ELECTRICAL SYSTEM

ELECTRICAL DESIGN

To understand the impact of the new lighting design on the electrical system, creating new panel board(s) configurations and making a comparison to the original system would be required. This would also facilitate a cost comparison to establish the economic feasibility of the alterations.

Unfortunately, there are too may panel boards in the Landscape Building for any of them to be illustrated in the electrical floor plans. There are other unknowns that make it impossible to create a theoretical panel for the original design. First, the types and quantity of equipment is unknown. While approximate power densities can be assumed for the HVAC load calculations, it is much more challenging to make these same assumptions for the panels. The voltage and phase requirements would need to be determined before a panel could be designed and obtaining this information for this project was impossible. Secondly, the laboratory spaces do not have typical receptacles. Instead, the lab stations are equipped with three ballards, each of which run on 120V. The load of each ballard is not specified in the design drawings and should be supplied by the contractor. This information was not able to be obtained.

The most logical design for the electric system would be for the lighting circuits to be on the same panels because florescent lights can cause distortion in the currents. This could be a potential problem for critical and expensive lab equipment. Laboratory equipment running at 120V and typical receptacles can all be put on the same panels and then specialized receptacles and equipment on their own series of panels. Panels are grouped by location. There is space running down the side of the service corridor for all of the panel boards to be located. This provides a central location for all panels for maintenance and service issues. An example of a lighting panel board and sample calculations can be found below.

Table 12 : Lighting Fixture Panel Board

Description	Load [VA]			Brk. Trip	LP 1				Brk. Trip	Load [VA]			Description
	A	B	C	[A]	Cond. Size	Ckt. #		Cond. Size	[A]	A	B	C	
Lab 285	4320			20	#12	1	2	#12	20	3,697			Lab Support 285
Lab 275		4320		20	#12	3	4	#12	20		3,697		Lab Support 275
Lab 255			4320	20	#12	5	6	#12	20			3,697	Lab Support 255
Lab Support 245	3,697			20	#12	7	8	#12	20	4320			Lab 245
Lab Support 225		3,697		20	#12	9	10	#12	20		4320		Lab 225
Lab Support 215			3,697	20	#12	11	12	#12	20			4320	Lab 215
Lab 270	1464			20	#12	13	14	#12	20	1253			Lab Support 270
Lab 265		1464		20	#12	15	16	#12	20		1253		Lab Support 265
Lab 240			1464	20	#12	17	18	#12	20			1253	Lab Support 240
Lab Suport 235	1253			20	#12	19	20	#12	20	1464			Lab 235
Lab Support 210		1525		20	#12	21	22	#12	20		1783		Lab 210
Lab Support 295			1754	20	#12	23	24	#12	20			2049	Lab 295
						25	26						
						27	28						
						29	30						
						31	32						
						33	34						
						35	36						
						37	38						
						39	40						
						41	42						

Total Load on Phase A	21468	[VA]
Total Load on Phase B	22059	[VA]
Total Load on Phase C	22554	[VA]
Load on Panel	82600	[kVA Demand]
	124.25	[A]
Voltage	277	[V]
Main Breaker	125	[A]
Feeder Size	(4) 1/0 @125A, 2"	
Panel Size	125	[A]