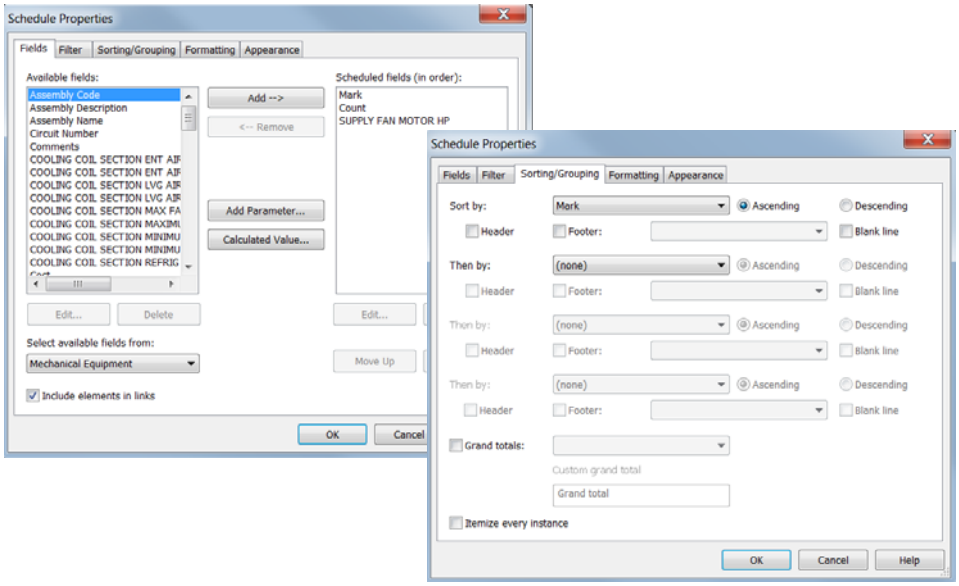




Mechanical Equipment Checks-REVIT Style

<Mechanical Equipment Schedule>

A	B	C
Mark	Count	SUPPLY FAN
AHU-NCN-1A	2	7.5
AHU-NCN-1B	2	
AHU-NCN-1C	1	10
AHU-NCN-1D	1	15
AHU-NCN-1E	2	
AHU-NCN-2A	2	30
AHU-NCN-2B	1	30
AHU-NCN-2C	2	30
AHU-NCN-2D	2	25
AHU-NCN-2E	2	25
AHU-NCN-2F	2	
AHU-NCN-2G	2	25
AHU-NCN-2H	2	30
AHU-NCN-2J	1	25
AHU-NCN-2K	1	25
AHU-NCN-2L	1	20
AHU-NCN-2M	1	15
AHU-NCN-2N	1	25
AHU-NCN-2P	1	25
AHU-NCN-2Q	1	20
AHU-NCN-2R	1	25
AHU-NCN-2S	1	15
AHU-NCN-2T	2	30
AHU-NCN-2U	1	25
OAHU-NCN-1A	2	15
OAHU-NCN-1B	1	7.5
OAHU-NCN-1C	2	25
OAHU-NCN-1D	1	7.5
OAHU-NCN-1D	1	
OAHU-NCN-3A	1	50
OAHU-NCN-3B	1	50



Electrical Loading Checks

Overall Load Analysis

Load Analysis:	MSGNCNA - SIDE A		
Load Classification	**Connected Load**	**Demand**	**Demand Current**
Cooling	480000 VA	480000 VA	577 A
Heating	282990 VA	282990 VA	340 A
Kitchen Equipment - Non-Dwelling Unit	0 VA	0 VA	0 A
Lighting	98959 VA	123699 VA	149 A
Misc. Continuous	31760 VA	39700 VA	48 A
Misc. Non-Continuous	472750 VA	472750 VA	569 A
Motor	412707 VA	428704 VA	516 A
Receptacle (10KVA + 50% REMAIN...	79700 VA	44850 VA	54 A
Spare	146800 VA	146800 VA	177 A
Existing Load	990550 VA	990550 VA	1191 A
TOTAL:		2727553 VA	3281 A AT 480V

LOADS INDICATED AS SPARE ARE ALLOWANCES MADE FOR FUTURE CONCESSIONAIRES

DIVERSITY PER NEC ARTICLE 220

CONVIENCE RECEPTACLES ARE CALCULATED AT 180 VA PER RECEPTACLE.

ACTUAL LIGHTING LOAD EXCEEDS NEC CALCULATION OF SQ. FT. OF AREA @ VOLT-AMP PER TABLE 220.12

5000 A SERVICE IS ADEQUATE

Panel Load Analysis

NOTE **PANEL: 1LAAA** NOTE

VOLTAGE: 208/120V Wye | 3 PH 4W | AIC: 10000 | REMARKS:
MAINS: 225 A MCB | SURFACE | TYPE NL
LUGS: THRU-FEED | Type 1

Con...	Wire	Load Name	BKR	P	CKT	A	B	C	CKT	P	BKR	Load Name	Wire	Con...
	1-#12, 1-#12, 1-#12	REC. RM 10401	20 A	1	1	900 VA	1050 VA		2	1	20 A	COMP. RM 10401	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	COMP. RM 10401	20 A	1	3		1050 VA	180 VA	4	1	20 A	PROJ. RM 10401	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	PROJ. SCREEN RM 10401	20 A	1	5			180 VA	360 VA	6	1	20 A	REC. RM 10401	1-#12, 1-#12, 1-#12
	1-#10, 1-#10, 1-#10	COMP. RM 10401	20 A	1	7	1400 VA	180 VA			8	1	20 A	PRINTER RM 10401	1-#12, 1-#12, 1-#12
	1-#12, 1-#12, 1-#12	COMP. RM 10401	20 A	1	9			1400 VA	1400 VA	10	1	20 A	COMP. RM 10401	1-#12, 1-#12, 1-#12
	1-#12, 1-#12, 1-#12	REC. RM 10401	20 A	1	11			900 VA	1400 VA	12	1	20 A	COMP.RM 10405	1-#12, 1-#12, 1-#12
	1-#12, 1-#12, 1-#12	COMP. RM 10405	20 A	1	13	1400 VA	180 VA			14	1	20 A	TV RM 10413	1-#12, 1-#12, 1-#12
	1-#8, 1-#8, 1-#8	REC. RM 10406	20 A	1	15		1440 VA	900 VA		16	1	20 A	REC. RM 10406	1-#10, 1-#10, 1-#10
	1-#10, 1-#10, 1-#10	COMP. RM 10406	20 A	1	17			1050 VA	180 VA	18	1	20 A	PROJ. RM 10406	1-#12, 1-#12, 1-#12
	1-#12, 1-#12, 1-#12	PROJ. SCREEN RM 10606	20 A	1	19	180 VA	1260 VA			20	1	20 A	REC. 10407,8	1-#10, 1-#10, 1-#10
	1-#12, 1-#12, 1-#12	MICROWAVE RM 10407	20 A	1	21		1200 VA	1200 VA		22	1	20 A	MICROWAVE RM 10407	1-#12, 1-#12, 1-#12
	1-#12, 1-#12, 1-#12	REFRIG. RM 10407	20 A	1	23			1200 VA	1200 VA	24	1	20 A	COFFEE MACHINE RM 10407	1-#12, 1-#12, 1-#12
	1-#12, 1-#12, 1-#12	TV RM 10407	20 A	1	25	180 VA	1200 VA			26	1	20 A	REFRIG. RM 10407	1-#12, 1-#12, 1-#12
	1-#12, 1-#12, 1-#12	REC. RM 10407	20 A	1	27		360 VA	1440 VA		28	1	20 A	REC. RM 10409	1-#8, 1-#8, 1-#8
	1-#12, 1-#12, 1-#12	PROJ. RM 10409	20 A	1	29			180 VA	180 VA	30	1	20 A	PROJ. SCREEN RM 10409	1-#12, 1-#12, 1-#12
	1-#12, 1-#12, 1-#12	REC. FLOOR RM 10409	20 A	1	31	900 VA	1050 VA			32	1	20 A	COMP. RM 10409	1-#12, 1-#12, 1-#12
	1-#10, 1-#10, 1-#10	REC. RM. 10410,11,12	20 A	1	33		1260 VA	720 VA		34	1	20 A	COMP. RM 10411,12	1-#12, 1-#12, 1-#12
	1-#12, 1-#12, 1-#12	SYS. FUR. RM 1014	20 A	1	35			1080 VA	1080 VA	36	1	20 A	SYS. FUR. RM 1014	1-#12, 1-#12, 1-#12
	1-#12, 1-#12, 1-#12	SYS. FUR. RM 1014	20 A	1	37	1080 VA	360 VA			38	1	20 A	POWER POLE SYS. FUR. RM ...	1-#12, 1-#12, 1-#12
	1-#12, 1-#12, 1-#12	POWER POLE SYS. FUR. RM ...	20 A	1	39			360 VA	1080 VA	40	1	20 A	SYS. FUR. RM 1014	1-#12, 1-#12, 1-#12
	1-#12, 1-#12, 1-#12	ELEV. S1 PIT REC. & LTS	20 A	1	41			180 VA	180 VA	42	1	20 A	PROJ. SCREEN RM 10415	1-#12, 1-#12, 1-#12

65050 VA	VA CONNECTED
48670 VA	VA DEMAND
135 A	AMPS DEMAND @ 480V

Load Classification	Connected Load	Demand Factor	Estimated Demand
Cooling	0 VA	0.00%	0 VA
Heating	0 VA	0.00%	0 VA
Lighting	0 VA	0.00%	0 VA
Misc. Continuous	7360 VA	125.00%	9200 VA
Misc. Non-Continuous	19600 VA	100.00%	19600 VA
Motor	1100 VA	125.00%	1375 VA
Other	0 VA	0.00%	0 VA
Receptacle (10KVA + 50% REMAINDER)	26990 VA	68.63%	18495 VA

Panel Totals	
Total Conn. Load:	65050 VA
Total Est. Demand:	48670 VA
Total Conn. Current:	163 A
Total Est. Demand Current:	135 A
Non-Coincident Heating/Cooling:	0 A
Total Demand Current:	135 A

MOTOR LOAD: LARGEST MOTOR AT 125% AND REMAINING MOTORS AT 100% PER NEC 430.24.
RECEPTACLE LOAD: FIRST 10KVA AT 100% AND REMAINING KVA AT 50% PER NEC 220.44 AND PER NEC 220.66.
ALL WIRING IS IN 3/4"C UNLESS OTHERWISE NOTED.
1. PROVIDE GFCI BREAKER

Panel Load Analysis

NOTE	PANEL: 1LAAA	VOLTAGE: 208/120V Wye	3 PH	4W	AIC: 10000	REMARKS:
		MAINS: 225 A	MCB		SURFACE	TYPE NL
		LUGS: THRU-FEED			Type 1	

Co...	Wire	Load Name	BKR	P	CKT	A		B		C		CKT	P	BKR	Load Name	Wire	Co...
	1-#12, 1-#12, 1-#12	REC RM 10401	20 A	1	1	900 VA	1050 VA					2	1	20 A	COMP. RM 10401	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	COMP. RM 10401	20 A	1	3			1050 VA	180 VA			4	1	20 A	PROJ. RM 10401	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	PROJ. SCREEN RM 10401	20 A	1	5					180 VA	360 VA	6	1	20 A	REC. RM 10401	1-#12, 1-#12, 1-#12	
	1-#10, 1-#10, 1-#10	COMP. RM 10401	20 A	1	7	1400 VA	180 VA					8	1	20 A	PRINTER RM 10401	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	COMP. RM 10401	20 A	1	9			1400 VA	1400 VA			10	1	20 A	COMP. RM 10401	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	REC. RM 10401	20 A	1	11					900 VA	1400 VA	12	1	20 A	COMP.RM 10405	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	COMP. RM 10405	20 A	1	13	1400 VA	180 VA					14	1	20 A	TV RM 10413	1-#12, 1-#12, 1-#12	
	1-#8, 1-#8, 1-#8	REC. RM 10406	20 A	1	15			1440 VA	900 VA			16	1	20 A	REC. RM 10406	1-#10, 1-#10, 1-#10	
	1-#10, 1-#10, 1-#10	COMP. RM 10406	20 A	1	17					1050 VA	180 VA	18	1	20 A	PROJ. RM 10406	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	PROJ. SCREEN RM 10606	20 A	1	19	180 VA	1260 VA					20	1	20 A	REC. 10407,8	1-#10, 1-#10, 1-#10	
	1-#12, 1-#12, 1-#12	MICROWAVE RM 10407	20 A	1	21			1200 VA	1200 VA			22	1	20 A	MICROWAVE RM 10407	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	REFRIG. RM 10407	20 A	1	23					1200 VA	1200 VA	24	1	20 A	COFFEE MACHINE RM 104...	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	TV RM 10407	20 A	1	25	180 VA	1200 VA					26	1	20 A	REFRIG. RM 10407	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	REC. RM 10407	20 A	1	27			360 VA	1440 VA			28	1	20 A	REC. RM 10409	1-#8, 1-#8, 1-#8	
	1-#12, 1-#12, 1-#12	PROJ. RM 10409	20 A	1	29					180 VA	180 VA	30	1	20 A	PROJ. SCREEN RM 10409	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	REC. FLOOR RM 10409	20 A	1	31	900 VA	1050 VA					32	1	20 A	COMP. RM 10409	1-#12, 1-#12, 1-#12	
	1-#10, 1-#10, 1-#10	REC. RM. 10410,11,12	20 A	1	33			1260 VA	700 VA			34	1	20 A	COMP. RM 10411,12	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	SYS. FUR. RM 1014	20 A	1	35					1080 VA	1080 VA	36	1	20 A	SYS. FUR. RM 1014	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	SYS. FUR. RM 1014	20 A	1	37	1080 VA	360 VA					38	1	20 A	POWER POLE SYS. FUR. ...	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	POWER POLE SYS. FUR. ...	20 A	1	39			360 VA	1080 VA			40	1	20 A	SYS. FUR. RM 1014	1-#12, 1-#12, 1-#12	
	1-#12, 1-#12, 1-#12	ELEV. S1 PIT REC. & LTS	20 A	1	41					180 VA	180 VA	42	1	20 A	PROJ. SCREEN RN 10415	1-#12, 1-#12, 1-#12	

55050 VA	VA CONNECTED
48670 VA	VA DEMAND
135 A	AMPS DEMAND @ 480V

MOTOR LOAD: LARGEST MOTOR AT 125% AND REMAINING MOTORS AT 100% PER NEC 430.24.
RECEPTACLE LOAD: FIRST 10KVA AT 100% AND REMAINING KVA AT 50% PER NEC 220.44 AND PER NEC 220. 56.
ALL WIRING IS IN 3/4"C UNLESS OTHERWISE NOTED.
1. PROVIDE GFCI BREAKER

Equipment Loading

<LOADING - TRANSFORMER SCHEDULE>

A	B	C	D
Mark	KVA	Total Connected	Total Estimated Demand
1TAAA	75 kVA	55050 VA	48670 VA
1TAAB	75 kVA	9210 VA	10000 VA
1TABA	75 kVA	26550 VA	23425 VA
1TACA	75 kVA	39080 VA	35635 VA
1TADA	30 kVA	46274 VA	39159 VA
1TADB	75 kVA	21030 VA	21030 VA
1TAEA	75 kVA	20780 VA	20470 VA
1TAEB	75 kVA	0 VA	0 VA
1TAEC	75 kVA	3750 VA	3750 VA
1TAHA	75 kVA	49540 VA	47345 VA
1TAHB	75 kVA	0 VA	0 VA
1TAKA	30 kVA	49280 VA	49880 VA
1TAKB	75 kVA	3160 VA	3450 VA
1TBAA	75 kVA	22220 VA	23260 VA
1TBBA	75 kVA	45360 VA	36695 VA
1TBBB	75 kVA	10040 VA	10735 VA
1TBCA	75 kVA	35510 VA	29120 VA
1TBCB	75 kVA	2846 VA	3020 VA
1TBDA	75 kVA	44154 VA	40134 VA
1TBDB	75 kVA	4750 VA	4750 VA
1TBEA	75 kVA	20790 VA	19165 VA
1TBEB	75 kVA	0 VA	0 VA
1TBEC	75 kVA	0 VA	0 VA

Equipment Loading

<LOADING - PANELBOARDS SCHEDULE>

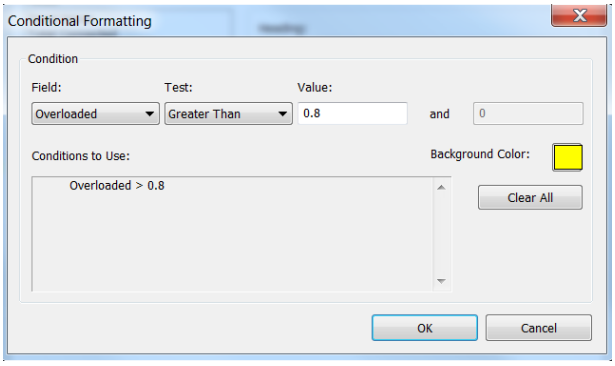
A	B	C	D	E
Panel Name	Total Connected	Total Connected Current	Total Demand Current	Mains
1DAA	880362 VA	1059 A	1074 A	1600 A
1DAB	422566 VA	508 A	517 A	1600 A
1DAC	293495 VA	353 A	364 A	800 A
1DAD	425009 VA	511 A	522 A	400 A
1DAE	209357 VA	252 A	267 A	1200 A
1DAF	323000 VA	389 A	389 A	800 A
1DAG	146800 VA	177 A	177 A	800 A
1DAH	1004508 VA	1208 A	1218 A	1600 A
1DAJ	429000 VA	516 A	516 A	800 A
1DAK	977388 VA	1176 A	1176 A	1600 A
1DBA	577109 VA	694 A	712 A	1600 A
1DBB	966427 VA	1162 A	1170 A	1600 A
1DBC	761451 VA	916 A	917 A	1600 A
1DBD	241162 VA	290 A	311 A	800 A
1DBE	669189 VA	805 A	815 A	1600 A
1DBF	339400 VA	408 A	408 A	800 A
1DBG	200200 VA	241 A	241 A	800 A
1DBH	387132 VA	466 A	468 A	800 A
1DBJ	1226517 VA	1475 A	1475 A	1600 A
1EHAEA	6243 VA	8 A	9 A	100 A

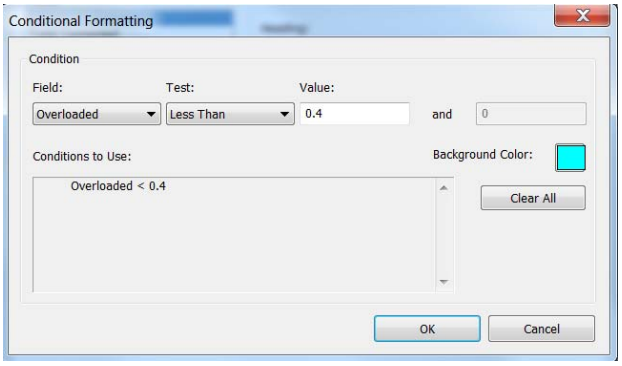
Equipment Loading

<LOADING - PANELBOARDS SCHEDULE>

A	B	C	D	E	F
Panel Name	Total Connected	Total Connected Current	Total Demand Current	NC Demand Current	Mains
1DAA	880362 VA	1059 A	1074 A	911 A	1600 A
1DAB	422566 VA	508 A	517 A	429 A	1600 A
1DAC	293495 VA	353 A	364 A		800 A
1DAD	425009 VA	511 A	522 A		400 A
1DAE	209357 VA	252 A	267 A		1200 A
1DAF	323000 VA	389 A	389 A		800 A
1DAG	146800 VA	177 A	177 A		800 A
1DAH	1004508 VA	1208 A	1218 A	1041 A	1600 A
1DAJ	429000 VA	516 A	516 A		800 A
1DAK	977388 VA	1176 A	1176 A	1096 A	1600 A
1DBA	577109 VA	694 A	712 A	615 A	1600 A
1DBB	966427 VA	1162 A	1170 A	996 A	1600 A
1DBC	761451 VA	916 A	917 A	757 A	1600 A
1DBD	241162 VA	290 A	311 A		800 A
1DBE	669189 VA	805 A	815 A	595 A	1600 A
1DBF	339400 VA	408 A	408 A		800 A
1DBG	200200 VA	241 A	241 A		800 A
1DBH	387132 VA	466 A	468 A	338 A	800 A
1DBJ	1226517 VA	1475 A	1475 A	997 A	1600 A
1EHAEA	6243 VA	8 A	9 A		100 A

Equipment Loading



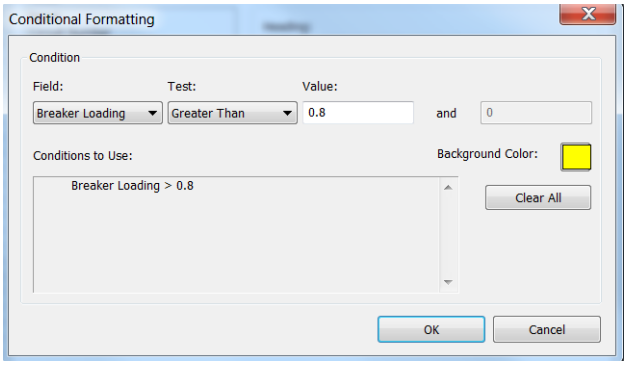


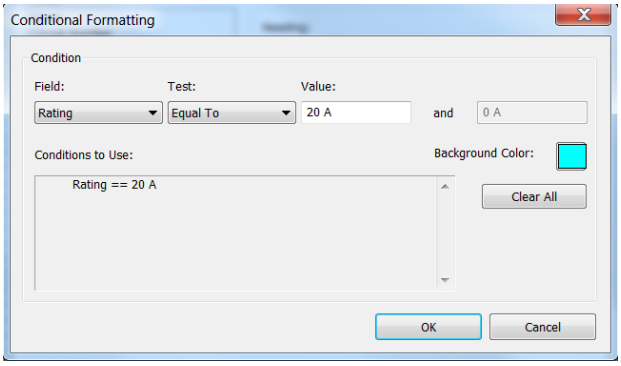
Circuit Loading

<LOADING - Electrical Circuit Schedule>

A	B	C	D	E	F	G	H	I	J
Panel	Circuit Num	Load Name	Rating	Apparent Curre	Apparent Load	Wire Size	Length	Voltage	Voltage Drop
XFMR-C4	1	MSGNCNB	5000 A	2560 A	2128363 VA	14 runs of 3-#500, 1-#500	77' - 3 15/32"	480 V	1 V
XFMR-C3	1	MSGNCNB - SIDE B	20 A	3440 A	2859947 VA	3-#500, 1-#500, 1-#500	74' - 11 15/32"	480 V	13 V
XFMR-C2	1	MSGNCNA - SIDE A	20 A	3428 A	2849706 VA	3-#500, 1-#500, 1-#500	60' - 11 11/32"	480 V	14 V
XFMR-C1	1	MSGNCNA	5000 A	2228 A	1852083 VA	14 runs of 3-#500, 1-#500	63' - 3 1/16"	480 V	1 V
UPS-1BEA	1	1UDBEA	125 A	36 A	30280 VA	3-#500, 1-#500, 1-#6	22' - 4 27/32"	480 V	0 V
UPS-1AEA	1	1UDAEA	125 A	44 A	36740 VA	3-#500, 1-#500, 1-#6	17' - 7 5/16"	480 V	0 V
T-EXISTIN	1	1RIDFNW2H	100 A	0 A	0 VA	3-#500, 1-#8	437' - 11 21/32"	208 V	0 V
T-EXISTIN	2	PNL IR-IDF-NW1C (	20 A	0 A	0 VA	3-#12, 1-#12	706' - 10 13/32"	208 V	0 V
T-EXISTIN	3	PNL IR-IDF-NW1H (	20 A	0 A	0 VA	3-#12, 1-#12	720' - 8 19/32"	208 V	0 V
T-EXISTIN	4	1RIDFNW2C	20 A	0 A	0 VA	3-#12, 1-#12	454' - 5 29/32"	208 V	0 V
PNL LP-F1	1,3,5	JBOX	60 A	48 A	17280 VA	3-#500, 1-#10	2' - 7 7/8"	208 V	0 V
MSGNCNB	1	1DBA	1200 A	694 A	577109 VA	4 runs of 3-#500, 1-#500,	202' - 10 13/16"	480 V	2 V
MSGNCNB	3	1DBJ	1600 A	1475 A	1226517 VA	5 runs of 3-#500, 1-#4/0	843' - 5 11/32"	480 V	12 V
MSGNCNB	5	1DBE	1600 A	805 A	669189 VA	5 runs of 3-#500, 1-#500,	33' - 11 7/32"	480 V	0 V
MSGNCNB	7	1DBG	800 A	241 A	200200 VA	3 runs of 3-#500, 1-#1/0	368' - 9 11/32"	480 V	0 V
MSGNCNB	8	1DBH	1600 A	466 A	387132 VA	5 runs of 3-#500, 1-#4/0	240' - 2 27/32"	480 V	1 V
MSGNCNB	2	1DBB	1600 A	1162 A	966427 VA	5 runs of 3-#500, 1-#500,	656' - 0 11/32"	480 V	8 V
MSGNCNB	4	1DBD	800 A	290 A	241162 VA	3 runs of 3-#500, 1-#500,	187' - 3 1/4"	480 V	1 V
MSGNCNB	6	1DBF	800 A	408 A	339400 VA	3 runs of 3-#500, 1-#1/0	218' - 1 25/32"	480 V	0 V
MSGNCNB	9	3DBA	1200 A	192 A	159328 VA	4 runs of 3-#500, 1-#500,	289' - 7 25/32"	480 V	2 V
MSGNCNB	10	1DBC	1600 A	916 A	761451 VA	5 runs of 3-#500, 1-#500,	843' - 10 19/32"	480 V	8 V
MSGNCNA	2	1DAD	800 A	511 A	425009 VA	3 runs of 3-#500, 1-#500,	99' - 3 3/16"	480 V	1 V
MSGNCNA	10	1DAF	800 A	389 A	323000 VA	3 runs of 3-#500, 1-#500,	78' - 5 17/32"	480 V	0 V
MSGNCNA	4	1DAB	1200 A	508 A	422566 VA	4 runs of 3-#500, 1-#500,	696' - 0 29/32"	480 V	5 V
MSGNCNA	7	1DAJ	800 A	516 A	429000 VA	3 runs of 3-#500, 1-#1/0	264' - 3 13/32"	480 V	0 V
MSGNCNA	8	1DAH	1200 A	1208 A	1004508 VA	4 runs of 3-#500, 1-#500,	388' - 11 25/32"	480 V	6 V
MSGNCNA	1	1DAE	1200 A	252 A	209357 VA	4 runs of 3-#500, 1-#500,	28' - 10 5/32"	480 V	0 V
MSGNCNA	3	1DAA	1200 A	1059 A	880362 VA	4 runs of 3-#500, 1-#500,	92' - 3 5/16"	480 V	1 V

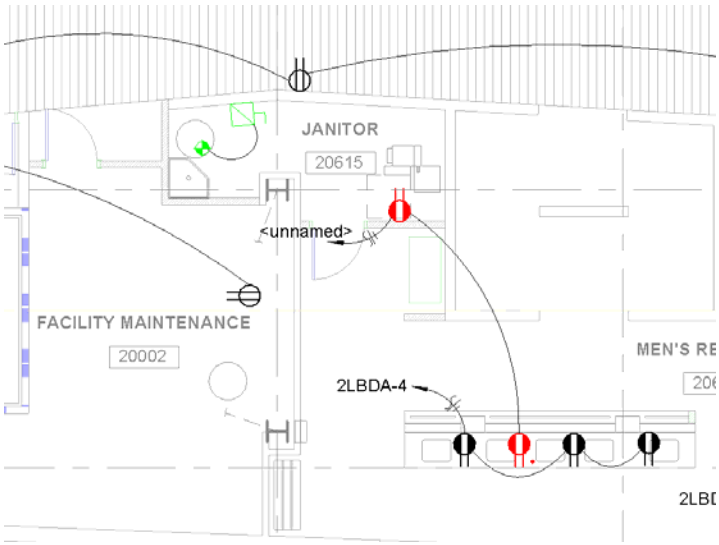
Circuit Loading



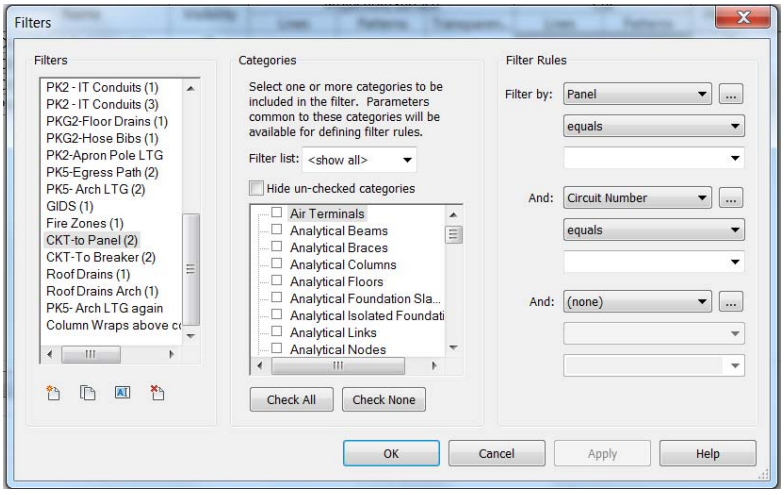


View Filters to Catch Un-Circuited Electrical Items

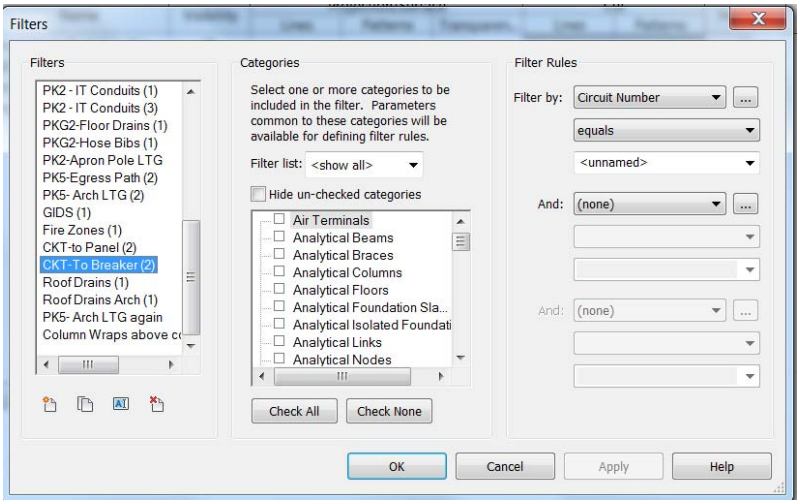
View Filters for Circuitry



View Filters for Circuitry



View Filters for Circuitry



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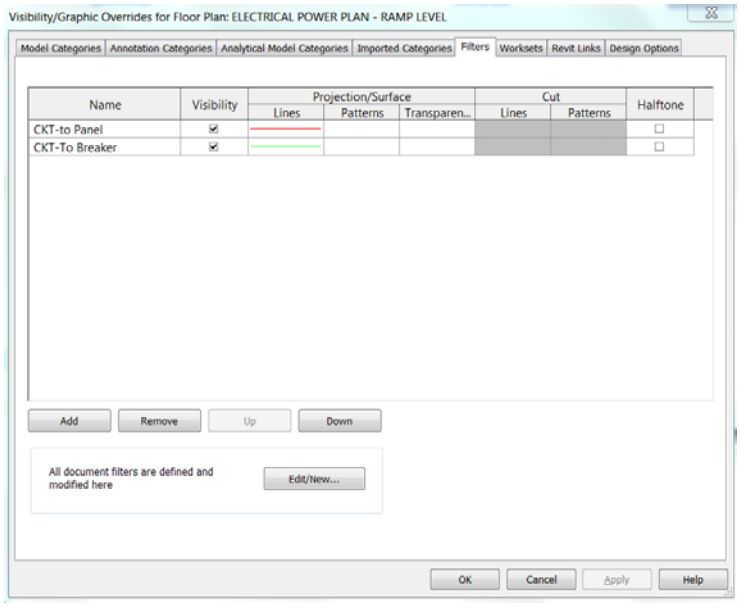
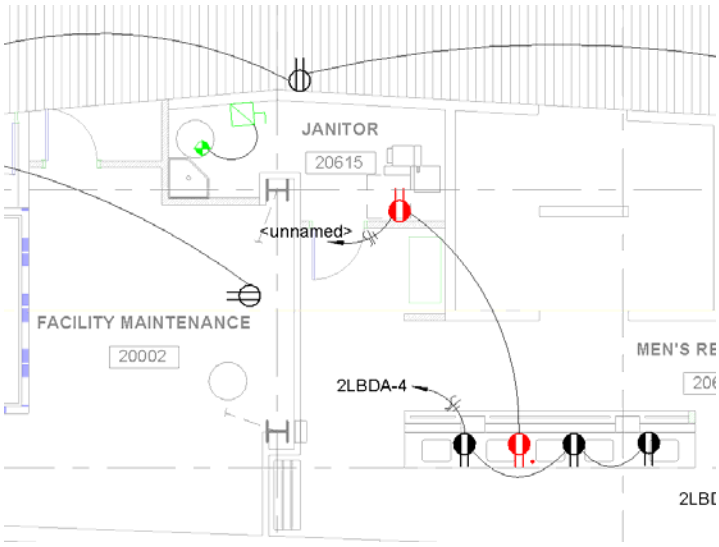


View Filters for Circuitry



Important Items to Note

- Length calculations
  - follow structure i.e. sum of x,y, and z axis
  - assume series connections
- Voltage drop
  - Length
  - Circuit Ampacity
- Wire size
  - Length
  - Breaker Ampacity
- Breakers default to 20A

Additional Software

- Space Naming Utility Plug-in
- Rushforth Tools
  - Schedules
  - Parameter adder
  - Parameter linker

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