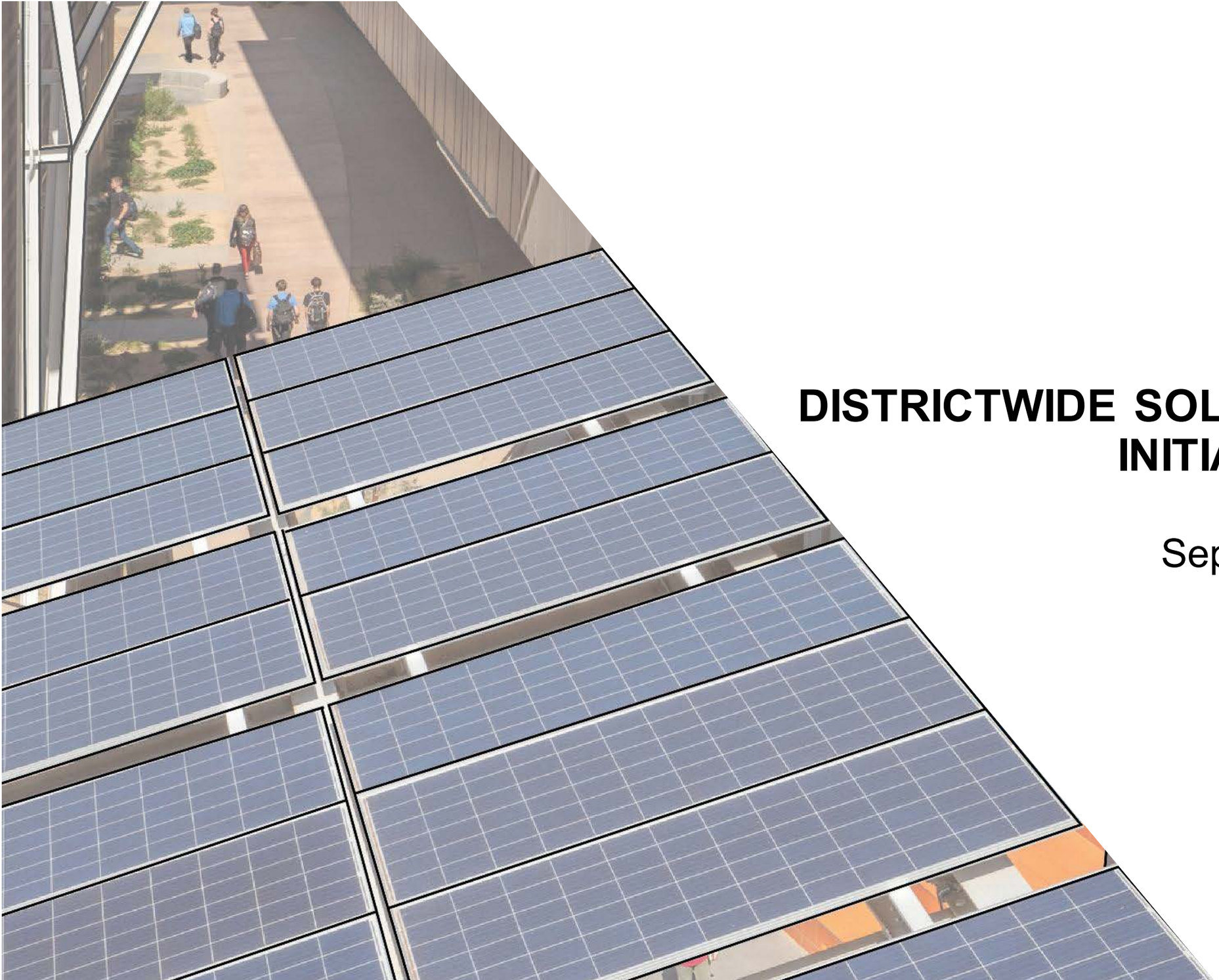

RCCD
RIVERSIDE COMMUNITY COLLEGE DISTRICT

DISTRICTWIDE SOLAR PLANNING INITIATIVE UPDATE

September 25, 2020

DLR Group
Architecture Engineering Planning Interiors

AGENDA

1 INTRODUCTION

2 GOALS AND OBJECTIVES

3 PROJECT OVERVIEW

4 EDUCATION

5 PROGRESS

6 NEXT STEPS

INTRODUCTION

DLR Group
Architecture Engineering Planning Interiors

Energy and Solar Planning **Consultant**

Rod Oathout

PE, CEM, LEED AP

PRINCIPAL-IN-CHARGE

Energy Leader

Leigh Anne Jones

AIA, LEED AP BD+C

CLIENT LEADER

Higher Education Expert

Sean Avery

PE, LEED AP

SENIOR ELECTRICAL ENGINEER

PV System Design Expert

RCCD
RIVERSIDE COMMUNITY COLLEGE DISTRICT

Energy and Solar Planning **Committee**

MORENO VALLEY COLLEGE

Dr. Nathaniel Jones, Vice President of Business Services

Brian Adair, Interim Facilities Director
Facilities

Dr. Fabian Biancardi, Professor, Political Science,
Humanities & Social Sciences

NORCO COLLEGE

Dr. Michael Collins, Vice President of Business Services

Steven Marshall, Facilities Director, Facilities

Jeff Buch, Maintenance Mechanic, Facilities

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Math & Sciences

Quinton Bemiller, Associate Professor, Art
Norco College

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DISTRICT OFFICE

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Mehran Mohtasham, Director, Capital Planning
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Bart Doering, Facilities Development Director
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Susanne Ma, Director of IT
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Facilities Planning & Development

Victor Bolanos, Help Desk Support Technician
Information Services

GOALS AND OBJECTIVES

Goals and **Objectives**

Solar Planning Initiatives aligns with …

1. RCCD Board Policy 6870 Sustainability & Environmental Responsibility

   - ✓ District recognizes its responsibility to exercise environmental stewardship
   - ✓ Minimize negative environmental impacts of activities under district control
   - ✓ Economically manage the use of buildings, land and natural resources

2. CCCCO BOG Climate Change and Sustainability Policy (May 2019) – one of its goals “increase renewable energy consumption to 25% by 2025 & 50% by 2030”

3. RCCD upcoming Sustainability Plan – Part of the Long-Term Capital Facilities Program (LTCFP)

4. College Facilities Master Plans

PROJECT OVERVIEW

FEASIBILITY & PLANNING PHASE
DEVELOPMENT PHASE
EXECUTION PHASE

CURRENT **PHASE**

FEASIBILITY & PLANNING PHASE

Feasibility and Planning **Phase**

Evaluation

Actual energy consumption

Utility meters, tariffs, and incentive opportunities

Potential locations for PV

Existing facility master plans

Development

Develop PV & storage implementation strategy

Add the effect of projected campus growth

Plan electrical interconnection

Structural viability

Refine

Incorporate comments from Development step

Evolve PV & storage implementation strategy

Development cost models
Prepare a solar ready guideline

Finalize

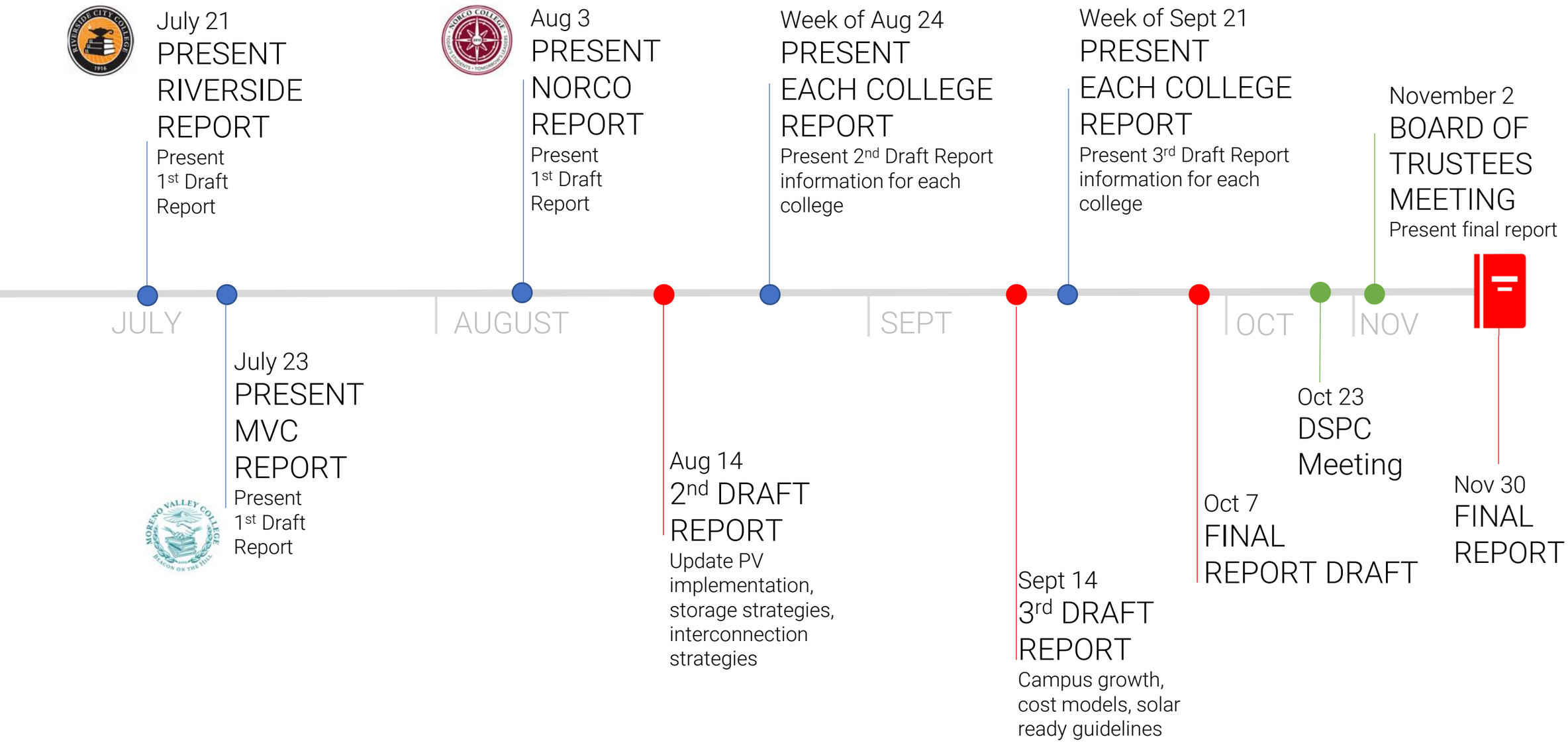
Incorporate comments from Refine step

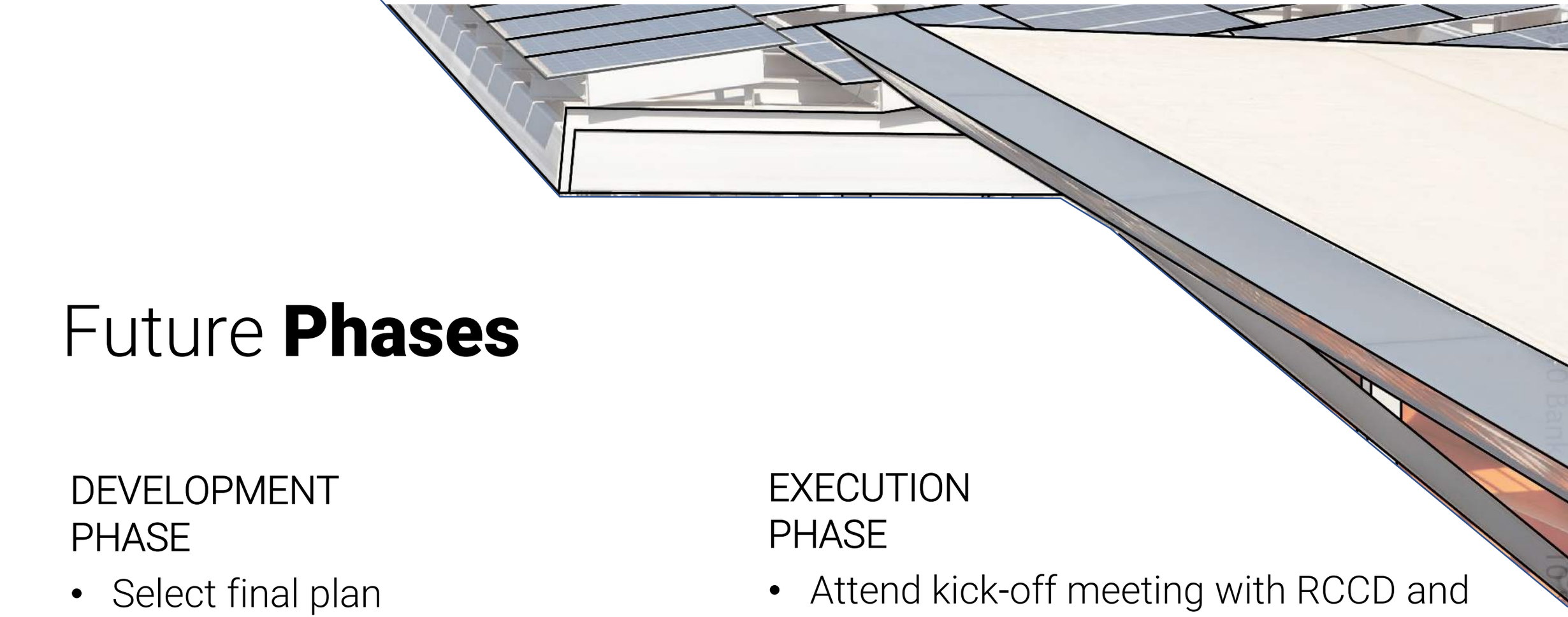
Finishing touches:

- PV & storage implementation strategy
- Electrical interconnection
- Financial models

Prepare final report with graphics

Project Schedule Timeline





Future **Phases**

DEVELOPMENT PHASE

- Select final plan
- Discuss project phasing and schedule
- Assist in preparation of RFQ/Ps
- Assist in evaluations RFQ/Ps submissions

EXECUTION PHASE

- Attend kick-off meeting with RCCD and selected PV contractor
- Provide peer reviews
- Field visits and observation reports

  Review commissioning report + Performance tests

EDUCATION

RENEWABLES **IN CURRICULUM**

- Showcase of sustainability features
- Sustainability kiosk with web-based dashboard, mural and teaching area also engage students and community members
- Visible photovoltaic systems demonstrate on-site renewable energy production
- Practical, hands-on training opportunities

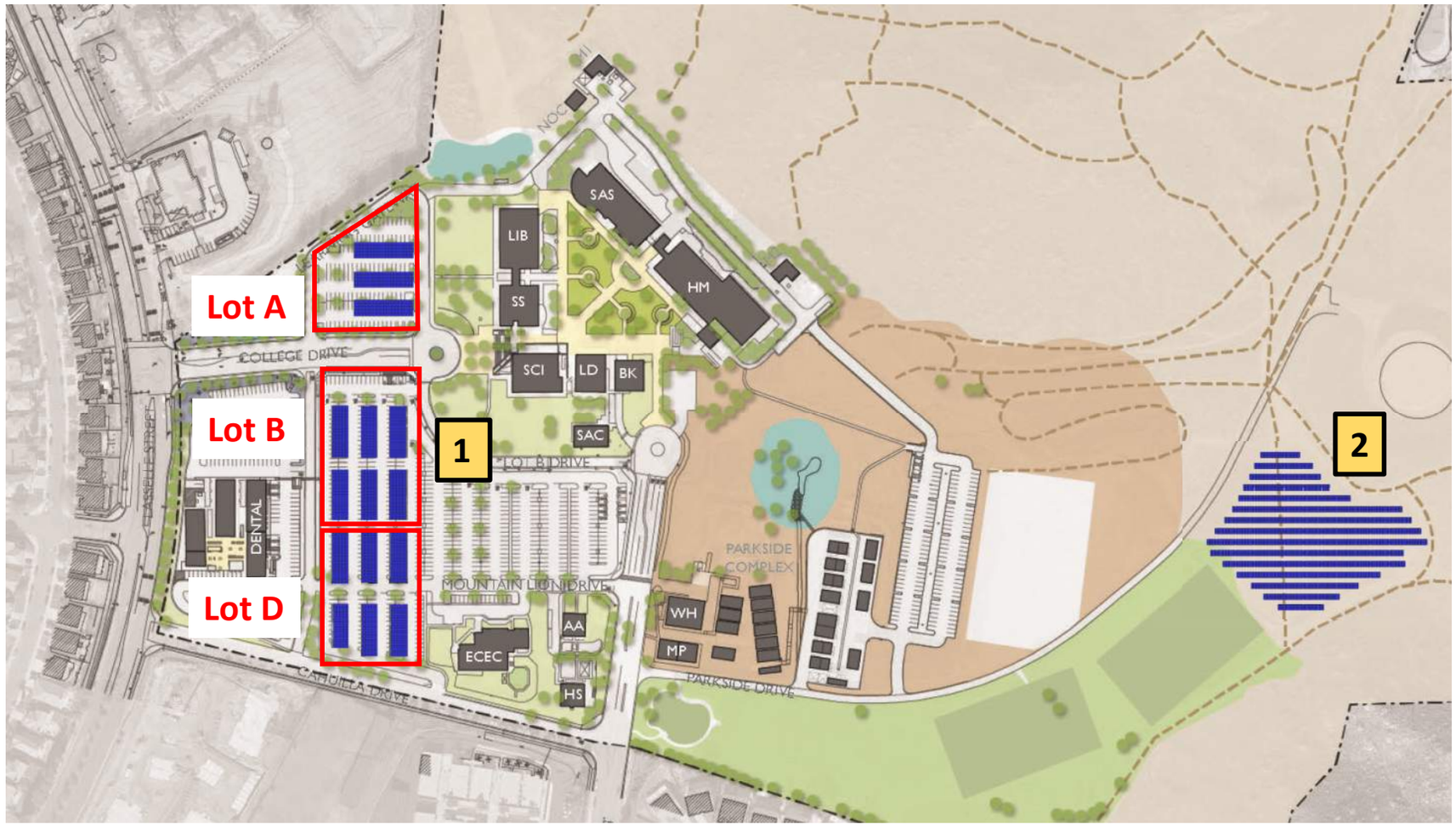
Feasibility and Planning **Phase**

PROGRESS – FINALIZE

PROGRESS – MORENO VALLEY COLLEGE

MORENO VALLEY COLLEGE

SOLAR ON **EXISTING CAMPUS**



ARRAYS OPTIONS

1. LOTS A, B, & D CARPORTS: 986 KW DC

2. GROUND MOUNT: 979 kW DC

Total

1.96 MW DC

MORENO VALLEY COLLEGE

BATTERY STORAGE **LOCATION**

Location of 400 kW battery storage and new interconnection switchgear

CURRENT SUMMARY– MVC

Total System Performance (All Options)

Solar

986 kW carport arrays

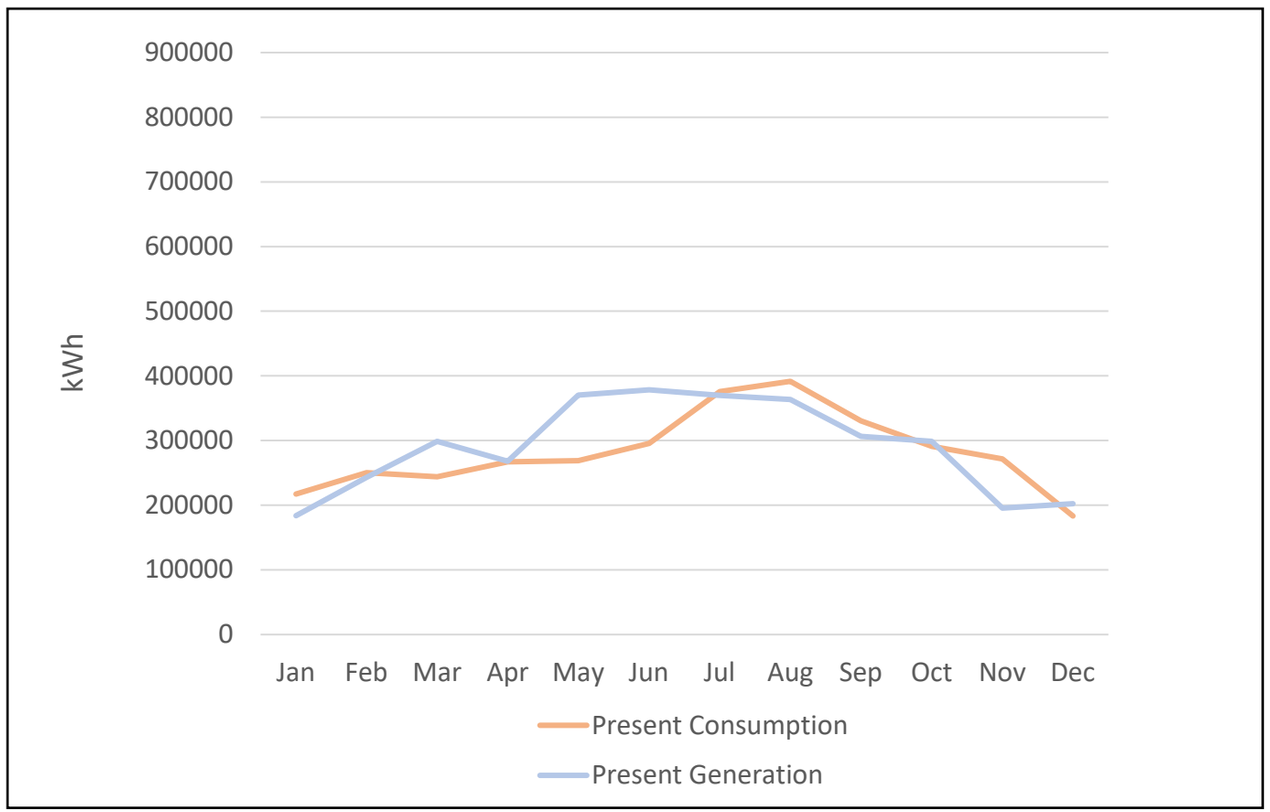
979 kW ground mount arrays

1,965 kW Total

Energy Offset: 102%

Battery Energy Storage System

400 kW

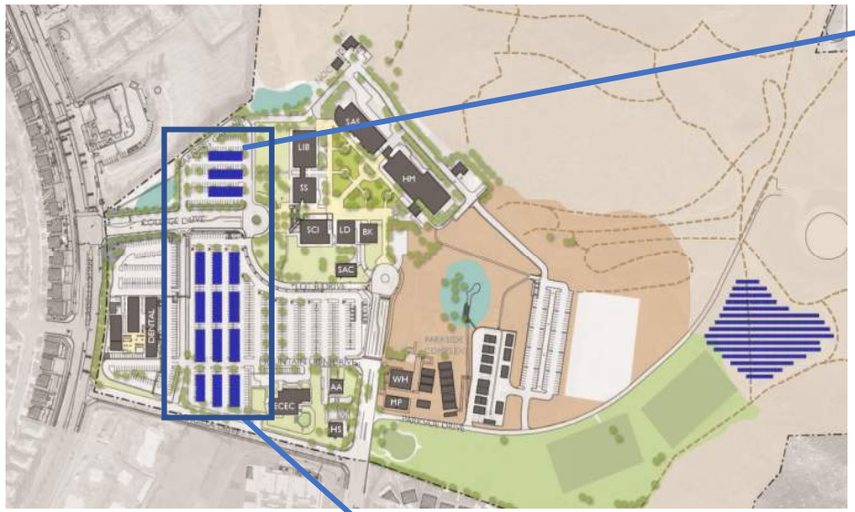


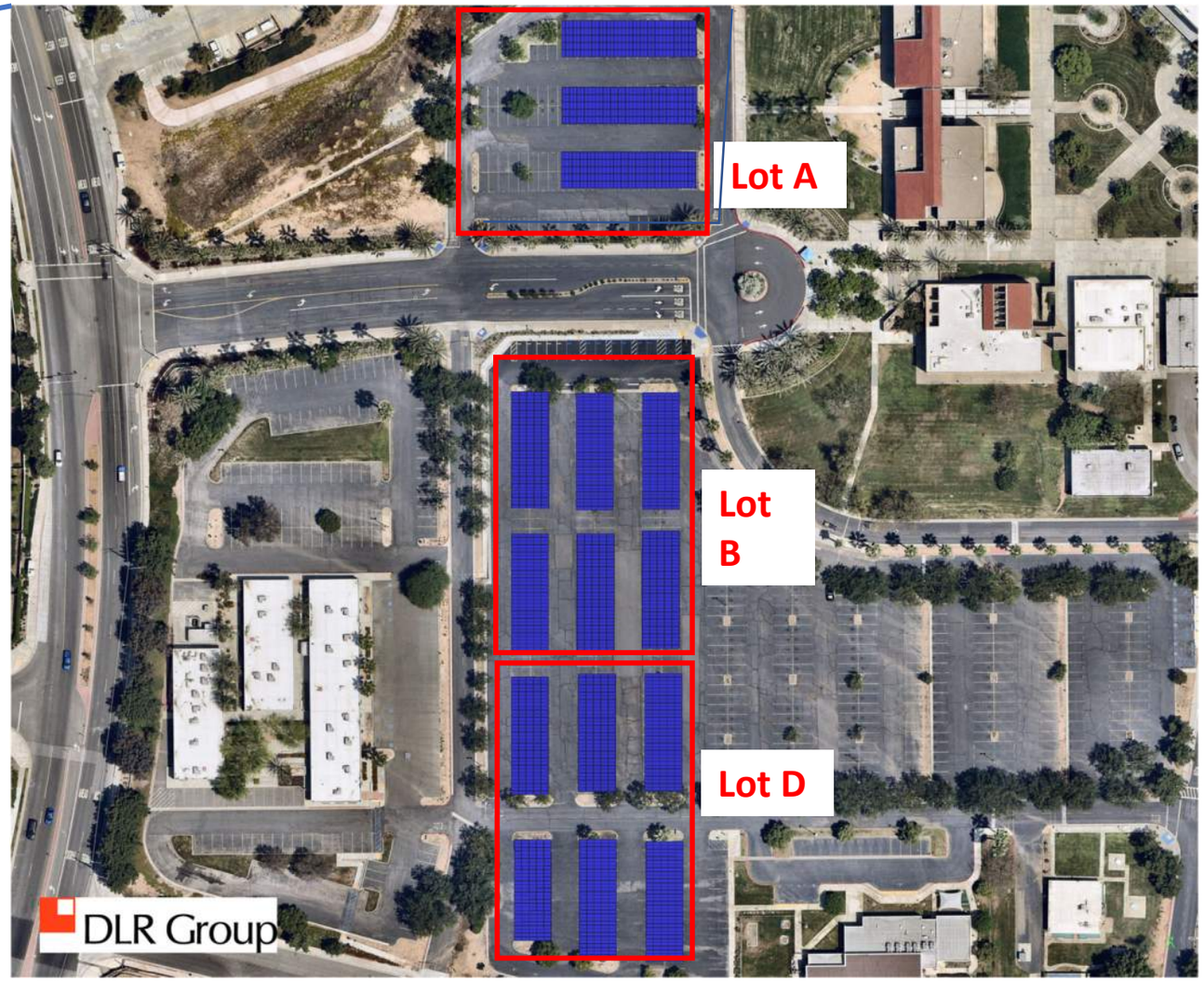
MVC Solar Options

MORENO VALLEY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#1: **Lots A,B,D Carports**

986kW DC Carport Arrays





MORENO VALLEY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#1: **Lots A,B,D Carports**

Interconnection

POINT OF INTERCONNECTION

EXISTING 12.47 KV SECTIONALIZING CABINETS AND FEEDERS

NEW 12.47 KV SECTIONALIZING CABINET AND FEEDERS

NEW 3000A SWITCHBOARD AND 2000 KVA TRANSFORMER

MORENO VALLEY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#1: **Lots A,B,D Carports**

Financials

	Solar - Option 1
Array size (kW)	986
BESS size (kW)	N/A
First year performance (kWhr)	1,665,364
Solar performance degradation	0.50%
Battery performance degradation	N/A
First year cost avoidance (2021)	$ 109,761
Construction cost	$ 3,418,950
Solar O&M costs	$ 12.50
BESS O&M costs	N/A
Interest rate	3.00%
Term	25
Utility escalation	2.50%

Loan Option	Solar - Option 1
Array size (kW)	986.00
BESS size (kW)	N/A
First year cash flow (loan option)	$ (98,907)
25-year accumulated cash flow (loan option)	$ (1,815,144)

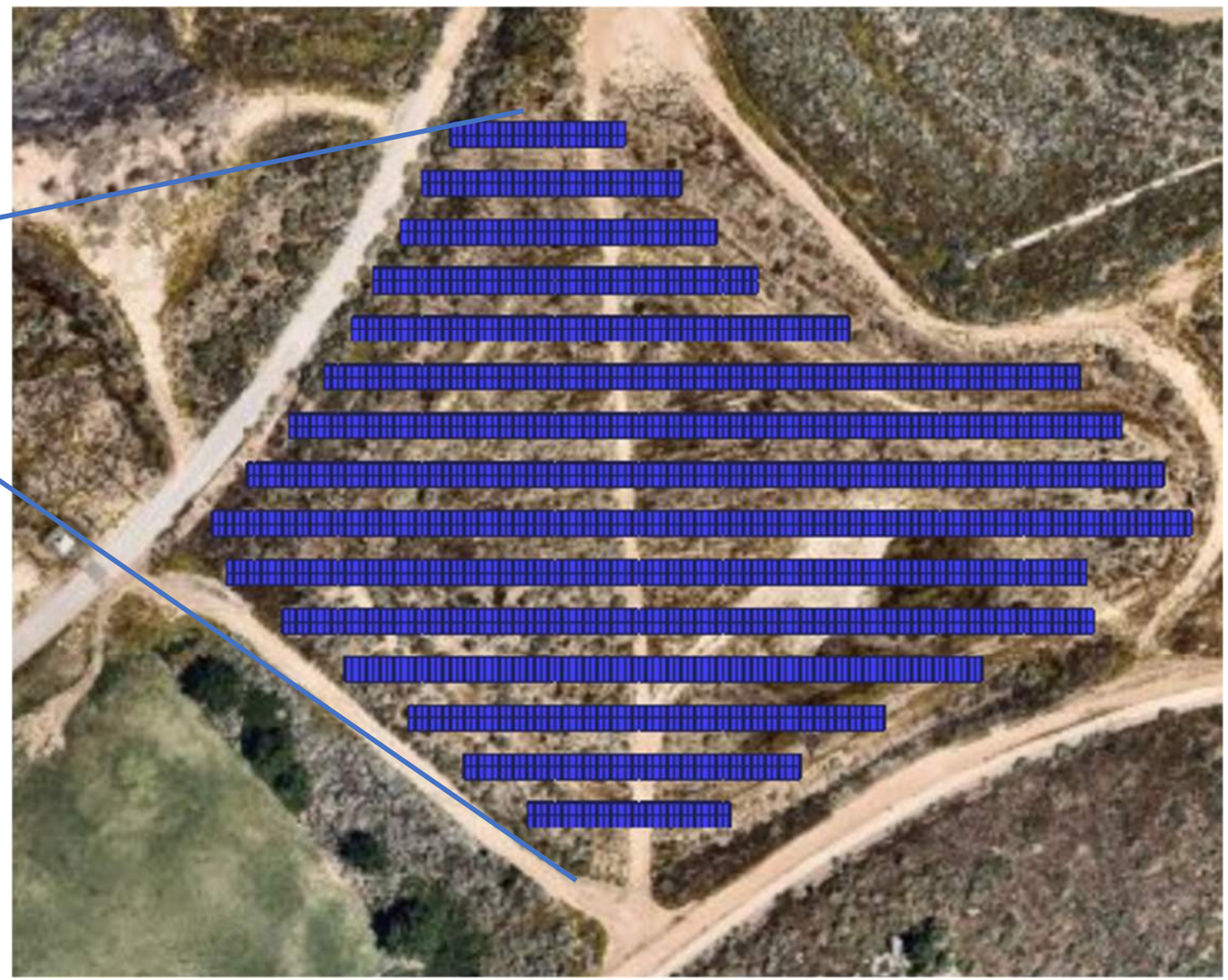
PPA Option	Solar - Option 1
Forecasted PPA rate	$ 0.17
PPA Escalation	0%
First year cash flow (PPA option)	$ (173,350)
25-year accumulated cash flow (PPA option)	$ (5,921,262)

Carbon Equivalence Reporting	Solar - Option 1
First year performance (kWhr)	1,665,364
Carbon Offset (metric tons)	1177
Cars Driven for One Year	254

MORENO VALLEY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#2: **Ground Mount**

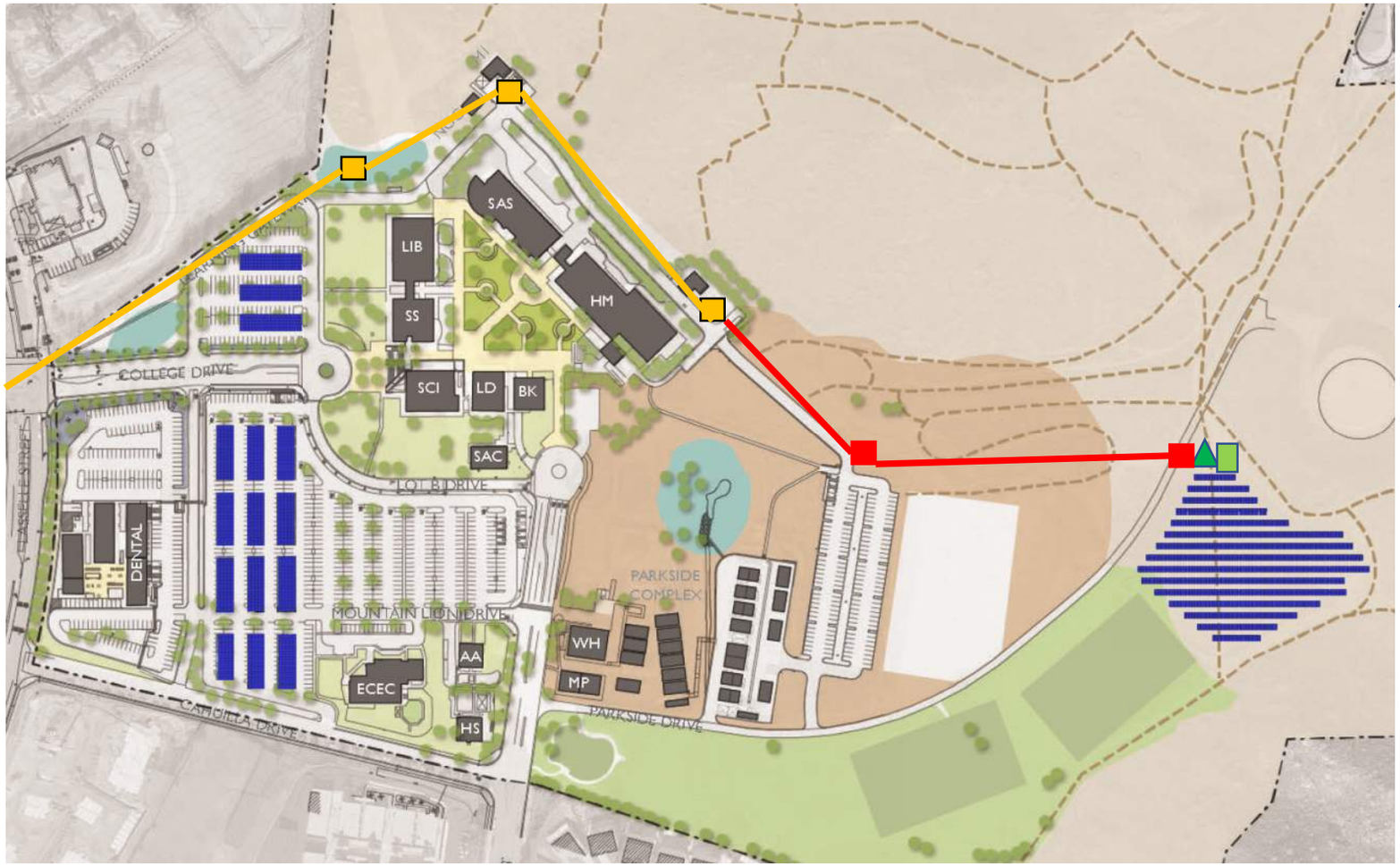
979kW DC Ground Mount Array



MORENO VALLEY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#2: **Ground Mount**

Interconnection



EXISTING 12.47 KV SECTIONALIZING CABINETS AND FEEDERS

NEW 12.47 KV SECTIONALIZING CABINETS AND FEEDERS

NEW 1600A SWITCHBOARD AND 1000 KVA TRANSFORMER

MORENO VALLEY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#2: **Ground Mount**

Financials

	Solar - Option 2
Array size (kW)	979
First year performance (kWhr)	1,818,594
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 115,669
Construction cost	$ 3,073,375
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term	25
Utility escalation	2.50%

Loan Option	Solar - Option 2
Array size (kW)	979
First year cash flow (loan option)	$ (73,065)
25-year accumulated cash flow (loan option)	$ (1,127,112)

PPA Option	Solar - Option 2
Forecasted PPA rate	$ 0.12
PPA Escalation	0%
First year cash flow (PPA option)	$ (102,562)
25-year accumulated cash flow (PPA option)	$ (3,503,285)

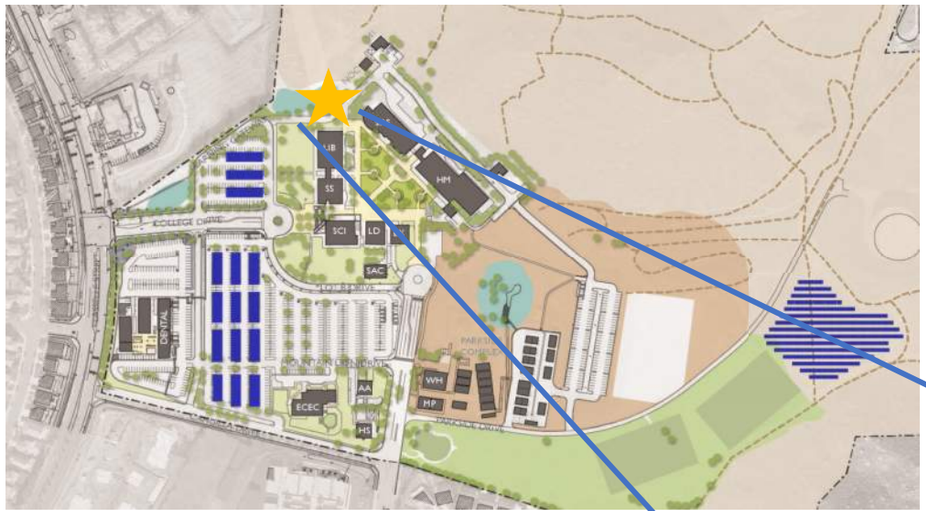
Carbon Equivalence Reporting	Solar - Option 2
First year performance (kWhr)	1,818,594
Carbon Offset (metric tons)	1286
Cars Driven for One Year	278

MVC BESS Option

MORENO VALLEY COLLEGE - SOLAR ON EXISTING CAMPUS

BESS Option: **12.47 kV Loop**

400kW/kWh



POINT OF INTERCONNECTION

EXISTING 12.47 KV SECTIONALIZING CABINETS AND FEEDERS

NEW 12.47 KV SECTIONALIZING CABINET AND FEEDERS

BATTERY ENERGY STORAGE AND TRANSFORMER

MORENO VALLEY COLLEGE - SOLAR ON EXISTING CAMPUS

BESS Option: **12.47 kV Loop**

Financials

	BESS
BESS size (kW)	400
Battery performance degradation	0.00%
First year cost avoidance (2019)	$ 87,953
First year cost avoidance (2020)	$ 90,152
First year cost avoidance (2021)	$ 92,406
Construction cost	$ 672,000
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term	25
Utility escalation	2.50%

Loan Option	BESS
BESS size (kW)	$ 400
First year cash flow (loan option)	$ 50,814
25-year accumulated cash flow (loan option)	$ 1,961,916

PPA Option	BESS
Forecasted PPA rate	$ 0.13
PPA Escalation	0%
First year cash flow (PPA option)	$ 39,054
25-year accumulated cash flow (PPA option)	$ 1,333,984

MVC Combined PV+BESS Option

PV+ BESS Option: **All Options Combined**

Financials

	Combined Solar + BESS
Array size (kW)	1965
BESS size (kW)	400
First year performance (kWhr)	3,483,958
Solar performance degradation	0.50%
Battery performance degradation	0.00%
First year cost avoidance (2021)	$ 225,431
Construction cost	$ 7,164,325
Solar O&M costs	$ 12.50
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term	25
Utility escalation	2.50%

Loan Option	Combined Solar + BESS
Array size (kW)	1,965
BESS size (kW)	$ 400
First year cash flow (loan option)	$ (121,158)
25-year accumulated cash flow (loan option)	$ (955,644)

PPA Option	Combined Solar + BESS
Forecasted PPA rate	$ 0.14
PPA Escalation	0%
First year cash flow (PPA option)	$ (227,374)
25-year accumulated cash flow (PPA option)	$ (7,766,575)

Carbon Equivalence Reporting	Combined Solar + BESS
First year performance (kWhr)	3,483,958
Carbon Offset (metric tons)	2463
Cars Driven for One Year	532

MORENO VALLEY COLLEGE - SOLAR ON EXISTING CAMPUS

PV+ BESS Option A: **345kW carport + 0kW GM**

Financials

	Combined Op A Solar + BESS
Array size (kW)	345
BESS size (kW)	400
First year performance (kWhr)	582,877
Solar performance degradation	0.50%
Battery performance degradation	0%
First year cost avoidance (2019)	$ 36,565
First year cost avoidance (2020)	$ 37,480
First year cost avoidance (2021)	$ 38,417
Construction cost	1,868,633
Solar O&M costs	$ 12.50
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term	25
Utility escalation	2.50%

Loan Option	Combined Op A Solar + BESS
Array size (kW)	345
BESS size (kW)	400
First year cash flow (loan option)	$ 16,197
25-year accumulated cash flow (loan option)	$ 1,319,651

PPA Option	Combined Op A Solar + BESS
Forecasted PPA rate	$ 0.13
PPA Escalation	0%
First year cash flow (PPA option)	$ 1,696
25-year accumulated cash flow (PPA option)	$ 57,934

Carbon Equivalence Reporting	Combined Op A Solar + BESS
First year performance (kWhr)	582,877
Carbon Offset (metric tons)	412
Cars Driven for One Year	89

MORENO VALLEY COLLEGE - SOLAR ON EXISTING CAMPUS

PV+ BESS Option B: **0kW carport + 392kW GM**

Financials

	Combined Op B Solar + BESS
Array size (kW)	392
BESS size (kW)	0
First year performance (kWhr)	727,438
Solar performance degradation	0.00%
Battery performance degradation	0%
First year cost avoidance (2019)	$ 44,038
First year cost avoidance (2020)	$ 45,139
First year cost avoidance (2021)	$ 46,268
Construction cost	1,901,350
Solar O&M costs	$ 12.50
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term	25
Utility escalation	2.50%

Loan Option	Combined Op B Solar + BESS
Array size (kW)	392
BESS size (kW)	0
First year cash flow (loan option)	$ 21,588
25-year accumulated cash flow (loan option)	$ 1,506,282

PPA Option	Combined Op B Solar + BESS
Forecasted PPA rate	$ 0.12
PPA Escalation	0%
First year cash flow (PPA option)	$ 2,133
25-year accumulated cash flow (PPA option)	$ 72,854

Carbon Equivalence Reporting	Combined Op B Solar + BESS
First year performance (kWhr)	727,438
Carbon Offset (metric tons)	514
Cars Driven for One Year	111

MORENO VALLEY COLLEGE - SOLAR ON EXISTING CAMPUS

PV+ BESS Option C: **197kW carport + 196kW GM**

Financials

	Combined Op C Solar + BESS
Array size (kW)	393
BESS size (kW)	0
First year performance (kWhr)	696,792
Solar performance degradation	0.00%
Battery performance degradation	0%
First year cost avoidance (2019)	$ 42,914
First year cost avoidance (2020)	$ 43,987
First year cost avoidance (2021)	$ 45,086
Construction cost	1,970,465
Solar O&M costs	$ 12.50
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term	25
Utility escalation	2.50%

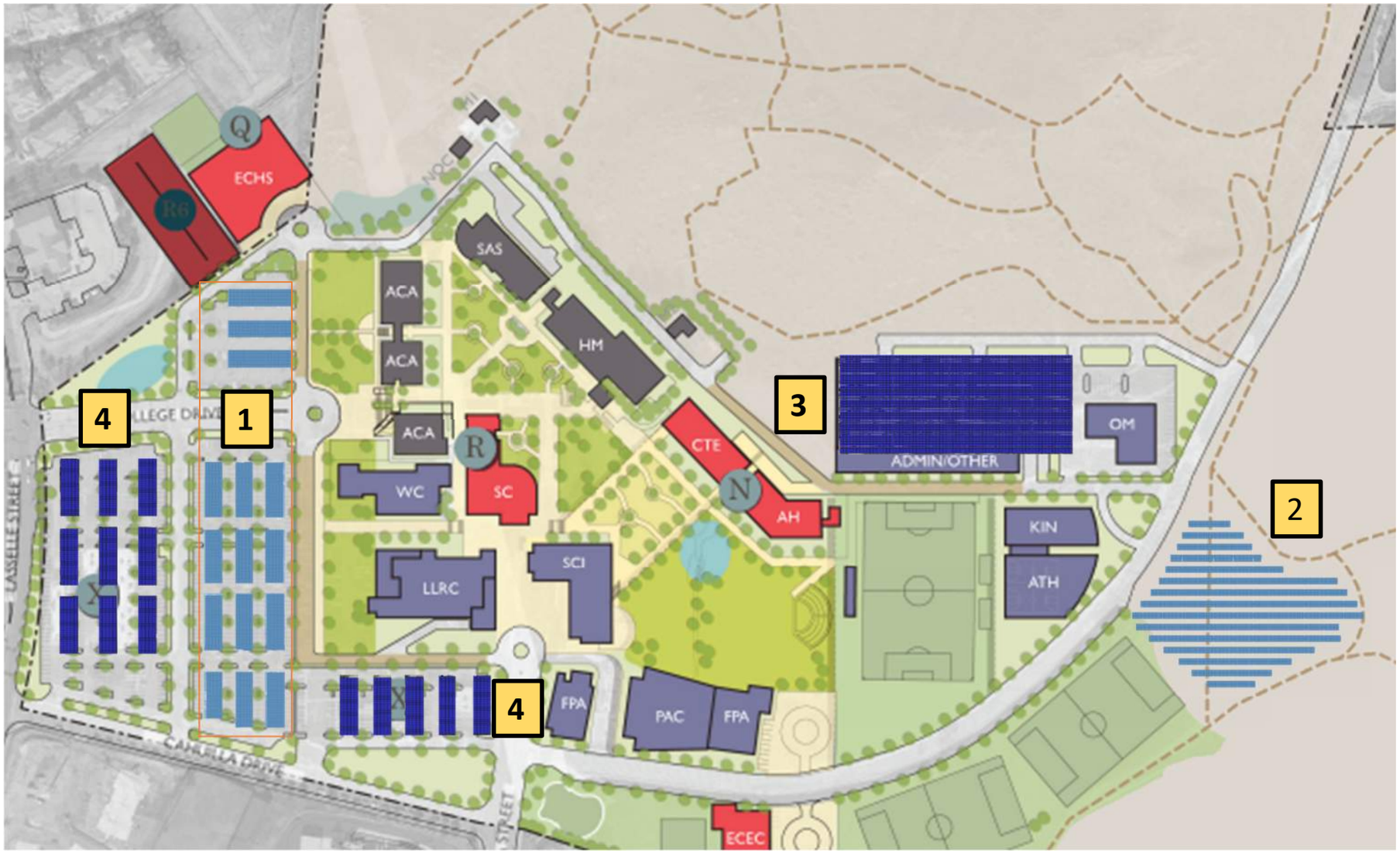
Loan Option	Combined Op C Solar + BESS
Array size (kW)	393
BESS size (kW)	0
First year cash flow (loan option)	$ 16,420
25-year accumulated cash flow (loan option)	$ 1,368,741

PPA Option	Combined Op C Solar + BESS
Forecasted PPA rate	$ 0.12
PPA Escalation	0%
First year cash flow (PPA option)	$ 4,629
25-year accumulated cash flow (PPA option)	$ 158,109

Carbon Equivalence Reporting	Combined Op C Solar + BESS
First year performance (kWhr)	696,792
Carbon Offset (metric tons)	493
Cars Driven for One Year	107

MORENO VALLEY COLLEGE

SOLAR ON **FUTURE CAMPUS**



ARRAYS (CURRENT/**FUTURE**)

1. LOTS A,B,D CARPORTS: 986 kW DC
2. GROUND MOUNT: 979 kW DC
3. **PARKING STRUCTURE: 1.19 MW DC (FMP Phase 3 Part of Structure Design in 2031-32)**
4. **LOT B, C CARPORTS: 904 kW DC (FMP Phase 4, Demo Dental Bldg. in 2032-33)**

Total

4.06 MW DC

FUTURE SUMMARY– MVC

Total System Performance (All Options)

Solar

1,890 kW carport arrays

979 kW ground mount array

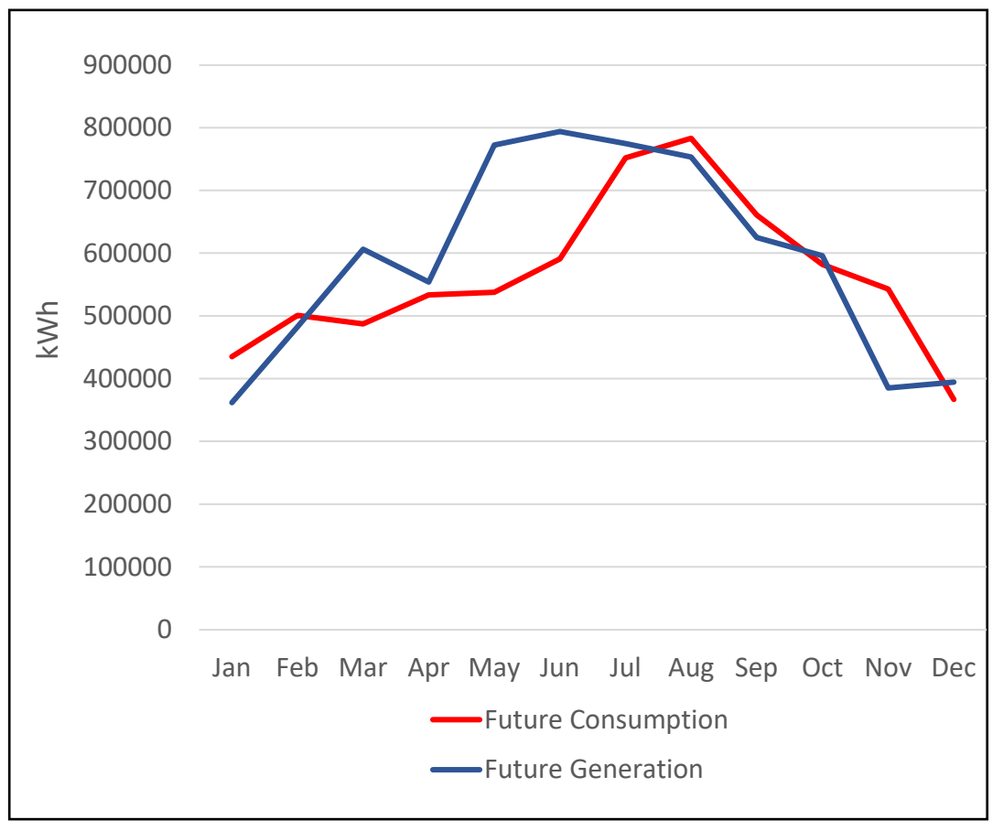
1,190 kW parking structure arrays

4,060 kW Total

Energy Offset: 104%

Battery Energy Storage System

400 kW

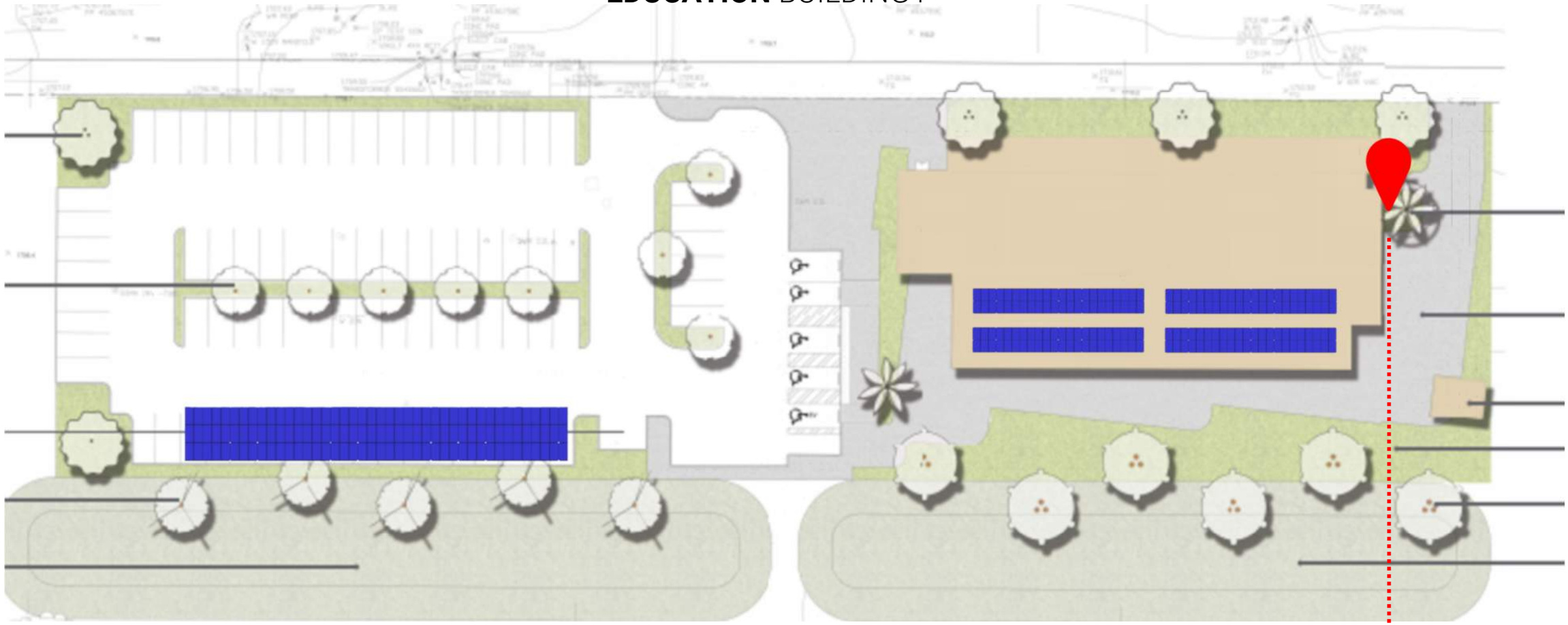


PROGRESS
BEN CLARK TRAINING CENTER
EDUCATION BUILDING PH.1

BEN CLARK TRAINING CENTER

SOLAR ON **NEW BUILDING AND SITE**

EDUCATION BUILDING I



Rooftop Array: 50 kW DC

Carport Arrays: 50 kW DC

BESS= 50 kW DC

SOLUTION SUMMARY– BCTC

Total System Performance (All Options)

Solar

50 kW Rooftop Array

50 kW Carport Arrays

100 kW Total

Battery Energy Storage System

50 kW

MORENO VALLEY COLLEGE - SOLAR ON BEN CLARK TRAINING CAMPUS

PV Option#1: **Carport**

Financials

	BCT - Carport
Array size (kW)	50
First year performance (kWhr)	89,206
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 8,286
Construction cost	$ 232,875
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term	25
Utility escalation	2.50%

Loan Option	BCT - Carport
Array size (kW)	50
First year cash flow (loan option)	$ (5,713)
25-year accumulated cash flow (loan option)	$ (94,002)

PPA Option	BCT - Carport
Forecasted PPA rate	$ 0.18
PPA Escalation	0%
First year cash flow (PPA option)	$ (7,771)
25-year accumulated cash flow (PPA option)	$ (265,451)

Carbon Equivalence Reporting	BCT - Carport
First year performance (kWhr)	89,206
Carbon Offset (metric tons)	63
Cars Driven for One Year	14

Cost avoidance data based on forecasted energy use

MORENO VALLEY COLLEGE - SOLAR ON BEN CLARK TRAINING CAMPUS

PV Option#2: **Rooftop**

Financials

	BCT - Rooftop
Array size (kW)	50
First year performance (kWhr)	89,206
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 8,286
Construction cost	$ 175,375
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term	25
Utility escalation	2.50%

Loan Option	BCT - Rooftop
Array size (kW)	50
First year cash flow (loan option)	$ (2,411)
25-year accumulated cash flow (loan option)	$ (11,450)

PPA Option	BCT - Rooftop
Forecasted PPA rate	$ 0.14
PPA Escalation	0%
First year cash flow (PPA option)	$ (4,203)
25-year accumulated cash flow (PPA option)	$ (143,568)

Carbon Equivalence Reporting	BCT - Rooftop
First year performance (kWhr)	89,206
Carbon Offset (metric tons)	63
Cars Driven for One Year	14

Cost avoidance data based on forecasted energy use

BESS Option

Financials

	BCT - BESS
BESS size (kW)	50
Battery performance degradation	0.00%
First year cost avoidance (2019)	$ 10,500
First year cost avoidance (2020)	$ 10,763
First year cost avoidance (2021)	$ 11,032
Construction cost	$ 90,600
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term	25
Utility escalation	2.50%

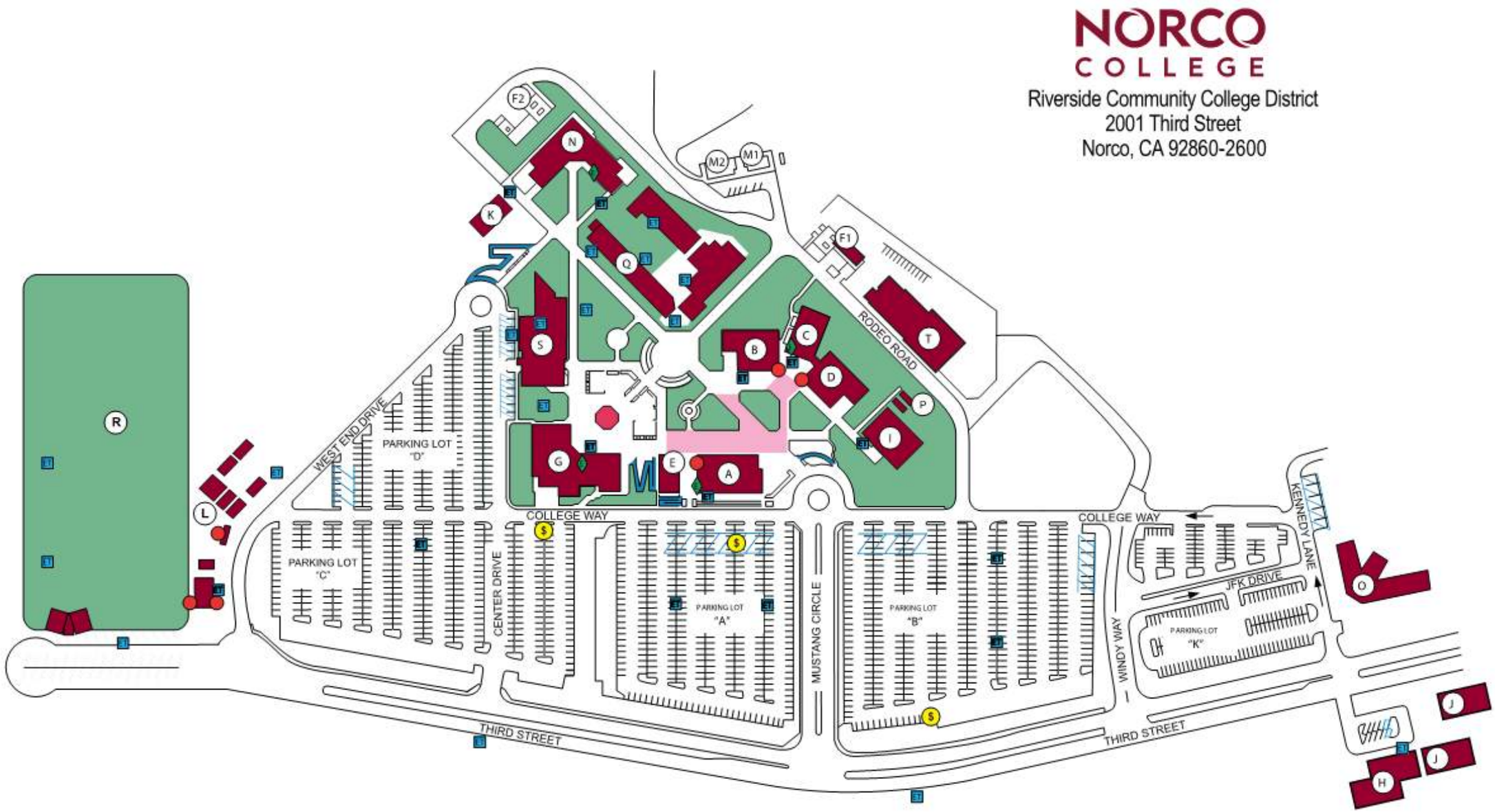
Loan Option	BCT - BESS
BESS size (kW)	$ 50
First year cash flow (loan option)	$ 5,454
25-year accumulated cash flow (loan option)	$ 218,031

PPA Option	BCT - BESS
Forecasted PPA rate	$ 0.14
PPA Escalation	0%
First year cash flow (PPA option)	$ 4,732
25-year accumulated cash flow (PPA option)	$ 161,620

Cost avoidance data based on forecasted energy use

PROGRESS – NORCO COLLEGE

Current **NORCO Campus**



Master Plan **NORCO Cam pus**

NORCO COLLEGE

Utility **Summary**

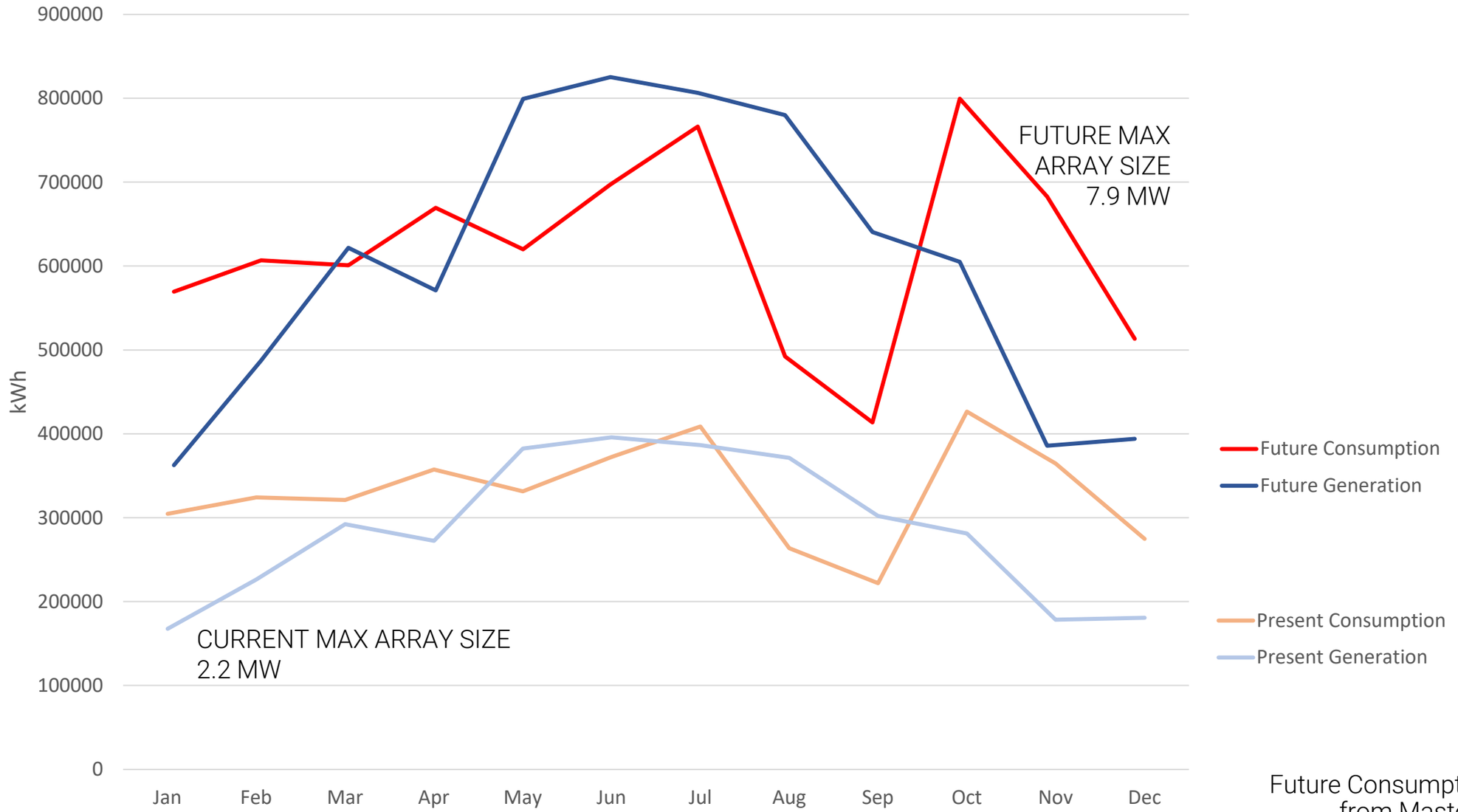
Consumption (kWhr)	On Demand (kW)	Mid Peak Demand (kW)	Off Peak Demand (kW)	Super-off Peak Demand (kW)
3,100,901	1,090	864	1,157	904
79,255	38	35	42	30
1,093,668	984	776	472	88
4,273,824	2,112	1,675	1,671	1,022

Cost of Consumption	Cost of Demand	Misc, taxes, etc	Total Cost
$ 201,749	$ 277,255	$ 73,287	$ 552,292
$ 6,164.19	$ 8,972.14	$ 1,932.73	$ 17,069
$ 71,860.04	$ 93,151.98	$ 8,822.03	$ 173,834
$ 279,773	$ 379,380	$ 84,042	$ 743,195

NORCO COLLEGE

Maximum Allowable **Solar**

(Site cannot be a Net Exporter of Electricity)



Future Consumption Estimate from Master Plan

NORCO COLLEGE

SOLAR ON **EXISTING CAMPUS**

ARRAYS OPTIONS

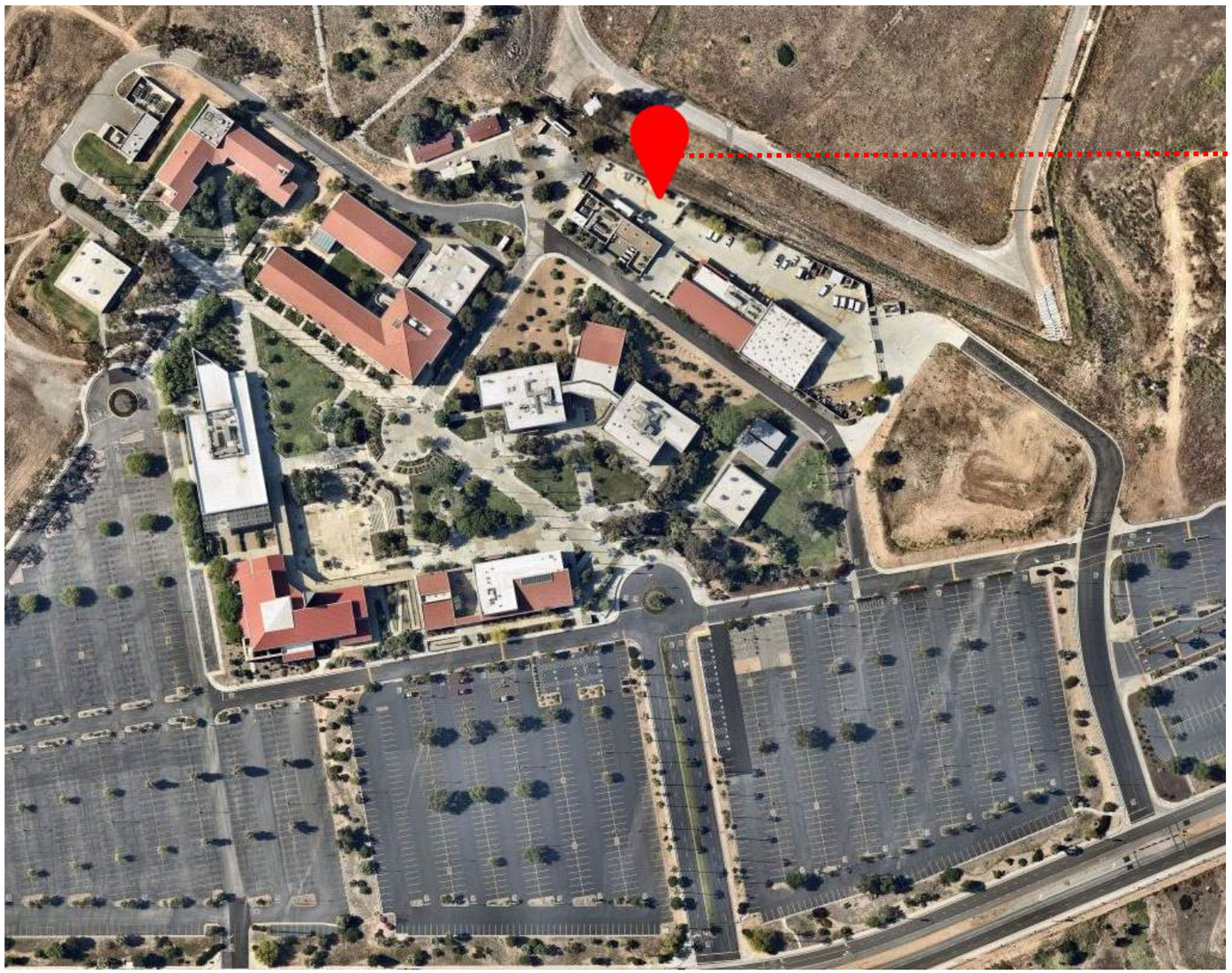
1. CENTER FOR STUDENT SUCCESS BUILDING ROOF: 70 KW DC
2. EAST GROUND MOUNT: 364KW DC
3. NE GROUND MOUNT: 1.63 MW DC
4. NORTH GROUND MOUNT: 467 kW DC

TOTAL

2.53 MW DC

NORCO COLLEGE

BATTERY STORAGE **ON EXISTING CAMPUS**



Location of 500 kW battery storage

CURRENT SUMMARY - NORCO

Total System Performance (All Options)

Solar: Options 1-4

70 kW Rooftop Array

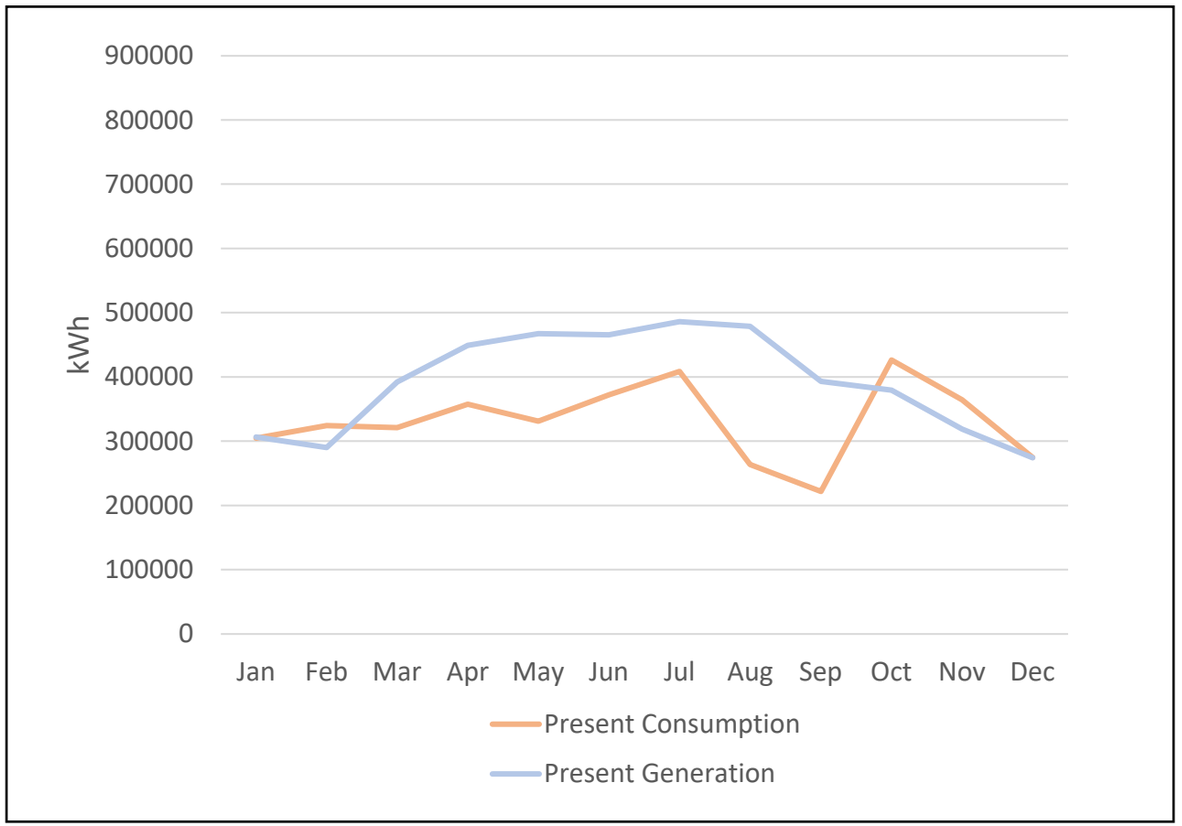
2,461 kW Ground Mount Arrays

2,531 kW Total

Energy Offset: 118%

Battery Energy Storage System

500 kW



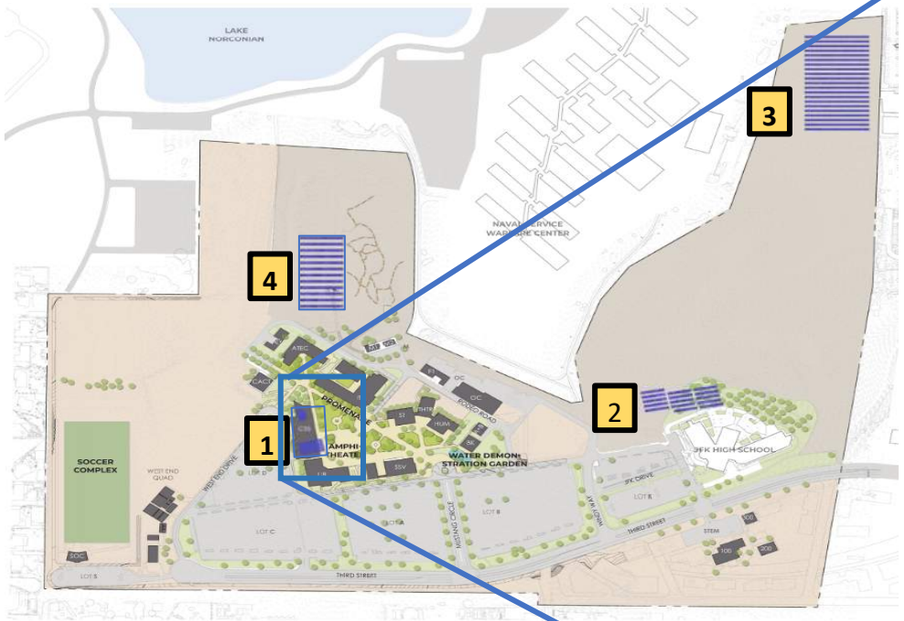
Norco Solar Options

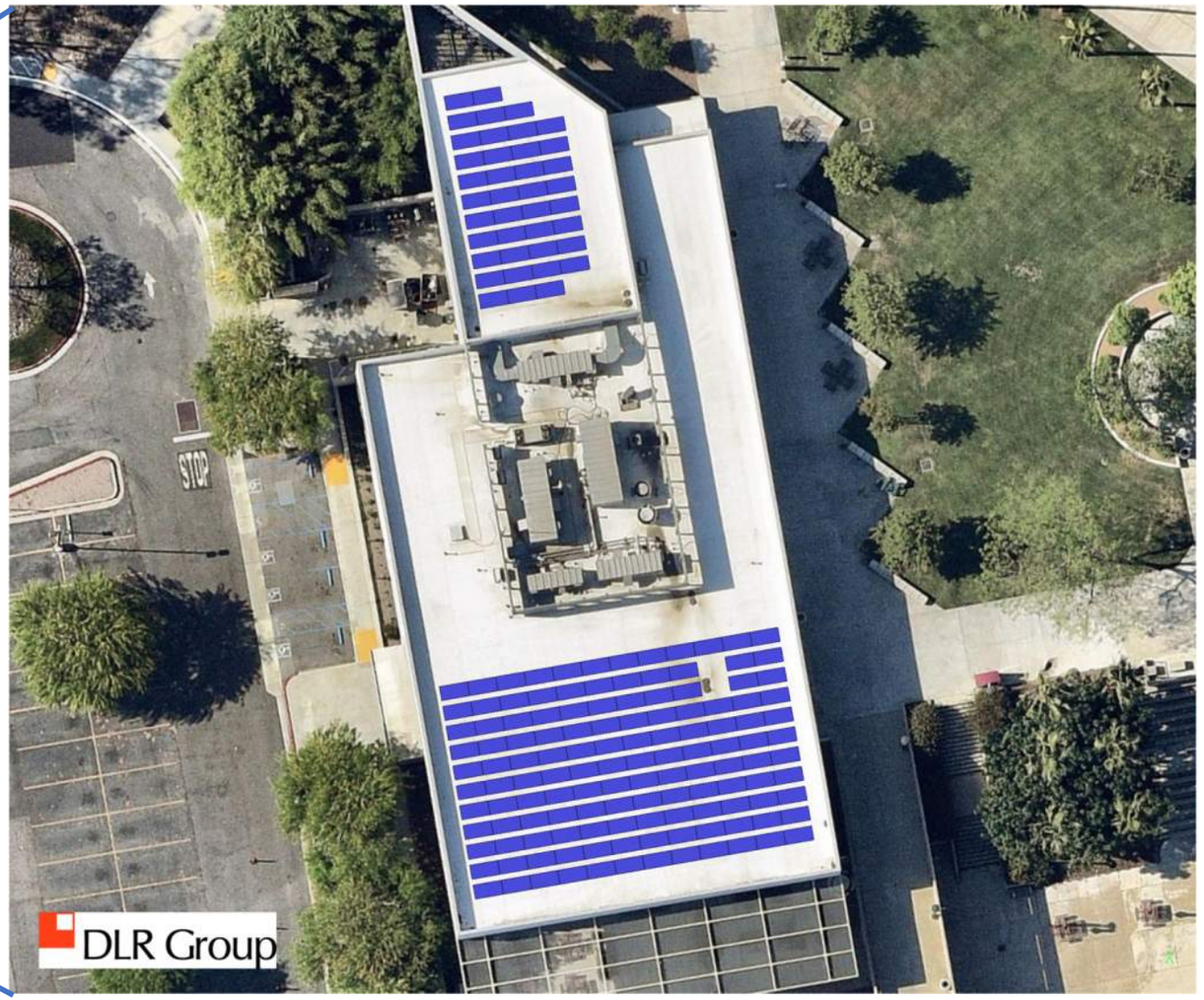
Norco College Solar Options

NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#1: **CSS Building**

70kW DC Rooftop Array





Solar Option#1: **CSS Building**

Interconnection

NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#1: **CSS Building**

Financials

Design Option	Solar - Option 1
Array size (kW)	70
First year performance (kWhr)	120,652
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 7,677
Construction cost	$ 240,272
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Solar - Option 1
Array size (kW)	70
First year cash flow (loan option)	$ (6,994)
25-year accumulated cash flow (loan option)	$ (115,194)

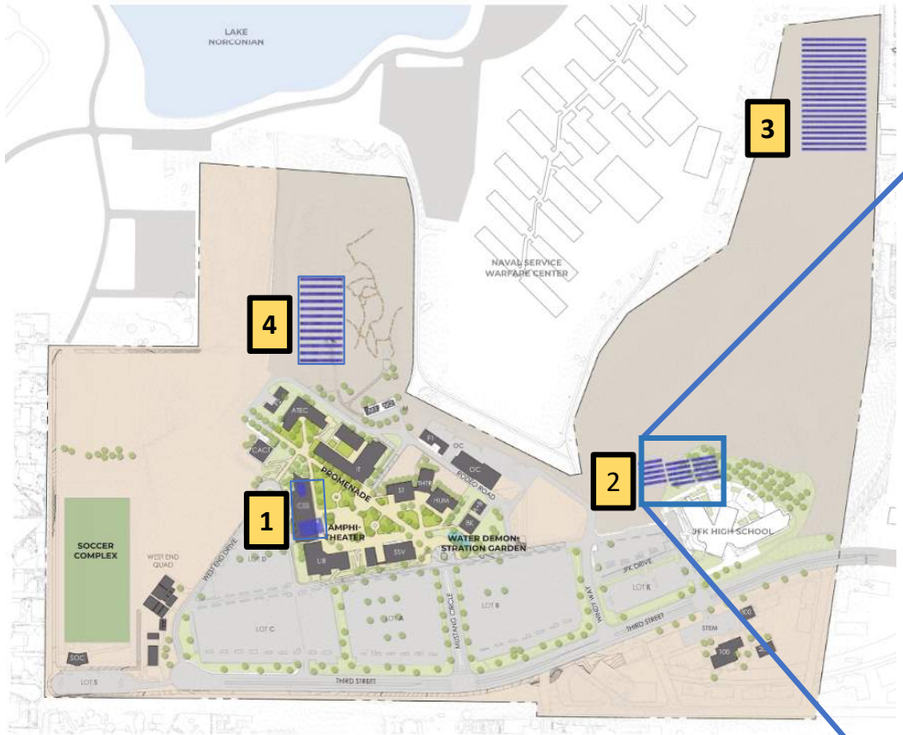
PPA Option	Solar - Option 1
Forecasted PPA rate	$ 0.14
PPA Escalation	0%
First year cash flow (PPA option)	$ (8,273)
25-year accumulated cash flow (PPA option)	$ (211,321)

Carbon Equivalence Reporting	Solar - Option 1
First year performance (kWhr)	120,652
Carbon Offset (metric tons)	85.3
Cars Driven in a Year	18

NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#2: **East Ground Mount**

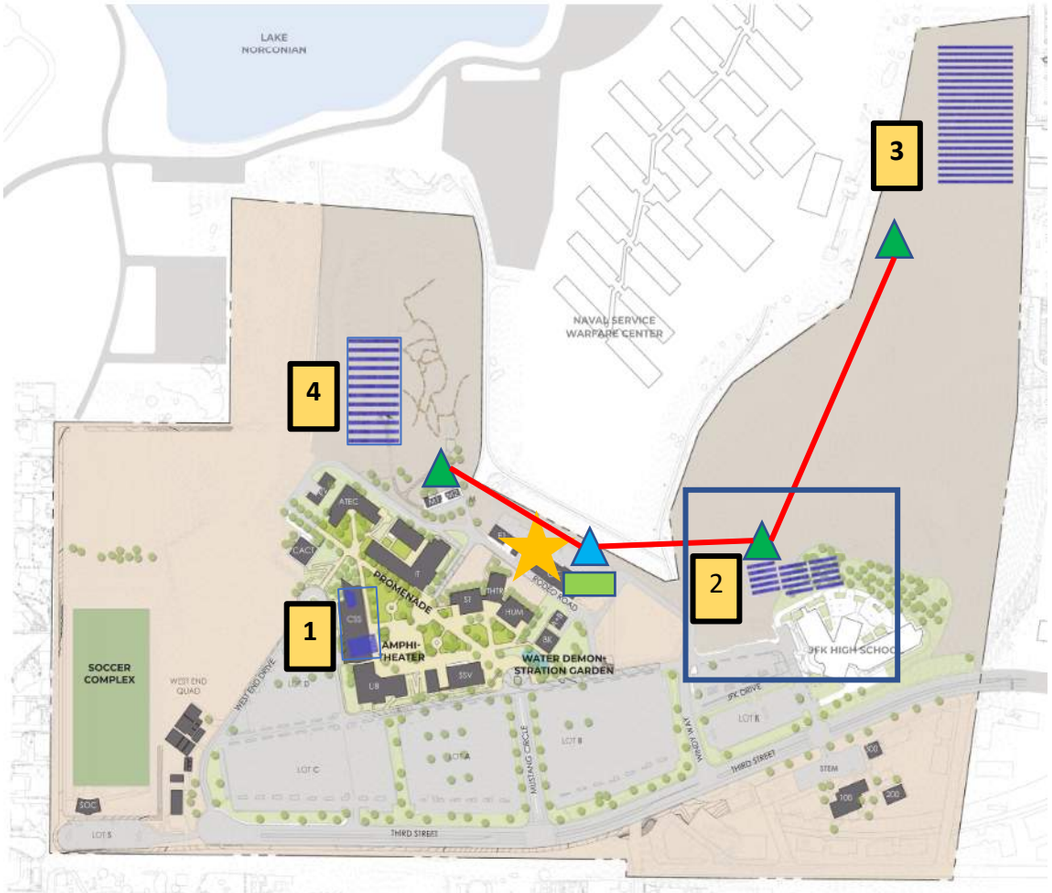
364kW DC Ground Mount Array



NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#2: **East Ground Mount**

Interconnection



1. POINT OF INTERCONNECTION – EXISTING GEAR
2. NEW 4000A-480V SERVICE TO COLLECT PV, BATTERY AND FUEL CELL
3. NEW 12.47KV FEEDERS
4. NEW 12.47KV-480V LOOP FED XFMRS
   - a) 2500 KVA COLLECTOR XFMR
   - b) EAST GROUND ARRAY – 300 KVA XFMR
   - c) NE GROUND ARRAY – 1500 KVA XFMR
   - d) NW GROUND ARRAY– 500 KVA XFMR
     1. COULD FEED FUTURE GARAGE
5. DATA BETWEEN SITES FOR REMOTE DISCONNECT

NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#2: **East Ground Mount**

Financials

Design Option	Solar - Option 2
Array size (kW)	364
First year performance (kWhr)	676,636
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 48,335
Construction cost	$ 993,101
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Solar - Option 2
Array size (kW)	364
First year cash flow (loan option)	$ (13,247)
25-year accumulated cash flow (loan option)	$ (100,843)

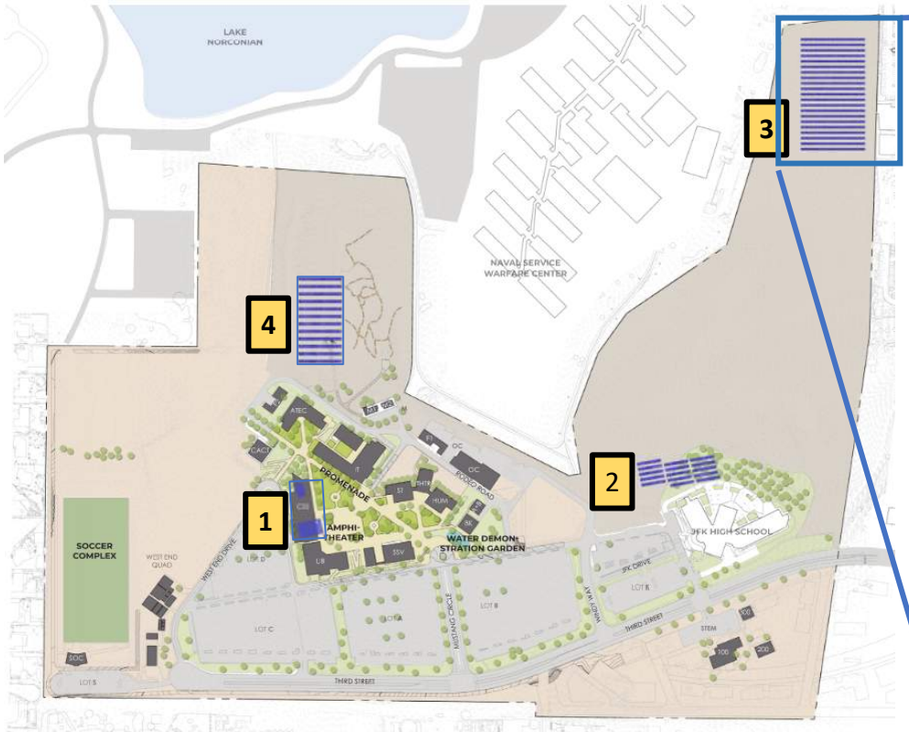
PPA Option	Solar - Option 2
Forecasted PPA rate	$ 0.10
PPA Escalation	0%
First year cash flow (PPA option)	$ (19,329)
25-year accumulated cash flow (PPA option)	$ (493,745)

Carbon Equivalence Reporting	Solar - Option 2
First year performance (kWhr)	676,636
Carbon Offset (metric tons)	478
Cars Driven in a Year	103

NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#3: **Northeast Ground Mount**

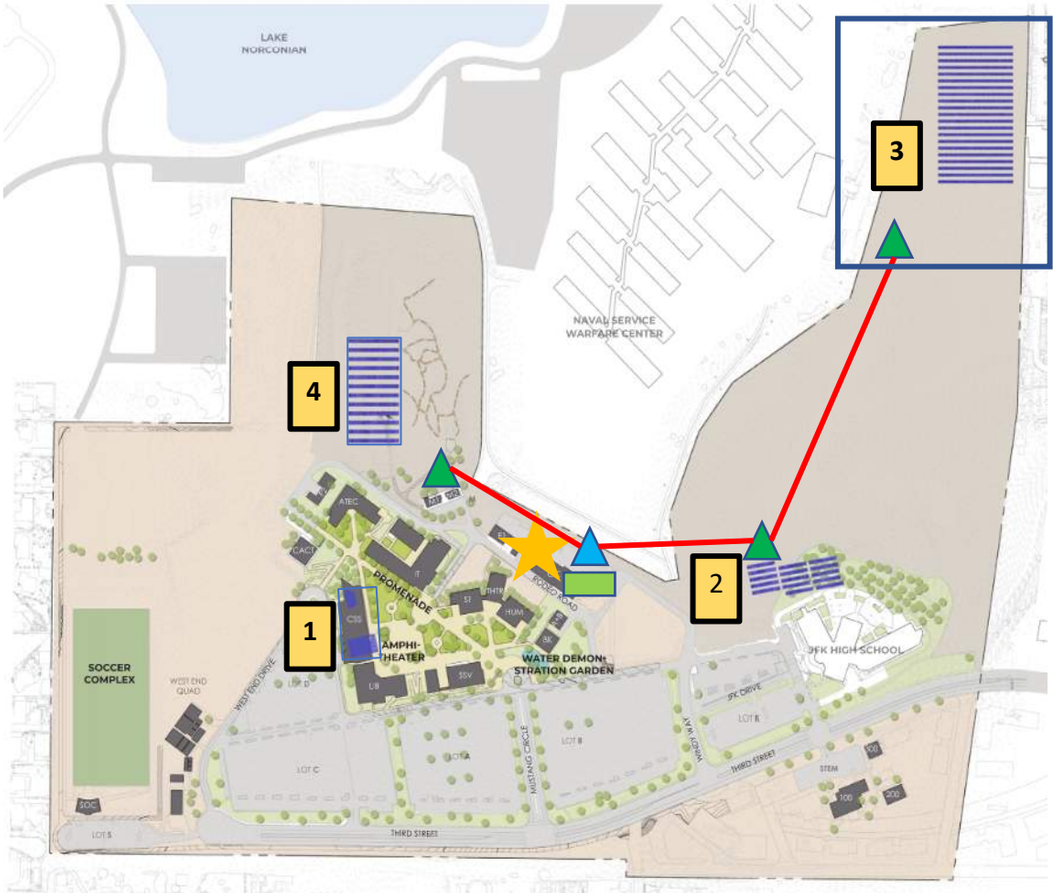
1,630kW DC Ground Mount Array



NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#3: **Northeast Ground Mount**

Interconnection



1. POINT OF INTERCONNECTION – EXISTING GEAR
2. NEW 4000A-480V SERVICE TO COLLECT PV, BATTERY AND FUEL CELL
3. NEW 12.47KV FEEDERS
4. NEW 12.47KV-480V LOOP FED XFMRS
   - a) 2500 KVA COLLECTOR XFMR
   - b) EAST GROUND ARRAY – 300 KVA XFMR
   - c) NE GROUND ARRAY – 1500 KVA XFMR
   - d) NW GROUND ARRAY– 500 KVA XFMR
     1. COULD FEED FUTURE GARAGE
5. DATA BETWEEN SITES FOR REMOTE DISCONNECT

Solar Option#3: **Northeast Ground Mount**

Financials

Design Option	Solar - Option 3
Array size (kW)	1630
First year performance (kWhr)	3,046,644
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 204,919
Construction cost	$ 4,339,396
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Solar - Option 3
Array size (kW)	1630
First year cash flow (loan option)	$ (64,658)
25-year accumulated cash flow (loan option)	$ (607,531)

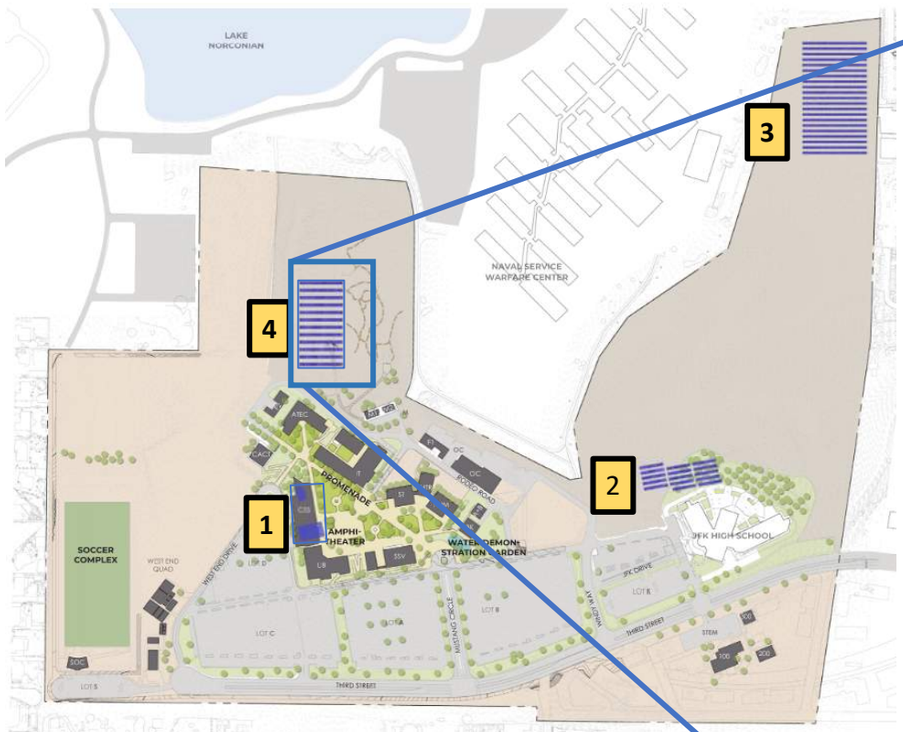
PPA Option	Solar - Option 3
Forecasted PPA rate	$ 0.10
PPA Escalation	0%
First year cash flow (PPA option)	$ (87,030)
25-year accumulated cash flow (PPA option)	$ (2,223,154)

Carbon Equivalence Reporting	Solar - Option 3
First year performance (kWhr)	3,046,644
Carbon Offset (metric tons)	2154
Cars Driven in a Year	465

NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#4: **Northwest Ground Mount**

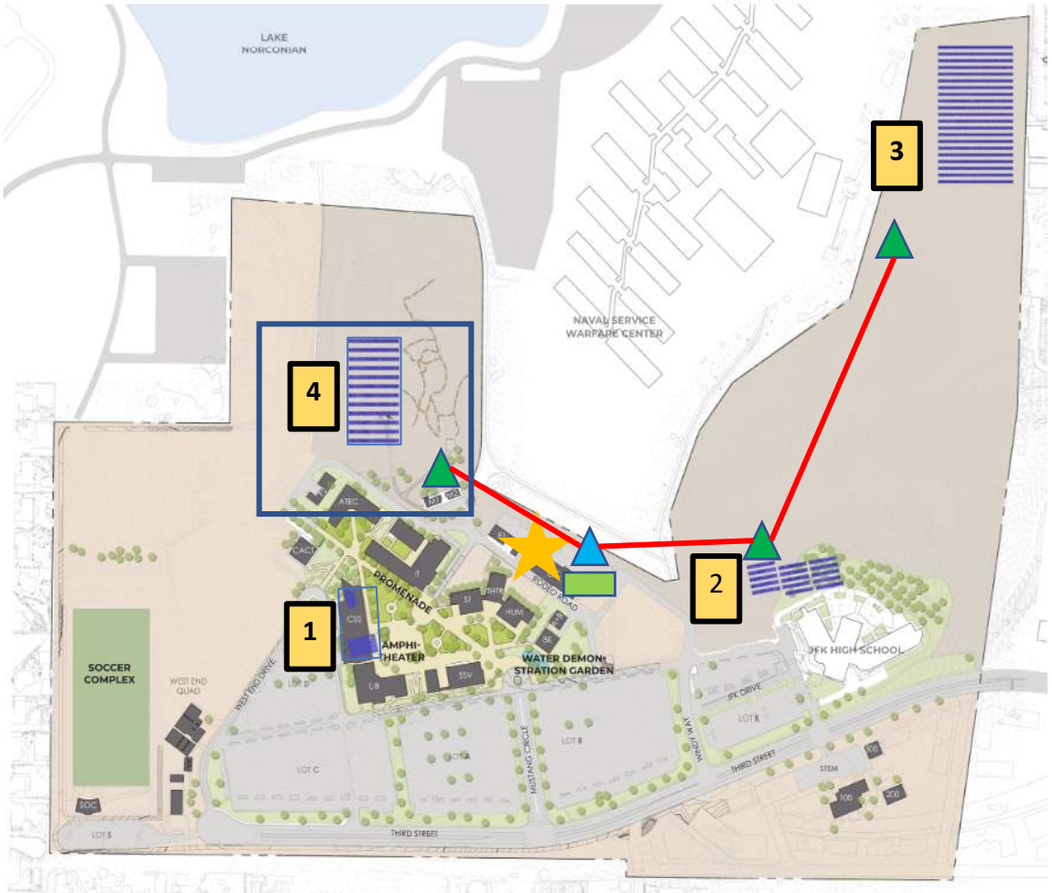
467kW DC Ground Mount Array



NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#4: **Northwest Ground Mount**

Interconnection



1. POINT OF INTERCONNECTION – EXISTING GEAR
2. NEW 4000A-480V SERVICE TO COLLECT PV, BATTERY AND FUEL CELL
3. NEW 12.47KV FEEDERS
4. NEW 12.47KV-480V LOOP FED XFMRS
   - a) 2500 KVA COLLECTOR XFMR
   - b) EAST GROUND ARRAY – 300 KVA XFMR
   - c) NE GROUND ARRAY – 1500 KVA XFMR
   - d) NW GROUND ARRAY– 500 KVA XFMR
     1. COULD FEED FUTURE GARAGE
5. DATA BETWEEN SITES FOR REMOTE DISCONNECT

Solar Option#4: **Northwest Ground Mount**

Financials

Design Option	Solar - Option 4
Array size (kW)	467
First year performance (kWhr)	879,712
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 61,357
Construction cost	$ 1,254,592
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Solar - Option 4
Array size (kW)	467
First year cash flow (loan option)	$ (16,529)
25-year accumulated cash flow (loan option)	$ (122,851)

PPA Option	Solar - Option 4
Forecasted PPA rate	$ 0.10
PPA Escalation	0%
First year cash flow (PPA option)	$ (25,130)
25-year accumulated cash flow (PPA option)	$ (641,931)

Carbon Equivalence Reporting	Solar - Option 4
First year performance (kWhr)	879,712
Carbon Offset (metric tons)	622
Cars Driven in a Year	134

Norco BESS Option

Norco College BESS Option

NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

BESS Option

500 kW/kWh

POINT OF INTERCONNECTION

NEW 480V FEEDER

BATTERY

NEW 480V, 4000A SWITCHBOARD TO COLLECT BATTERIES AND PV.

BESS Option

Financials

Design Option	Batteries
BESS size (kW)	500
Battery performance degradation	0.00%
First year cost avoidance (2021)	$ 72,981
Construction cost	$ 848,400
Solar O&M costs	N/A
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Batteries
BESS size (kW)	500
First year cash flow (loan option)	$ 20,509
25-year accumulated cash flow (loan option)	$ 620,715

PPA Option	Batteries
Forecasted PPA rate	$ 0.11
PPA Escalation	0%
First year cash flow (PPA option)	$ 16,551
25-year accumulated cash flow (PPA option)	$ 422,792

Norco PV+BESS Option

NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar + BESS Option

Financials

Design Option	Combined Solar + BESS
Array size (kW)	2531
First year performance (kWhr)	5,236,644
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 395,269
Construction cost	$ 7,675,761
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Combined - Solar + BESS
Array size (kW)	2531
BESS size (kW)	500
First year cash flow (loan option)	$ (80,918)
25-year accumulated cash flow (loan option)	$ (325,705)

PPA Option	Combined - Solar + BESS
Forecasted PPA rate	$ 0.11
PPA Escalation	0%
First year cash flow (PPA option)	$ (123,210)
25-year accumulated cash flow (PPA option)	$ (3,147,359)

Carbon Equivalence Reporting	Combined - Solar + BESS
First year performance (kWhr)	5,236,644
Carbon Offset (metric tons)	3703
Cars Driven in a Year	800

NORCO COLLEGE

SOLAR ON **FUTURE CAMPUS**

ARRAYS OPTIONS CURRENT/**FUTURE**

1. CENTER FOR STUDENT SUCCESS BUILDING ROOF: 70 kW DC
2. EAST GROUND MOUNT: 364 kW DC
3. NE GROUND MOUNT: 1.63 MW DC
4. ~~NORTH GROUND MOUNT: 467 KW DC~~ **DEMO**
5. **SE PARKING ARRAY, (FMP Phase I, 2030-31): 652 kW DC**
6. **SW PARKING ARRAY (FMP Phase II, 2033-34): 642 kW DC**
7. **NORTH PARKING STRUCTURE (FMP Phase III, 2036-37): 700 kW DC**

Total
4.06 MW DC

FUTURE SUMMARY - NORCO

Total System Performance (All Options)

Solar – Options 1-7

1,994 kW ground mount array

70 kW roof top array

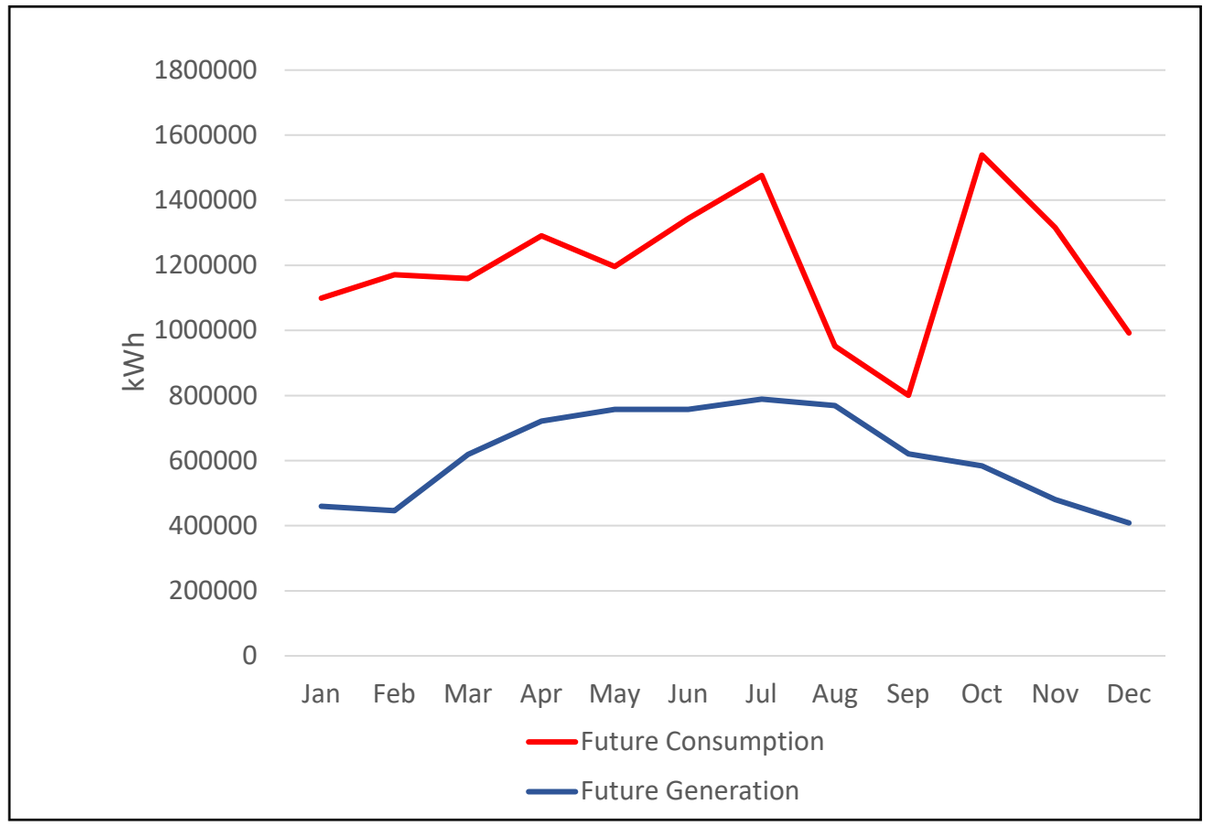
1,994 kW parking structure arrays

4,058 kW Total

Energy Offset: 52%

Battery Energy Storage System

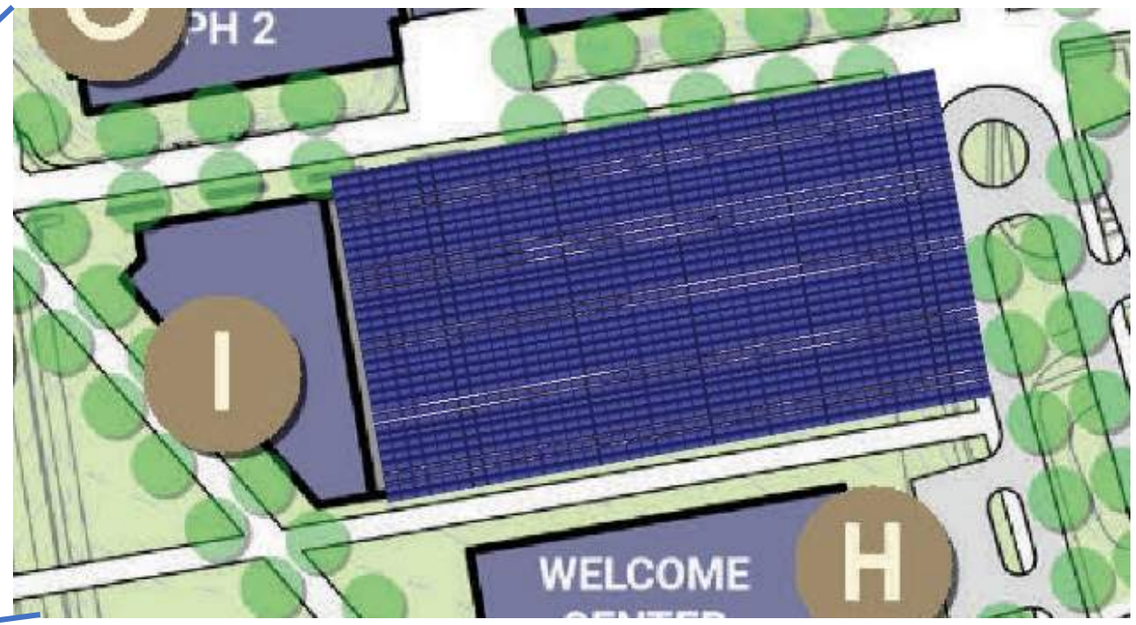
1,500 kW



NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#5: **SE Parking Structure**

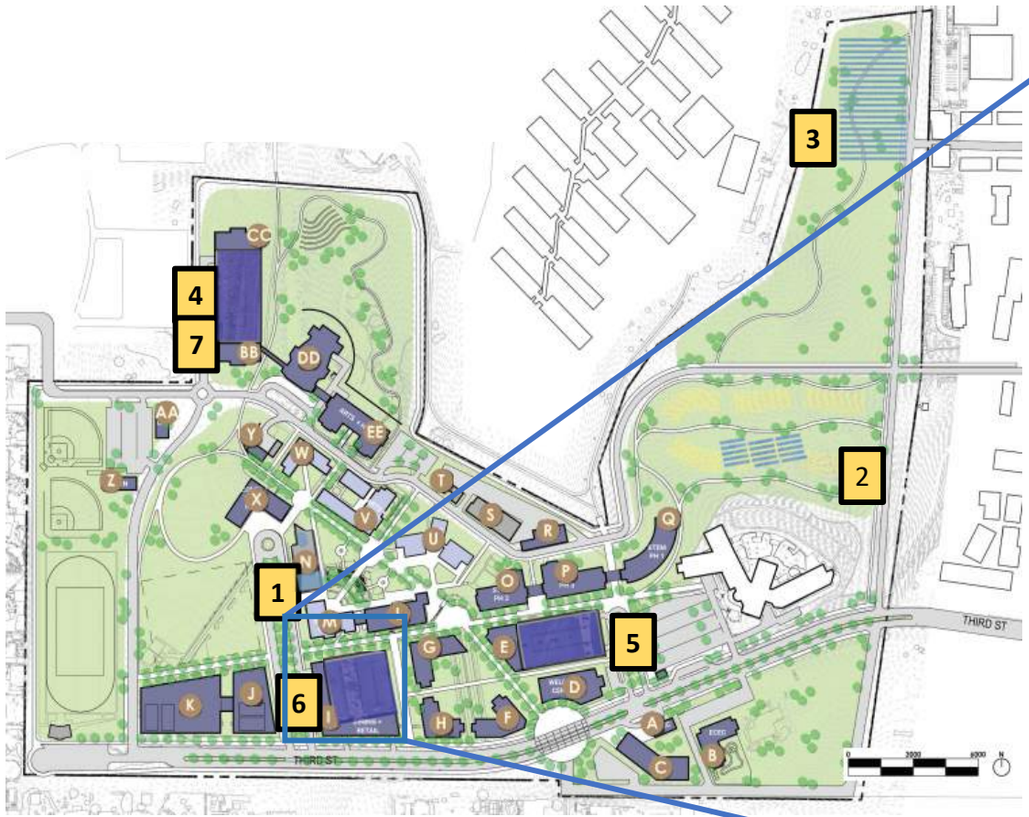
652 kW DC Canopy Array

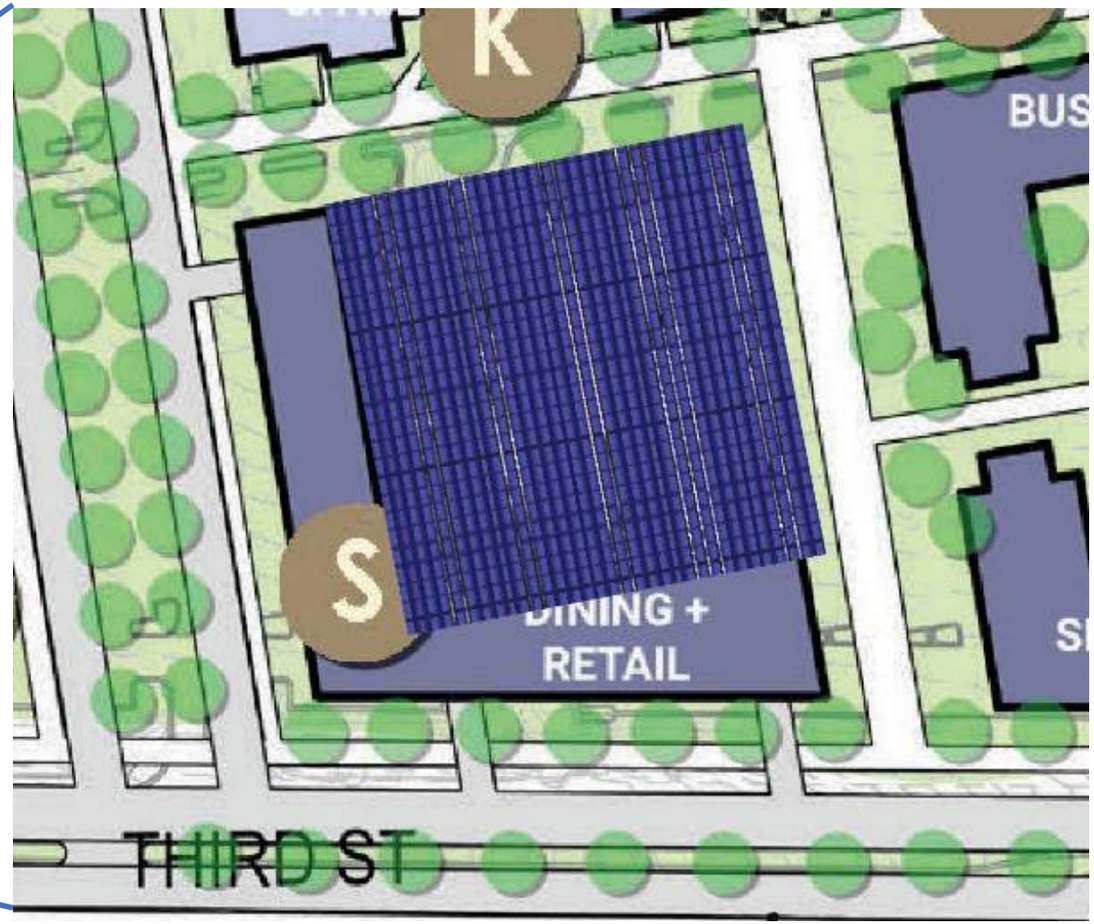


NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#6: **SW Parking Structure**

642 kW DC Canopy Array

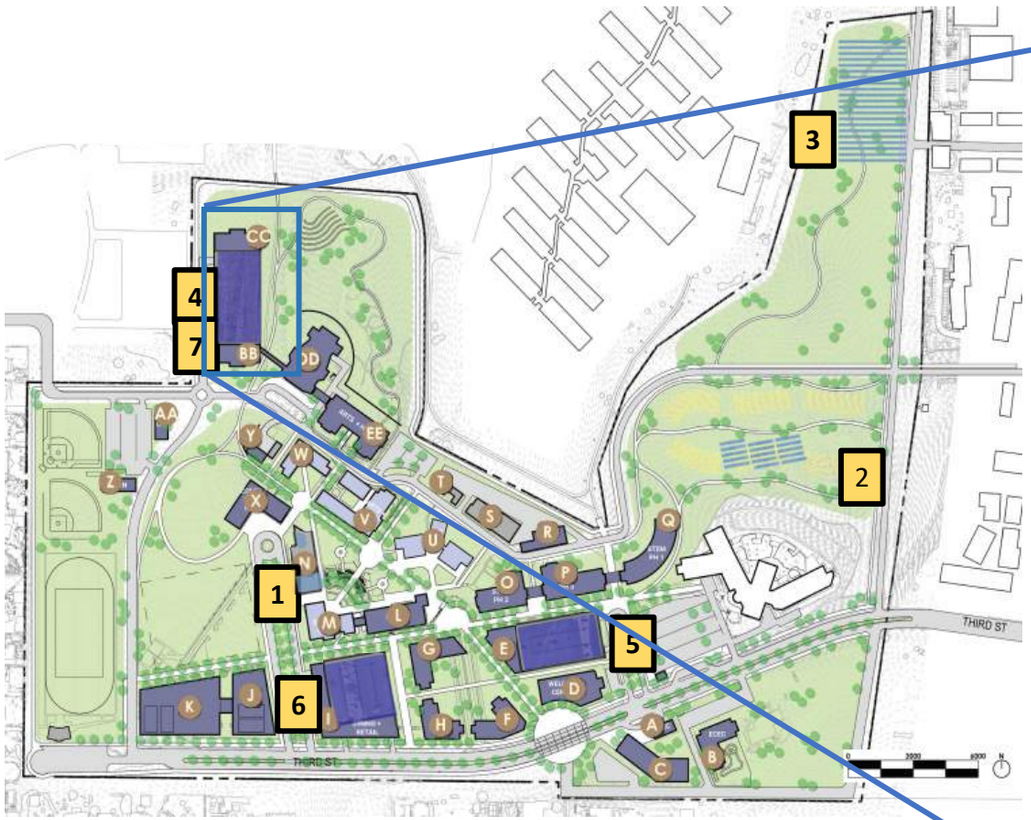


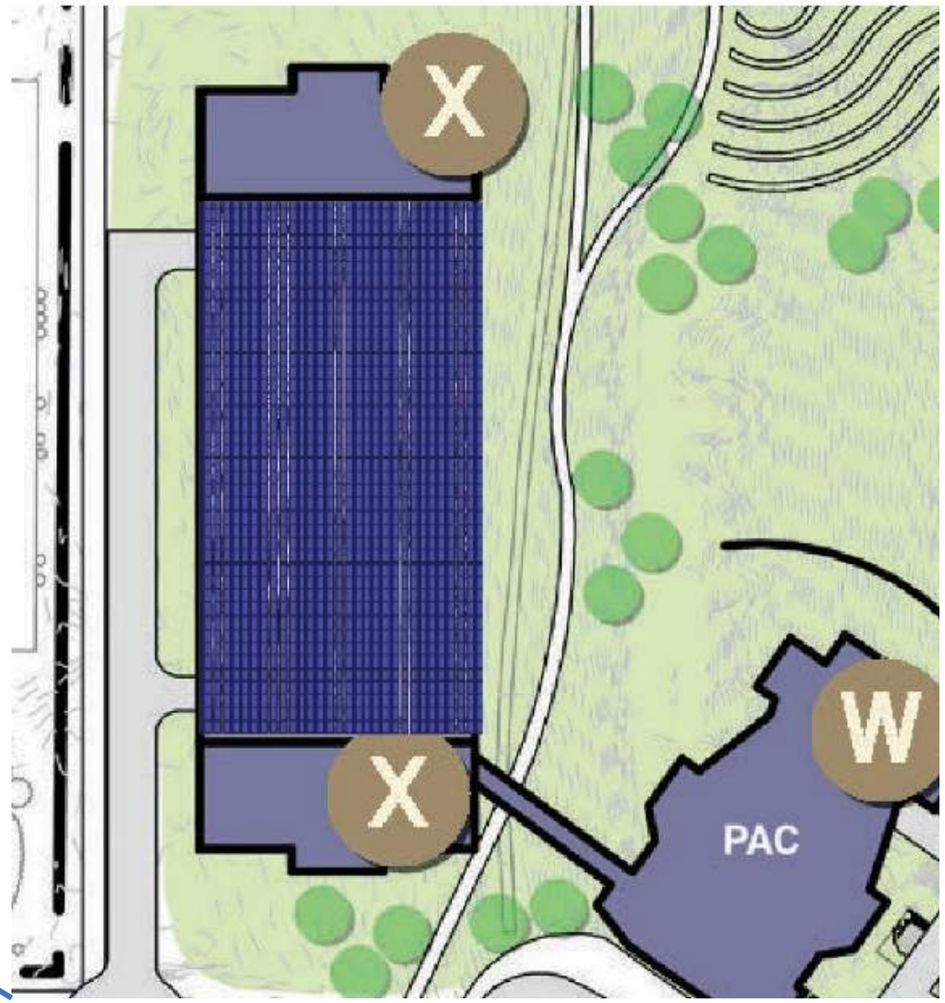


NORCO COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#7: **North Parking Structure**

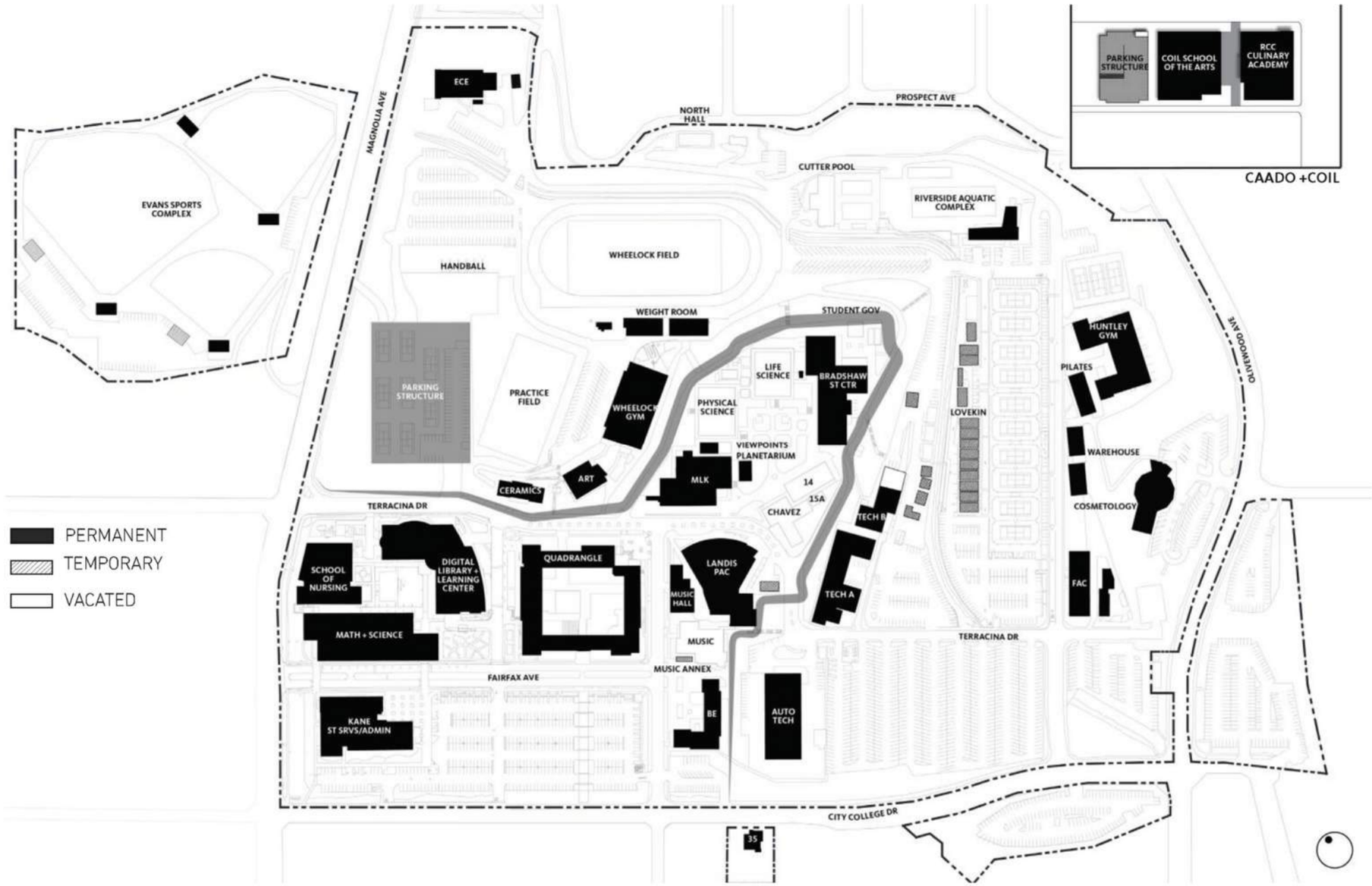
700 kW DC Canopy Array





PROGRESS
RIVERSIDE CITY COLLEGE

Current **Riverside City Campus**



Future Riverside **City Campus**

Utility Meter **Summary**

Building Address	Meter Number	Consumption (kWhr)	On Demand (kW)	Mid Peak Demand (kW)	Off Peak Demand (kW)	Super-off Peak Demand (kW)
4557 MAGNOLIA AVE	158347000	99,760	145	431	127	0
4559 MAGNOLIA AVE	158348000	3,072	0	0	0	0
4800 MAGNOLIA AVE UNIT TPPA	158353000	86,120	0	0	0	0
4699 OLIVEWOOD AVE	171659000	161,840	96	0	0	0
3500 PROSPECT AVE	178926000	214,320	0	0	0	0
3600 PROSPECT AVE	178930000	5,055	0	0	0	0
4726 RIVERSIDE AVE	181098000	4,636,800	1,472	1,616	1,232	0
3617 SAUNDERS ST, UNIT A	184039000	2,709	0	0	0	0
3617 SAUNDERS ST, UNIT B	184040000	644	0	0	0	0
4651 SAUNDERS ST	184041000	23,600	0	0	0	0
4654 SAUNDERS ST	184042000	122,480	0	0	0	0
4656 SAUNDERS ST	184043000	90,330	0	0	0	0
4678 SAUNDERS ST	184044000	9,909	0	0	0	0
3615 TERRACINA DR	189392000	752,040	436	286	258	118
4800 MAGNOLIA AVE, SUITE A	205524000	1,728,900	600	612	546	0
4678 SAUNDERS ST SUITE, A	209999000	289,200	122	115	127	0
4800 MAGNOLIA AVE, BLDG P	211360000	177,440	106	109	96	0
4800 MAGNOLIA AVE, UNIT T	213346000	16,398	0	0	0	0
4800 MAGNOLIA AVE	216462000	2,668,000	752	848	672	0
4800 MAGNOLIA AVE, SUITE B	216580000	488,820	226	0	0	0
4800 MAGNOLIA AVE, UNIT PUMP	216830000	540	22	0	0	0
3801 MARKET ST	217519000	870,600	300	276	206	0
3890 UNIVERSITY AVE	224605000	586,000	206	184	192	0
3902 UNIVERSITY AVE	225189000	73,320	0	0	0	0
	Total	13,107,897				

Based on data from 2019 calendar year

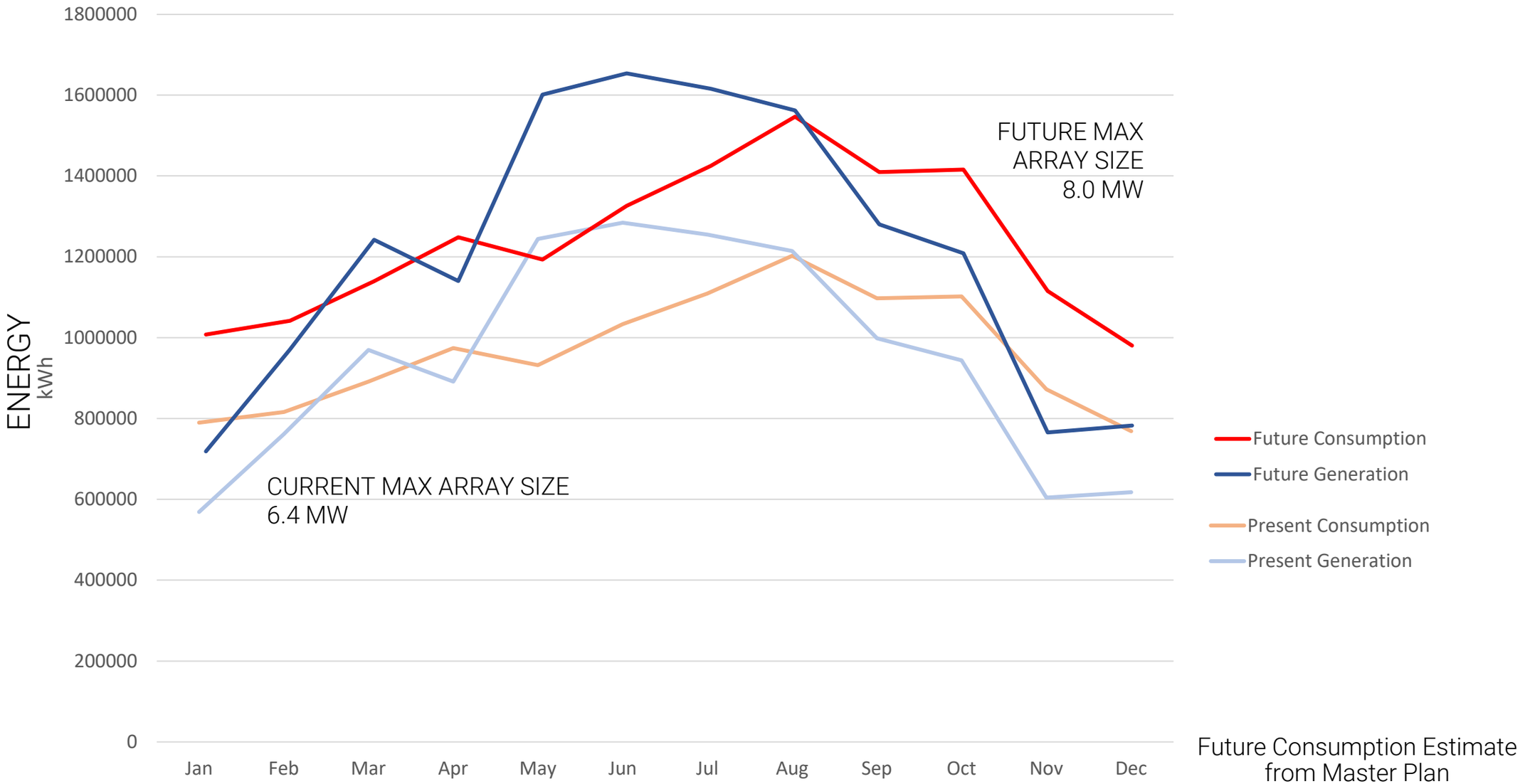
Utility Meter **Summary**

Building Address	Meter Number	Cost of Consumption	Cost of Demand	Misc, taxes, etc	Total Cost
4557 MAGNOLIA AVE	158347000	$ 8,554	$ 15,250	$ 20,161	$ 43,965
4559 MAGNOLIA AVE	158348000	$ 419	$ -	$ 382	$ 801
4800 MAGNOLIA AVE UNIT TPPA	158353000	$ 11,759	$ -	$ 1,169	$ 12,928
4699 OLIVEWOOD AVE	171659000	$ 18,290	$ 7,512	$ 1,451	$ 27,253
3500 PROSPECT AVE	178926000	$ 31,890	$ -	$ 1,207	$ 33,097
3600 PROSPECT AVE	178930000	$ 690	$ -	$ 426	$ 1,117
4726 RIVERSIDE AVE	181098000	$ 387,245	$ 138,886	$ 47,533	$ 573,664
3617 SAUNDERS ST, UNIT A	184039000	$ 370	$ -	$ 382	$ 751
3617 SAUNDERS ST, UNIT B	184040000	$ 88	$ -	$ 381	$ 469
4651 SAUNDERS ST	184041000	$ 3,222	$ -	$ 982	$ 4,203
4654 SAUNDERS ST	184042000	$ 16,721	$ -	$ 1,179	$ 17,900
4656 SAUNDERS ST	184043000	$ 12,331	$ -	$ 1,817	$ 14,149
4678 SAUNDERS ST	184044000	$ 1,353	$ -	$ 650	$ 2,003
3615 TERRACINA DR	189392000	$ 71,616	$ 39,284	$ 22,817	$ 133,716
4800 MAGNOLIA AVE, SUITE A	205524000	$ 144,976	$ 58,449	$ 22,780	$ 226,205
4678 SAUNDERS ST SUITE, A	209999000	$ 24,132	$ 10,281	$ 19,513	$ 53,926
4800 MAGNOLIA AVE, BLDG P	211360000	$ 14,704	$ 7,068	$ 19,462	$ 41,235
4800 MAGNOLIA AVE, UNIT T	213346000	$ 2,238	$ -	$ 720	$ 2,958
4800 MAGNOLIA AVE	216462000	$ 218,493	$ 70,838	$ 23,999	$ 313,330
4800 MAGNOLIA AVE, SUITE B	216580000	$ 56,589	$ 14,388	$ 1,798	$ 72,775
4800 MAGNOLIA AVE, UNIT PUMP	216830000	$ 61	$ 2,012	$ 1,183	$ 3,256
3801 MARKET ST	217519000	$ 72,134	$ 27,368	$ 21,413	$ 120,915
3890 UNIVERSITY AVE	224605000	$ 48,106	$ 19,192	$ 20,727	$ 88,025
3902 UNIVERSITY AVE	225189000	$ 10,008	$ -	$ 1,165	$ 11,173
	Total	$ 1,155,989	$ 410,527	$ 233,296	$ 1,799,812

Based on data from 2019 calendar year

Maximum Allowable **Solar**

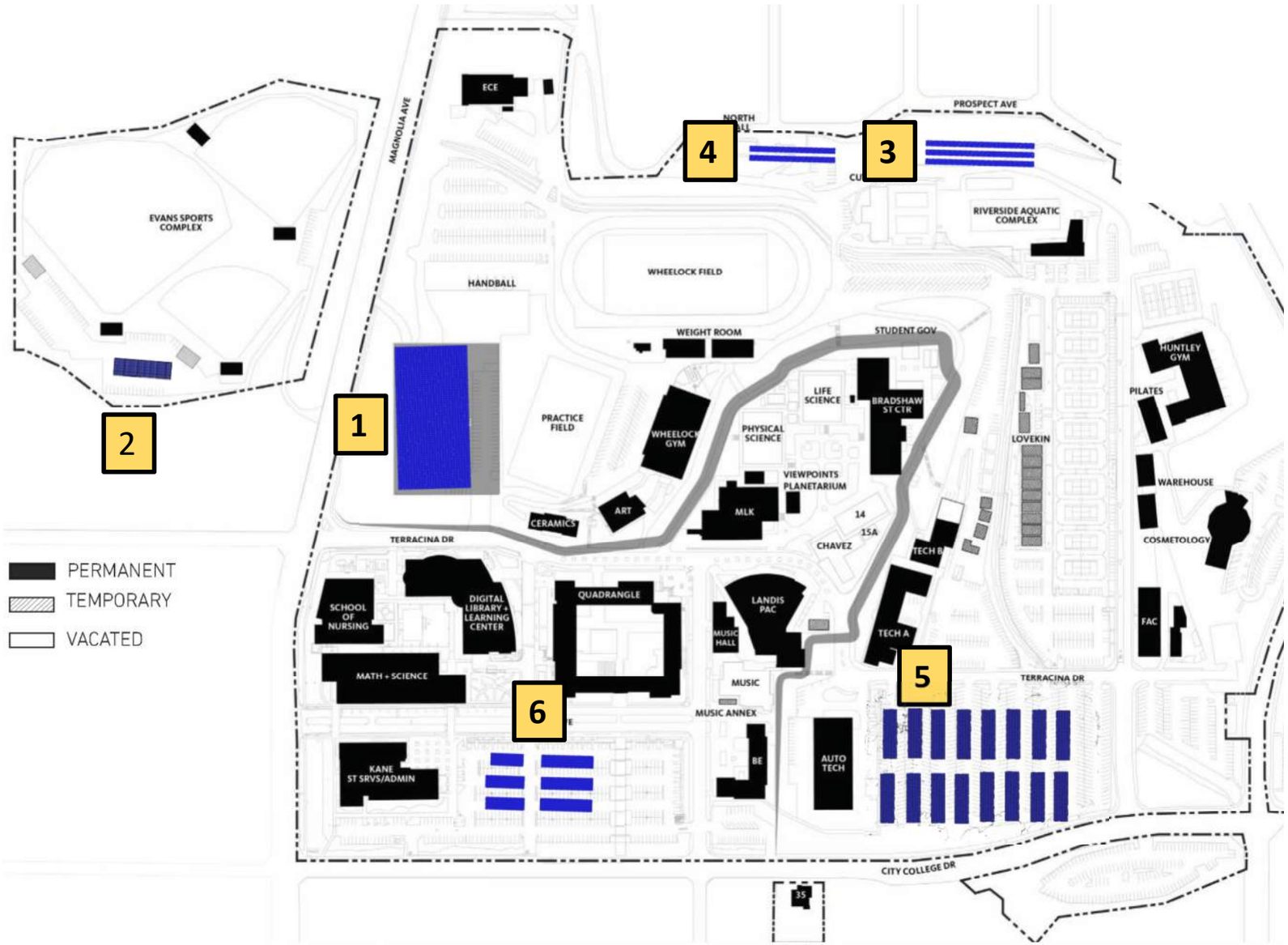
(Site cannot be a Net Exporter of Electricity)



Future Consumption Estimate from Master Plan

RIVERSIDE CITY COLLEGE

SOLAR ON **EXISTING CAMPUS**



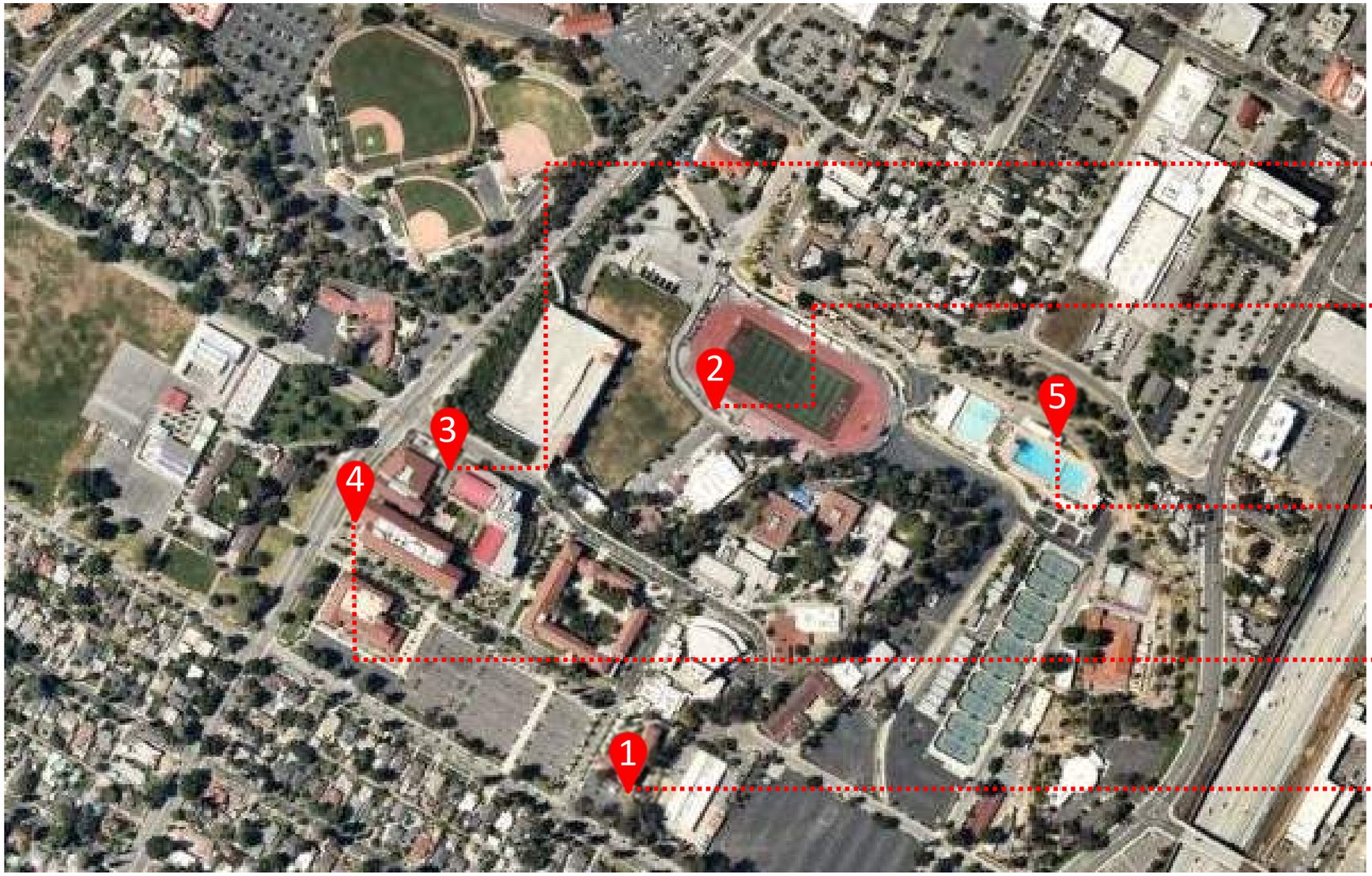
ARRAYS OPTIONS

1. PARKING STRUCTURE: 831 KW DC
2. EVANS PARKING: 66KW DC
3. RAC POOL: 194 kW DC
4. COLLEGE HOUSE: 102 KW DC
5. Lot E: 1.17MW DC
6. Lot C: 445 kW DC

Total
2,808 kW DC

RIVERSIDE CITY COLLEGE

BATTERY STORAGE **ON EXISTING CAMPUS**



Digital Library
250 kW battery storage

Wheelock Field
200 kW battery storage

Aquatics Complex
100 kW battery storage

Math and Science
300 kW battery storage

MV Service Point
600 kW battery storage

CURRENT SUMMARY - RCC

Total System Performance (All Options)

Solar

445 kW Total Carport Arrays

831 kW Parking Structure Array

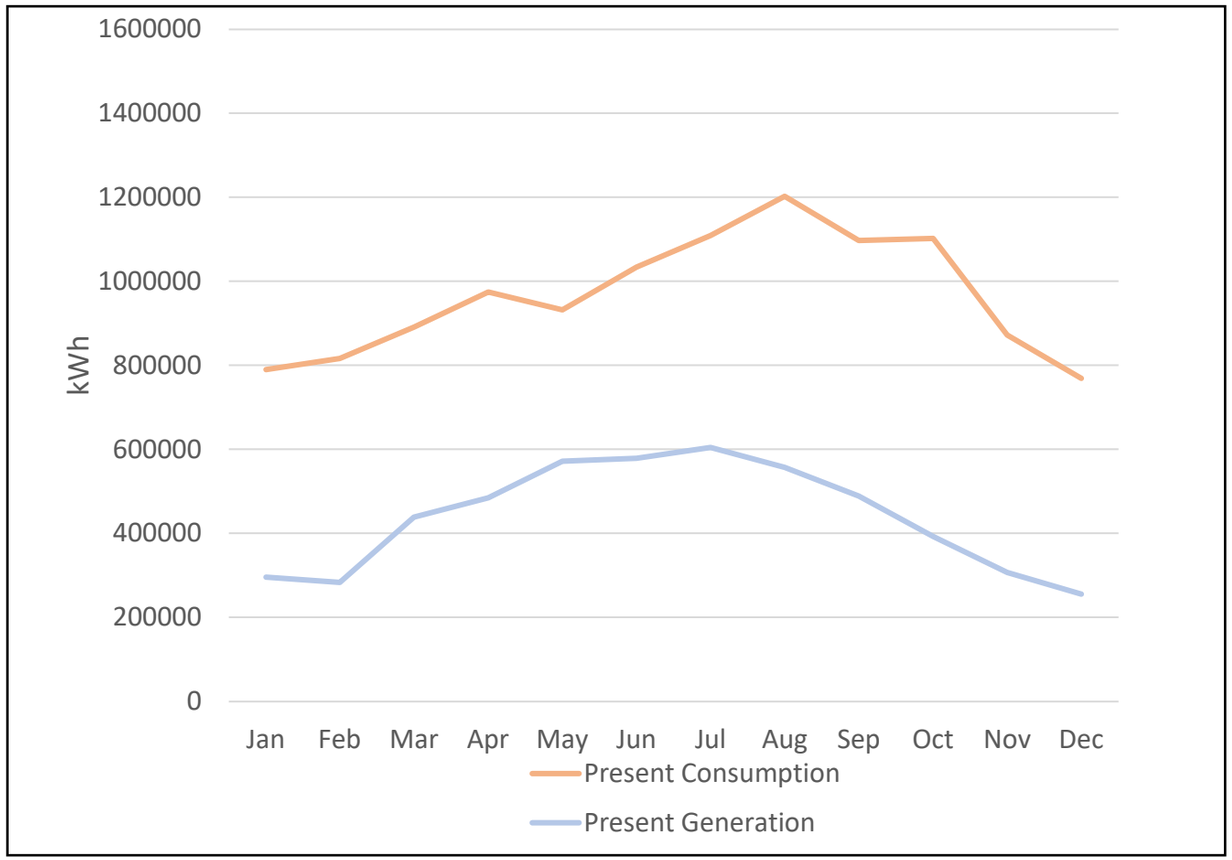
296 kW Total Ground Arrays

1,638 KW Total

Energy Offset: 26%

Battery Energy Storage System

1,450 kW Total

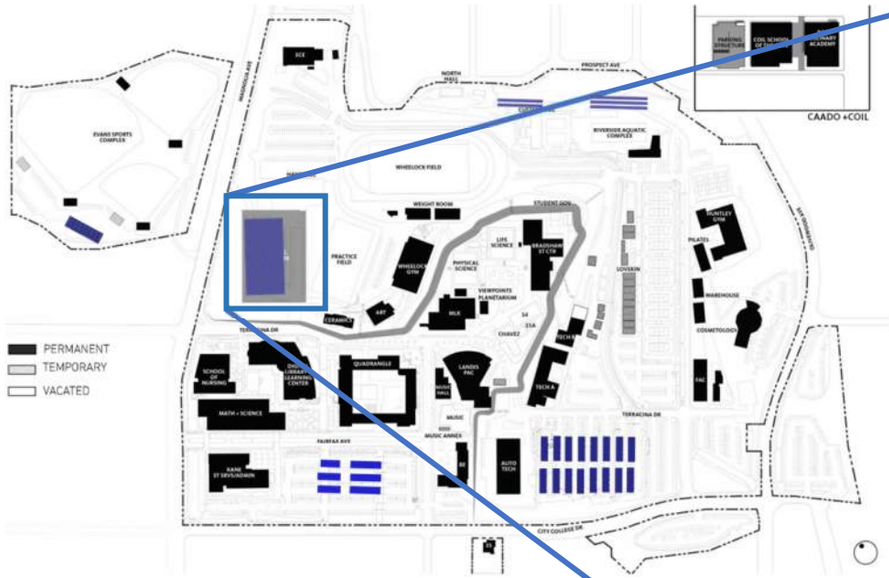


RCC Solar Options

RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#1: **Parking Structure**

831kW DC Canopy Array



RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#1: **Parking Structure**

Interconnection

POINT OF INTERCONNECTION

EXISTING 12.47 KV SECTIONALIZING CABINETS AND FEEDERS

NEW 12.47 KV SECTIONALIZING CABINET AND FEEDERS

EXISTING TRANSFORMERS AND SWITCHBOARDS

NEW 1200A SWITCHBOARD AND 1000 KVA TRANSFORMER

NOTES

-TOO BIG OF ARRAY TO BACKFEED GARAGE.

-CAN SUPPORT STADIUM + DIGITAL LIBRARY

-LONG DISTANCES FOR 480V

RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#1: **Parking Structure**

Financials

Design Option	Solar - Option 1
Array size (kW)	831
First year performance (kWhr)	1,532,913
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 187,738
Construction cost	$ 4,107,513
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Solar - Option 1
Array size (kW)	831
First year cash flow (loan option)	$ (58,535)
25-year accumulated cash flow (loan option)	$ (291,957)

PPA Option	Solar - Option 1
Forecasted PPA rate	$ 0.19
PPA Escalation	0%
First year cash flow (PPA option)	$ (103,515)
25-year accumulated cash flow (PPA option)	$ (3,535,842)

Carbon Equivalence Reporting	Solar - Option 1
First year performance (kWhr)	1,532,913
Carbon Offset (metric tons)	1084
Cars Driven for One Year	234

RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

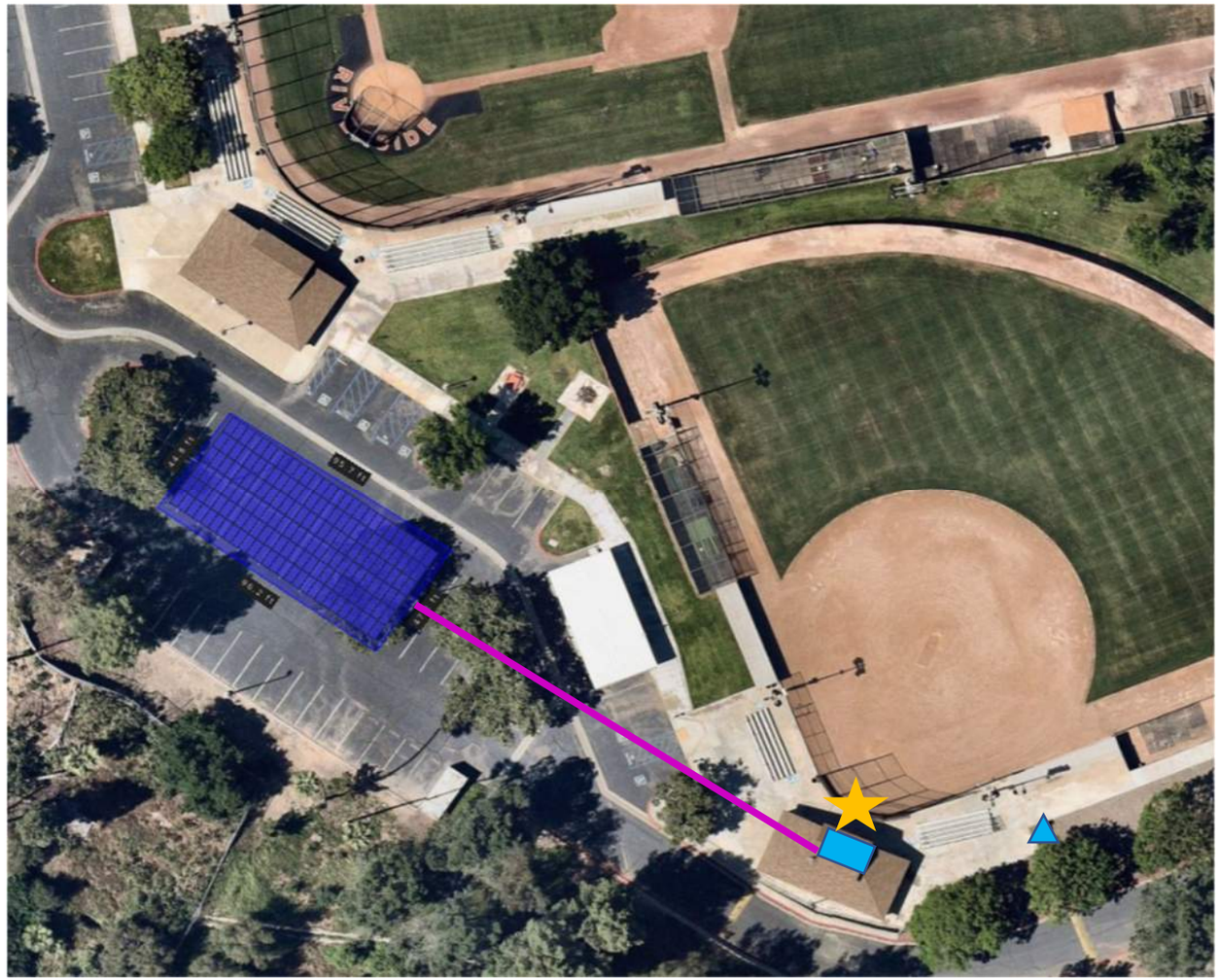
Solar Option#2: **Evans Parking**

66kW DC Carport Array

RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#2: **Evans Parking**

Interconnection



POINT OF INTERCONNECTION

NEW 480V-100A FEEDER

EXISTING TRANSFORMERS AND SWITCHBOARDS

RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#2: **Evans Parking**

Financials

Design Option	Solar - Option 2
Array size (kW)	66.0
First year performance (kWhr)	244,224
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 22,626
Construction cost	$ 279,450
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Solar - Option 2
Array size (kW)	66
First year cash flow (loan option)	$ 5,752
25-year accumulated cash flow (loan option)	$ 290,691

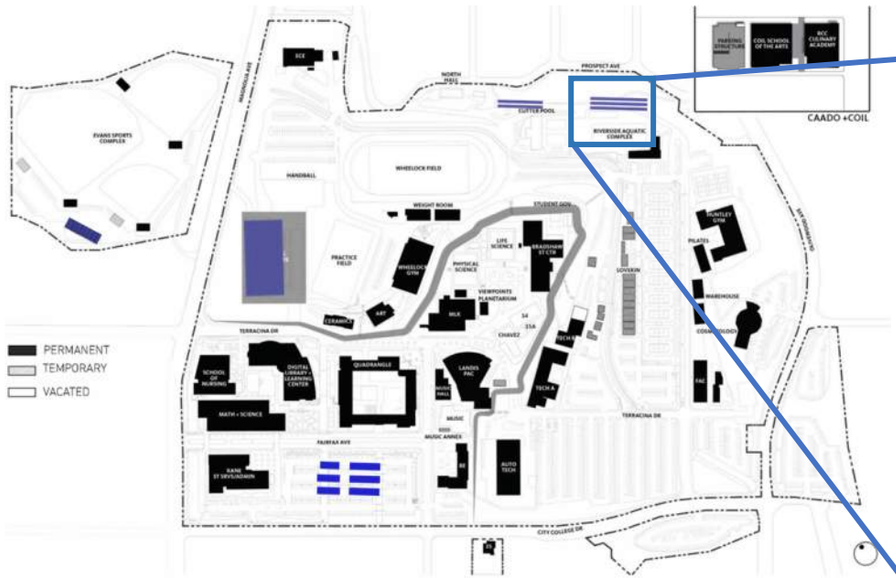
PPA Option	Solar - Option 2
Forecasted PPA rate	$ 0.11
PPA Escalation	0%
First year cash flow (PPA option)	$ (4,239)
25-year accumulated cash flow (PPA option)	$ (144,797)

Carbon Equivalence Reporting	Solar - Option 2
First year performance (kWhr)	244,224
Carbon Offset (metric tons)	173
Cars Driven for One Year	37

RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#3: **RAC Pool**

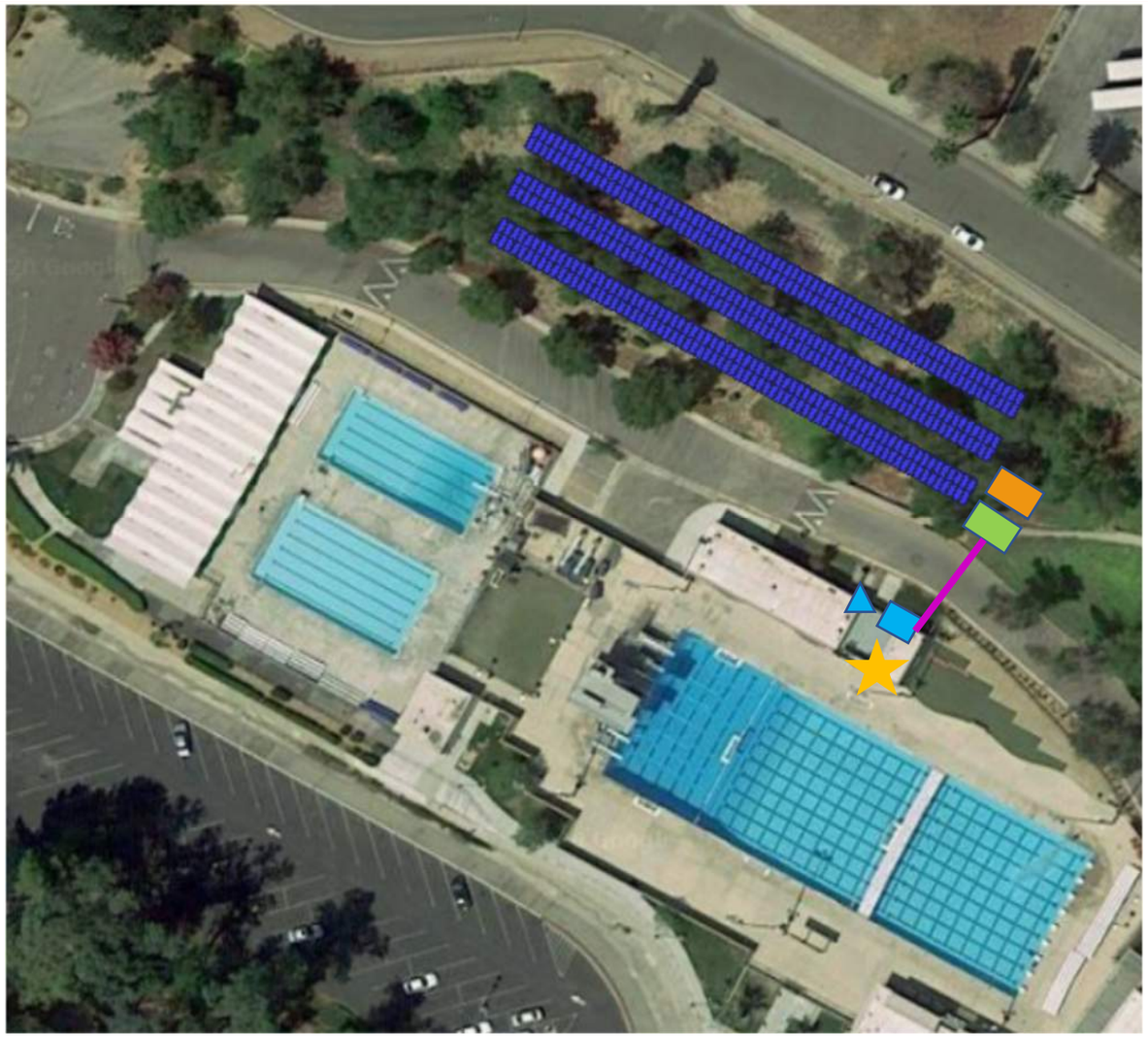
194kW DC Ground Mount Array



RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#3: **RAC Pool**

Interconnection



POINT OF INTERCONNECTION

NEW 480V FEEDER

EXISTING TRANSFORMERS AND SWITCHBOARDS

NEW 400A – 480V SWITCHBOARD

NEW BATTERY ENERGY STORAGE SYSTEM

RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#3: **RAC Pool**

Financials

Design Option	Solar - Option 3
Array size (kW)	194
First year performance (kWhr)	369,735
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 44,402
Construction cost	$ 513,820
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Solar - Option 3
Array size (kW)	194
First year cash flow (loan option)	$ 12,469
25-year accumulated cash flow (loan option)	$ 416,378

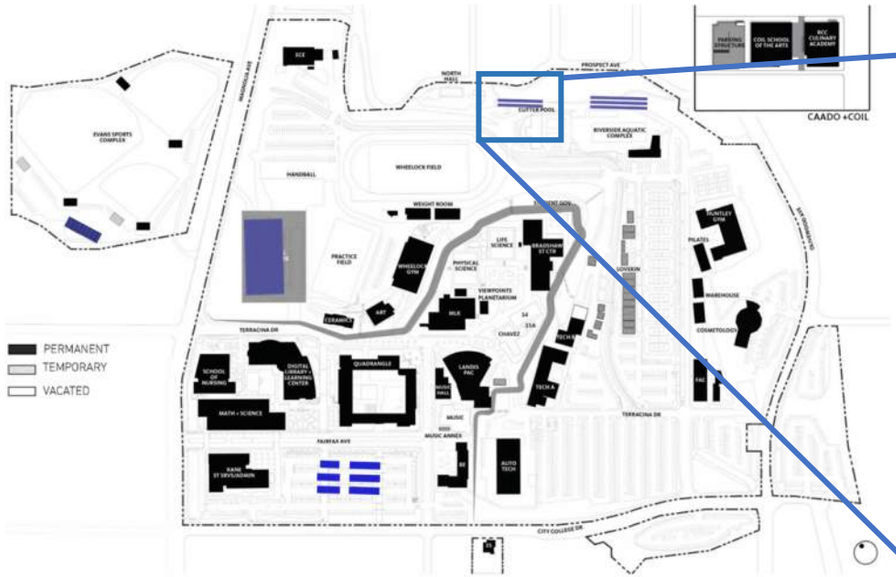
PPA Option	Solar - Option 3
Forecasted PPA rate	$ 0.11
PPA Escalation	0%
First year cash flow (PPA option)	$ 3,731
25-year accumulated cash flow (PPA option)	$ 127,432

Carbon Equivalence Reporting	Solar - Option 3
First year performance (kWhr)	369,735
Carbon Offset (metric tons)	261
Cars Driven for One Year	57

RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#4: **College House**

102kW DC Ground Mount Array



RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#4: **College House**

Interconnection

POINT OF INTERCONNECTION

NEW 480V FEEDER

EXISTING TRANSFORMERS AND SWITCHBOARDS

NEW 200A - 480V SWITCHBOARD

NOTES

EXISTING GEAR FOR CUTTER POOL IS OLD AND NOT RECOMMENDED FOR INTERCONNECTION. ASSUMES GEAR IS UPGRADED DURING CUTTER REMODEL AS PART OF PHASE 1 OF FMP

Solar Option#4: **College House**

Financials

Design Option	Solar - Option 4
Array size (kW)	102
First year performance (kWhr)	116,098
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 29,939
Construction cost	$ 281,060
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Solar - Option 4
Array size (kW)	102
First year cash flow (loan option)	$ 7,881
25-year accumulated cash flow (loan option)	$ 269,188

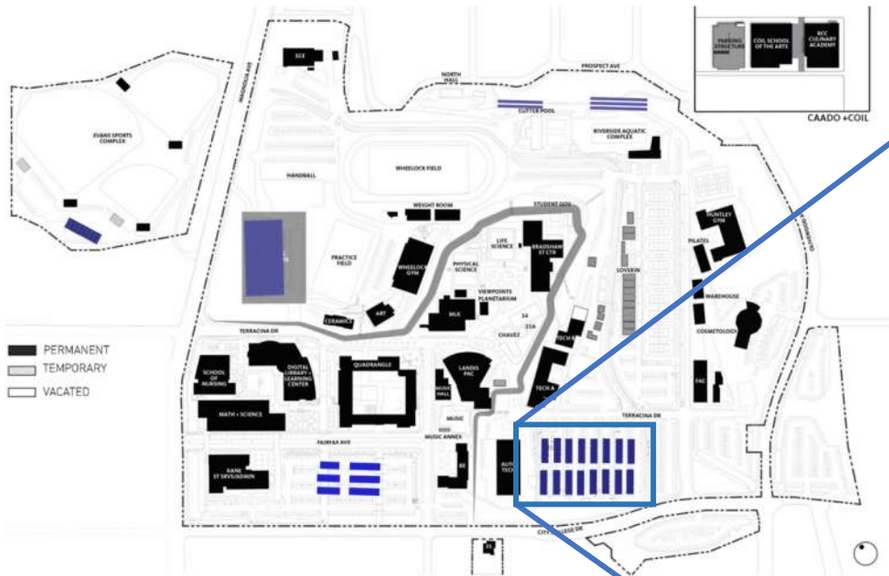
PPA Option	Solar - Option 4
Forecasted PPA rate	$ 0.19
PPA Escalation	0%
First year cash flow (PPA option)	$ 7,881
25-year accumulated cash flow (PPA option)	$ 269,188

Carbon Equivalence Reporting	Solar - Option 4
First year performance (kWhr)	116,098
Carbon Offset (metric tons)	82.1
Cars Driven for One Year	18

RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#5: **Parking Lot E**

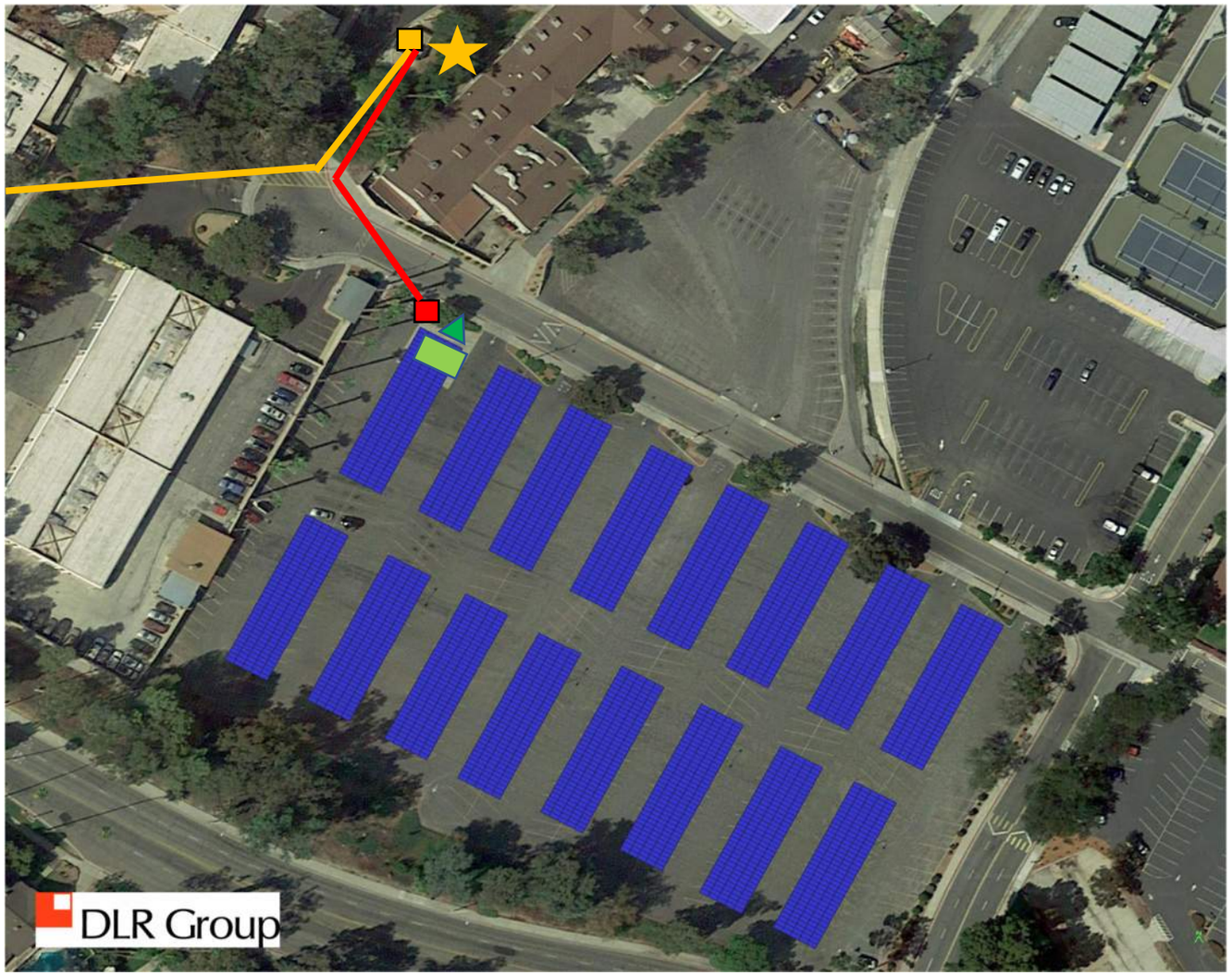
1,170kW DC Carport Array



RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#5: **Parking Lot E**

Interconnection



POINT OF INTERCONNECTION

EXISTING 12.47 KV SECTIONALIZING CABINETS AND FEEDERS

NEW 12.47 KV SECTIONALIZING CABINET AND FEEDERS

NEW 1600A SWITCHBOARD AND 1000 KVA TRANSFORMER

Solar Option#5: **Parking Lot E**

Financials

Design Option	Solar - Option 5
Description	Carport
Array size (kW)	1170
BESS size (kW)	N/A
First year performance (kWhr)	2,035,374
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 187,738
Construction cost	$ 4,237,750
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

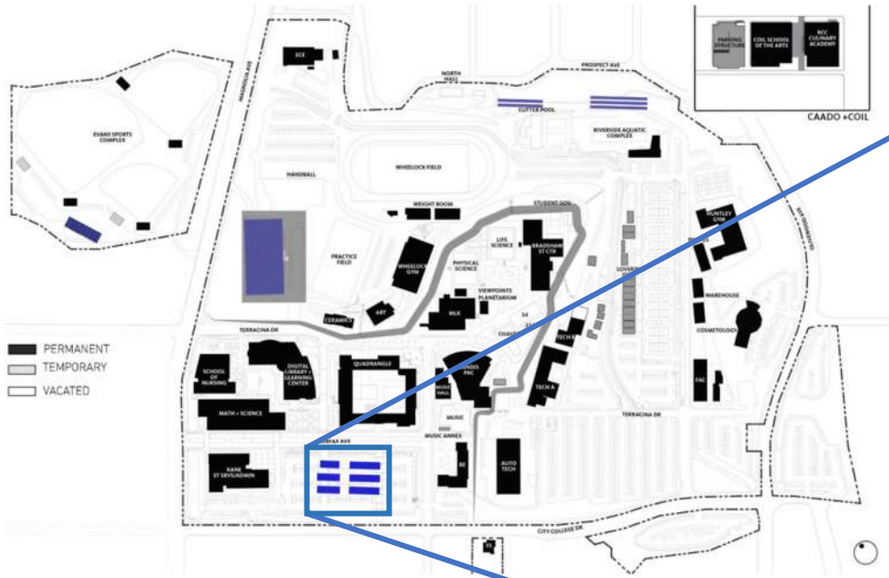
Loan Option	Solar - Option 5
Array size (kW)	1170
First year cash flow (loan option)	$ (70,252)
25-year accumulated cash flow (loan option)	$ (739,435)

PPA Option	Solar - Option 5
Forecasted PPA rate	$ 0.12
PPA Escalation	0%
First year cash flow (PPA option)	$ (56,507)
25-year accumulated cash flow (PPA option)	$ (1,930,139)

Carbon Equivalence Reporting	Solar - Option 5
First year performance (kWhr)	2,035,374
Carbon Offset (metric tons)	1439
Cars Driven for One Year	311

Solar Option#6: **Parking Lot C**

445kW DC Carport Array



RIVERSIDE CITY COLLEGE - SOLAR ON EXISTING CAMPUS

Solar Option#6: **Parking Lot C**

Interconnection

POINT OF INTERCONNECTION

EXISTING 12.47 KV SECTIONALIZING CABINETS AND FEEDERS

NEW 12.47 KV SECTIONALIZING CABINET AND FEEDERS

NEW 600A SWITCHBOARD AND 500 KVA TRANSFORMER

Solar Option#6: **Parking Lot C**

Financials

Design Option	Solar - Option 6
Description	Carport
Array size (kW)	445
BESS size (kW)	N/A
First year performance (kWhr)	723,135
Solar performance degradation	0.50%
First year cost avoidance (2021)	$ 66,997
Construction cost	$ 1,736,500
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Solar - Option 6
Array size (kW)	445
First year cash flow (loan option)	$ (38,289)
25-year accumulated cash flow (loan option)	$ (531,443)

PPA Option	Solar - Option 6
Forecasted PPA rate	$ 0.18
PPA Escalation	0%
First year cash flow (PPA option)	$ (63,168)
25-year accumulated cash flow (PPA option)	$ (2,157,668)

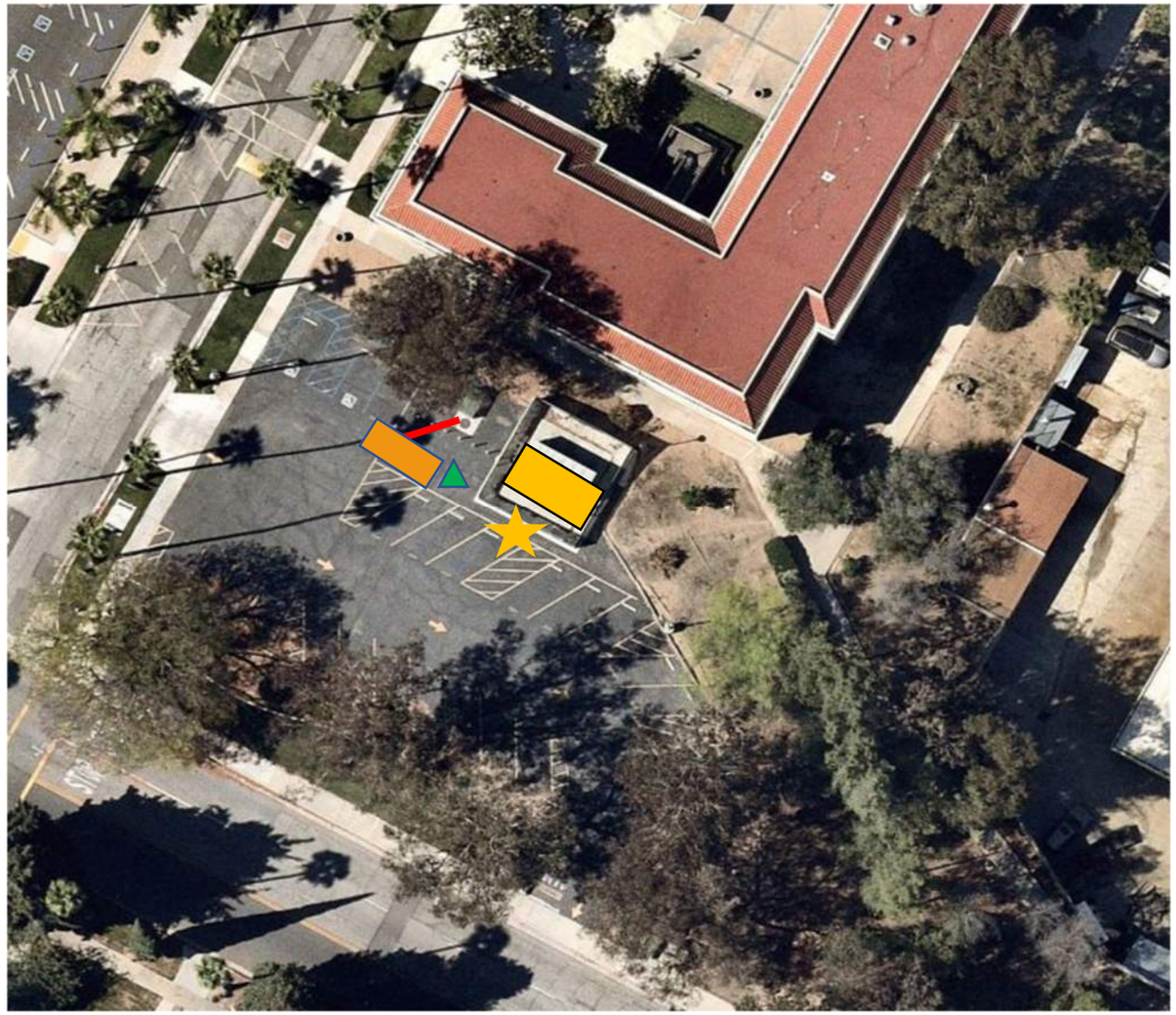
Carbon Equivalence Reporting	Solar - Option 6
First year performance (kWhr)	723,135
Carbon Offset (metric tons)	511
Cars Driven for One Year	110

RCC BESS Options

RIVERSIDE CITY COLLEGE – BATTERY STORAGE ON EXISTING CAMPUS

BESS Option#1: **12.47 kV Loop**

600kW/kWh



- POINT OF INTERCONNECTION
- EXISTING 12.47 KV SECTIONALIZING CABINETS AND FEEDERS
- NEW 12.47 KV SECTIONALIZING CABINET AND FEEDERS
- New 750 KVA TRANSFORMER
- NEW BATTERY ENERGY STORAGE SYSTEM

NOTES

Interconnection can occur anywhere on 12.47kV Loop

BESS Option#1: **12.47 kV Loop**

Financials

Design Option	BESS - Option 1
BESS size (kW)	600
Battery performance degradation	0.00%
Construction cost	$ 1,050,000
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	BESS - Option 1
Array size (kW)	N/A
First year cash flow (loan option)	$ 21,082
25-year accumulated cash flow (loan option)	$ 664,870

PPA Option	BESS - Option 1
Forecasted PPA rate	$ 0.10
PPA Escalation	0%
First year cash flow (PPA option)	$24,321
25-year accumulated cash flow (PPA option)	$ 830,759

RIVERSIDE CITY COLLEGE – BATTERY STORAGE ON EXISTING CAMPUS

BESS Option#2: **Wheelock Field**

200kW/kWh

POINT OF INTERCONNECTION

EXISTING TRANSFORMERS AND SWITCHBOARDS

NEW BATTERY ENERGY STORAGE SYSTEM

BESS Option#2: **Wheelock Field**

Financials

Design Option	BESS - Option 2
BESS size (kW)	200
Battery performance degradation	0.00%
Construction cost	$ 339,000
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

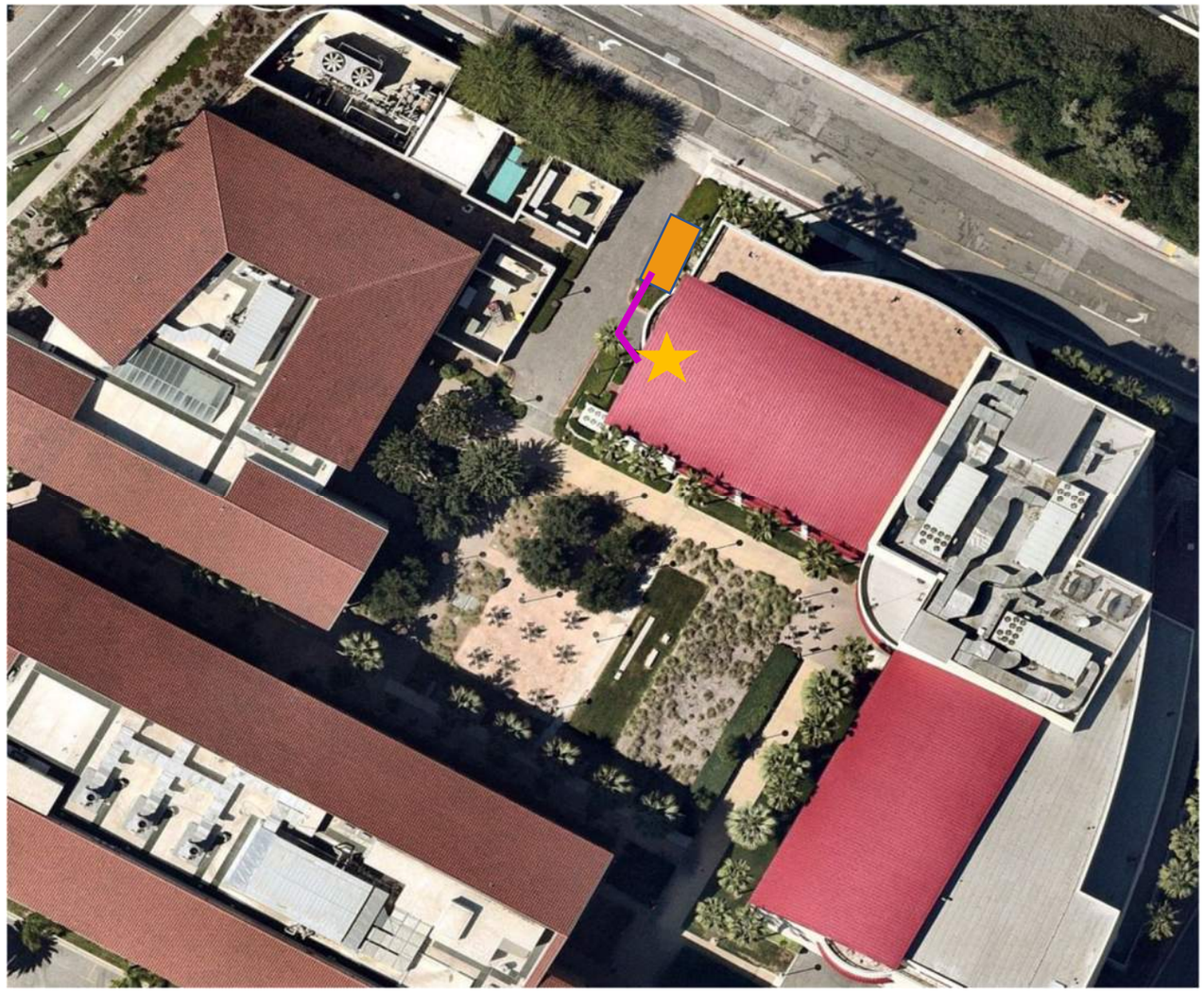
Loan Option	BESS - Option 2
Array size (kW)	N/A
First year cash flow (loan option)	$ 14,863
25-year accumulated cash flow (loan option)	$ 418,290

PPA Option	BESS - Option 2
Forecasted PPA rate	$ 0.14
PPA Escalation	0%
First year cash flow (PPA option)	$7,103
25-year accumulated cash flow (PPA option)	$ 242,637

RIVERSIDE CITY COLLEGE – BATTERY STORAGE ON EXISTING CAMPUS

BESS Option#3: **Digital Library**

250kW/kWh



POINT OF INTERCONNECTION

EXISTING 480V FEEDERS

NEW BATTERY ENERGY STORAGE SYSTEM

NOTES

EXACT STORAGE LOCATION TO BE WORKED OUT

BESS Option#3: **Digital Library**

Financials

Design Option	BESS - Option 3
BESS size (kW)	250
Battery performance degradation	0.00%
Construction cost	$ 420,000
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

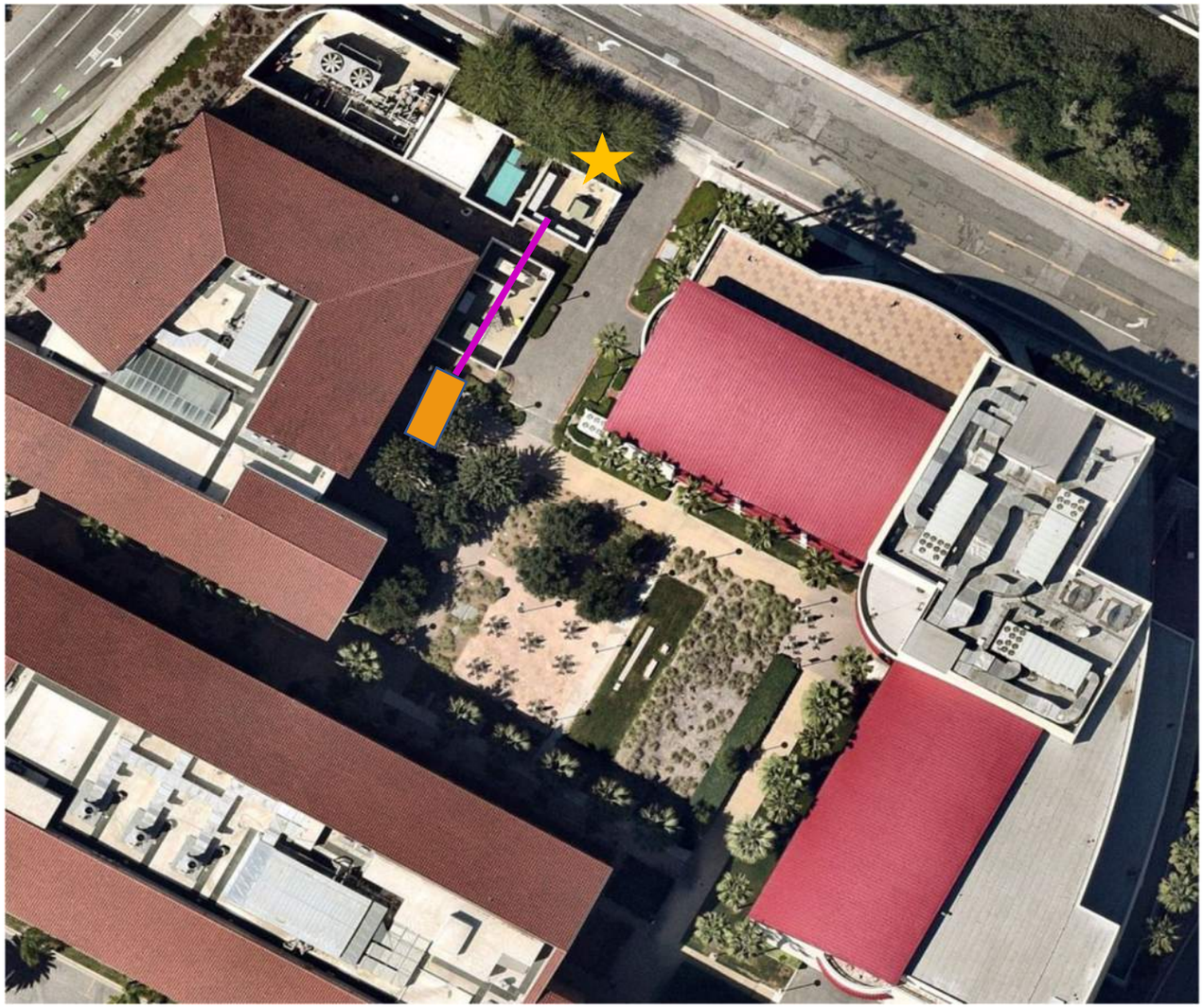
Loan Option	BESS - Option 3
Array size (kW)	N/A
First year cash flow (loan option)	$ 9,837
25-year accumulated cash flow (loan option)	$ 298,344

PPA Option	BESS - Option 3
Forecasted PPA rate	$ 0.10
PPA Escalation	0%
First year cash flow (PPA option)	$ 10,181
25-year accumulated cash flow (PPA option)	$ 347,775

RIVERSIDE CITY COLLEGE – BATTERY STORAGE ON EXISTING CAMPUS

BESS Option#4: **Math and Science**

300 kW/kWh



POINT OF INTERCONNECTION

EXISTING 480V FEEDERS

NEW BATTERY ENERGY STORAGE SYSTEM

NOTES

EXACT STORAGE LOCATION TO BE WORKED OUT

BESS Option#4: **Math and Science**

Financials

Design Option	BESS - Option 4
BESS size (kW)	300
Battery performance degradation	0.00%
Construction cost	$ 501,000
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

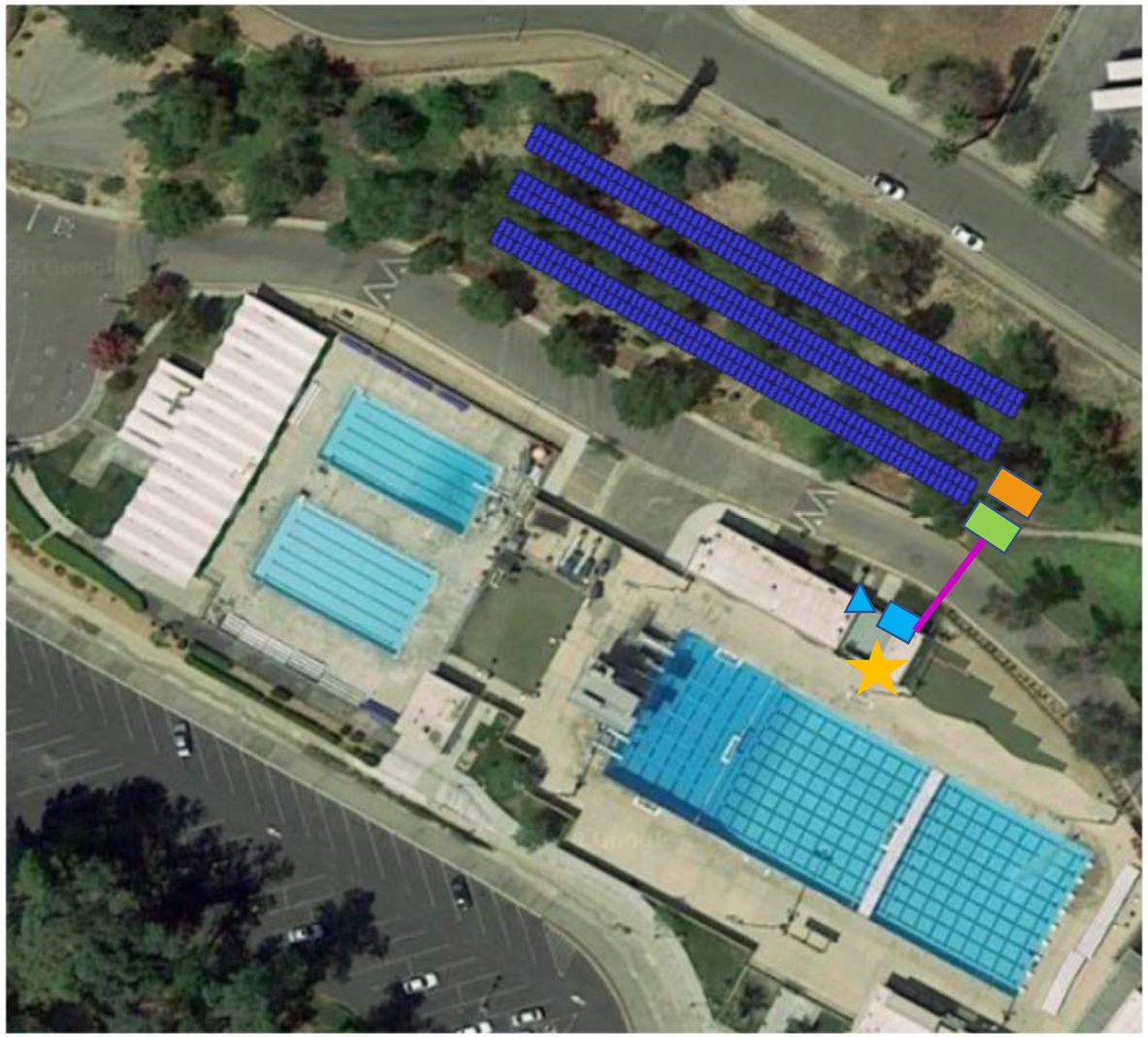
Loan Option	BESS - Option 4
Array size (kW)	N/A
First year cash flow (loan option)	$ 10,963
25-year accumulated cash flow (loan option)	$ 335,583

PPA Option	BESS - Option 4
Forecasted PPA rate	$ 0.10
PPA Escalation	0%
First year cash flow (PPA option)	$ 11,205
25-year accumulated cash flow (PPA option)	$ 382,729

RIVERSIDE CITY COLLEGE – BATTERY STORAGE ON EXISTING CAMPUS

BESS Option#5: **RAC**

100 kW/kWh



POINT OF INTERCONNECTION

NEW 480V FEEDER

EXISTING TRANSFORMERS AND SWITCHBOARDS

NEW 400A – 480V SWITCHBOARD

NEW BATTERY ENERGY STORAGE SYSTEM

BESS Option#5: **RAC**

Financials

Design Option	BESS - Option 5
BESS size (kW)	100
Battery performance degradation	0.00%
First year cost avoidance (2021)	$ 13,995
Construction cost	$ 177,000
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	BESS - Option 5
Array size (kW)	N/A
First year cash flow (loan option)	$ 10,963
25-year accumulated cash flow (loan option)	$ 100,375

PPA Option	BESS - Option 5
Forecasted PPA rate	$ 0.10
PPA Escalation	0%
First year cash flow (PPA option)	$ 3,735
25-year accumulated cash flow (PPA option)	$ 127,576

RCC Combined PV+BESS Option

PV+BESS Option: **All Options Combined**

Financials

Design Option	Combined Solar + BESS
Array size (kW)	1638
BESS size (kW)	1450
First year performance (kWhr)	2,986,105
Solar performance degradation	0.50%
Battery performance degradation	0.00%
First year cost avoidance (2021)	$ 565,225
Construction cost	$ 9,405,343
Solar O&M costs	$ 12.50
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

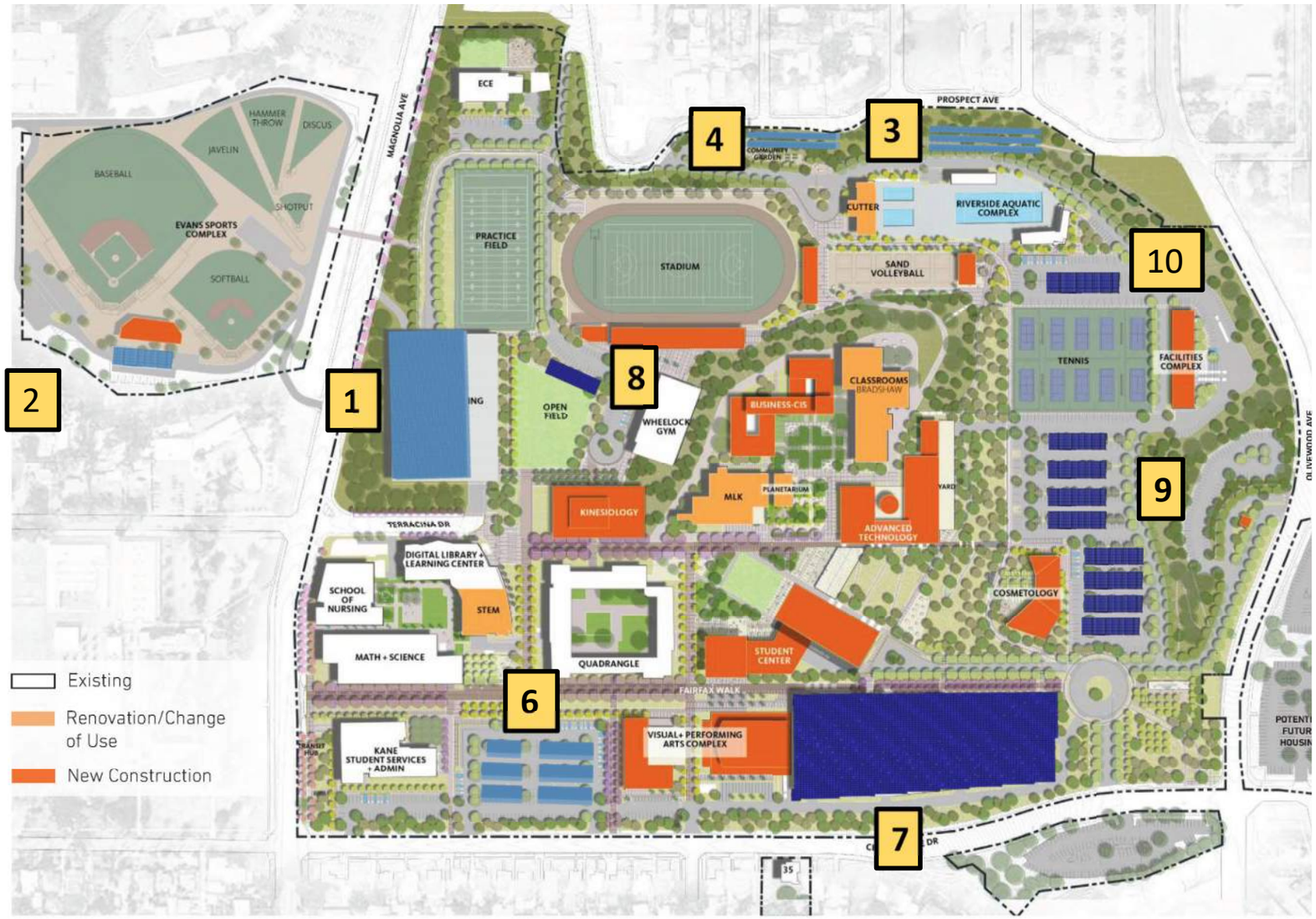
Loan Option	Combined Solar + BESS
Array size (kW)	1638
BESS size (kW)	1450
First year cash flow (loan option)	$ 13,562
25-year accumulated cash flow (loan option)	$ 25,492

PPA Option	Combined Solar + BESS
Forecasted PPA rate	$ 0.13
PPA Escalation	0%
First year cash flow (PPA option)	$ (16,369)
25-year accumulated cash flow (PPA option)	$ (559,143)

Carbon Equivalence Reporting	Combined Solar + BESS
First year performance (kWhr)	2,986,105
Carbon Offset (metric tons)	2111
Cars Driven for One Year	456

RIVERSIDE CITY COLLEGE

SOLAR ON **FUTURE CAMPUS**



ARRAYS OPTIONS (CURRENT/**FUTURE**)

1. PARKING STRUCTURE: 831 KW DC
2. EVANS PARKING: 66 KW DC
3. RAC POOL: 194 KW DC
4. COLLEGE HOUSE – 102 KW DC
5. NOT CONSIDERED
6. PARKING LOT C: 445 KW DC
7. **PARKING STR. 2 (FMP Phase II,2031-32): 1.68 MW DC**
8. **WHEELOCK GYM (FMP Phase II, 2033-34): 105 KW DC**
9. **PARKING LOT G (FMP Phase III, 2035-36): 697 KW DC**
10. **RAC PARKING (FMP Phase III, 2035-36): 87 KW DC**

Total

4.30 MW DC

FUTURE SUMMARY - RCC

Total System Performance (All Options)

Solar

1,490 kW Carport Arrays

2,511 kW Parking Structure Arrays

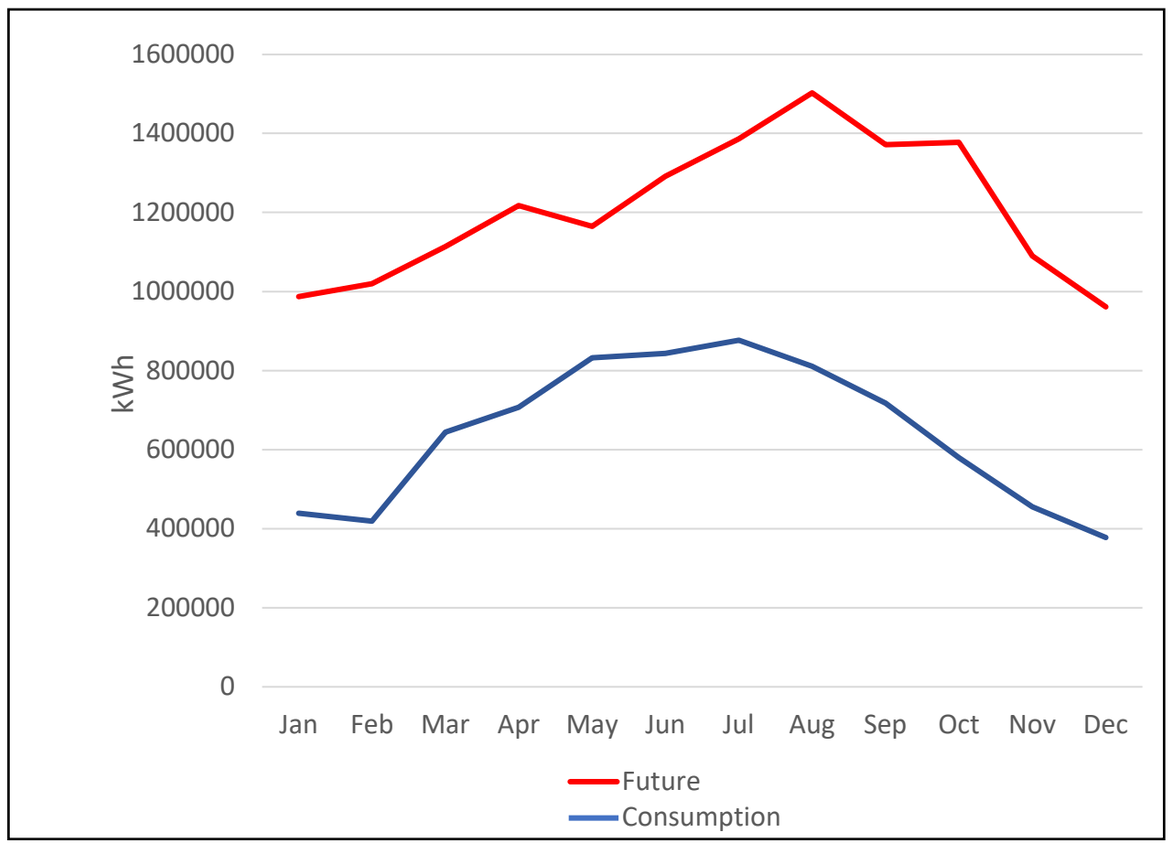
296 kW Ground Array

4,300 KW Total

Energy Offset: 53%

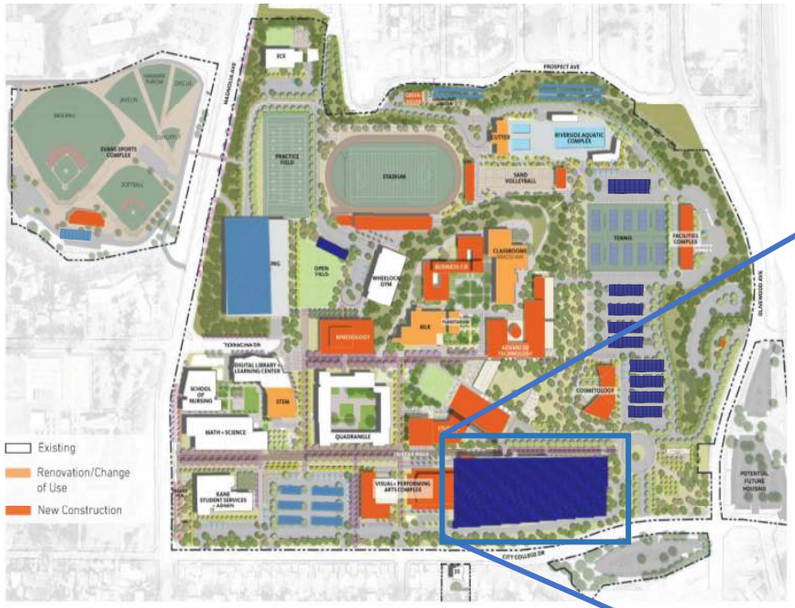
Battery Energy Storage System

1,450 kW



Solar Option#7: **Parking Structure #2**

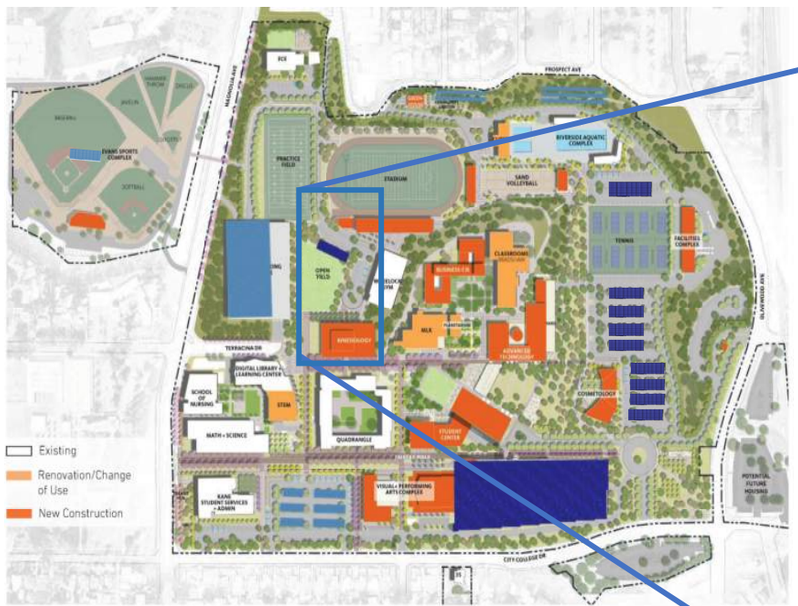
1,682kW DC Canopy Array



RIVERSIDE CITY COLLEGE - SOLAR ON FUTURE CAMPUS

Solar Option#8: **Wheelock Gym Parking**

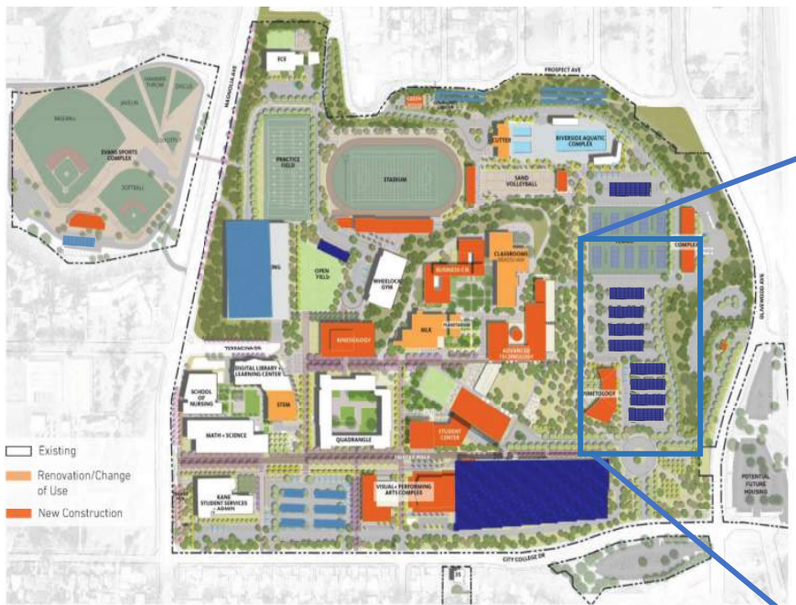
105 kW DC Carport/Shade Structure Array



RIVERSIDE CITY COLLEGE - SOLAR ON FUTURE CAMPUS

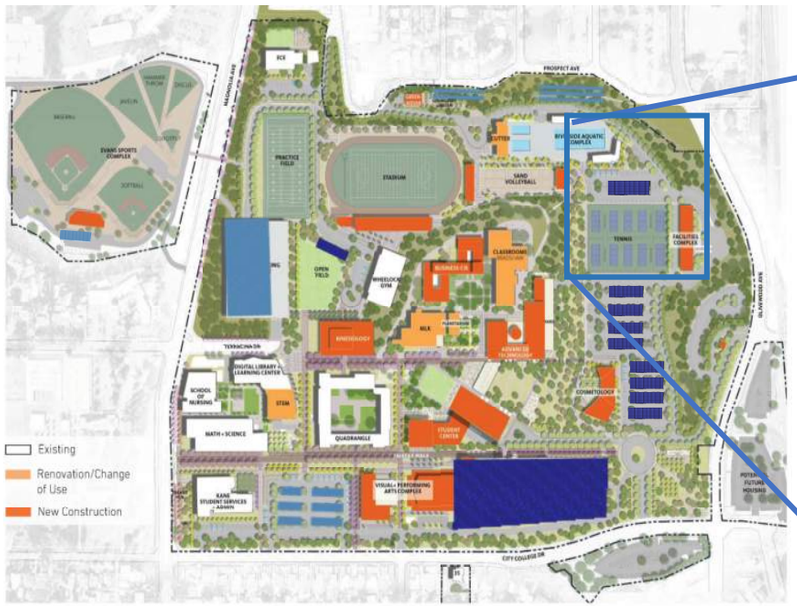
Solar Option#9: **Parking Lot G**

697 kW DC Carport Array

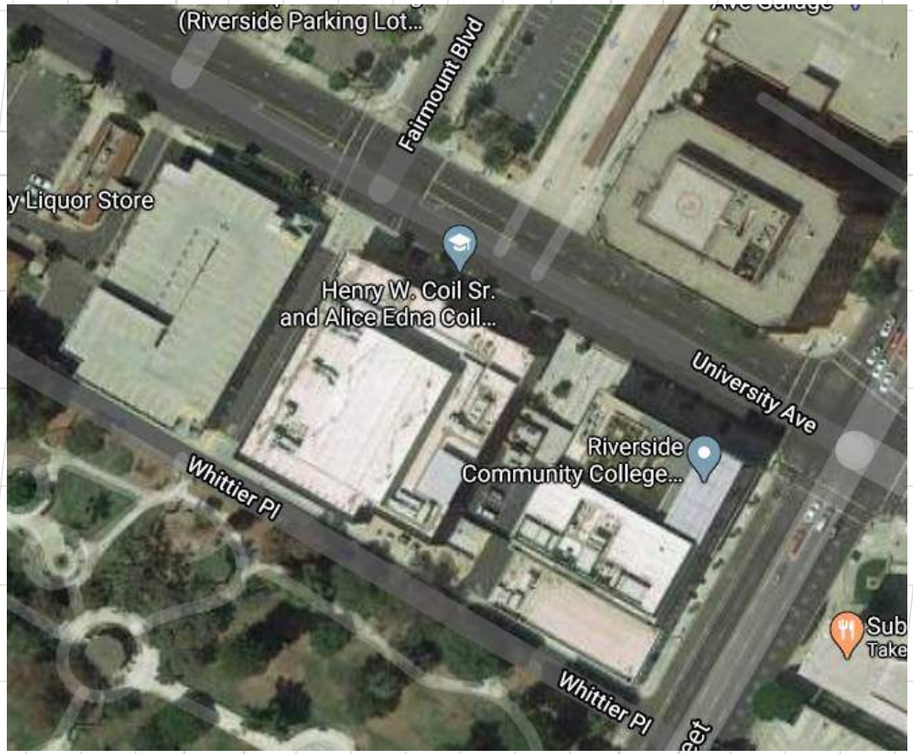


Solar Option#10: **RAC Parking**

87 kW DC Carport Array

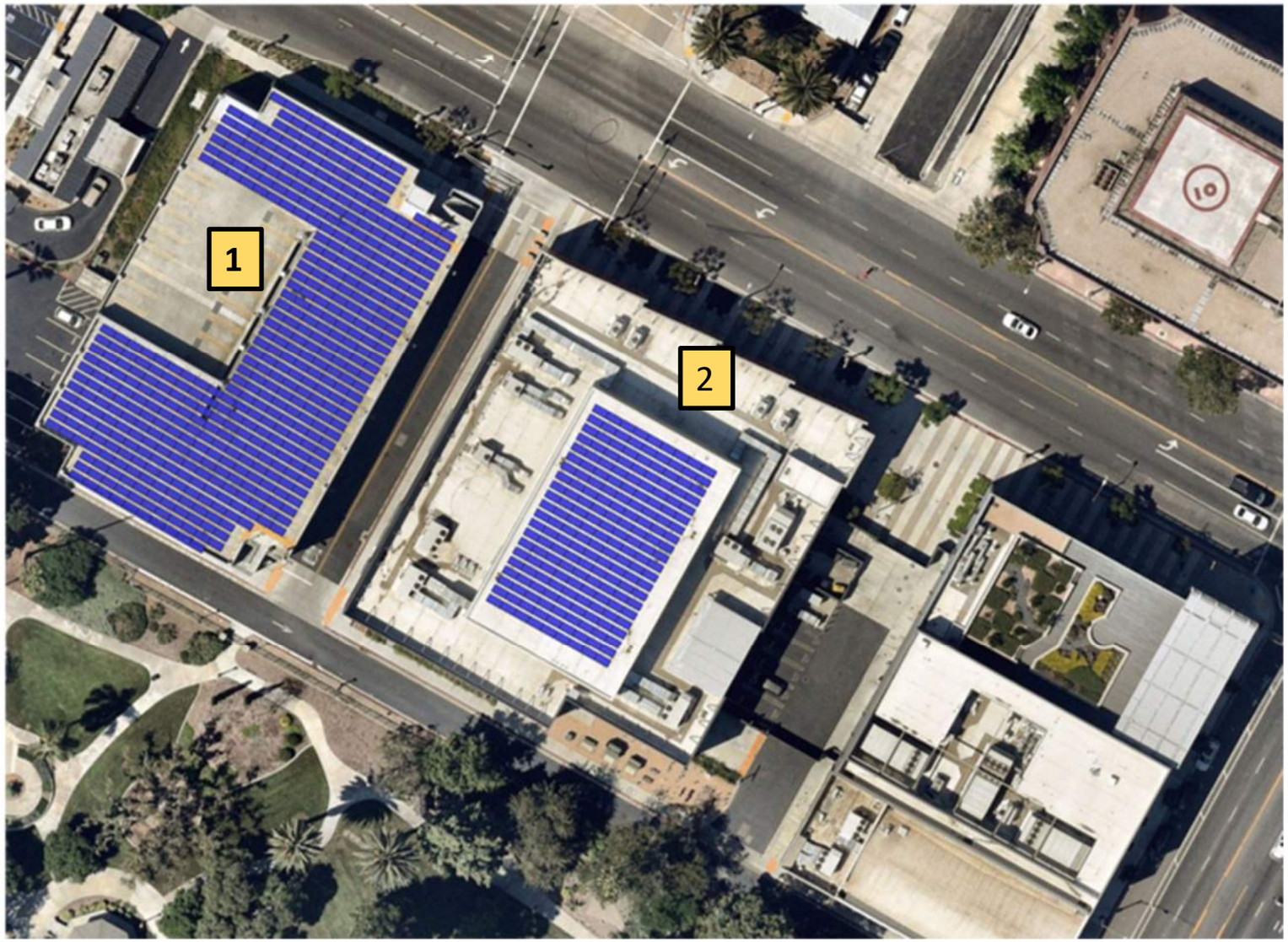


PROGRESS – DOWNTOWN RIVERSIDE



DOWNTOWN RIVERSIDE

SOLAR ON **EXISTING BUILDINGS**



ARRAY OPTIONS

1. PARKING STRUCTURE ARRAY
   194 kW DC

2. CSA BUILDING ROOF ARRAY
   76 kW DC

Total
270. kW DC

80 kW Energy Storage for the CSA Building

CURRENT SUMMARY – DOWNTOWN RIVERSIDE

Performance

Solar

76 kW Roof Array

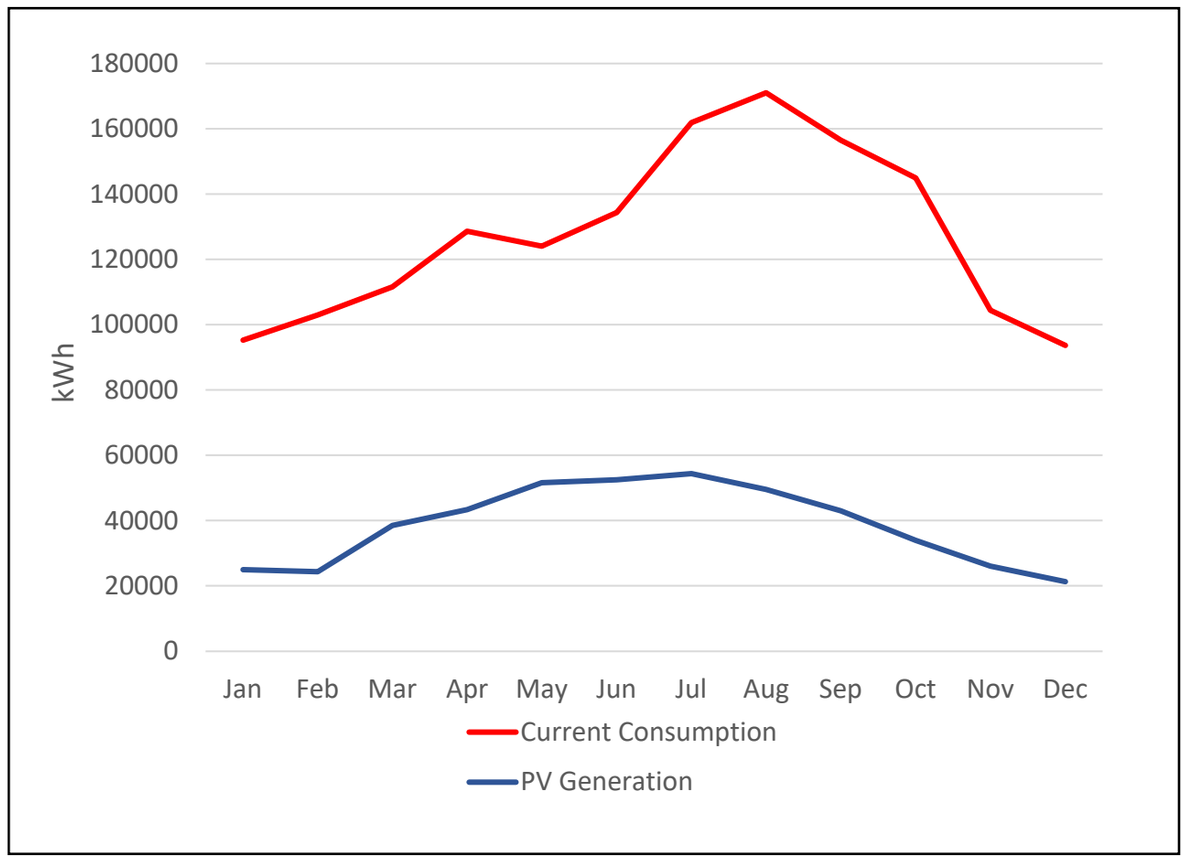
194 kW Parking Structure Array

270 kW Total

Energy Offset: 30%

Battery Energy Storage System

80 kW



DOWNTOWN RIVERSIDE

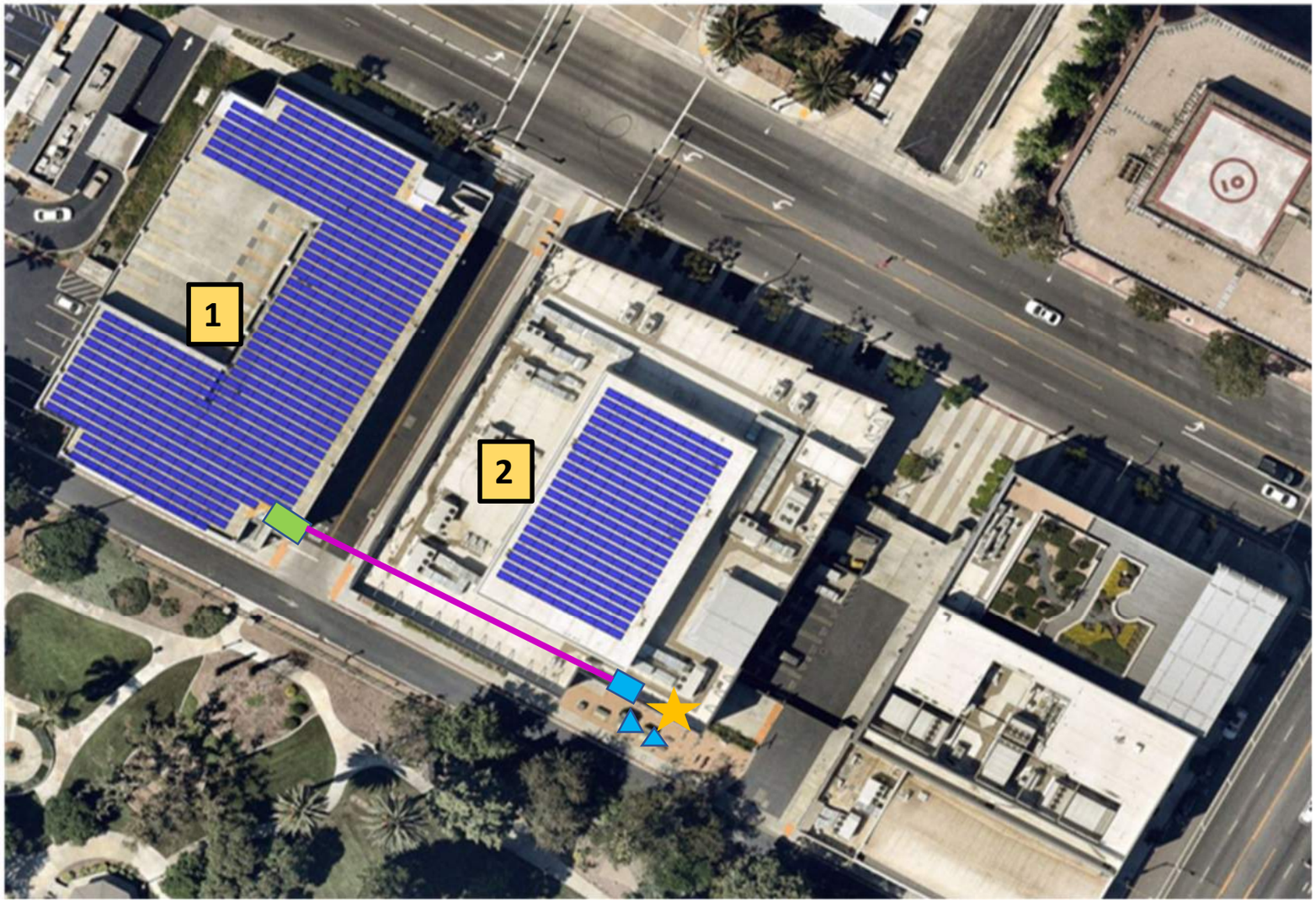
Solar Option#1: **Parking Structure**

194kW DC Canopy Array

DOWNTOWN RIVERSIDE

Solar Option#1: **Parking Structure**

Interconnection



POINT OF INTERCONNECTION

NEW 480V FEEDER

EXISTING TRANSFORMERS AND SWITCHBOARDS

NEW PANELBOARDS

NOTES

- PARKING STRUCTURE MUST FEED OTHER BUILDINGS OR MAX SIZE 40KW

Solar Option#1: **Parking Structure**

Financials

Design Option	Solar - Option DT1
Array size (kW)	193
First year cost avoidance (2021)	$ 46,649
Construction cost	$ 995,038
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Solar - Option DT1
Array size (kW)	193
First year cash flow (loan option)	$ (12,906)
25-year accumulated cash flow (loan option)	$ (81,414)

PPA Option	Solar - Option DT1
Forecasted PPA rate	$ 0.20
PPA Escalation	0%
First year cash flow (PPA option)	$ (18,577)
25-year accumulated cash flow (PPA option)	$ (634,557)

Carbon Equivalence Reporting	Solar - Option DT1
First year performance (kWhr)	326,133
Carbon Offset (metric tons)	231
Cars Driven for One Year	50

Solar Option#2: **CSA Building**

76kW DC Rooftop Array

DOWNTOWN RIVERSIDE

Solar Option#2: **CSA Building**

Interconnection

POINT OF INTERCONNECTION

NEW 480V FEEDER

EXISTING TRANSFORMERS AND SWITCHBOARDS

NEW PANELBOARDS

Solar Option#2: **CSA Building**

Financials

Design Option	Solar - Option DT2
Array size (kW)	73
First year performance (kWhr)	130,241
Solar performance degradation	0.50%
First year cost avoidance (2019)	$ 11,514
First year cost avoidance (2020)	$ 11,802
First year cost avoidance (2021)	$ 12,097
Blended utility rate (2021)	$ 0.0929
Construction cost	$ 248,113
Solar O&M costs	$ 12.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Solar - Option DT2
Array size (kW)	73
First year cash flow (loan option)	$ (3,064)
25-year accumulated cash flow (loan option)	$ (18,111)

PPA Option	Solar - Option DT2
Forecasted PPA rate	$ 0.15
PPA Escalation	0%
First year cash flow (PPA option)	$ (7,439)
25-year accumulated cash flow (PPA option)	$ (254,096)

Carbon Equivalence Reporting	Solar - Option DT2
First year performance (kWhr)	130,241
Carbon Offset (metric tons)	92.1
Cars Driven for One Year	20

DOWNTOWN RIVERSIDE

BESS Option#1: **CSA Building**

Interconnection

- POINT OF INTERCONNECTION
- NEW 480V FEEDER
- EXISTING TRANSFORMERS AND SWITCHBOARDS
- NEW SWITCHBOARDS
- NEW BATTERY ENERGY STORAGE SYSTEM

BESS Option#1: **CSA Building**

Financials

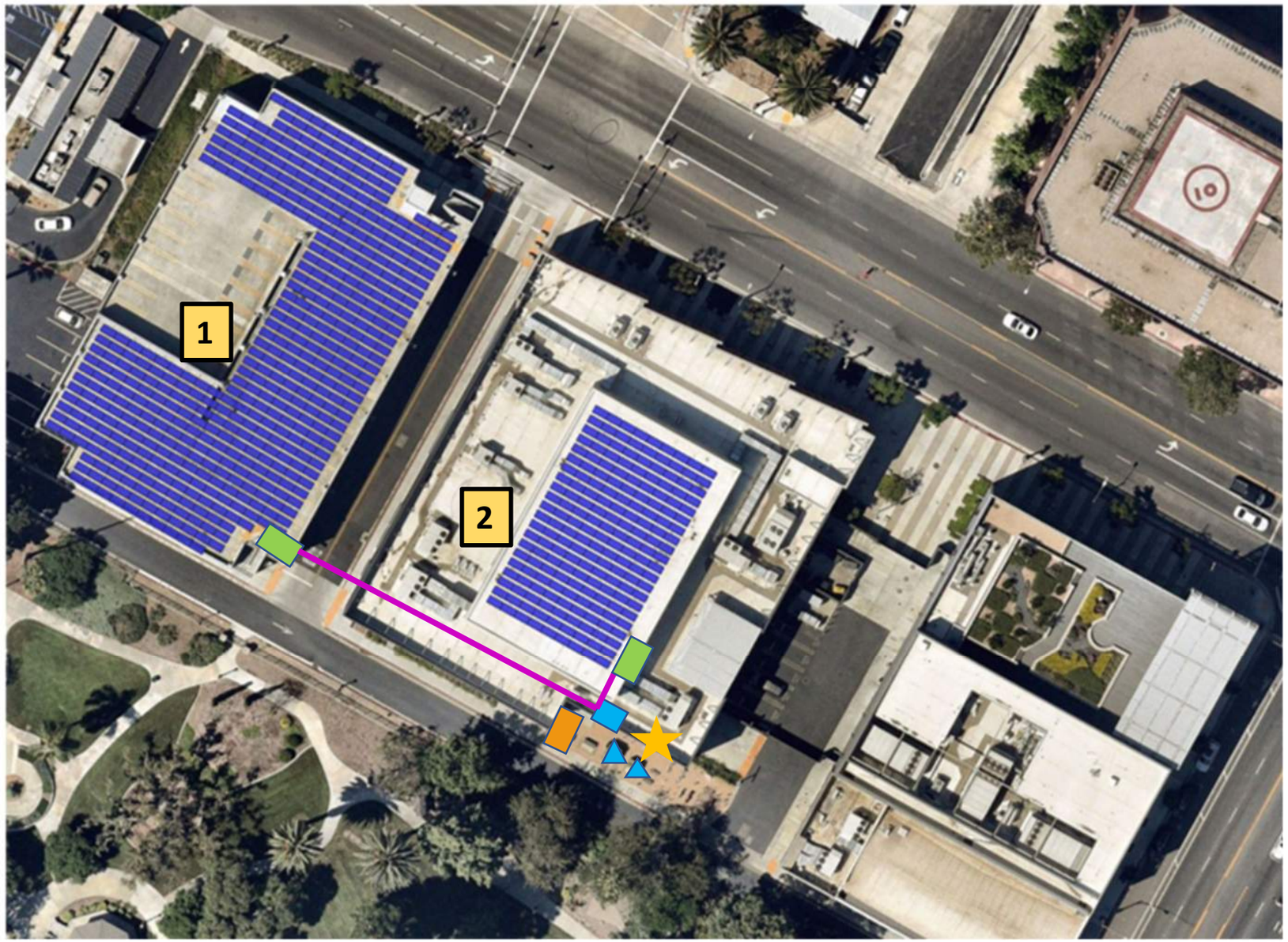
Design Option	BESS - Option DT2
BESS size (kW)	80
Battery performance degradation	0.00%
First year cost avoidance (2021)	$ 10,902
Construction cost	$ 133,800
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	BESS - Option DT2
First year cash flow (loan option)	$ 2,618
25-year accumulated cash flow (loan option)	$ 81,755

PPA Option	BESS - Option DT2
Forecasted PPA rate	$ 0.10
PPA Escalation	0%
First year cash flow (PPA option)	$ 2,694
25-year accumulated cash flow (PPA option)	$ 92,027

Downtown Combined PV+BESS Option

Downtown **Interconnection**



POINT OF INTERCONNECTION

NEW 480V FEEDER

EXISTING TRANSFORMERS AND SWITCHBOARDS

NEW SWITCHBOARDS

NEW BATTERY ENERGY STORAGE SYSTEM

NOTES

- PARKING STRUCTURE MUST FEED OTHER BUILDINGS OR MAX SIZE 40KW

DOWNTOWN RIVERSIDE

PV+ BESS Option: **Combined**

Financials

Design Option	Combined DT Solar + BESS
Array size (kW)	266
BESS size (kW)	80
First year performance (kWhr)	456,374
Solar performance degradation	0.50%
Battery performance degradation	0.00%
First year cost avoidance (2021)	$ 89,996
Construction cost	$ 1,371,200
Solar O&M costs	$ 12.50
BESS O&M costs	$ 7.50
Interest rate	3.00%
Term (years)	25
Utility escalation	2.50%

Loan Option	Combined DT Solar + BESS
Array size (kW)	266
First year cash flow (loan option)	$ 7,326
25-year accumulated cash flow (loan option)	$ 482,605

PPA Option	Combined DT Solar + BESS
Forecasted PPA rate	$ 0.18
PPA Escalation	0%
First year cash flow (PPA option)	$ (32,268)
25-year accumulated cash flow (PPA option)	$ (1,102,206)

Carbon Equivalence Reporting	Combined DT Solar + BESS
First year performance (kWhr)	456,374
Carbon Offset (metric tons)	323
Cars Driven for One Year	70

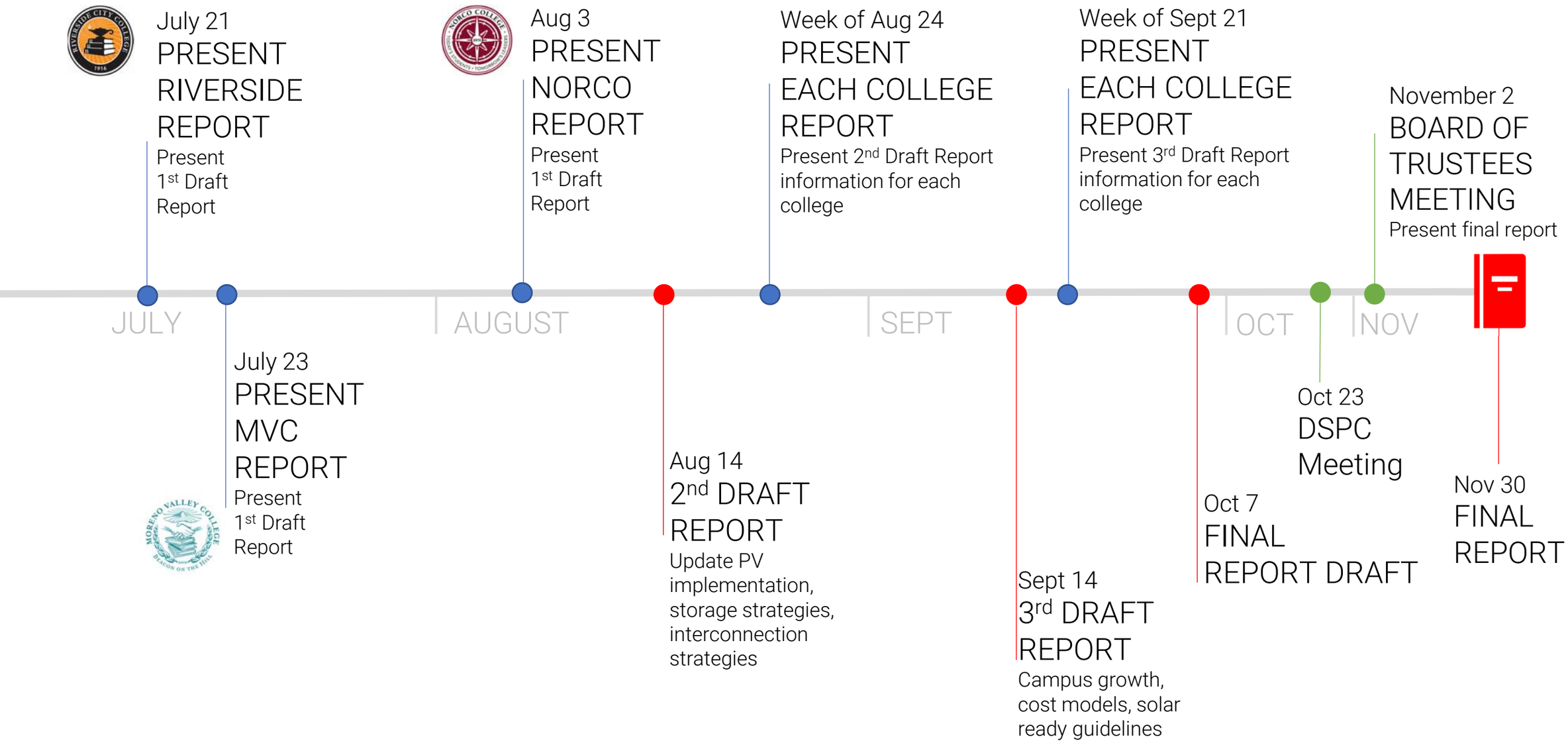
Feasibility and Planning **Phase**

NEXT STEPS

EVALUATION DEVELOPMENT REFINE **FINALIZE**

Prepare final report

Project Schedule Timeline



Q + A

DLR Group
Architecture Engineering Planning Interiors