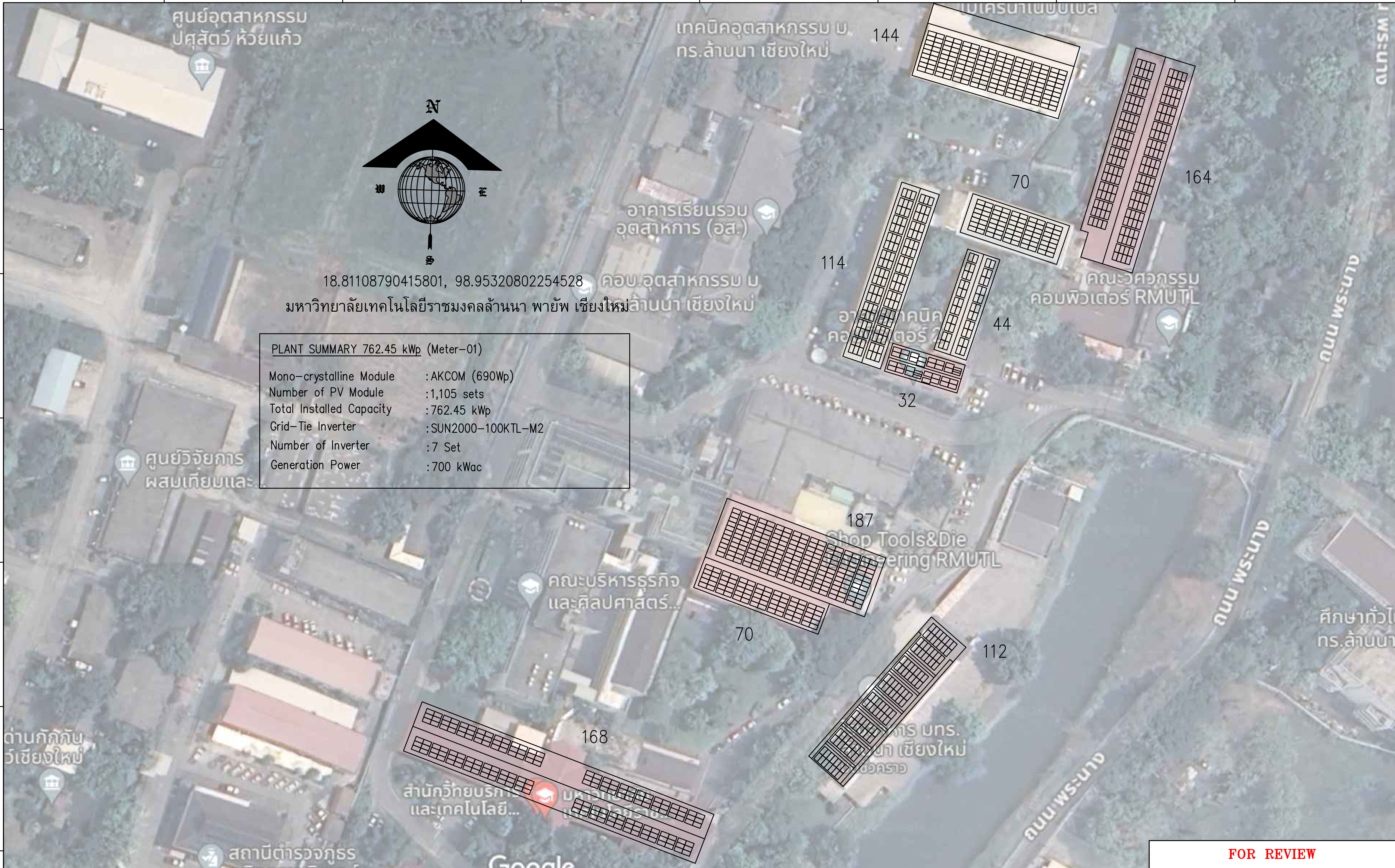

PLANT SUMMARY 762.45 kWp (Meter-01)

Mono-crystalline Module	: AKCOM (690Wp)
Number of PV Module	: 1,105 sets
Total Installed Capacity	: 762.45 kWp
Grid-Tie Inverter	: SUN2000-100KTL-M2
Number of Inverter	: 7 Set
Generation Power	: 700 kWac

FOR REVIEW

CLIENT:
มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ภาคพายัพ เชียงใหม่
128 ถนนห้วยแก้ว ต.ช้างเผือก อ.เมือง จ.เชียงใหม่ 50300

CONTRACTOR:
วันชัยการไฟฟ้า

REV.	DATE	DISCRIPTION	DRAWN	CHECKED	APPROVED
A	3/02/2024	For-Review	Ms. Wanmai K.	Ms. Wanmai K.	Ms. Wanmai K.

CIVIL ENGINEER	
ELECTRICAL ENGINEER	
MECHANICAL ENGINEER	-
PROJECT MANAGER	
DATE	3 Feb 2024

SOLAR ROOFTOP 762.45 kWp PROJECT (Meter-01)

DRAWING NAME: PV MODULE LAYOUT

DRAWING NO. -

REV. A

SHEET: 1 Of 1

SCALE: N/A

DESIGNED BY วันชัยการไฟฟ้า

BOQ มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ภาคพายัพ เชียงใหม่ 762.45 kW (Meter-01) 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**	1105	**Panel**	6,862,050.00	276,250.00	**7,138,300.00**	
3.2	**String Inverter SUN2000-100KTL-M2**	**Huawei**	7	**ea**	1,354,430.00	14,000.00	**1,368,430.00**	
3.3	**String Inverter SUN2000-50KTL-M3**	**Huawei**	0	**ea**	-	-	**-**	
3.3	**Rapid shutdown for comply with EIT standard with Emergency Botton**	**Projoy**	552.5	**ea**	5,525,000.00	55,250.00	**5,580,250.00**	ตามมาตราฐาน วศท.กำหนดให้ต้องติดตั้ง Rapid shutdown ตั้งแต่วันที่ 1 ก.ค. 2566
3.3	**Controller Box for DC24V กล่องควบคุมไฟฟ้า (Rapid Shutdown Device)**	**Projoy**	14	**ea**	140,000.00	2,800.00	**142,800.00**	
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**	115	**ea**	23,000.00	8,050.00	**31,050.00**	
3.5	**DC Extension Cable (Solar Cable) FD depends on calculation**	**Helukabel/JJ Lap/Prysmian/Link**	40,000.00	m	1,440,000.00	240,000.00	**1,680,000.00**	
3.6	**AC Cable**						**-**	
3.6.1	AC Cable CV Cable size …1C x 70.. Sq.mm.(Inverter to MDB Solar)	Thai Yazaki	250	m	112,500.00	45,000.00	**157,500.00**	
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	350,000.00	5,000.00	**355,000.00**	
3.8	**Grounding System**	**Kumwell**	1	**Set**	25,000.00	7,500.00	**32,500.00**	
							-	
3.9	**Mounting Structure (762.45 kWp)**	**-**	1	**Set**	762,450.00	228,735.00	**991,185.00**	
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 800 kVA	**-**	1	ea	650,000.00	30,000.00	**680,000.00**	
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	Iapp	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	Mobilization		1	Set	-	100,000.00	**100,000.00**	
6.5	Unload and Transportation		1	Set	400,000.00	150,000.00	**550,000.00**	
6.6	Insurance			Set	-		**-**	
6.7	Management and Overhead		1	**Set**		300,000.00	**300,000.00**	
	Total				**20,371,930.00**	**2,327,585.00**	**22,699,515.00**	
						Total	**22,699,515.00**	
	System Size (KWdc) = Q'ty Panel x PV Module Rate							
	THB/W				**26.72**	**3.05**	**29.77**	

Solar PV Rooftop 762.45 kWp. มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ภาคพายัพ เชียงใหม่ Meter-01

Total PV Plant Capacity (DC)	**762.45**	**kWp**
Daily Electricity Production	2,134.86	kWh/day
Monthly Electricity Production	64,045.80	kWh/month
Annual Electricity Production	768,549.60	kWh/year
Investment	22,699,515.0	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%		-22,699,515.00		-22,699,515.00
1	2.50%	97.50%	768,550	3,074,198	3,074,198	-19,625,317
2	0.60%	96.90%	749,336	2,997,343	6,071,542	-16,627,973
3	0.60%	96.30%	744,840	2,979,359	9,050,901	-13,648,614
4	0.60%	95.70%	740,371	2,961,483	12,012,384	-10,687,131
5	0.60%	95.10%	735,929	2,943,714	14,956,099	-7,743,416
6	0.60%	94.50%	731,513	2,926,052	17,882,151	-4,817,364
7	0.60%	93.90%	727,124	2,908,496	20,790,647	-1,908,868
8	0.60%	93.30%	722,761	2,891,045	23,681,691	982,176
9	0.60%	92.70%	718,425	2,873,698	26,555,390	3,855,875
10	0.60%	92.10%	714,114	2,856,456	29,411,846	6,712,331
11	0.60%	91.50%	709,829	2,839,318	32,251,164	9,551,649
12	0.60%	90.90%	705,570	2,822,282	35,073,445	12,373,930
13	0.60%	90.30%	701,337	2,805,348	37,878,793	15,179,278
14	0.60%	89.70%	697,129	2,788,516	40,667,309	17,967,794
15	0.60%	89.10%	692,946	2,771,785	43,439,094	20,739,579
16	0.60%	88.50%	688,789	2,755,154	46,194,248	23,494,733
17	0.60%	87.90%	684,656	2,738,623	48,932,871	26,233,356
18	0.60%	87.30%	680,548	2,722,191	51,655,062	28,955,547
19	0.60%	86.70%	676,465	2,705,858	54,360,921	31,661,406
20	0.60%	86.10%	672,406	2,689,623	57,050,544	34,351,029
21	0.60%	85.50%	668,371	2,673,485	59,724,029	37,024,514
22	0.60%	84.90%	664,361	2,657,444	62,381,474	39,681,959
23	0.60%	84.30%	660,375	2,641,500	65,022,973	42,323,458
24	0.60%	83.70%	656,413	2,625,651	67,648,624	44,949,109
25	0.60%	83.10%	652,474	2,609,897	70,258,521	47,559,006
Total			**17,564,630**	**70,258,521**	**70,258,521**