Upper Union St, Franklin,
MA 02038
APN: 319-009-000
GPS: -71.3893151 42.05603755

SYSTEM SUMMARY:

PV System:
(950) Jinko Solar, JKM395M-6R3-V (395W) PV Panels
375.3kW DC
Azimuth: 180°,Tilt: 15°

PV Panels Stringing Plan:
Inverter 1 - 12 strings of 40 modules
Inverter 2 - 7 strings of 40 and 5 strings of 38 modules

PV Inverters:
(2) SolarEdge, SE120KUS, 120kW/kVA AC Inverter Output
UL 1741 SA Certified

Total System:
240kW/kVA AC

SYSTEM NARRATIVE:

This Solar PV generation system will interconnect to Utility's 13.8kV primary EPS (05_05_348W6) on Pole# 116 on Upper Union St. A 360 feet 3ϕ Line extension from Pole# 113 to Pole#116 will be required.

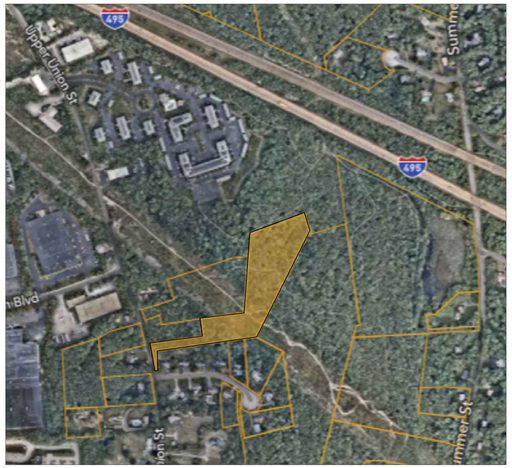
The Utility is to provide a 13.8kV class primary meter based on the SMART revenue meter configuration 5a (Stand alone PV generation system with 60kW to 500kW AC).

This project will operate under the Massachusetts SMART program rules and regulations. This asset will be managed in a way that respects the tariff and all ISO-NE best practices.

This project will participate in the following markets and programs:

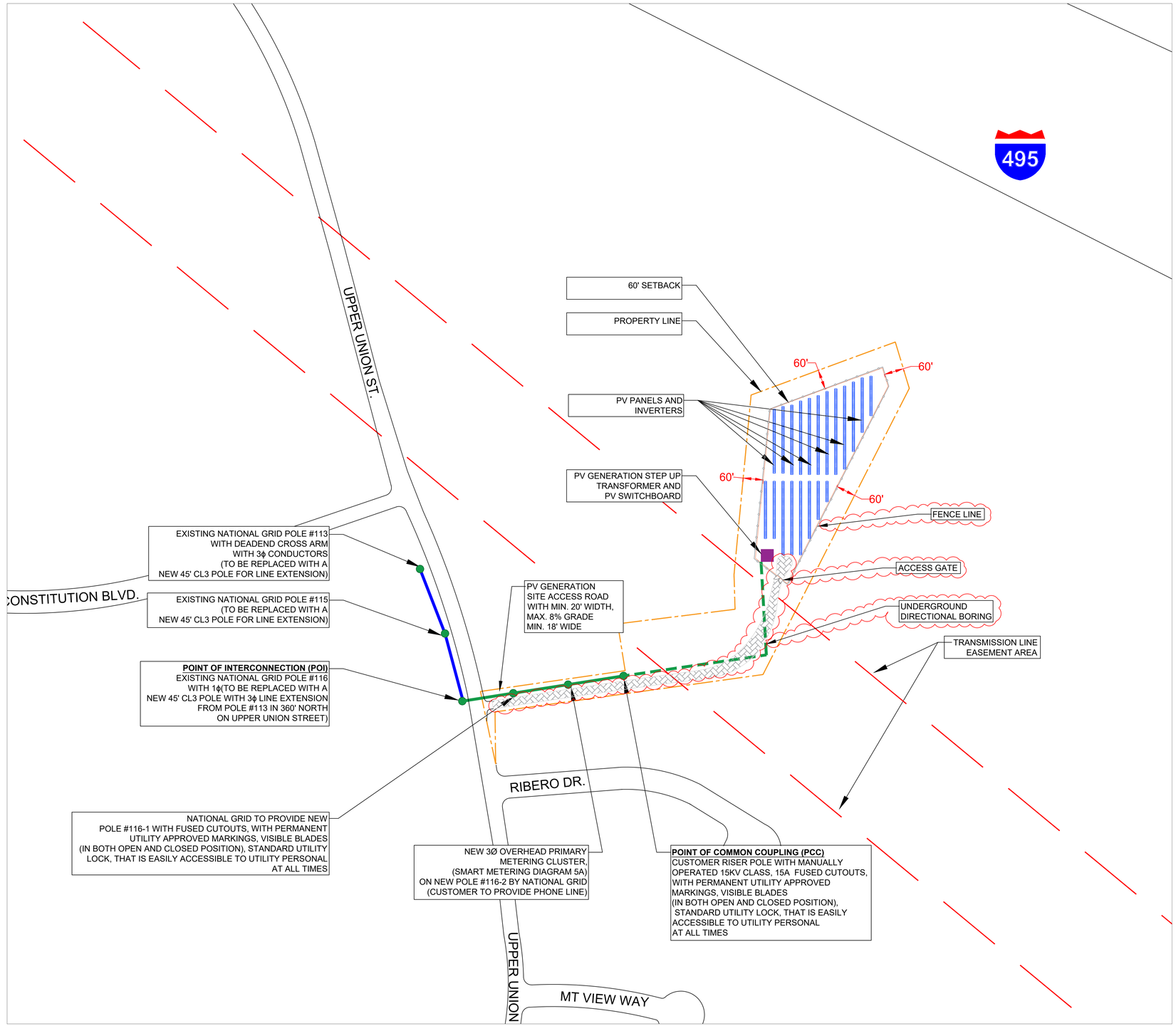
- SMART Program

VICINITY MAP



SHEET INDEX

E - 2.0	SITE PLAN
E - 4.0	SITE PLAN DIAGRAM



A SCALE: 1-128"=1'-0"
0 100' 200'
N

CLEAN POWER MANAGEMENT
24941 DANA POINT HARBOR DR
SUITE C220
DANA POINT, CA 92629
469-735-2234

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SEAL:

PROJECT NAME:
Upper Union St.

PROJECT ADDRESS:
Upper Union St, Lot A,
Franklin, MA 02038

Revision:

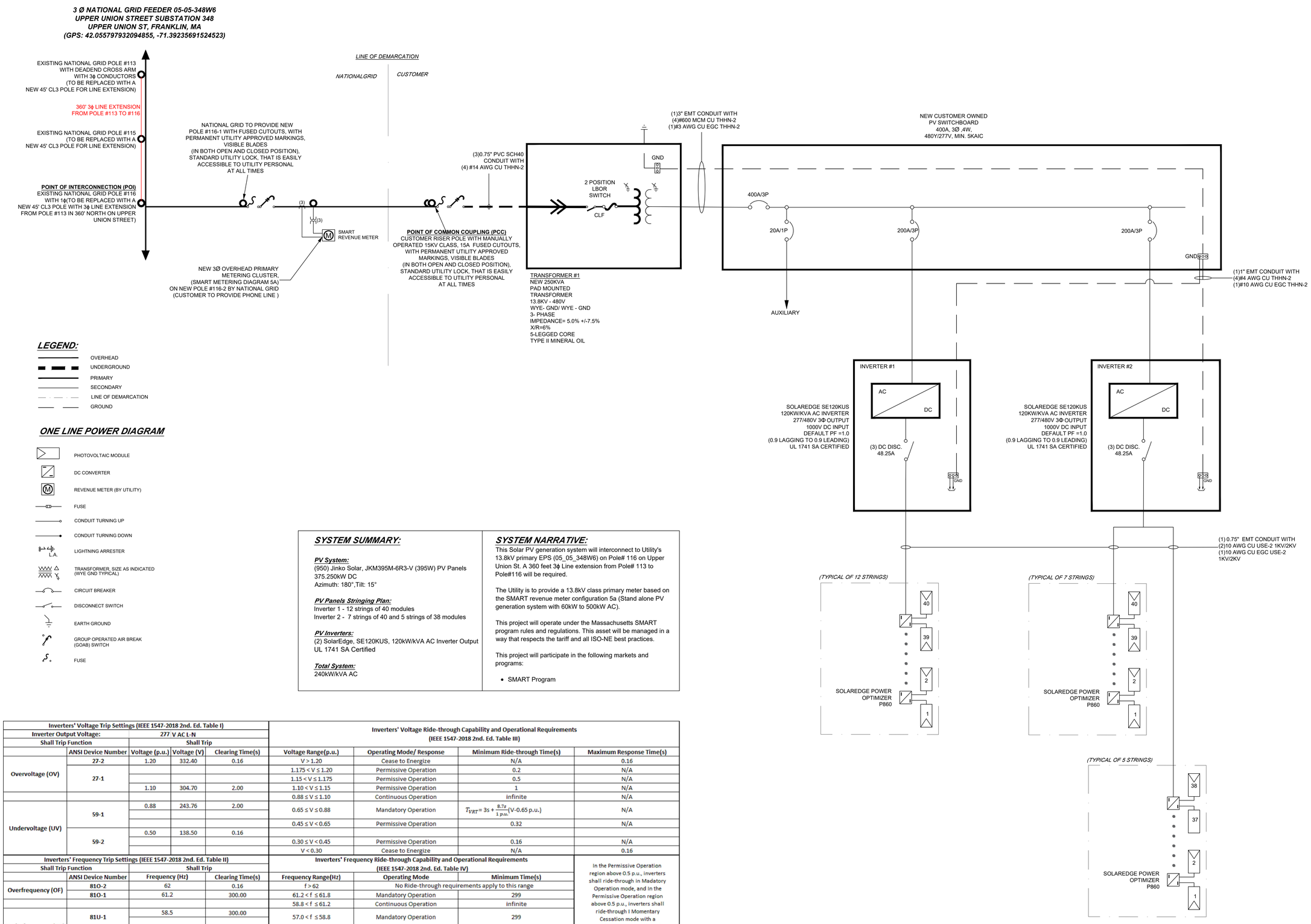
REV.	Date	Description
1	08/24/2021	
2	03/08/2022	Update to SE120KUS
3	03/09/2023	Fence, Gate & Road

Drawn By: Mana Asgari
Checked By:

Date: 08/24/2021
Job No.:

Sheet Title:
SITE PLAN

Sheet No.:
E2.0



LEGEND:

- OVERHEAD
- UNDERGROUND
- PRIMARY
- SECONDARY
- LINE OF DEMARCATION
- GROUND

ONE LINE POWER DIAGRAM

- PHOTOVOLTAIC MODULE
- DC CONVERTER
- REVENUE METER (BY UTILITY)
- FUSE
- CONDUIT TURNING UP
- CONDUIT TURNING DOWN
- L.A. LIGHTNING ARRESTER
- TRANSFORMER, SIZE AS INDICATED (WYE GND TYPICAL)
- CIRCUIT BREAKER
- DISCONNECT SWITCH
- EARTH GROUND
- GROUP OPERATED AIR BREAK (GOAB) SWITCH
- FUSE

SYSTEM SUMMARY:

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Inverters' Voltage Trip Settings (IEEE 1547-2018 2nd. Ed. Table I)				
Inverter Output Voltage:		277 V AC L-N		
Shall Trip Function		Shall Trip		
	ANSI Device Number	Voltage (p.u.)	Voltage (V)	Clearing Time(s)
Overvoltage (OV)	27-2	1.20	332.40	0.16
	27-1			
		1.10	304.70	2.00
Undervoltage (UV)	59-1	0.88	243.76	2.00
	59-2	0.50	138.50	0.16

Inverters' Voltage Ride-through Capability and Operational Requirements (IEEE 1547-2018 2nd. Ed. Table III)			
Voltage Range(p.u.)	Operating Mode/ Response	Minimum Ride-through Time(s)	Maximum Response Time(s)
V > 1.20	Cease to Energize	N/A	0.16
1.175 < V ≤ 1.20	Permissive Operation	0.2	N/A
1.15 < V ≤ 1.175	Permissive Operation	0.5	N/A
1.10 < V ≤ 1.15	Permissive Operation	1	N/A
0.88 ≤ V ≤ 1.10	Continuous Operation	infinite	N/A
0.65 ≤ V ≤ 0.88	Mandatory Operation	$T_{VRT} = 3s + \frac{8.7\tau}{1\,p.u.}(V - 0.65\,p.u.)$	N/A
0.45 ≤ V < 0.65	Permissive Operation	0.32	N/A
0.30 ≤ V < 0.45	Permissive Operation	0.16	N/A
V < 0.30	Cease to Energize	N/A	0.16

Inverters' Frequency Trip Settings (IEEE 1547-2018 2nd. Ed. Table II)			
Shall Trip Function		Shall Trip	
	ANSI Device Number	Frequency (Hz)	Clearing Time(s)
Overfrequency (OF)	81O-2	62	0.16
	81O-1	61.2	300.00
Underfrequency (UF)	81U-1	58.5	300.00
	81U-2		
		56.6	0.16

Inverters' Frequency Ride-through Capability and Operational Requirements (IEEE 1547-2018 2nd. Ed. Table IV)		
Frequency Range(Hz)	Operating Mode	Minimum Time(s)
f > 62	No Ride-through requirements apply to this range	
61.2 < f ≤ 61.8	Mandatory Operation	299
58.8 < f ≤ 61.2	Continuous Operation	infinite
57.0 < f ≤ 58.8	Mandatory Operation	299
f ≤ 57.0	No Ride-through requirements apply to this range	

In the Permissive Operation region above 0.5 p.u., inverters shall ride-through in Madatory Operation mode, and in the Permissive Operation region above 0.5 p.u., inverters shall ride-through I Momentary Cessation mode with a maximum response time of 0.082 seconds.

CLEAN POWER MANAGEMENT

24941 DANA POINT HARBOR DR
SUITE C220
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469-735-2234

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SEAL:

PROJECT NAME:
Upper Union St.

PROJECT ADDRESS:
Upper Union St, Lot A,
Franklin, MA 02038

Revision:

REV.	Date	Description
1	08/24/2021	
2	03/08/2022	Update to SE120KUS
3	03/09/2023	Fence, Gate & Road

Drawn By: Mana Asgari

Checked By:

Date: 08/24/2021

Job No.:

Sheet Title:
SINGLE LINE DIAGRAM

Sheet No.:
E 4.0