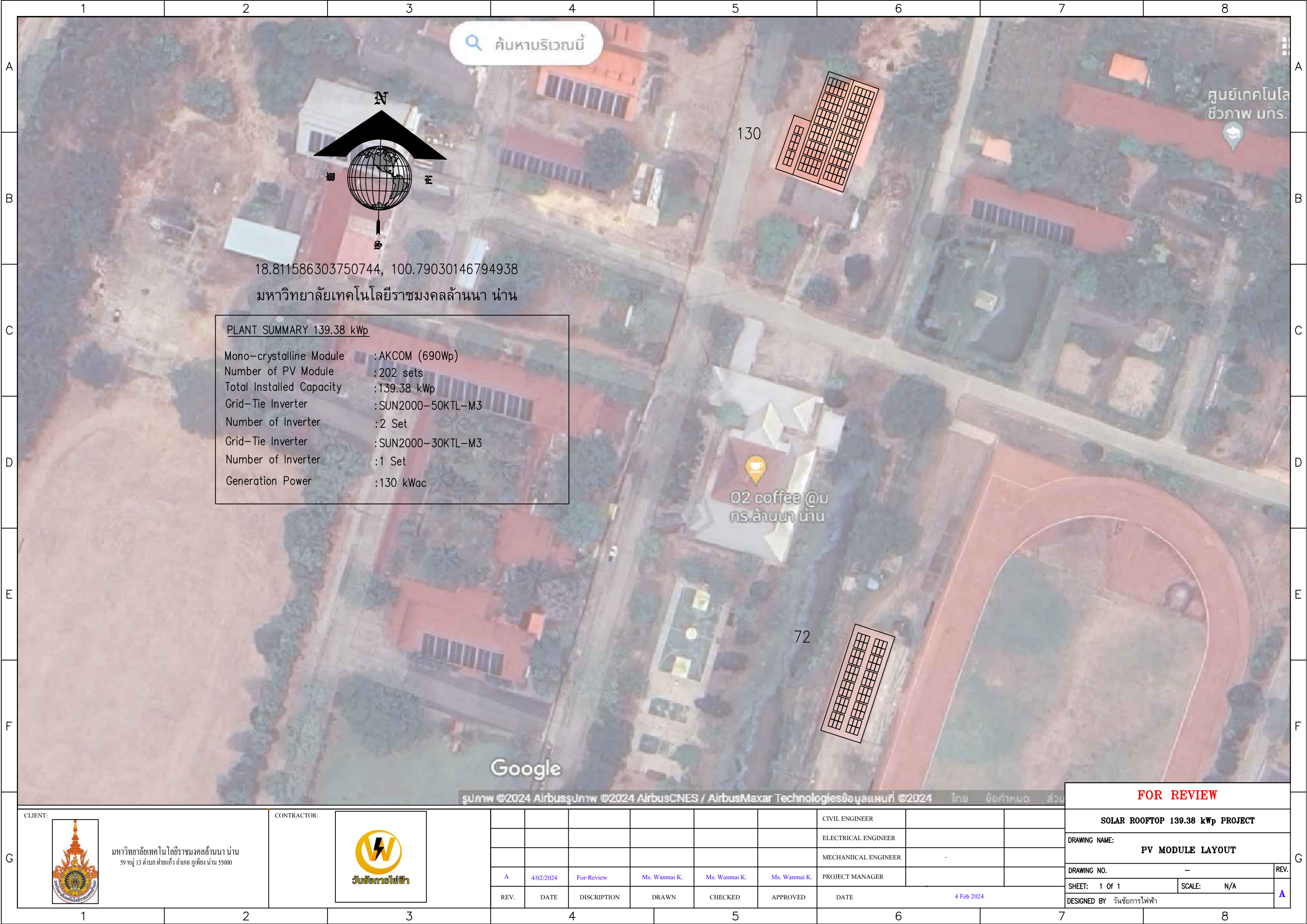




PLANT SUMMARY 139.38 kWp	
Mono-crystalline Module	: AKCOM (690Wp)
Number of PV Module	: 202 sets
Total Installed Capacity	: 139.38 kWp
Grid-Tie Inverter	: SUN2000-50KTL-M3
Number of Inverter	: 2 Set
Grid-Tie Inverter	: SUN2000-30KTL-M3
Number of Inverter	: 1 Set
Generation Power	: 130 kWac

CLIENT:



มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา น่าน
59 หมู่ 13 ตำบล ฝ่ายแก้ว อำเภอภูเพียง น่าน 55000

CONTRACTOR:



วันชัยการไฟฟ้า

							CIVIL ENGINEER		
							ELECTRICAL ENGINEER		
							MECHANICAL ENGINEER	-	
A	4/02/2024	For-Review	Ms. Wanmai K.	Ms. Wanmai K.	Ms. Wanmai K.	PROJECT MANAGER			
REV.	DATE	DISCRIPTION	DRAWN	CHECKED	APPROVED	DATE	4 Feb 2024		

FOR REVIEW	
SOLAR ROOFTOP 139.38 kWp PROJECT	
DRAWING NAME: PV MODULE LAYOUT	
DRAWING NO.	REV.
SHEET: 1 Of 1	SCALE: N/A
DESIGNED BY วันชัยการไฟฟ้า	

BOQ มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา น่าน 139.38 kW Rev.1 (2024)

Item	Description							Remark
		Model / Brand	Quantity	Unit	Price / Unit		Total Price	
					Material	Installation		
1	Permit Coordination	Government	1	Set		100,000.00	100,000.00	
2	Engineering / Design Work	Skylink/ PV Syst	1	Set		50,000.00	50,000.00	
3	Procurement / Installation	Skylink	1	Set			-	
							-	
3.1	PV Module 690 W	AKCOM	202	Panel	1,254,420.00	50,500.00	1,304,920.00	
3.2	String Inverter SUN2000-50KTL-M3	Huawei	2	ea	192,060.00	12,000.00	204,060.00	
3.2	String Inverter SUN2000-30KTL-M3	Huawei	1	ea	85,250.00	6,000.00	91,250.00	
3.3	Rapid shutdown for comply with EIT standard with Emergency Botton	Projoy		ea	-	-	-	ตามมาตรฐาน วศท.กำหนดให้ต้องติดตั้ง Rapid shutdown ตั้งแต่วันที่ 1 ก.ค. 2566
3.3	Controller Box for DC24V กล่องควบคุมไฟฟ้า (Rapid Shutdown Device)	Projoy		ea	-	-	-	
3.3	สายไฟเลี้ยง Rapit shutdown	Thai Yazaki		m	-	-	-	
3.3	DC Fuse(Inline Fuse)	Uriarte	0	set	-	-	-	
3.4	DC Connector	Multi Contact	40	ea	8,000.00	2,000.00	10,000.00	
3.5	DC Extension Cable (Solar Cable) FD depends on calculation	Helukabel/JJ Lap/Prysmian/Link	9,100.00	m	327,600.00	54,600.00	382,200.00	
3.6	AC Cable						-	
3.6.1	AC Cable CV Cable size ...1C x 70.. Sq.mm.(Inverter to MDB Solar)	Thai Yazaki	0	m	-	-	-	
3.6.2	AC Cable CV Cable size ...150.. Sq.mm. (MDB Solar to MAIN MDB)	Thai Yazaki	0	m	-	-	-	
3.6.4	AC Cable THW Cable size ...35.. Sq.mm.	Thai Yazaki	250	m	87,500.00	20,000.00	107,500.00	
3.6.5	AC Cable THW Cable size ...16.. Sq.mm. (AC Collection Ground)	Thai Yazaki	200	m	12,600.00	5,000.00	17,600.00	
3.6.5	AC Cable THW Cable size ...6.. Sq.mm. (DC Ground)	Thai Yazaki	300	m	13,500.00	7,500.00	21,000.00	
3.6.6	Acc . AC Cable (cable lag,Terminat lag,support cable grend)	Thai Yazaki	1	Set	15,000.00	7,500.00	22,500.00	
3.7	Main Distribution Board	Precise					-	
3.7.1	Main Distribution Board (MDB)	Precise	1	ea	250,000.00	5,000.00	255,000.00	
3.8	Grounding System	Kumwell	1	Set	10,000.00	6,000.00	16,000.00	
							-	
3.9	Mounting Structure (139.38 kWp)	Skylink Solar	1	Set	139,380.00	41,814.00	181,194.00	
3.10	Cable Tray	Perforated Tray					-	
3.10.1	Cable Tray 100x100x2400	Perforated Tray	50	ea	77,000.00	7,500.00	84,500.00	
3.10.3	Cable Tray 200x100x2400	Perforated Tray	0	ea	-	-	-	
3.10.4	Cable Tray 300x100x2400	Perforated Tray	0	ea	-	-	-	
3.10.5	Cable ladder 400x100x2400	Perforated Tray	0	ea	-	-	-	
3.10.6	Conduit and Flexible, Support Cable Tray		1	Lot	25,000.00	10,000.00	35,000.00	
							-	
3.11	Metering System						-	
3.11.1	PQM Meter ปรับปรุงของเดิม		1	Set	30,000.00	20,000.00	50,000.00	
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 360 kVA Std.Loss		0	ea		-	-	
3.13.2	22kV For Transformer	STC,Precise	0	Set	-	-	-	
3.13.3	22 kV Sac Cable		0	m	-	-	-	
3.13.4	Current Transformer MV	Precise	0	ea	-	-	-	
3.13.5	Potential Transformer MV	Precise	0	ea	-	-	-	
3.13.6	Concret Pole and Support CT,VT and Acc.	STC	0	ea	-	-	-	
3.13.7	Concret Pole For Riser Pole Incomming + Outgoing	STC	0	ea	-	-	-	
3.13.8	Drop Out Fuse	Precise	0	ea	-	-	-	
3.13.9	Lightning Arrester 21 kV 10 kA	Precise	0	ea	-	-	-	
3.13.10	Electrical Distribution Box	Schneider	0	ea	-	-	-	
3.13.11	Electrical System (Lighting Fixture, Receptacle)	Philips	0	Set	-	-	-	
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	10,000.00	30,000.00	
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)	Skylink	1	Set	5,000.00	1,000.00	6,000.00	
4.2	Ladder For Service	Skylink	0	Set	-	-	-	
4.3	Inverter Support Structure and Fence	Skylink	1	Set	20,000.00	10,000.00	30,000.00	
5	Test and Comissioning System						-	
5.1	Commissioning Work	Skylink	1	Set		15,000.00	15,000.00	
6	Others						-	
6.1	Hand rail Lifegrad	Skylink		Set	-	-	-	
6.2	Walkway	Skylink		Set	-	-	-	
6.3	Water Cleaning system	Skylink	1	Set	30,000.00	10,000.00	40,000.00	
6.4	Mobilization	Skylink	1	Set	-	30,000.00	30,000.00	
6.5	Unload and Transportation	Skylink	1	Set	20,000.00	10,000.00	30,000.00	
6.6	Insurance	Skylink		Set	-		-	
6.7	Management and Overhead	Skylink	1	Set		200,000.00	200,000.00	
	Total				2,662,310.00	705,914.00	3,368,224.00	
			Total				3,368,224.00	
	System Size (KWdc) = Q'ty Panel x PV Module Rate							
	THB/W				19.10	5.06	24.17	

Solar PV Rooftop 139.38 kWp. มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา น่าน

Total PV Plant Capacity (DC)	139.38 kWp
Daily Electricity Production	390.26 kWh/day
Monthly Electricity Production	11,707.92 kWh/month
Annual Electricity Production	140,495.04 kWh/year
Investment	3,368,224.0 Baht
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%		-3,368,224.00		-3,368,224.00
1	2.50%	97.50%	140,495	561,980	561,980	-2,806,244
2	0.60%	96.90%	136,983	547,931	1,109,911	-2,258,313
3	0.60%	96.30%	136,161	544,643	1,654,554	-1,713,670
4	0.60%	95.70%	135,344	541,375	2,195,929	-1,172,295
5	0.60%	95.10%	134,532	538,127	2,734,056	-634,168
6	0.60%	94.50%	133,725	534,898	3,268,954	-99,270
7	0.60%	93.90%	132,922	531,689	3,800,643	432,419
8	0.60%	93.30%	132,125	528,499	4,329,142	960,918
9	0.60%	92.70%	131,332	525,328	4,854,469	1,486,245
10	0.60%	92.10%	130,544	522,176	5,376,645	2,008,421
11	0.60%	91.50%	129,761	519,043	5,895,688	2,527,464
12	0.60%	90.90%	128,982	515,928	6,411,616	3,043,392
13	0.60%	90.30%	128,208	512,833	6,924,449	3,556,225
14	0.60%	89.70%	127,439	509,756	7,434,205	4,065,981
15	0.60%	89.10%	126,674	506,697	7,940,902	4,572,678
16	0.60%	88.50%	125,914	503,657	8,444,559	5,076,335
17	0.60%	87.90%	125,159	500,635	8,945,195	5,576,971
18	0.60%	87.30%	124,408	497,631	9,442,826	6,074,602
19	0.60%	86.70%	123,661	494,646	9,937,471	6,569,247
20	0.60%	86.10%	122,919	491,678	10,429,149	7,060,925
21	0.60%	85.50%	122,182	488,728	10,917,877	7,549,653
22	0.60%	84.90%	121,449	485,795	11,403,672	8,035,448
23	0.60%	84.30%	120,720	482,881	11,886,553	8,518,329
24	0.60%	83.70%	119,996	479,983	12,366,536	8,998,312
25	0.60%	83.10%	119,276	477,103	12,843,639	9,475,415
Total			3,210,910	12,843,639	12,843,639	

