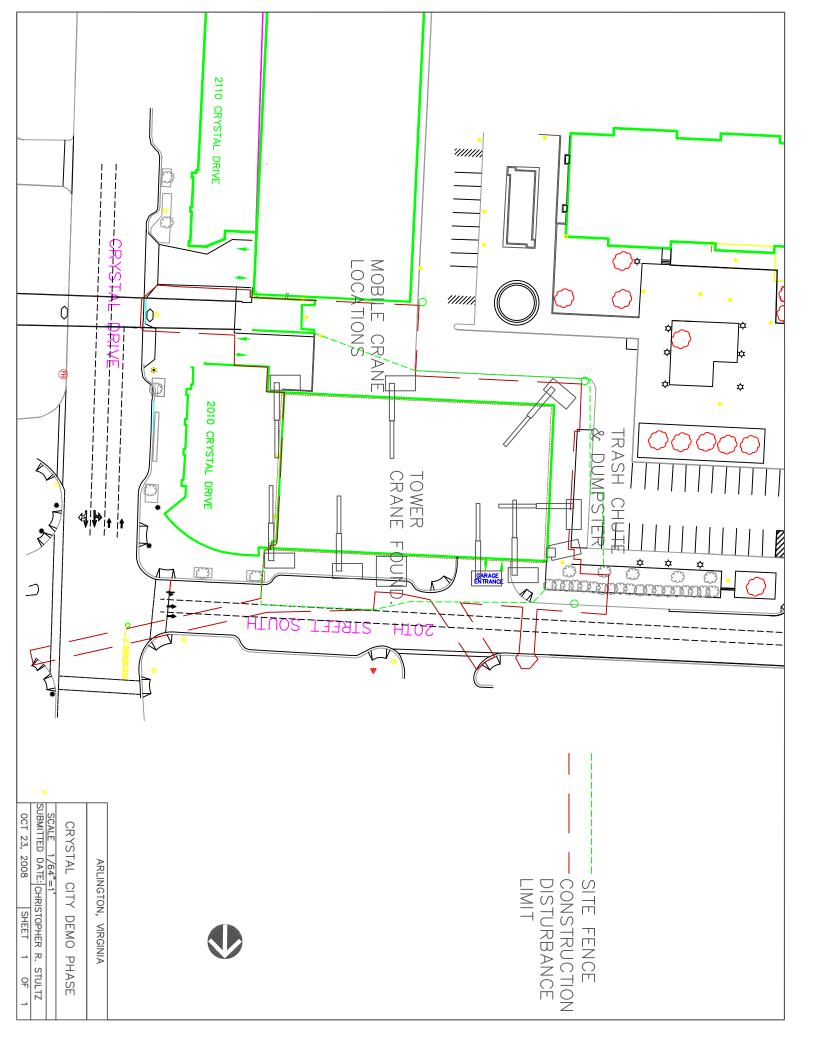
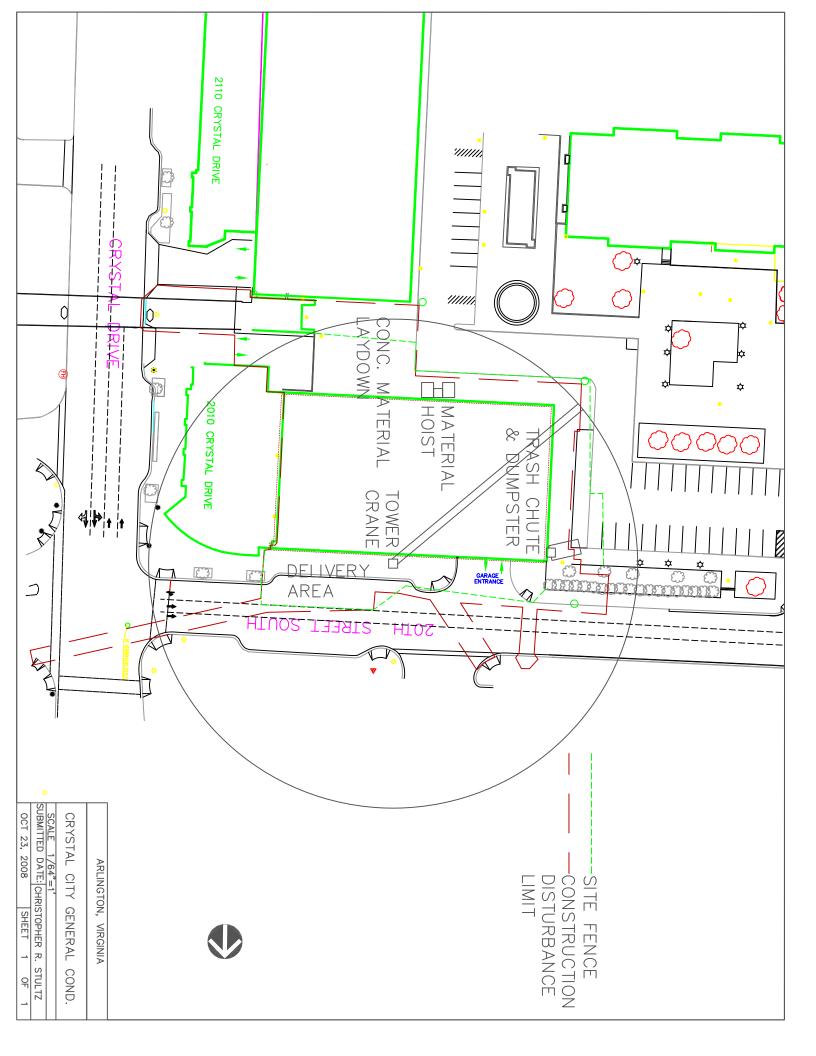
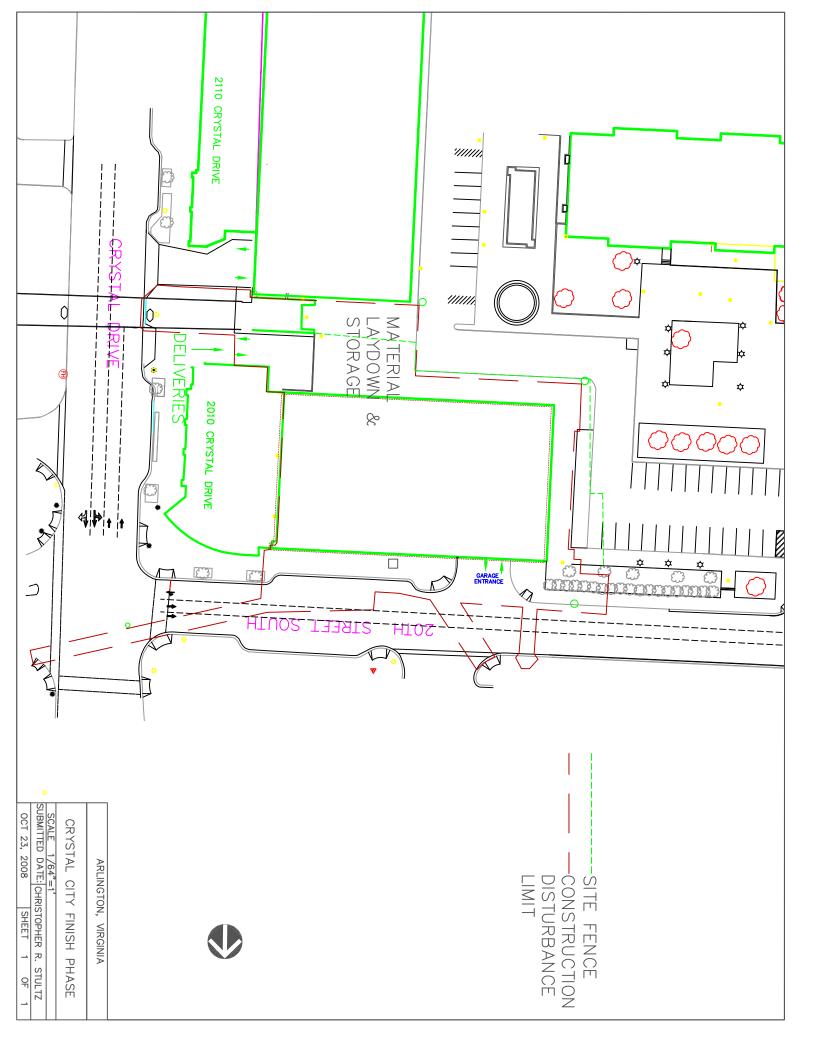


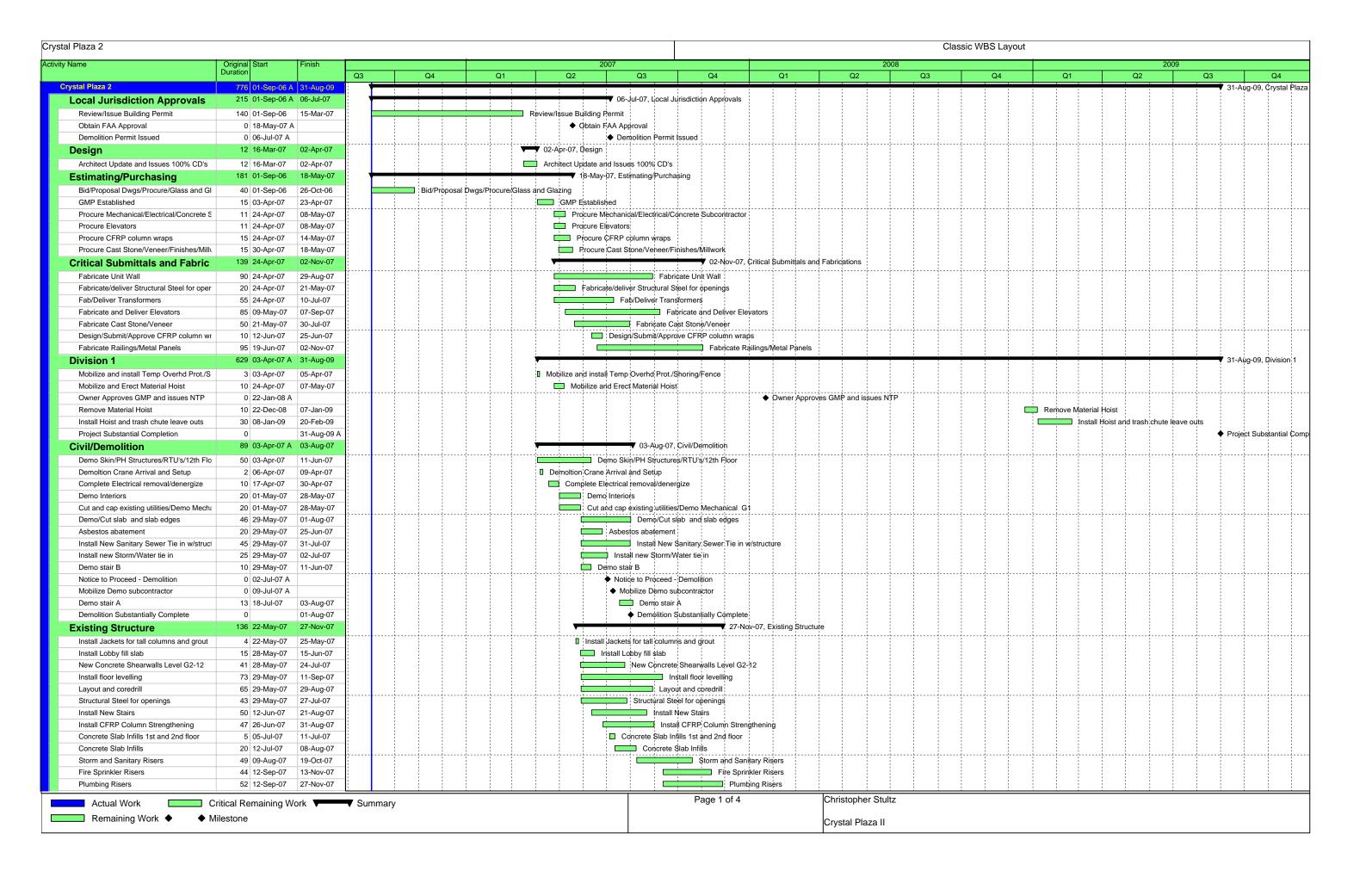


Appendix A User Created Documents



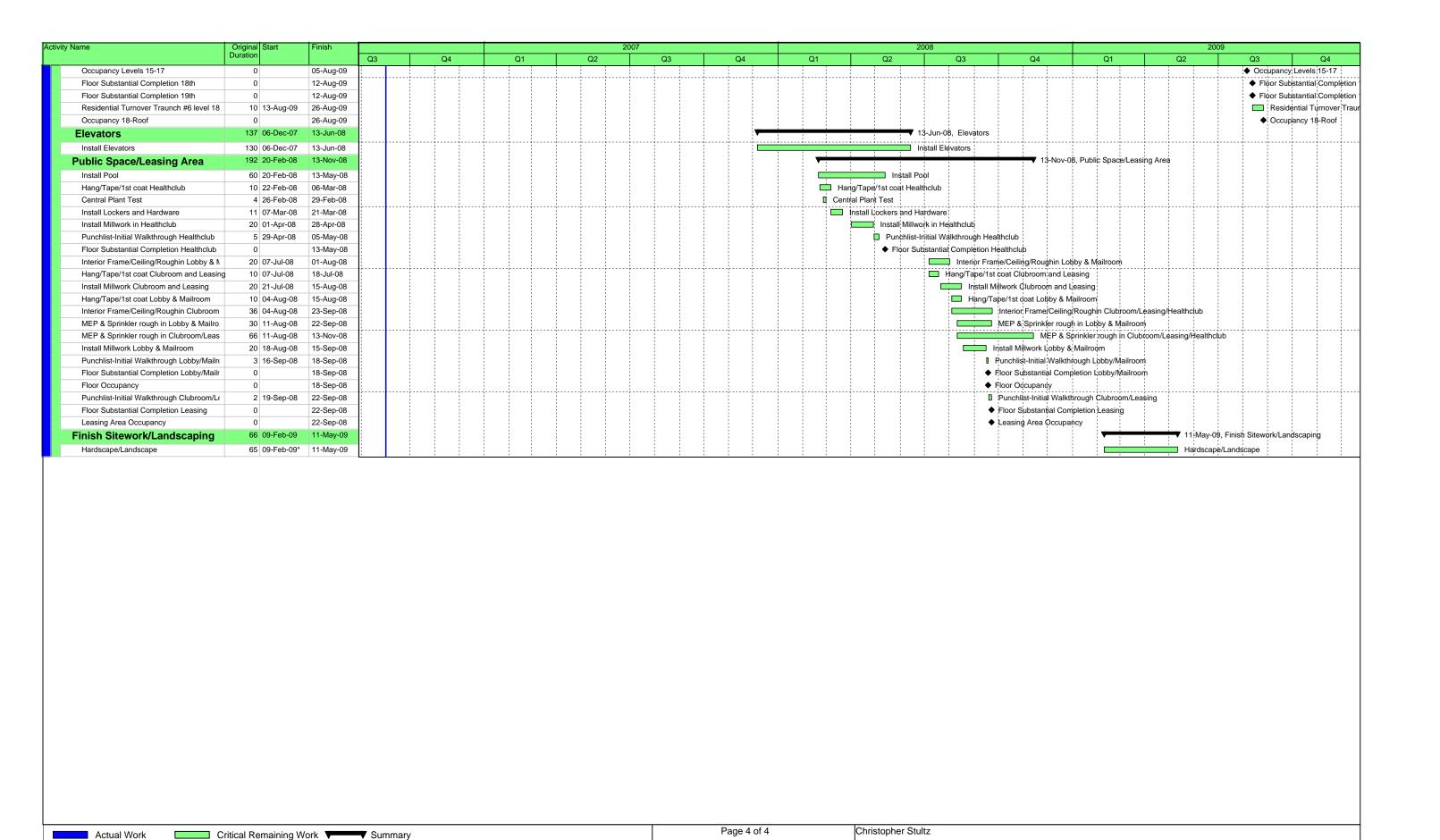






Activity Name	Original Start	Finish			2007			2008			200	09	
	Duration	Q3	Q4	Q1	Q2 Q3	Q4	Q1 Q2	Q3	Q4	Q1	Q2	Q3	Q4
New Structure	239 11-May-07	A 10-Apr-08			▼		▼ 10-Apr-08, N	w Structure					
Install Crane Foundation and Cure	8 11-May-07	22-May-07			Install Crane Foundation	and Cure							
Erect Tower Crane	3 23-May-07	25-May-07			☐ Erect Tower Crane								
Columns to level 13	5 28-May-07	01-Jun-07			Columns to level 13								
F/R/P Flr 13	15 04-Jun-07*	22-Jun-07			F/R/P Flr 13								
F/R/P Flr 14	10 04-Sep-07	17-Sep-07				■ F/R/P FIr 14							
F/R/P Flr 15	10 13-Sep-07	i				F/R/P Flr 15							
F/R/P Flr 16	10 24-Sep-07					F/R/P FIr 16							
F/R/P Flr 17	10 03-Oct-07												
F/R/P Flr 18	10 15-Oct-07					F/R/P Flr 18							
F/R/P Fir 19	10 24-Oct-07					F/R/P Fir 19							
F/R/P Flr 20	20 02-Nov-07	i				F/R/P F	r 20						
Fire Sprinkler Risers	27 14-Nov-07						e Sprinkler Risers						·
Plumbing/Storm/Sanitary Risers	27 28-Nov-07	i				i i i i	Plumbing/Storm/Sanitary Risers						
F/R/P PH roof/EMR floor/curbs/EMR Roof							PH roof/EMR floor/curbs/EMR Roof						
Set Mechanical Equipment	10 17-Dec-07	!				the state of the s	Set Mechanical Equipment						
Dismantle Tower Crane	3 04-Jan-08	i				1 1 1 1	Dismantle Tower Crane						
Mobilize Concrete Sub	0 10-Apr-08						◆ Mobilize Con	rete Sub					
Skin/Roof	308 13-Jun-07	i					↓ MdSiii28 Goil	15-Aug-08,	Skin/Roof				
								¥ 19 749-00,					
Install Curtain wall level 3	15 13-Jun-07	i			Install Curtain	i i i i							
Install Curtain Wall level 4	15 04-Jul-07	24-Jul-07			Install Cu								
Install Curtain wall level 5	10 25-Jul-07	07-Aug-07				Curtain wall level 5				.			
Install Curtain wall level 6	10 15-Aug-07					nstall Curtain wall level 6							
Install Curtain wall level 7	10 30-Aug-07	· · · · · · · · · · · · · · · · · · ·				Install Curtain wall level 7							
Install Curtain wall level 8	10 21-Sep-07	1				Install Curtain wall leve	i i i i i						
Install Curtain wall level 9	10 05-Oct-07					Install Curtain wall							
Install Curtain wall level 10	10 22-Oct-07	· · · · · · · · · · · · · · · · · · ·				Install Curtain w							
Install Curtain wall level 11	10 05-Nov-07	i				Install Curta							
Install Curtain wall level 12	10 19-Nov-07						urtain wall level 12						
Install Curtain wall level 13	10 05-Dec-07					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	II Curtain wall level 13						
Install Curtain wall level 14	10 19-Dec-07					1 1 1 1	Install Curtain wall level 14						
Install Curtain wall level 15	10 08-Jan-08						Install Curtain wall level 15						
Install Curtain wall level 16	10 23-Jan-08	i					Install Curtain wall level 16						
Install Curtain wall level 17	10 06-Feb-08						Install Curtain wall level						
Install Curtain wall level 18	10 21-Feb-08	i					Install Curtain wall lev	i i i i					
Install Curtain wall level 19	10 06-Mar-08						Install Curtain wall						
Install Curtain wall level 20	35 20-Mar-08						Install	Curtain wall level 20		.			
Install railings/metal panels 3-19	105 20-Mar-08							i i i i	ngs/metal panels 3-	19			
Install Storefront 1st,2nd floors	30 08-May-08							Install Storefront 1st,2nd	1 1				
Install steel posts level 20/PH Level	•	14-May-08						I steel posts level 20/PH Lev	and the second second				
Install Built-up Parapets on EMR/Roof	14 08-May-08	28-May-08						stall Built-up Parapets on EN					
Install EIFS wall on Roof/PH Roof	13 22-May-08	10-Jun-08						Install EIFS wall on Roof/PI	H Roof				
Hot fluid applied waterproofing/ballast/uni	27 28-May-08	03-Jul-08						Hot fluid applied wate	rproofing/ballast/un	it pavers			
Building Dried in	0	03-Jul-08						Building Dried in					
Interior Framing/Roughin/Fini	587 29-May-07	26-Aug-09			4 1 1							26-Aug	ı-09, Interior Frar
Demo/Enlarge Transformer Room	30 29-May-07	10-Jul-07			Demo/Enlarg	e Transformer Room							
Install Switchgear Equipment	20 11-Jul-07	07-Aug-07			Install	Switchgear Equipment							
Dominion Power Delivers and set new tra	6 08-Aug-07	15-Aug-07			□ Don	ninion Power Delivers and set i	new transformers						
Interior Frame/Ceiling/Roughin 3rd, 4th, 5	30 09-Aug-07					Interior Frame/Ceiling/Round							
Connect new equipment to switchgear	5 16-Aug-07				1 1 1 1 1	nnect new equipment to switch							
Interior Frame/Ceiling/Roughin 6th, 7th, 8	30 05-Oct-07						ne/Ceiling/Roughin 6th, 7th, 8th Floo	rs					
MEP & Sprinkler rough in 6th, 7th, 8th Flc	50 05-Nov-07						■ MEP & Sprinkler rough in 6th, 7t						
Interior Frame/Ceiling/Roughin 9th, 10th,	30 19-Nov-07						Interior Frame/Ceiling/Roughin 9th,						
MEP & Sprinkler rough in 3rd, 4th, 5th Flo	50 11-Dec-07	i					MEP & Sprinkler rough						
MEP & Sprinkler rough in 9th, 10th, 11th	50 19-Dec-07						MEP & Sprinkler roug						
Set and Connect Boilers/Heat Exchanger	30 04-Jan-08						Set and Connect Boilers/H	i i i i					
Set and connect rooftop exhaust fans	20 04-Jan-08						Set and connect rooftop exha						
Interior Frame/Ceiling/Roughin 12th, 13th	39 08-Jan-08							Roughin 12th, 13th, 14th, 2n	d Floors				
Set and connect emergency generator	40 28-Jan-08	i					Set and connect						
Duct work fitness center/locker rooms	13 04-Feb-08						Duct work fitness center/	(5) (6) (1)					
2 de l'antimisso dell'all'indica 150mb	.5 04105-00						Sacragin introduction						
Actual Work C	Pritical Damainin - 1	Nork Com	nmon/			Page 2 of 4	Christopher S	Stultz					
	=	Work ▼ Sun	iiiiaiy										
Remaining Work ◆ ◆ M	Milestone						Crystal Plaza	II					
							1 ,						

Activity Name	Original	Start	Finish				20	007			2008					2009		
	Duration			Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q	Q4
Connect RTU's to service ducts	40	04-Feb-08	31-Mar-08								Connect RTU's to service of	ucts						
Set and Connect pumps	10	19-Feb-08	03-Mar-08			1 1				Set	t and Connect pumps						ii	
Test and Flush systems	5	19-Feb-08	25-Feb-08							■ Test	and Flush systems							
MEP & Sprinkler rough in 12th, 13th, 14th	50	20-Feb-08	29-Apr-08	}							MEP & Sprinkler rou	igh in 12th, 1	3th, 14th, 2nd Floors					
Final System online	0		25-Feb-08							◆ Final	I System online							
Interior Frame/Ceiling/Roughin 15th, 16th	30	05-Mar-08	15-Apr-08								Interior Frame/Ceiling/F	oughin 15th,	16th, 17th Floors					į
Permanent Power Online	0		24-Mar-08								Permanent Power Online							
Temporary Service Mech. Central System) 0		31-Mar-08	:							◆ Temporary Service Mech. (Lentral Syste	m:					
MEP & Sprinkler rough in 15th, 16th, 17th		02-Apr-08	11-Jun-08									1 11	in 15th, 16th, 17th Floo	ors				į
Interior Frame/Ceiling/Roughin 18th, 19th		16-Apr-08	20-May-08								Interior Frame/		i i i i					
MEP & Sprinkler rough in 18th, 19th Floor		07-May-08	30-Jun-08								1 1 1		ough in 18th, 19th Floo	re				
Floor/Wall Finishes 3rd, 4th, 5th Floors		07-May-08	15-Aug-08	1							the state of the s		/all Finishes 3rd, 4th, 5	1 1 1				1
				ļ														
Install Cabinets/Tops/Hardware 3rd, 4th,		07-Jul-08	22-Aug-08	1									Cabinets/Tops/Hardw	1 1 1	ors			1
Floor/Wall Finishes 6th, 7th, 8th Floors		18-Aug-08	29-Sep-08									i i	Floor/Wall Finishes	1 1 1				
Install Cabinets/Tops/Hardware 6th, 7th, a		25-Aug-08	14-Oct-08										Install Cabinets	1.1				
Floor/Wall Finishes 9th, 10th, 11th Floors		30-Sep-08	12-Nov-08	}									1 1 1	II Finishes 9th, 10th				
Install Cabinets/Tops/Hardware 9th, 10th	35	15-Oct-08	05-Dec-08										Ins	tall Cabinets/Tops/F	lardware 9th, 10th,	11th Floors		
Floor/Wall Finishes 12th, 13th, 14th, 2nd	30	13-Nov-08	30-Dec-08											Floor/Wall Finish	es 12th, 13th, 14th,	2nd Floors		į
Install Cabinets/Tops/Hardware 12th, 13tl	34	08-Dec-08	28-Jan-09											Instal Ca	oinets/Tops/Hardwa	re 12th, 13th, 14th, 2r	d Floors	
MEP Fit Out 3rd, 4th, 5th Floors	25	23-Dec-08*	30-Jan-09											MEP Fit (Out 3rd, 4th, 5th Flo	oors		
Floor/Wall Finishes 15th, 16th, 17th Floors	s 30	31-Dec-08	12-Feb-09											Floor/	Wall Finishes 15th,	16th, 17th Floors		
Floor/Wall Finishes 18th, 19th Floors	25	31-Dec-08	05-Feb-09											Floor/W	all Finishes 18th, 19	th Floors		
Install Carpet/Final Paint 3rd, 4th, 5th Flo	20	16-Jan-09	13-Feb-09									;		Install	Carpet/Final Paint	3rd, 4th, 5th Floors		
MEP Fit Out 6th, 7th, 8th Floors		02-Feb-09	09-Mar-09											1 1 1	MEP Fit Out 6th, 7			
Install Cabinets/Tops/Hardware 15th, 16tl		13-Feb-09	30-Mar-09											1	- 1 1 11	s/Tops/Hardware 15th	16th 17th Floo	ore
Floor Substantial Completion 4th	0	13 1 05 03	13-Feb-09											1 1 1	Substantial Comple	*1	, 1001, 170111100	//3
	-			1										1 1 1	1 1 1	1 1 1		1
Floor Substantial Completion 5th	0		13-Feb-09				ļļ					ļ			Substantial Comple			
Floor Substantial Completion 3rd	0		13-Feb-09												Substantial Comple			
Residential Turnover Traunch #1 level 3,		17-Feb-09	02-Mar-09	1												Traunch #1 level 3, 4,		
Install Carpet/Final Paint 6th, 7th, 8th Flo	20	24-Feb-09	23-Mar-09												1 1 1	nal Paint 6th, 7th, 8th I	Floors	
Occupancy Levels 3-5	0		02-Mar-09											♦ 0	ccupancy Levels 3-	5		
MEP Fit Out 9th, 10th, 11th Floors	25	10-Mar-09	13-Apr-09												MEP Fit Φι	ıt 9th, 10th, 11th Floor	s	
Floor Substantial Completion 6th	0		23-Mar-09												◆ Floor Substantia	Completion 6th		
Floor Substantial Completion 7th	0		23-Mar-09												◆ Floor Substantia	I Completion 7th		
Floor Substantial Completion 8th	0		23-Mar-09	1											◆ Floor Substantia	I Completion 8th		
Residential Turnover Traunch #2 level 6,	10	24-Mar-09	06-Apr-09												Residential 1	urnover Traunch #2 le	vel 6. 7. 8	
Install Carpet/Final Paint 9th, 10th, 11th F		31-Mar-09	05-May-09													Carpet/Final Paint 9th	1 1	ors
Install Cabinets/Tops/Hardware 18th, 19tl		31-Mar-09	30-Apr-09									ļ				Cabinets/Tops/Hardwa		
Occupancy Levels 6-8	0	01 14101 00	06-Apr-09												◆ Occupancy I			5010
MEP Fit Out 12th, 13th, 14th, 2nd Floors		14-Apr-09	18-May-09												1 1 1	P Fit Out 12th, 13th,	1 4th Ond Floor	_
															1 1 1	1 1 1 1	11	1
Install Carpet/Final Paint 12th, 13th, 14th	29	05-May-09	12-Jun-09												i i i	Install Carpet/Final	1 1	1, 14th, 2
Floor Substantial Completion 9th	0		05-May-09	<u> </u>			ļļļ					ļ				Substantial Completio		
Floor Substantial Completion 10th	0		05-May-09													Substantial Completio		
Floor Substantial Completion 11th	0		05-May-09												1 1 1	Substantial Completio	1 1	
Residential Turnover Traunch #3 level 9,	10	06-May-09	19-May-09												☐ Re	sidential Turnover Tra	unch #3 level 9,	, 10, 11
MEP Fit Out 15th, 16th, 17th Floors	31	19-May-09	30-Jun-09													MEP Fit Out 1	5th, 16th, 17th I	Floors
Occupancy Levels 9-11	0		19-May-09									i i			♦ Ød	cupancy Levels 9-11		į
Floor Substantial Completion 2nd	0		12-Jun-09] !		[]				◆ Floor Substantial C	ompletion 2nd	
Occupancy level 2	0		12-Jun-09													♦ Occupancy level 2		
Floor Substantial Completion 12th	0		12-Jun-09									i i				♦ Floor Substantial C	1 1	į
Floor Substantial Completion 13th	0		12-Jun-09													◆ Floor Substantial C		
Floor Substantial Completion 14th	0		12-Jun-09													◆ Floor Substantial C		
· · · · · · · · · · · · · · · · · · ·	-	15-Jun-09		 			 -	 				} -		- } -		Residential Tur		
Residential Turnover Traunch #4 level 12			26-Jun-09															
Install Carpet/Final Paint 15th, 16th, 17th		17-Jun-09	22-Jul-09													Install Ca	1 1	i
MEP Fit Out 18th,19th Floors		01-Jul-09	31-Jul-09														it Out 18th,19th	!
Install Carpet/Final Paint 18th, 19th Floors		20-Jul-09	12-Aug-09													i i i	all Carpet/Final I	i
Floor Substantial Completion 15th	0		22-Jul-09	ļ										ļ <u>ļ</u>			stantial Comple	+
Floor Substantial Completion 16th	0		22-Jul-09													◆ Floor Sub	stantial Comple	tion 16tl
Floor Substantial Completion 17th	0		22-Jul-09													◆ Floor Sub	stantial Comple	tion 17t
Occupancy Levels 12-14	0		22-Jul-09													◆ Occupan	cy Levels 12-14	
Residential Turnover Traunch#5 level 15,	10	23-Jul-09	05-Aug-09									i i				Resid	ential Turnover	Traunch
			· -	<u> </u>	<u> </u>	1 1			D 0 11	1 1	Total control					i		
Actual Work	Critical Re	maining W	ork	▼ Sumn	nary				Page 3 of 4		Christopher Stultz							
	Milestone	ŭ			•													
Remaining work ▼ ▼ N	ville Stolle										Crystal Plaza II							



Crystal Plaza II

Remaining Work

Milestone

	South Façade Sun Hours(kWh/m2/day)													
						Sun Ho	ours(kWh/m	2/day)						
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr Avg or Total	
	3.4	3.7	3.5	3.1	2.6	2.5	2.6	2.9	3.3	3.7	3.3	3	3.13	
days	31	28	31	30	31	30	31	31	30	31	30	31	365	
kWh/mon	8182.97	8,043.23	8,423.65	7,220.27	6,257.57	5,822.80	6,257.57	6,979.60	7,686.09	8,905.00	7,686.09	7,220.27	7,390.43	
Monthly kWh	675,818.35	610,416.58	675,818.35	654,017.76	675,818.35	654,017.76	675,818.35	675,818.35	654,017.76	675,818.35	654,017.76	675,818.35	7,957,216.08	
Monthly kWh after Solar	667,635.38	602,373.35	667,394.70	646,797.49	669,560.78	648,194.96	669,560.78	668,838.76	646,331.67	666,913.35	646,331.67	668,598.08	7,868,530.97	
Monthly Bill	\$32,052.02	\$29,131.83	\$32,052.02	\$31,078.62	\$32,052.02	\$49,669.20	\$51,263.04	\$51,263.04	\$49,669.20	\$32,052.02	\$31,078.62	\$32,052.02	\$453,413.63	
w/o solar Bill/unit	\$120.50	\$109.52	\$120.50	\$116.84	\$120.50	\$186.73	\$192.72	\$192.72	\$186.73	\$120.50	\$116.84	\$120.50	\$142.05	
Monthly Bill w/solar	\$31,686.65	\$28,772.70	\$31,675.90	\$30,756.24	\$31,772.62	\$49,243.49	\$50,805.55	\$50,752.76	\$49,107.27	\$31,654.41	\$30,735.44	\$31,729.63	\$448,692.65	
Bill/unit	\$119.12	\$108.17	\$119.08	\$115.62	\$119.45	\$185.13	\$191.00	\$190.80	\$184.61	\$119.00	\$115.55	\$119.28	Total	
Savings	\$365.37	\$359.13	\$376.12	\$322.39	\$279.40	\$425.70	\$457.49	\$510.28	\$561.93	\$397.61	\$343.18	\$322.39	\$4,720.98	

Watts/SF	Size kW	Total kWh	Effiency of Grid Connected System	kWh/Year	120/240 System Max Demand (kW)	Use Factor	120/240 Adjusted Demand (kW)	Daily kWh usage 120/240	Cost/kW Installed	Cost of System	Estimated simple payback using savings
5	89	88685.11	0.90	79,816.60	1513.93	0.6	908.36	21,800.59	\$8,500.00	\$757,286.69	160.41

	South, East, and West Facades Sun Hours(kWh/m2/day)													
						Sun Hou	rs(kWh/m2/	day)						
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr Avg or Total	
South	3.4	3.7	3.5	3.1	2.6	2.5	2.6	2.9	3.3	3.7	3.3	3	3.13	
days	31	28	31	30	31	30	31	31	30	31	30	31	365	
kWh/mon	8,182.97	8,043.23	8,423.65	7,220.27	6,257.57	5,822.80	6,257.57	6,979.60	7,686.09	8,905.00	7,686.09	7,220.27	7,390.43	
_														
East	3.4	3.7	3.5	3.1	2.6	2.5		2.9	3.3	3.7	3.3	3	3.13	
days	31	28	31	30	31	30	31	31	30	31	30	31	365	
kWh/mon	3,628.46	3,566.50	3,735.18	3,201.59	2,774.71	2,581.92	2,774.71	3,094.87	3,408.14	3,948.62	3,408.14	3,201.59	39,371.46	
West	3.4	3.7	3.5	3.1	2.6	2.5	2.6	_	3.3	_	3.3	3	3.13	
days	31	28	31	30	31	30	31	31	30	31	30	31	365	
kWh/mon	3,628.46	3,566.50	3,735.18	3,201.59	2,774.71	2,581.92	2,774.71	3,094.87	3,408.14	3,948.62	3,408.14	3,201.59	39,371.46	
Monthly														
kWh after	660,378.45	595,240.36	659,924.34	640,394.32	664,011.37	643,031.11	664,011.37	662,649.03	639,515.39	659,016.11	639,515.39	662,194.91	7,789,882.14	
Solar														
Monthly Bill w/o solar	\$32,052.02	\$29,131.83	\$32,052.02	\$31,078.62	\$32,052.02	\$49,669.20	\$51,263.04	\$51,263.04	\$49,669.20	\$32,052.02	\$31,078.62	\$32,052.02	\$453,413.63	
Bill/unit	\$120.50	\$109.52	\$120.50	\$116.84	\$120.50	\$186.73	\$192.72	\$192.72	\$186.73	\$120.50	\$116.84	\$120.50	\$142.05	
Monthly Bill w/solar	\$31,362.63	\$28,454.21	\$31,342.35	\$30,470.33	\$31,524.84	\$48,865.96	\$50,399.83	\$50,300.23	\$48,608.93	\$31,301.80	\$30,431.09	\$31,443.73	\$444,505.93	
Bill/unit	\$117.90	\$106.97	\$117.83	\$114.55	\$118.51	\$183.71	\$189.47	\$189.10	\$182.74	\$117.68	\$114.40	\$118.21	Total	
Savings	\$689.39	\$677.62	\$709.67	\$608.29	\$527.18	\$803.23	\$863.21	\$962.81	\$1,060.27	\$750.22	\$647.53	\$608.29	\$8,907.70	

Watts/SF	Size kW	Total kWh	Effiency of Grid Connected System	kWh/Year	120/240 System Max Demand (kW)	Use Factor	120/240 Adjusted Demand (kW)	Daily kWh usage 120/240	Cost/kW Installed	Cost of System	Estimated simple payback using savings
5	89	88685.11	0.90	79,816.60	1513.93	0.6	908.36	21,800.59	\$8,500.00	\$757,286.69	
5	50	39324.42	0.90	35,391.97	1513.93	0.6	908.36	21,800.59	\$8,500.00	\$424,493.28	
5	50	39324.42	0.90	35,391.97	1513.93	0.6	908.36	21,800.59	\$8,500.00	\$424,493.28	
	_	_	_						Total	\$1,606,273.24	180.32

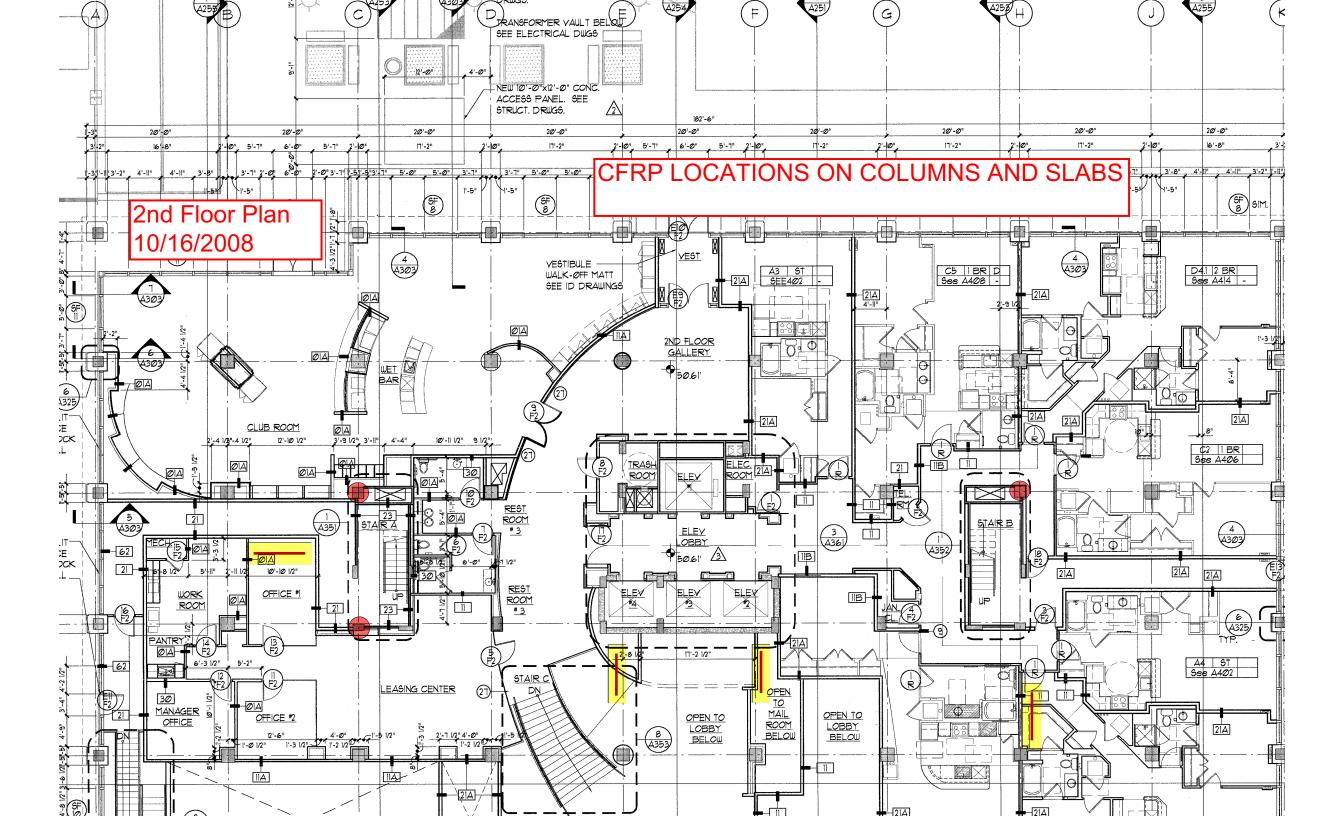
	Sun Hours(kWh/m2/day)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr Avg or Total
South	3.4	3.7	3.5	3.1	2.6	2.5	2.6	2.9	3.3	3.7	3.3	3	3.13
days	31	28	31	30	31	30	31	31	30	31	30	31	365
kWh/mon	8182.97	8043.23	8423.65	7220.27	6257.57	5822.80	6257.57	6979.60	7686.09	8905.00	7686.09	7220.27	7390.43
East	3.4	3.7	3.5	3.1	2.6	2.5	2.6	2.9	3.3	3.7	3.3	3	3.13
days	31	28	31	30	31	30	31	31	30	31	30	31	365
kWh/mon	3628.46	3566.50	3735.18	3201.59	2774.71	2581.92	2774.71	3094.87	3408.14	3948.62	3408.14	3201.59	39371.46
West	3.4	3.7	3.5	3.1	2.6	2.5	2.6	2.9	3.3	3.7	3.3	3	3.13
days	31	28	31	30	31	30	31	31	30	31	30	31	365
kWh/mon	3628.46	3566.50	3735.18	3201.59	2774.71	2581.92	2774.71	3094.87	3408.14	3948.62	3408.14	3201.59	39371.46
North	0	0	0	0	_	2.5	2.6	2.9	0	0	0	0	0.88
days	31	28	31	30	31	30	31	31	30	31	30	31	365
kWh/mon	0.00	0.00	0.00	0.00	6257.57	5822.80	6257.57	6979.60	0.00	0.00	0.00	0.00	2109.79
Monthly													
kWh after	660,378.45	595,240.36	659,924.34	640,394.32	657,753.80	637,208.31	657,753.80	655,669.43	639,515.39	659,016.11	639,515.39	662,194.91	7,789,882.14
Solar													
	ć22.052.02	620 424 02	daa osa oa	da4 070 ca	422.052.02	440.660.20	d=4 262 04	454 262 04	¢40.660.20	ć22.052.02	624.070.62	422.052.02	6452 442 62
Monthly Bill	\$32,052.02	\$29,131.83	\$32,052.02	\$31,078.62	\$32,052.02	\$49,669.20	\$51,263.04	\$51,263.04	\$49,669.20	\$32,052.02	\$31,078.62	\$32,052.02	\$453,413.63
w/o solar	Ć120 F0	¢100 F2	Ć120 F0	¢116.04	¢120 F0	\$186.73	\$192.72	\$192.72	¢106 72	Ć120 F0	¢116.94	¢120 F0	¢1.42.0F
Bill/unit Monthly Bill	\$120.50	\$109.52	\$120.50	\$116.84	\$120.50	\$180.73	\$192.72	\$192.72	\$186.73	\$120.50	\$116.84	\$120.50	\$142.05
w/solar	\$31,362.63	\$28,454.21	\$31,342.35	\$30,470.33	\$31,245.44	\$48,440.26	\$49,942.34	\$49,789.95	\$48,608.93	\$31,301.80	\$30,431.09	\$31,443.73	\$442,833.06
Bill/unit	\$117.90	\$106.97	\$117.83	\$114.55	\$117.46	\$182.11	\$187.75	\$187.18	\$182.74	\$117.68	\$114.40	\$118.21	Total
•	\$689.39	\$677.62	\$709.67	\$608.29	\$806.58	•	\$1,320.70	\$1,473.09	\$1,060.27	\$750.22	\$647.53	\$608.29	\$10,580.58
Savings	\$5,590	3077.62	\$709.67	\$608.29	\$6.00.58	\$1,228.94	\$1,320.70	\$1,473.09	\$1,000.27	\$750.22	\$047.53	\$008.29	\$10,580.58

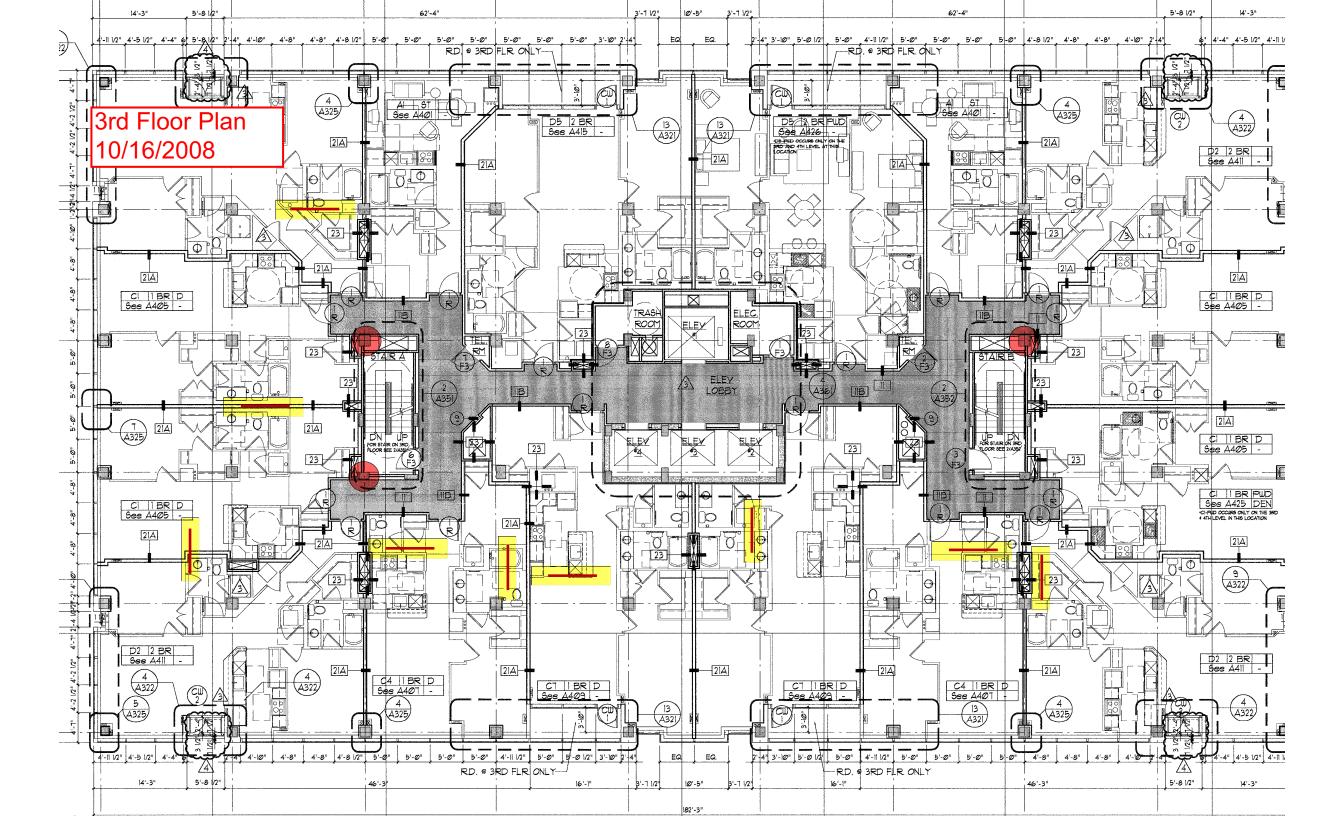
Watts/SF	Size kW	Total kWh	Efficiency of Grid Connected System	kWh/Year	120/240 System Max Demand (kW)	Use Factor	120/240 Adjusted Demand (kW)	Daily kWh usage 120/240	Cost/kW Installed	Cost of System	Estimated simple payback using savings
5	89	88685.11	0.90	79,816.60	1513.93	0.6	908.36	21,800.59	\$8,500.00	\$757,286.69	
5	50	39324.42	0.90	35,391.97	1513.93	0.6	908.36	21,800.59	\$8,500.00	\$424,493.28	
5	50	39324.42	0.90	35,391.97	1513.93	0.6	908.36	21,800.59	\$8,500.00	\$424,493.28	
5	89	25317.53	0.90	22,785.78	1513.93	0.6	908.36	21,800.59	\$8,500.00	\$757,286.69	
									Total	\$2,363,559.93	223.39

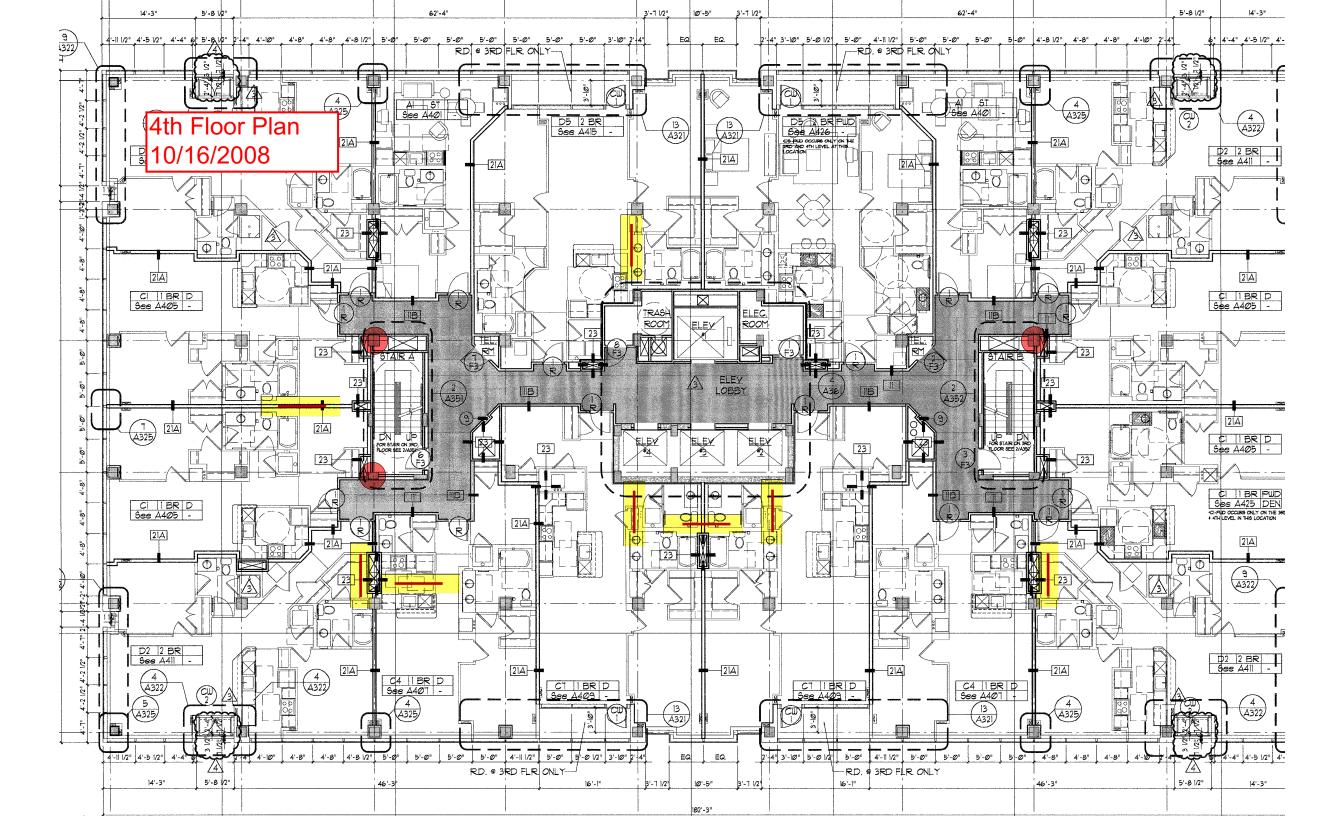


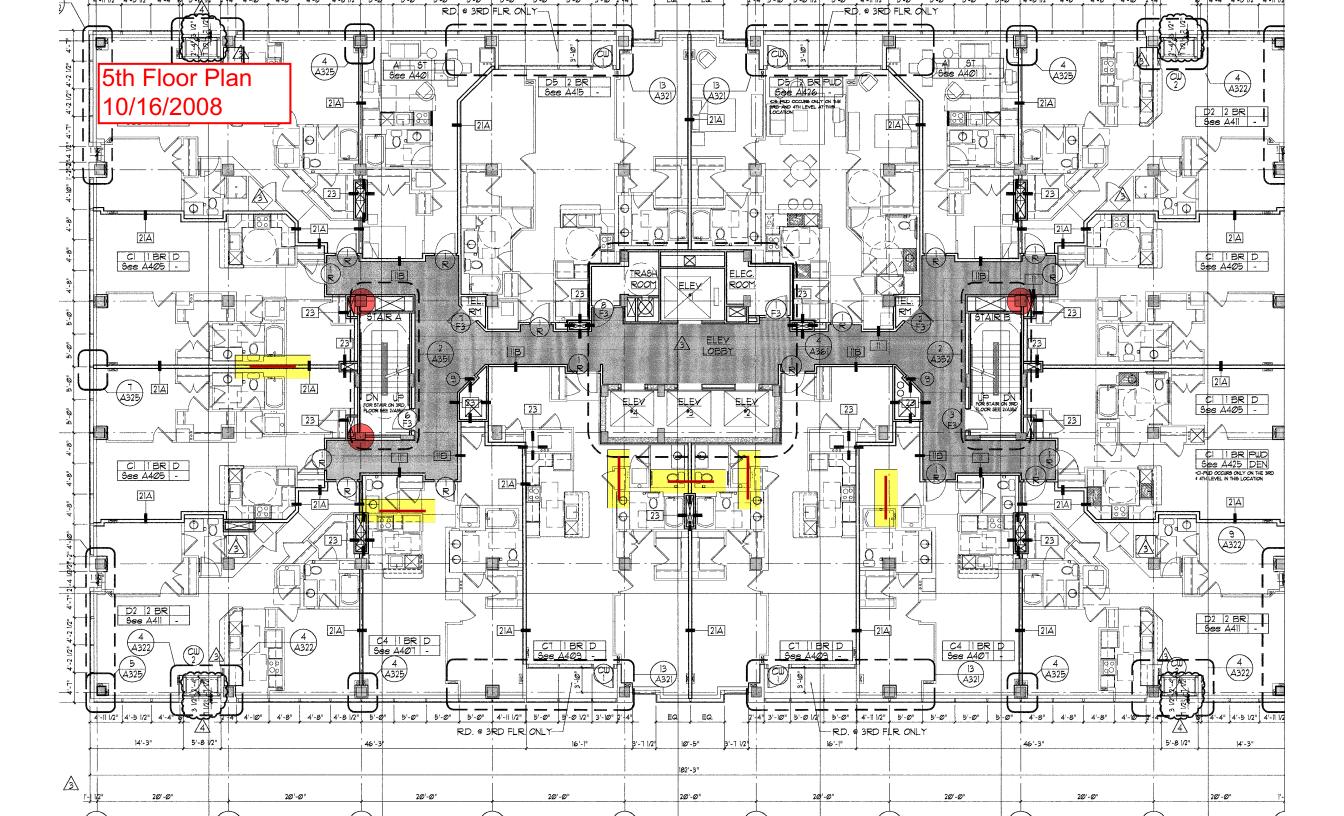
Christopher R. Stultz | Construction Management Dr. David Riley | Advisor

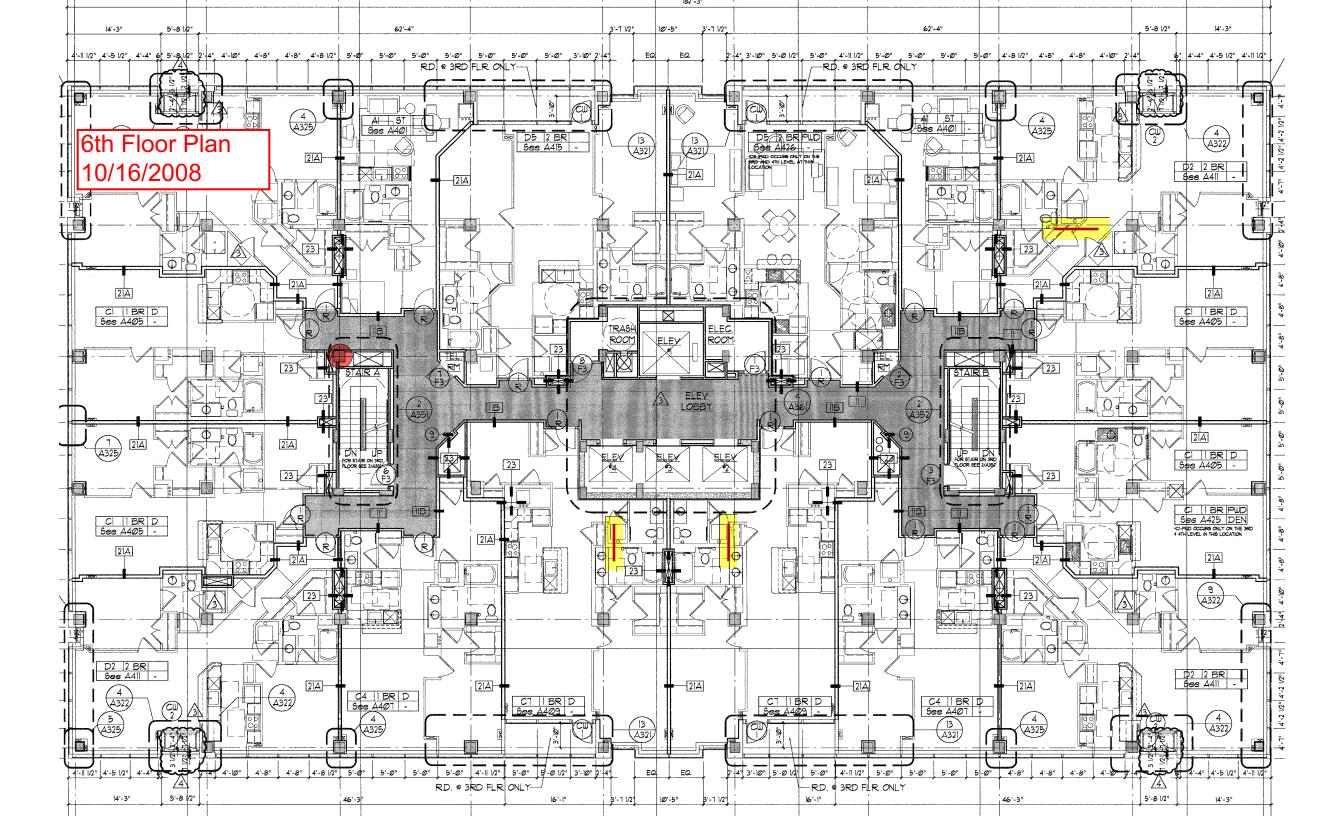
Appendix B Referenced Documents

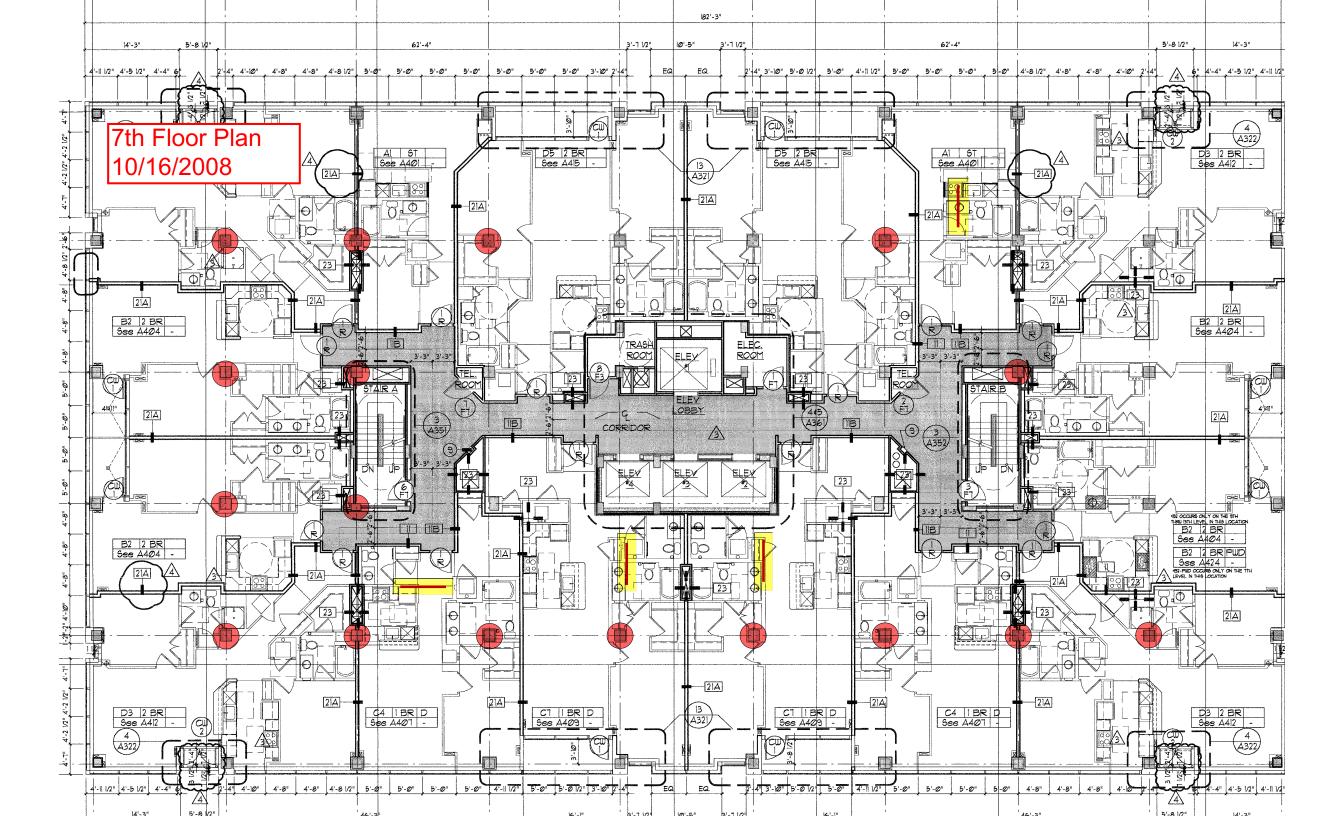


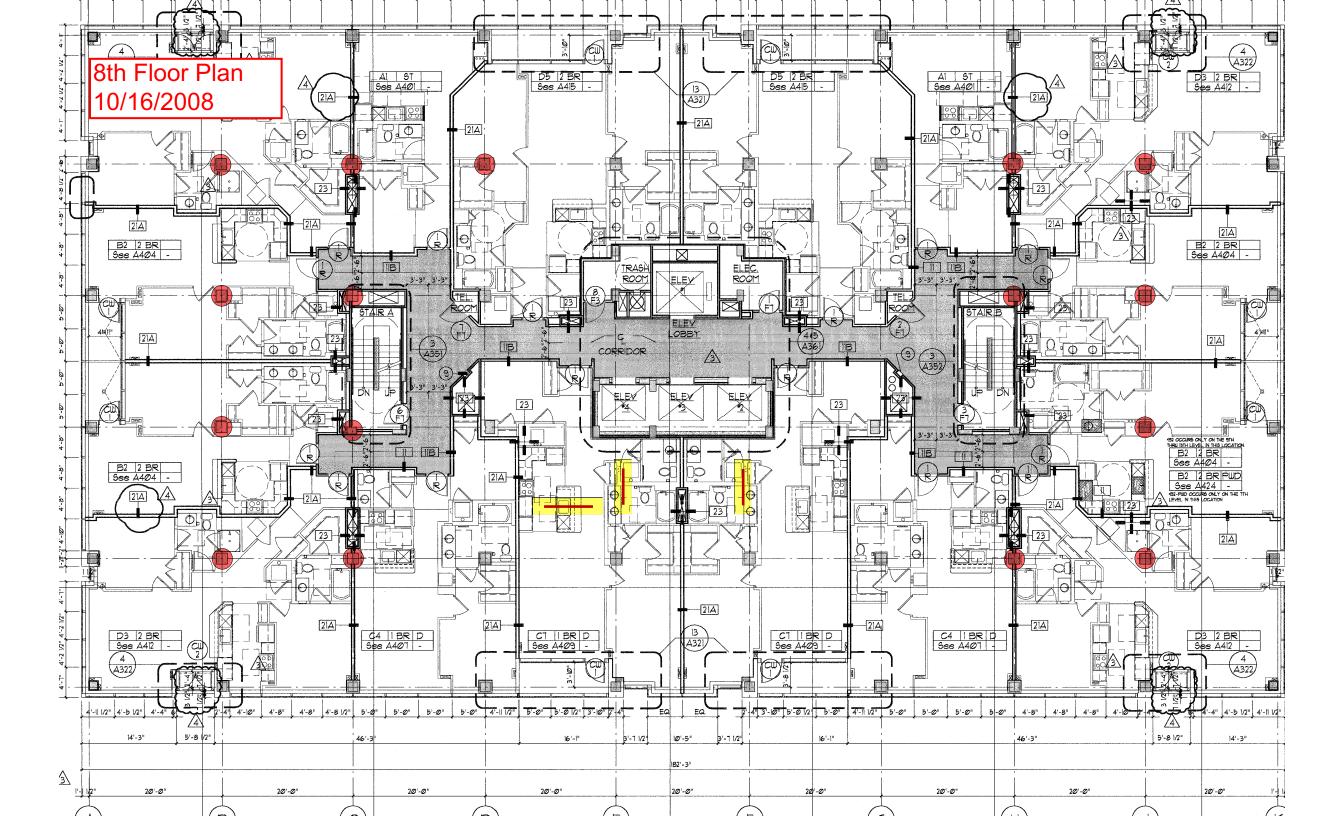


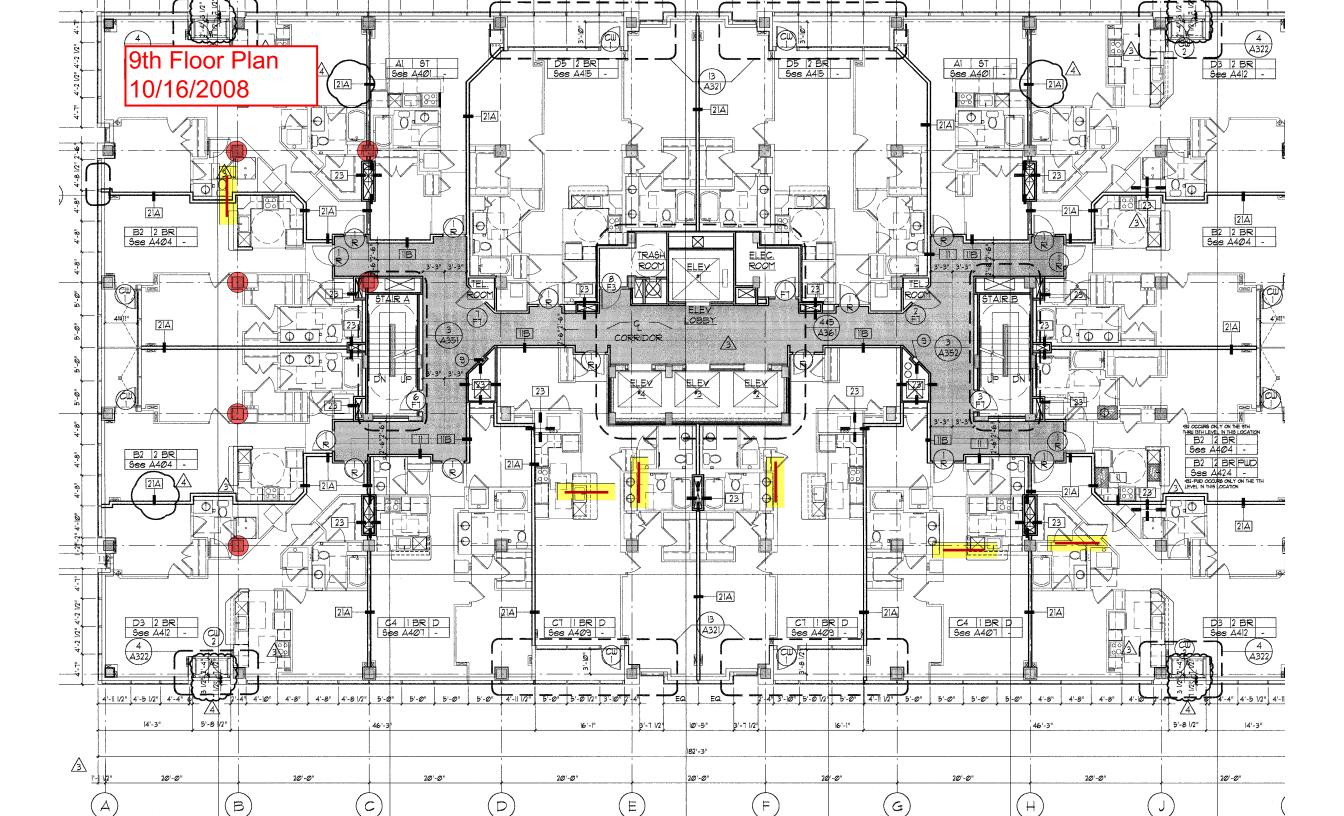


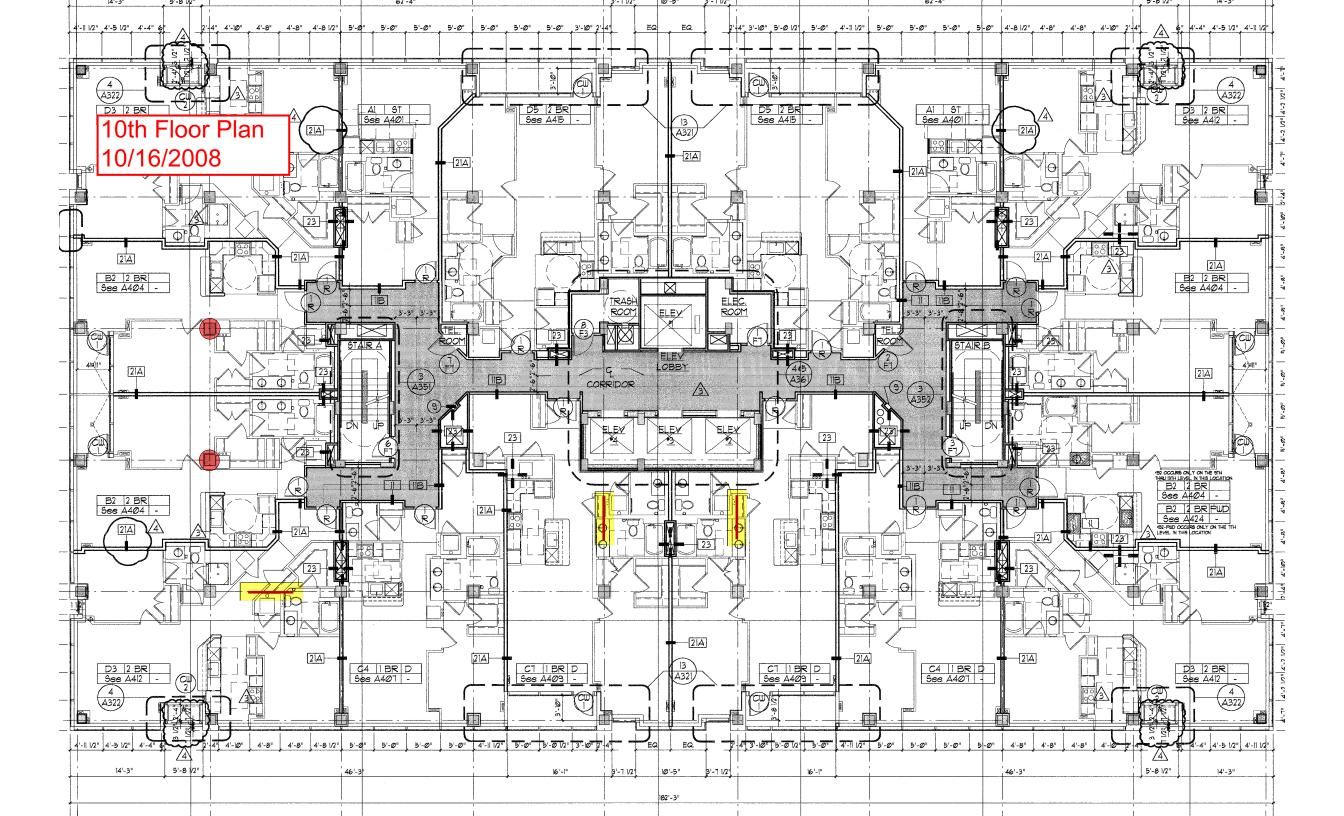


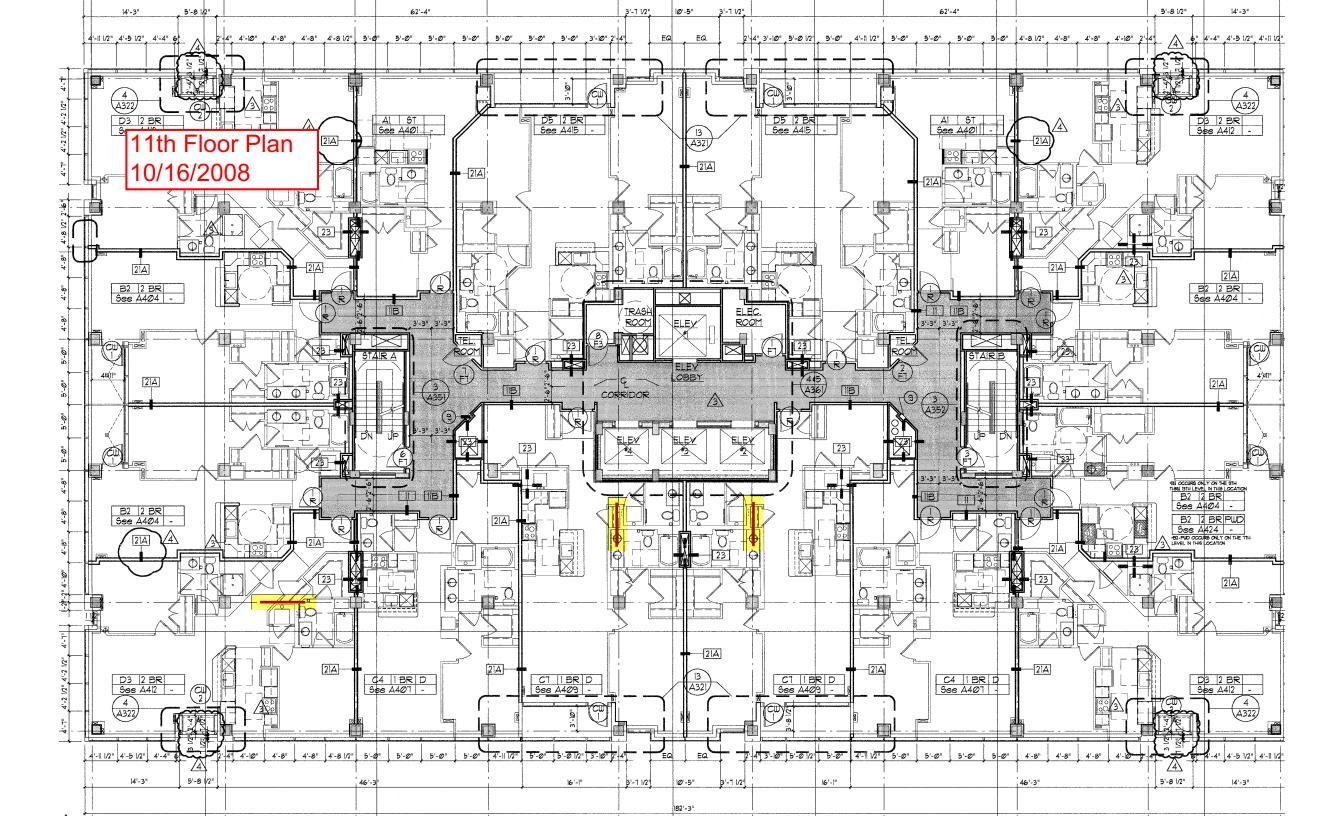






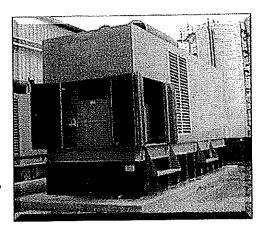




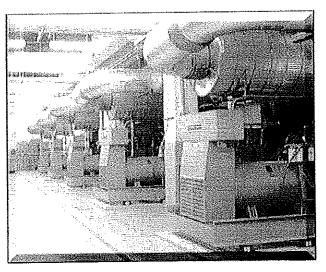


C Series

MTU Detroit Diesel Power Generation's Custom Product Series (C Series) engine generator sets are available in a multitude of configurations. We have the ability to custom build to the most demanding specifications in the market, minimizing the need for time consuming and costly modifications at the job site. The result is an engine generator set that arrives at the job site which has been factory engineered, built and tested. Our distributor network, consisting of factory certified technicians, ensures that the equipment is properly installed and implemented.



The C Series offers numerous options. From the brand of engine to the brand of battery charger, we can meet your preferences. We can provide a wide variety of options for control panels, load banks, voltage selector switches, water jacket heaters, silencers, mainline circuit breakers, paint colors, cooling systems, annunciation, fuel tanks, and many other options. No one in the industry can match MTU DD's ability to customize and engineer generator sets to a customer's specific requirements.



Fuel	kW Range	Frequency	Voltage
LP Gas	15 kW - 700 kW 12 kW - 580 kW	60 Hz 50 Hz	Single & Three Phase
Natural Gas	15 kW - 800 kW 12 kW - 650 kW	60 Hz 50 Hz	Single & Three Phase
Diesel	15 kW - 2800 kW 12 kW - 2480 kW	60 Hz 50 Hz	Single & Three Phase
Diesel, LP Gas, Natural Gas	15 kW - 200 kW	400 Hz	Three Phase
Diesel	300 kW - 2800 kW 250 kW - 2480 kW	60 Hz 50 Hz	Medium Voltage







C Series

Standard Features

Engine Features:

- · Radiator cooled
- · Starter and alternator
- Oil pump and filter
- Air cleaner
- Mechanical governor 3-5%
 - standard up to 230 kW diesel
- Isochronous governor
 - 250 kW diesel and higher
 - standard on all gaseous models

Control Panel Features:

- 45 Series panel
 - 4 LEDs
 - 5 engine shutdowns: OS, OC, LOP, HWT, LCL
- Gauges
 - oil pressure, battery charging voltmeter, running time meter and engine temperature
- Meters—2% accuracy
 - voltmeter
 - ammeter
 - frequency meter
 - three position engine control switch
- Generator features
 - brushless single bearing, direct coupled
 - automatic voltage regulator
 - over-excitation protection
 - under-frequency compensation protection
- Additional standard features
 - oil drain extension
 - fuel flex
 - exhaust flex
 - battery cables
 - vibration pads

Optional Features:

- Cooling systems—high ambient temperature options
 - remote (vertical or horizontal) radiators
 - heat exchangers
- Isochronous governors—load sharing and paralleling controls
- · Control panels
 - 50 Series-12 LED NFPA 110 panel
 - DGC 500-digital NFPA 110 panel
 - DGC 2001—digital, remote communication capable
 - DGC 2000—digital, additional monitoring and remote communications
 - custom control panel
- Generators
 - Note: Marathon standard but we do offer choice of Kato, Leroy Somers, Newage, and others
 - PMG
- · Mainline circuit breakers
 - Note: Our standard MLCB is GE, 80% rated, thermo magnetic type trip (up to 1200 amps).
 Above 1200 amps electronic, 100% rated insulted case type breakers are standard.
 - Siemens, Cutler-Hammer, and Square D are available
 - 100% rated breaker
 - fusible disconnects
- Silencers—industrial, residential, critical, hospital grade available
- Battery chargers—ferro-resonant, solid state, dual rated, or preferred manufacturer
- · Batteries, lead acid or NiCd



DETROIT DIESEL

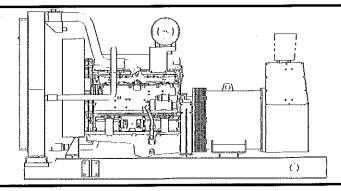




DETROIT DIESEL



Standby 450 ekW 60 Hz 415 ekW 60 Hz **Prime** 208 - 4160V



- EPA Tier 3 Certified
- Generator Set Tested to ISO 8528-5 for Transient Response
- UL2200, CSA Listing Offered
- Accepts Rated Load in One Step Per NFPA 110, Level 1
- All MTU DD is a single source supplier
- Global Product Support
- 2 Year Standard Warranty
- Complete Range of Accessories
- Custom Design for any Application

Series 60 (6063HV35) Diesel Engine

- 14.0 Liter Displacement
- Electronic Unit Pump Injection
- 4-Cycle

Permanent Magnet Generator (PMG)

- Brushless, Rotating Field
- 300% Short Circuit Capability
- 2/3 Pitch Windings Digital Control Panel

- UL 508 Listed, CSA Certified, NFPA 110
 - Complete System Metering
- LCD Display

Cooling System

- Integral Set-mounted
- Engine Driven Fan

GEN-SET RATINGS

Standby - 130º Rise

Voltage (L-L)	Phase	PF	Hz	kW	kVA	AMPS	skVA @ 30% voltage dip	Generator Model*	Connection
240v	1	1.0	60	450	450	1875	770	574RSL4037	12 LEAD ZIG-ZAG
208v	3	0.8	60	450	562.5	1561	1300	572RSL4027	12 LEAD LOW WYE
240v	3	0.8	60	450	562.5	1353	1300	572RSL4027	12 LEAD HI DELTA
480v	3	0.8	60	450	562.5	677	1100	572RSL4025	12 LEAD HI WYE
600v	3	0.8	60	450	562.5	541	1040	572RSS4270	4 LEAD WYE
4160v	3	0.8	60	450	562.5	78	1240	573FSM4354	6 LEAD WYE

Prime - 105º Rise

Voltage (L-L)	Phase	PF	Hz	kW	kVA	AMPS	skVA @ 30% voltage dip	Generator Model*	Connection
240v	ı	1.0	60	415	415	1729	770	574RSL4037	12 LEAD ZIG-ZAG
208v	3	0.8	60	415	518.75	1440	1300	572RSL4027	12 LEAD LOW WYE
240v	3	0.8	60	415	518.75	1248	1300	572RSL4027	12 LEAD HI DELTA
480v	3	0.8	60	415	518.75	624	1100	572RSL4025	12 LEAD HI WYE
600v	3	0.8	60	415	518.75	499	1040	572RSS4270	4 LEAD WYE
4160	3	0.8	60	415	518.75	72	1240	573FSM4354	6 LEAD WYE

***The Generator Model Number identified in the table is for standard C Series Configuration. Consult the factory for alternate configuration





STANDARD EQUIPMENT

ENGINE

- Air Cleaners
- Oil Pump
- Full Flow Oil Filter
- Jacket Water Pump
- **Thermostat**
- Exhaust Manifold dry
- Blower Fan & Fan Drive
- Radiator Unit Mounted
- Electric Starting Motor 24V
 Governor Electric Isochronous
 Base Structural Steel
 SAE Flywheel & Bell Housing

- Charging Alternator 24V
- Battery Box & Cables
- Flexible Fuel Connectors
- Flexible Exhaust Connection
- **EPA** Certified Engine

DIGITAL CONTROL PANEL

- Digital Metering
- **Engine Parameters**
- Generator Protection Functions
- **Engine Protection**
- SAE J1939 Engine ECU Communications Windows-based Software
- Multilingual Capability
- Remote Communications to our RDP-110 Remote Annunciator
- 16 Programmable Contact Inputs
- 7 contact outputs
- UL Recognized, CSA certified, CE approved
- Event Recording
- IP 54 Front Panel Rating with Integrated Gasket
- NFPA110 Level Compatible

GENERATOR

- NEMA MG1, IEEE and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rate current for up to 10 seconds
- Self Ventilated and Drip-proof
- Superior Voltage Waveform Digital, Solid State, Volts-per-hertz Regulator
- No Load to Full Load Regulation
- Brushless Alternator with Brushless Pilot Exciter
- 4 pole, Rotating Field
 130°C Standby Temperature Rise
 1 Bearing, Sealed
 Flexible Coupling
 Full Amortisseur Windings
 125% Rotor Balancing
 3-phase Voltage Sensing
 ±.25% Voltage Regulation
 100% of Rated Load One Step
 3% Maximum Harmonic Content

- 3% Maximum Harmonic Content





APPLICATION DATA

Engine

<u> </u>		- 10014			ו ממפו
Manufacturer:	MTU Detroit Diesel				
Model:					
Туре:		Max Power:	Standby:	bhp (kWm)	685 (511)
		• •	Prime:	bhp (kWm)	623 (465)
Arrangement:		c in i			
Displacement: in.3 (lit)	855 (14.0)			******************	
Bore: in. (cm)		Frequency:			6U HZ
		Air Cleaner:			Dry
Stoke: in. (cm)					
Compression Ratio:	16.0:1				

Liquid Capacity (Lubrication)

I	Total oil system: gal (lit)	9.5 (36)
I	Engine Jacket water capacity: gal (lit)	6.0 (23)
l	System Coolant capacity: gal (lit)	42 (159)
İ	Dysiem Coolain capacity, gai (iii)	

Electrical

Electric volts DC:	.24
Cold cranking Amps under 0°F (-17.8°C):	.1250

Fuel System

1/2" NPT
1⁄2″ NPT
6.8 (2.1)
Dissel #2
Diesel #2
90.8 (344)

Fuel Consumption

I		Standby	Prime
1	100% Power Rating: gal/hr (lit/hr)	.34.6 (131).	. 32.3 (122)
	75% Power Rating: gal/hr (lit/hr)	.26.4 (100).	24.3 (92)
	50% Power Rating: gal/hr (lit/hr)	18.2 (69)	16.4 (62)
ı	2 3 3 4		

Coolina - Radiator System

Coollid - Kaalaiai	,	
	Standby	Prime
Ambient Capacity of Radiator: °F (°C) Maximum Allowable	122 (50)	122 (50)
Static Pressure on Radiator Exhaust: in. H ₂ 0 (kPa)	0.5 (0.12)	0.5 (0.12)
Water Pump Capacity: gal/min (lit/min)		
Heat Rejection to Coolant: BTUM (kW)	9,400 (165)	9,300 (163)
Heat Rejection to Air to Air: BTUM (kW)	7,250 (127)	5,950 (105)
Heat Radiated to Ambient: BTUM (kW)	6,505 (114)	6,417 (113)
1		

Air Requirements

	Standby Prime
	Aspirating: CFM (m³min)
	Air Flow Required
	for Radiator Cooled
	Unit: CFM (m³min)26,991 (764)26,991 (764)
	Air Flow Required for
	Heat Exchanger/
	Remote Radiator based
l	on 25°F Rise: CFM (m³min)18,070 (512)17,825 (505)

Exhaust System

1	Standby Prime
	Gas Temp.(Stack): °F (°C) 1,058 (570) 980 (527)
	Gas Temp.(Stack): °F (°C)
	Temp: CFM (m³min)3,973 (112.3)3,030 (102.0)
	Back Pressure: in. H₂0 (kPa)40.8 (10.2)40.8 (10.2)

EMISSIONS DATA

NOx + NMHC	CO	<u>PM</u>
2.80	0.80	0.13

All units are in g/hp-hr and are EPA D2 cycle values.

Emission levels of the engine may vary as a function of ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data provided are laboratory results from one engine representing this rating. The data was obtained under controlled environmental conditions with calibrated instrumentation traceable to the United States National Bureau of Standards and in compliance with US EPA regulations found within 40 CFR Part 89. The weighted cycle value from each engine is guaranteed to be below the US EPA Standards at the US EPA defined conditions.

SOUND DATA

	Standby Full Load	Standby No Load	Prime Full Load	<u>Prime No Load</u>
23 ft (7m) OPU w/ critical grade muffler (dBA)	97.5	89	96	89
23 ft (7m) Sound Attenuated Enclosure (dBA)	89.5	81	88	81

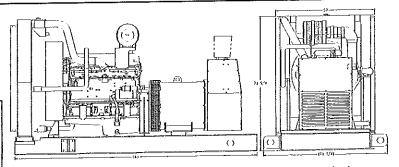
RATING DEFINITIONS and CONDITIONS

- Ambient capability factor at 300m (984 ft). Consult your local MTU DD Power Generation Distributor for other altitudes.
- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271.
- Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of
 generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in
 accordance with ISO-8528/1, overload power in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. For
 limited running time and base load ratings, consult the factory.
- Deration Factors:

Altitude: Derate 1% per 1,000 ft (305 m) above 600 ft (183m). Temperature: Derate 1% per 10°F (5.5°C) above 77°F (25°C).

Weights & Dimensions

Lenoth: in. (cm)	140 (355.6)
Width: in. (cm)	57 (144.8)
Height: in. (cm)	79.6 (202.2)
Length: in. (cm)	6,726 (3,051)



Drawing above for illustration purposes only, based on standard open power 480 volt generator. Lengths may vary with other voltages. *Do Not Use for Installation Design

DISTRIBUTED BY:

Materials and specifications subject to change without notice.

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100 Power Drive, Mankato, MN 56001

Phone: 800-325-5450

www.mtuddpowergeneration.com

I. APPLICABILITY

Except as modified herein, this schedule is applicable only to a non-residential transmission or primary voltage Customer (as defined in Paragraph XI.) who elects to receive Electricity Supply Service and Electric Delivery Service from the Company and whose peak measured demand has reached or exceeded 500 kW during at least three billing months within the current and previous 11 billing months.

For a Customer served under this schedule whose peak measured demand has decreased to less than 500 kW, this schedule shall remain applicable to the Customer and the Customer shall not have the option to purchase electricity under Schedule GS-1, GS-2, or GS-2T until such time as the maximum measured demand has remained at less than 500 kW during all billing months within the current and previous 11 billing months.

At such time the Customer no longer meets the above applicability requirements, the Customer shall remain on this schedule for the period (not exceeding two additional billing months) required to achieve an orderly transfer to the applicable schedule.

For new service, this schedule is applicable when the anticipated kW demand meets the above criteria.

II. 30-DAY RATE

A. Distribution Service Charges

- Basic Customer Charge Basic Customer Charge \$127.60 per billing month.
- Plus Distribution Demand Charge
 First 5000 kW of Distribution Demand
 Additional kW of Distribution Demand
 @ \$1.000 per kW
 \$0.755 per kW
- 3. Plus rkVA Demand Charge @ \$0.15 per rkVA

(Continued)

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II.	30-DAY RATE ((Continued)
-----	---------------	-------------

- B. Electricity Supply Service Charges
 - 1. On-Peak Electricity Supply Demand Charge
 - a. All On-Peak Electricity Supply Demand for
 Primary Service Voltage
 \$ 12.003 per kW
 - All On-Peak Electricity Supply Demand for Transmission Service Voltage @ \$11.715 per kW
 - Plus Off-Peak Electricity Supply Demand Charge
 All Off-Peak kW Demand @ \$ 0.632 per kW
 - 3. Plus Electricity Supply Adjustment Demand Charge
 First 5000 kW of Demand @ (\$ 0.421) per kW
 Additional kW of Demand @ (\$ 0.318) per kW
 - 4. Plus Electricity Supply kWh Charge
 All On-peak kWh
 All Off-Peak kWh
 @ 0.404¢ per kWh
 0.272¢ per kWh
 - 5. Each Electricity Supply kilowatthour used is subject to all applicable riders.
 - 6. Each On-Peak Electricity Demand billed pursuant to Paragraph II.B.1 above, is subject to all applicable riders.
- C. The minimum charge shall be as may be contracted for.

(Continued)

III. DETERMINATION OF ON-PEAK AND OFF-PEAK HOURS

The following on-peak and off-peak hours are applicable to the billing of all charges stated in this schedule.

A. On-peak hours are as follows:

- 1. For the period of June 1 through September 30, 10 a.m. to 10 p.m., Mondays through Fridays.
- 2. For the period of October 1 through May 31, 7 a.m. to 10 p.m., Mondays through Fridays.
- B. All hours not specified in III.A. are off-peak.

IV. DETERMINATION OF DISTRIBUTION DEMAND

- A. Distribution Demand shall be billed only where the normal service delivery voltage is less than 69 kV.
- B. The Distribution Demand billed under Paragraph II.A.2. shall be such as may be contracted for but not less than the highest of:
 - 1. The highest average kW measured at the location during any 30-minute interval of the current and previous 11 billing months.
 - 2. 500 kW.
- C. When the Customer's power factor is less than 85 percent, a minimum distribution demand of not less than 85 percent of the Customer's maximum kVA demand may be established.

V. DETERMINATION OF rkVA DEMAND

The rkVA of demand billed shall be the highest average rkVA measured in any 30-minute interval during the current billing month.

(Continued)

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VI. DETERMINATION OF ON-PEAK ELECTRICITY SUPPLY DEMAND

The kW of demand billed under II.B.1. shall be the highest of:

- A. The highest average kW measured in any 30-minute interval of the current billing month during on-peak hours.
- B. Seventy-five percent of the highest kW of demand at this location as determined under VI.A., above, during the billing months of June through September of the preceding 11 billing months.
- C. 100 kW.

VII. DETERMINATION OF OFF-PEAK ELECTRICITY SUPPLY DEMAND

The kW of demand billed under Paragraph II.B.2. shall be the off-peak demand which is in excess of 90% of the On-Peak Electricity Supply Demand determined under Paragraph VI.

VIII. DETERMINATION OF ELECTRICITY SUPPLY ADJUSTMENT DEMAND

This credit is required in order to achieve customer bill neutrality, arising from changes to the Distribution Demand Charge while maintaining the overall capped rates. The kW of demand billed under Paragraph II.B.3. shall be the Distribution Demand determined under Paragraph IV.

IX. METER READING AND BILLING

When the actual number of days between meter readings is more or less than 30 days, the Basic Customer Charge, the Distribution Demand Charge, the rkVA Demand Charge, the On-Peak Electricity Supply Demand Charge, the Off-peak Electricity Supply Demand Charge, the Electricity Supply Adjustment Demand Charge, and the minimum charge of the 30-day rate will each be multiplied by the actual number of days in the billing period and divided by 30.

(Continued)

Filed 12-10-08 Electric-Virginia

X. STANDBY, MAINTENANCE OR PARALLEL OPERATION SERVICE

A Customer requiring standby, maintenance or parallel operation service may elect service under this schedule provided the Customer contracts for the maximum kW which the Company is to supply. Standby, maintenance or parallel operation service is subject to the following provisions:

- A. Suitable relays and protective apparatus shall be furnished, installed, and maintained at the Customer's expense in accordance with specifications furnished by the Company. The relays and protective equipment shall be subject, at all reasonable times, to inspection by the Company's authorized representative.
- B. In case the Distribution Demand determined under Paragraph IV. exceeds the contract demand, the contract demand shall be increased by such excess demand.
- C. The demand billed under II.A.2. and II.B.3. shall be the contract demand.

XI. DEFINITION OF TRANSMISSION, PRIMARY AND SECONDARY VOLTAGE CUSTOMER

- A. A transmission voltage Customer is any Customer whose delivery voltage is 69 kV or above.
- B. A primary voltage Customer is any Customer (a) served from a circuit of 69 kV or more where the delivery voltage is 4,000 volts or more, (b) served from a circuit of less than 69 kV where Company-owned transformation is not required at the Customer's site, (c) where Company-owned transformation has become necessary at the Customer's site because the Company has changed the voltage of the circuit from that originally supplied, or (d) at a location served prior to October 27, 1992 where the Customer's connection to the Company's facilities is made at 2,000 volts or more.
- C. A secondary voltage Customer is any Customer not defined in XI.A. or XI.B. as a transmission or primary voltage Customer.

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XII. TERM OF CONTRACT

The contract shall be open order unless (a) standby, maintenance or parallel operation service is provided, or (b) the Customer or the Company requests a written contract. In such cases, the term of contract for the purchase of electricity under this schedule shall be as mutually agreed upon, but for not less than one year. During the minimum term of applicability, the Customer may be billed under the corresponding Unbundled Rate Schedule GS-4U, if applicable.