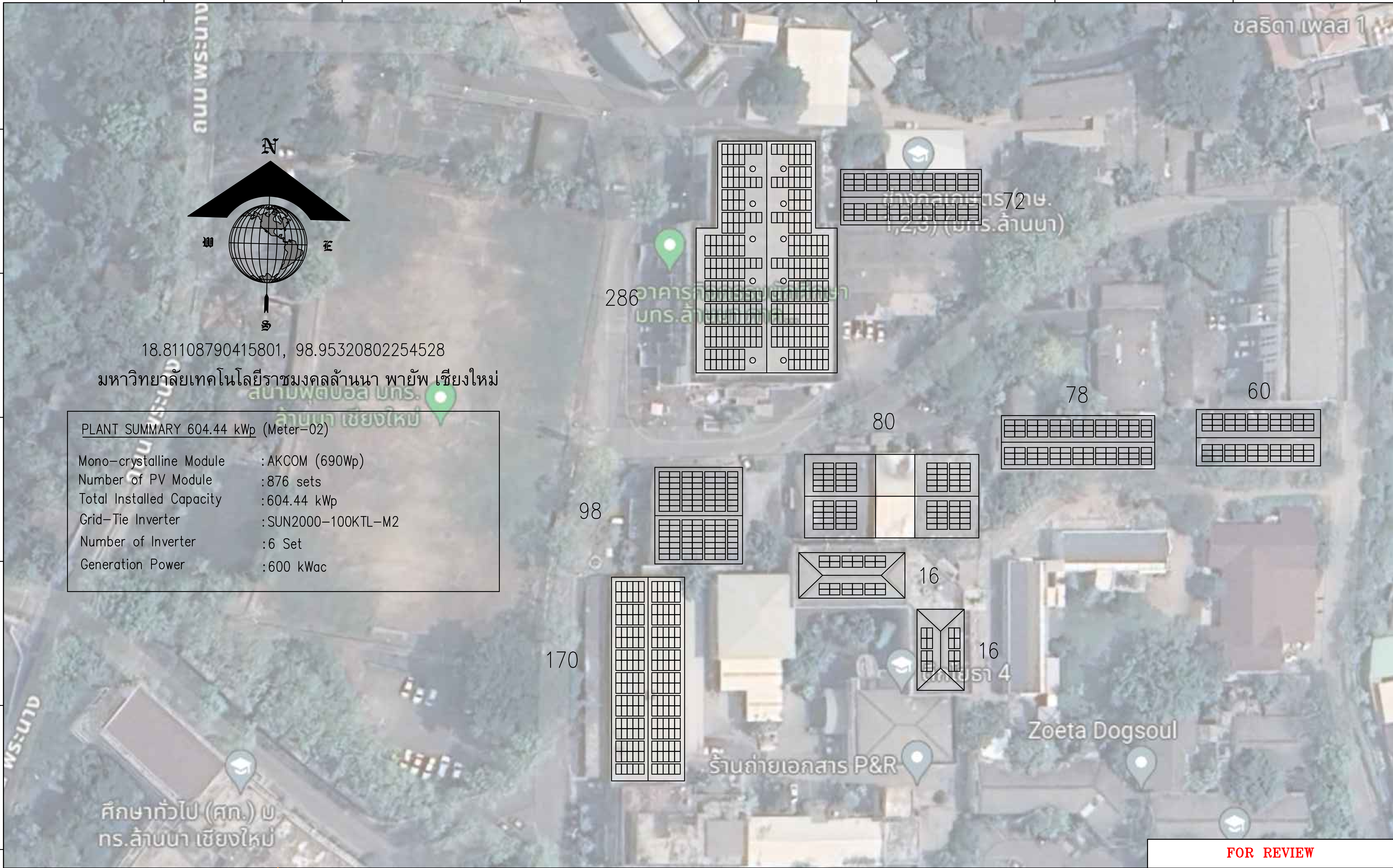

18.81108790415801, 98.95320802254528

มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา พายัพ เชียงใหม่

PLANT SUMMARY 604.44 kWp (Meter-02)

Mono-crystalline Module	: AKCOM (690Wp)
Number of PV Module	: 876 sets
Total Installed Capacity	: 604.44 kWp
Grid-Tie Inverter	: SUN2000-100KTL-M2
Number of Inverter	: 6 Set
Generation Power	: 600 kWac

CLIENT:

มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ภาคพายัพ เชียงใหม่

128 ถนนห้วยแก้ว ต.ช้างเผือก อ.เมือง จ.เชียงใหม่ 50300

CONTRACTOR:

วันชัยการไฟฟ้า

						CIVIL ENGINEER	
						ELECTRICAL ENGINEER	
						MECHANIICAL ENGINEER	-
A	3/02/2024	For-Review	Ms. Wanmai K.	Ms. Wanmai K.	Ms. Wanmai K.	PROJECT MANAGER	
REV.	DATE	DISCRIPTION	DRAWN	CHECKED	APPROVED	DATE	3 Feb 2024

FOR REVIEW

SOLAR ROOFTOP 604.44 kWp PROJECT (Meter-02)

DRAWING NAME: **PV MODULE LAYOUT**

DRAWING NO. –

REV. A

SHEET: 1 Of 1

SCALE: N/A

DESIGNED BY วันชัยการไฟฟ้า

BOQ มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ภาคพายัพ เชียงใหม่ 604.44 kW (Meter-02) Rev.1 (2024)

Item	Description	Model / Brand	Quantity	Unit	Price / Unit		Total Price	Remark
					Material	Installation		
1	Permit Coordination	Government	1	Set		120,000.00	120,000.00	
2	Engineering / Design Work	PV Syst	1	Set		50,000.00	50,000.00	
3	Procurement / Installation	-	1	Set			-	
							-	
3.1	PV Module 690 W	AKCOM	876	Panel	5,439,960.00	219,000.00	5,658,960.00	
3.2	String Inverter SUN2000-100KTL-M2	Huawei	6	ea	1,160,940.00	12,000.00	1,172,940.00	
3.3	String Inverter SUN2000-50KTL-M3	Huawei	0	ea	-	-	-	
3.3	Rapid shutdown for comply with EIT standard with Emergency Botton	Projoy	438	ea	4,380,000.00	43,800.00	4,423,800.00	ตามมาตราฐาน วศท.กำหนดให้ต้องติดตั้ง Rapid shutdown ตั้งแต่วันที่ 1 ก.ค. 2566
3.3	Controller Box for DC24V กล่องควบคุมไฟฟ้า (Rapid Shutdown Device)	Projoy	12	ea	120,000.00	2,400.00	122,400.00	
3.3	สายไฟเลี้ยง Rapit shutdown	Thai Yazaki	10000	m	550,000.00	150,000.00	700,000.00	
3.3	DC Fuse(Inline Fuse)	Uriarte	0	set	-	-	-	
3.4	DC Connector	Multi Contact	120	ea	24,000.00	8,400.00	32,400.00	
3.5	DC Extension Cable (Solar Cable) FD depends on calculation	Helukabel/JJ Lap/Prysmian/Link	32,000.00	m	1,152,000.00	192,000.00	1,344,000.00	
3.6	AC Cable						-	
3.6.1	AC Cable CV Cable size …1C x 70.. Sq.mm.(Inverter to MDB Solar)	Thai Yazaki	200	m	90,000.00	36,000.00	126,000.00	
3.6.2	AC Cable CV Cable size …240.. Sq.mm. (MDB Solar to TR)	Thai Yazaki	500	m	475,000.00	100,000.00	575,000.00	
3.6.4	AC Cable THW Cable size …120.. Sq.mm. (AC Collection Ground)	Thai Yazaki	50	m	27,500.00	4,000.00	31,500.00	
3.6.5	AC Cable THW Cable size …16.. Sq.mm. (Ground)	Thai Yazaki	600	m	37,800.00	15,000.00	52,800.00	
3.6.5	AC Cable THW Cable size …6.. Sq.mm. (DC Ground)	Thai Yazaki	2000	m	90,000.00	30,000.00	120,000.00	
3.6.6	Acc . AC Cable (cable lag,Terminat lag,support cable grend)	Thai Yazaki	1	Set	75,000.00	30,000.00	105,000.00	
3.7	Main Distribution Board	Precise					-	
3.7.1	Main Distribution Board (MDB)	Precise	1	ea	330,000.00	5,000.00	335,000.00	
3.8	Grounding System	Kumwell	1	Set	20,000.00	7,000.00	27,000.00	
							-	
3.9	Mounting Structure (604.44 kWp)	-	1	Set	604,440.00	181,332.00	785,772.00	
3.10	Cable Tray	Perforated Tray					-	
3.10.1	Cable Tray 100x100x2400	Perforated Tray	200	ea	308,000.00	30,000.00	338,000.00	
3.10.3	Cable Tray 200x100x2400	Perforated Tray	150	ea	202,500.00	30,000.00	232,500.00	
3.10.4	Cable Tray 300x100x2400	Perforated Tray	30	ea	59,250.00	9,000.00	68,250.00	
3.10.5	Cable ladder 400x100x2400	Perforated Tray	0	ea	-	-	-	
3.10.6	Conduit and Flexible, Support Cable Tray		1	Lot	50,000.00	25,000.00	75,000.00	
							-	
3.11	Metering System						-	
3.11.1	PQM Meter (UMG 512 Pro)	Janitza	1	ea	120,000.00	15,000.00	135,000.00	
3.11.2	Revenue Meter	EDMI ATLAS ,MK10E	0	ea	-	-	-	
3.12	Protection System						-	
3.12.1	Relay Protection System (SEL-751)	SEL-751	0	lot	-	-	-	
3.13	Other Accessories						-	
3.13.1	Transformer 630 kVA	-	1	ea	600,000.00	30,000.00	630,000.00	
3.13.2	22kV For Transformer	STC,Precise	1	Set	120,000.00	50,000.00	170,000.00	
3.13.3	22 kV Sac Cable		70	m	15,750.00	3,500.00	19,250.00	
3.13.4	Current Transformer MV	-	3	ea	96,000.00	15,000.00	111,000.00	
3.13.5	Potential Transformer MV	-	1	ea	51,700.00	10,000.00	61,700.00	
3.13.6	Concret Pole and Support CT,VT and Acc.	STC	1	ea	35,000.00	25,000.00	60,000.00	
3.13.7	Concret Pole For Riser Pole Incomming + Outgoing	STC	0	ea	-	-	-	
3.13.8	Drop Out Fuse	Precise	3	ea	9,000.00	3,000.00	12,000.00	
3.13.9	Lightning Arrester 21 kV 10 kA	Precise	3	ea	12,000.00	3,000.00	15,000.00	
3.13.10	Electrical Distribution Box	Schneider	1	ea	15,000.00	8,000.00	23,000.00	
3.13.11	Electrical System (Lighting Fixture, Receptacle)	Philips	1	Set	8,000.00	2,000.00	10,000.00	
3.14	Monitoring System						-	
3.14.1	Smart Logger 3000A	Huawei	1	ea	30,000.00	10,000.00	40,000.00	
3.14.2	RS485 for Zero Export	lapp	1	Set	20,000.00	5,000.00	25,000.00	
3.14.3	LAN Wiring System	TP Link	1	Set	5,000.00	3,500.00	8,500.00	
3.14.4	UPS	Leonic	1	ea	5,000.00	1,000.00	6,000.00	
4	Safety System						-	
4.1	Warning Sign,Fire Extinguisher 1 Sets ,Equipment Name Plate (Acrylic)		1	Set	10,000.00	3,000.00	13,000.00	
4.2	Ladder For Service		0	Set	-	-	-	
4.3	Inverter Support Structure and Fence		1	Set	150,000.00	40,000.00	190,000.00	
5	Test and Comissioning System						-	
5.1	Commissioning Work		1	Set		35,000.00	35,000.00	
6	Others						-	
6.1	Hand rail Lifegrad			Set	-	-	-	
6.2	Walkway			Set	-	-	-	
6.3	Water Cleaning system		1	Set	150,000.00	40,000.00	190,000.00	
6.4	เปลี่ยนหลังคา เป็นเมทัลชีท		2012.15	ตร.ม.	804,860.00	503,037.50	1,307,897.50	
6.5	Mobilization		1	Set	-	100,000.00	100,000.00	
6.6	Unload and Transportation		1	Set	300,000.00	100,000.00	400,000.00	
6.7	Insurance			Set	-		-	
6.8	Management and Overhead		1	Set		300,000.00	300,000.00	
	Total				17,753,700.00	2,604,969.50	20,358,669.50	
						Total	20,358,669.50	
	System Size (KWdc) = Q'ty Panel x PV Module Rate							
	THB/W				29.37	4.31	33.68	

Solar PV Rooftop 604.44 kWp. มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ภาคพายัพ เชียงใหม่ Meter-02

Total PV Plant Capacity (DC)	**604.44**	**kWp**
Daily Electricity Production	1,692.43	kWh/day
Monthly Electricity Production	50,772.96	kWh/month
Annual Electricity Production	609,275.52	kWh/year
Investment	20,358,669.5	Batt
Tariff	4.00	Bath/unit

Year	Degradation of PV Module		Annual Electricity Production (kWh/Year)	Estimated Yearly Saving (@ 4.00 Baht/kWh)	Accumulated Saving (Baht)	Payback Period (Baht)
0		100%		-20,358,669.50		-20,358,669.50
1	2.50%	97.50%	609,276	2,437,102	2,437,102	-17,921,567
2	0.60%	96.90%	594,044	2,376,175	4,813,277	-15,545,393
3	0.60%	96.30%	590,479	2,361,917	7,175,194	-13,183,475
4	0.60%	95.70%	586,936	2,347,746	9,522,940	-10,835,729
5	0.60%	95.10%	583,415	2,333,660	11,856,600	-8,502,070
6	0.60%	94.50%	579,914	2,319,658	14,176,257	-6,182,412
7	0.60%	93.90%	576,435	2,305,740	16,481,997	-3,876,673
8	0.60%	93.30%	572,976	2,291,905	18,773,902	-1,584,768
9	0.60%	92.70%	569,538	2,278,154	21,052,056	693,386
10	0.60%	92.10%	566,121	2,264,485	23,316,540	2,957,871
11	0.60%	91.50%	562,724	2,250,898	25,567,438	5,208,769
12	0.60%	90.90%	559,348	2,237,393	27,804,831	7,446,161
13	0.60%	90.30%	555,992	2,223,968	30,028,799	9,670,129
14	0.60%	89.70%	552,656	2,210,624	32,239,423	11,880,754
15	0.60%	89.10%	549,340	2,197,361	34,436,784	14,078,114
16	0.60%	88.50%	546,044	2,184,176	36,620,960	16,262,291
17	0.60%	87.90%	542,768	2,171,071	38,792,032	18,433,362
18	0.60%	87.30%	539,511	2,158,045	40,950,077	20,591,407
19	0.60%	86.70%	536,274	2,145,097	43,095,173	22,736,504
20	0.60%	86.10%	533,057	2,132,226	45,227,399	24,868,730
21	0.60%	85.50%	529,858	2,119,433	47,346,832	26,988,163
22	0.60%	84.90%	526,679	2,106,716	49,453,548	29,094,879
23	0.60%	84.30%	523,519	2,094,076	51,547,624	31,188,955
24	0.60%	83.70%	520,378	2,081,511	53,629,136	33,270,466
25	0.60%	83.10%	517,256	2,069,022	55,698,158	35,339,488
Total			**13,924,539**	**55,698,158**	**55,698,158**