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Project Statement

SECTION 1: PROJECT DETAILS

Consultant	Centrica Business Solutions Services Inc. (CBSS) – Formerly SmartWatt Energy, Inc.
National Grid Entity	Niagara Mohawk Power Corporation
Project ID	20230411
Project Name	Albany County Energy Conservation Project Implementation – MVP Arena
Start Date	December 10, 2024
End Date	December 10, 2026
Total Approximate Cost [USD$]	$7,816,311
Master Services Agreement	Master Services Agreement between National Grid and Centrica Business Solutions Services Inc. (CBSS) – Formerly SmartWatt Energy, Inc. effective August 5, 2015

SECTION 2: PROJECT AUTHORIZATION

National Grid and Service Firm hereby acknowledge and agree to the terms of this Project Statement and to the performance of the Services and provision of the Deliverables specified in this Project Statement by Consultant for and on behalf of National Grid in accordance with the terms and conditions of the Master Services Agreement.

Attached Herein:

- National Grid and Centrica Business Solutions Services Inc. Proposal No. 20241114 submitted to the Albany County, NY
- Albany County IGA Acceptance Letter dated November 14, 2024

Authorizations:

Becky Badalato UESC Project Administrator, National Grid		Date
Mike McLaughlin Deputy County Executive	Signature	Date 12/13/24

Proposal for an Energy Conservation Project Implementation at

Albany County, NY

National Grid Proposal Number: 20241114

SUBMITTED TO

Albany County
112 State St
Albany, NY 12207

PROPOSAL SUBMITTED BY

nationalgrid

THE POWER OF ACTION

www.nationalgridus.com

and

centrica
Business Solutions

National Grid USA Service Co. on behalf of the
Niagara Mohawk d.b.a. National Grid
1125 Broadway
Albany, NY 12204

November 18, 2024

Project Implementation – Albany County, NY

1. INTRODUCTION

National Grid is pleased to offer this proposal for the energy conversation project implementation for the Albany County through the Utility Energy Services Contract (UESC) Program. The UESC Program gives municipalities the opportunity to meet energy conservation goals by expeditiously implementing economically viable energy efficiency projects that reduce energy and water consumption.

National Grid selected a Sub-Contractor, Centrica Business Solutions Services Inc. (CBSS) Formerly SmartWatt Energy, Inc. ("SmartWatt"), per the direction of the County. CBSS performed an Investment Grade Audit (IGA) that was completed on November 11, 2024. The findings of the IGA indicate that Albany County facility located at 100 Beaver St Albany, NY 12207 is an ideal candidate for an energy conservation project. The IGA has identified first year energy cost savings of $168,392.

2. PROJECT ORGANIZATION

The proposed IGA may, at the Albany County option, be implemented in accordance with the conditions described in the attached Master Agreement for Energy Conservation and Management Services ("Master Agreement"). All terms and conditions shall be as listed in the Master Agreement unless modified by the Task Order as discussed below. For this project, National Grid intends to subcontract the services described in Attachment A to CBSS (Formerly SmartWatt). CBSS will sub-contract portions of the required services subject to approval of the customer.

3. TECHNICAL PROPOSAL

a. Scope of Service

National Grid proposes to install the three (3) Facility Improvement Measure (FIMs) described in the attached Investment Grade Audit dated 11/11/2024 as Attachment B. The total cost of the project will be $7,816,311. The scope of services will be performed at the following facility at Albany County:

MVP Arena Parking Garage: 100 Beaver St Albany, NY 12207

The IGA analysis included energy savings projections using accepted calculation methodologies, in-house and subcontractor installation pricing, and FIM specifications and design documentation. The FIMs included in the IGA are summarized in the following table:

FIM #	Measure
1	Install Canopy Mounted Solar PV Array
2	Lighting Improvements
3	EV Charging Stations and Infrastructure

More detail on all proposed FIMs can be found in the IGA under Attachment B.

After evaluation and acceptance of the IGA, Albany County has elected to proceed with the Implementation Phase. Prior to proceeding, the parties shall agree upon a statement of work necessary for the engineering, design, and implementation of FIMs, a time frame for completion of the work, and price or cost cap. Albany County will roll the costs of the IGA into the implementation phase.

Overall Program Phases

Phase I (complete)	Preliminary Audit	**No Cost**
Phase II (complete)	Investment Grade Audit a) Cost estimating and effectiveness b) Preliminary detailed design.	**$43,000– Included in final project cost**
Phase III	**Implementation:** **a) Detailed Engineering & Design** **b) Procurement** **c) Construction**	**$7,816,311 (Including IGA cost)**

b. Proposal Costs

Estimated sub-contractor costs for Phase III	$7,710,875
National Grid UESC Administrative Expense	$105,436
Total Phase III Cost	$7,816,311

4. OTHER

a) Task Order or Contract

The Task Order shall be approved by County Legislature after both Albany County and National Grid review and approve the necessary documents for this project. All documents relating to this project can be either e-mailed or mailed to:

Albany County
112 State St
Albany, NY 12207

Attention: Lucas Rogers
Economic Development Sustainability Coordinator
Phone: 518.447.5566
Email: lucas.rogers@albanycountyny.gov

For National Grid:
21265 NYS Route 232
Watertown, NY 13601

Attention: Becky Badalato
Business Development Manager

E-mail: becky.badalato@nationalgrid.com
Phone: (315) 785-7227

Payment Terms

Albany County has selected to fund the project by cash. Once the project statement has been executed, Vendor will begin construction. Vendor bills using percent complete invoicing based on the reflected schedule of completion.

Upon completion of the project:

a) Vendor shall pay the full National Grid fee of $105,436
b) Vendor shall pay National Grid's fee based on schedule of completion in the form of progress payments

5. PROPOSER QUALIFICATIONS

Corporate Profiles

National Grid - National Grid is an international energy delivery company. In the U.S., National Grid delivers electricity to approximately 3.3 million customers in Massachusetts, New Hampshire, New York, and Rhode Island, and manages the electricity network on Long Island under an agreement with the Long Island Power Authority (LIPA). It is the largest distributor of natural gas in the northeastern U.S., serving approximately 3.4 million customers in Massachusetts, New Hampshire, New York and Rhode Island. National Grid also owns over 4,000 megawatts of contracted electricity generation that provides power to over one million LIPA customers. National Grid offers nationally recognized energy conservation programs which have been recognized as EPA's Energy Star 2010 partner of the year.

Centrica Business Solutions Services Inc. (CBSS) - Formerly SmartWatt Energy Inc. - Is a leading nationwide provider of turnkey energy-efficiency solutions. We are dedicated to lowering businesses' operational costs through demand-side energy reduction strategies. CBSS provides whole building energy assessments and implements renewable energy systems, lighting upgrades, control system enhancements, variable frequency drive (VFD) upgrades, HVAC enhancements and other energy conservation measures to help commercial, industrial, institutional, and government customers and utilities meet their sustainability goals. CBSS also maintains status as a National Grid tier one partner and an approved contractor on National Grid's ProNet program.

For National Grid

Sincerely,

Becky Badalato
Business Development Manager

centrica
Business Solutions

Attachment A

Becky Badalato
National Grid
21265 NYS Route 232
Watertown, New York 13601

November 14, 2024

Subject: IGA Implementation Proposal for Albany County

Dear Becky;

On behalf of Centrica Business Solutions Service Inc. (CBSS) - Formerly SmartWatt Energy, Inc., I am pleased to submit herewith our proposal to perform the implementation of the findings within the attached Investment Grade Audit (IGA) at Albany County. The scope of work is based on the IGA presented to Albany County on November 11, 2024. Through discussions with you and County staff we have confirmed the final Facility Improvement Measures (FIMs) to be installed under this implementation phase of work.

Project Overview:
Albany County has authorized National Grid to proceed with implementation of an energy savings project as described in the IGA conducted by Centrica Business Solutions Services Inc. (Formerly SmartWatt) dated November 11, 2024.

CBSS is pleased to submit herewith its formal Firm Fixed Price IGA valued at $7,710,875 covering implementation as defined under the attached Scope of Work (SOW).

CBSS is pleased to have the opportunity to partner with National Grid, and we eagerly anticipate working with you on this phase of the Albany County Energy Conservation Project. CBSS is looking forward to demonstrating to Albany County and National Grid our depth of experience and expertise in developing comprehensive energy solutions.

CBSS appreciates this opportunity and looks forward to a long and mutually beneficial relationship with National Grid. Please feel free to contact the undersigned should you have any questions concerning the attached.

Sincerely,

Mitch Tombs
Senior Account Executive
Centrica Business Solutions Services Inc. (CBSS) - Formerly SmartWatt Energy, Inc.
Cell: 315.532.7584
Email: Mitch.Tombs@Centrica.com

Project Management/Implementation Overview

Geoff Frey, Senior Project Manager, at CBSS will have the overall responsibility for managing and executing the construction phase of this project. The table below lists the major milestones for this project. The dates below are approximate. A detailed WBS will be provided as part of the Project Management Plan presented during the construction phase.

Task Name	Duration	Start	Finish
Albany County MVP Arena Solar and EV Charging	371 days	Mon 9/9/24	Tue 2/24/26
Contract Issuance	69 days	Mon 9/9/24	Mon 12/16/24
Interconnection (Ngrid) Pre-Work	329 days	Mon 9/9/24	Fri 12/26/25
Engineering	45 days	Tue 12/17/24	Thu 2/20/25
Contracts	60 days	Tue 12/17/24	Thu 3/13/25
Submittals	105 days	Thu 1/30/25	Fri 6/27/25
Permitting	60 days	Thu 1/30/25	Thu 4/24/25
Major Equipment Procurement	205 days	Fri 2/21/25	Thu 12/11/25
Construction	165 days	Fri 5/23/25	Fri 1/16/26
Interconnection	10 days	Mon 1/19/26	Fri 1/30/26
Commission and Billing Setup	10 days	Mon 2/2/26	Fri 2/13/26
Close Out	17 days	Mon 2/2/26	Tue 2/24/26

Scope of Work

Please see Attachment B (Albany County – Investment Grade Audit).

Investment Grade Audit

December 13, 2024

Albany County – MVP Arena Parking Garage Solar PV Canopy and EV Charging Station Project

Mitch Tombs
Senior Account Executive
Mitch.Tombs@Centrica.com

Jeff Kilmer
Solar Project Director
Jeffery.Kilmer@Centrica.com

Scott Clark, PE, CEM, CMVP
Project Director
Scott.Clark@Centrica.com

centrica Business Solutions

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Appendices

1.0 Executive Summary

1.1 PROJECT OVERVIEW

Centrica Business Solutions Services, Inc. (Centrica) is pleased to provide this Investment Grade Audit (IGA), for Albany County. We developed the following report to identify, document, and present a turn-key photovoltaic (PV) solar canopy and electric vehicle (EV) charging station solution for the County at the MVP Arena Parking Garage.

We greatly value the support we have received from numerous members of the staff during the IGA and look forward to expanding our partnership with Albany County by implementing the Facility Improvement Measures (FIMs) during the design-build implementation phase of the project.

This report provides the scope of work, energy savings estimates, and cost proposal for infrastructure improvement and cost reduction strategies at the MVP Arena Parking Garage in Albany, NY

Centrica will complete the scope of work described in this proposal for an installed cost of **$7,816,311**. We will procure utility incentives with an estimated value of **$541,674**. If the value of the incentives exceeds the estimated incentive value, the additional incentive value will be kept by Albany County at the completion of the project implementation. Thus, the final project cost to Albany County after anticipated Utility incentives and prior to ongoing service requirements is **$7,274,637**.

Additionally, this project qualifies for two separate Direct Pay credits that have been included as part of the Federal Inflation Reduction Act (IRA). Additional information on these credits is provided later in this report, but the County is estimated to be able to receive a direct payment of **$2,349,874** upon completion of the project.

1.2 SUMMARY OF PROPOSED FACILITY IMPROVEMENT MEASURES (FIMS)

Centrica previously conducted a Preliminary Feasibility Assessment (PFA) on February 2, 2023 to document the potential energy savings and budgetary costs. The FIMs identified in the PFA were evaluated in detail and the FIMs shown in ***Table 1*** were selected by Albany County for further development as part of this IGA.

Table 1 provides savings, implementation price, and estimated utility incentives for the recommended FIMs. Please note that these costs also include the necessary utility infrastructure upgrade costs that were prepared by National Grid.

Table 1: Summary of Recommended Facility Improvement Measures

FIM Name	Annual Utility Savings ($/yr)	FIM Cost	Utility Incentive	Federal Direct-Pay Credits
1 – Install Canopy Mounted Solar PV Array and Under Canopy Lighting	$151,450	$5,330,622	$52,983	$1,673,405
2 – EV Charging Stations and Infrastructure	$16,942	$2,485,689	$488,691	$1,131,337
TOTAL	**$168,392**	**$7,816,311**	**$541,674**	**$2,316,050**

1.3 PROJECT GUIDELINES AND GOALS

Centrica has worked with the following objectives in mind for Albany County:

- Reduce the County's carbon footprint by enabling the production of green electricity and facilitating a transition to an all-electric vehicle fleet.
  - Perform an investment grade audit for the installation of a fixed-tilt roof canopy for mounting a solar PV array, under canopy lighting, and robust EV charging infrastructure within the facility.
- Maintain or improve existing environment within the facility.
- Provide quality engineering, construction, and long-term performance of these systems under a turnkey approach.

1.4 UTILITY INCENTIVES SUMMARY

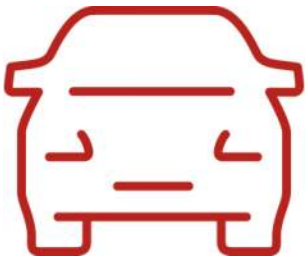
During this study, we confirmed that utility and State incentives will be available to reduce the cost of the PV array and the installation of EV chargers and associated infrastructure. Centrica has confirmed the availability of incentives based on the 2024 program offerings from NYSERDA and National Grid. We will work directly with the Utility and NYSERDA to provide the incentives indicated in ***Table 1***. We will fill out the required forms and provide for Albany County's review and signature. The incentives will be paid to the County and has reduced the amount of the project by **$541,674**. The incentives require Albany County's participation and cooperation to attain, and it is expected that Albany County will make all reasonable efforts to assist in procuring the incentives.

1.5 ENVIRONMENTAL BENEFITS

These turnkey improvements give Albany County the opportunity to reduce its carbon footprint, reducing harmful environmental impacts. The positive impact this project will have on the environment is quantifiable. Most of the energy generated by power plants in the United States comes from burning

fossil fuels. By reducing energy consumption, fewer fossil fuels are consumed which means less pollution. For Albany County, the project will reduce greenhouse gases by about 410 metric tons CO2e each year based on the calculated (projected) savings of 1,026,204 kWh/yr. *Figure 1* illustrates the reduction in greenhouse gases each year in terms of equivalencies of familiar items. These numbers were calculated through the EPA Greenhouse Gas Equivalencies Calculator https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

Figure 1: Greenhouse Reduction Equivalencies



57 VEHICLES OFF THE ROAD

CARBON SEQUESTERED BY 536 ACRES OF FOREST

CO_2 EMISSIONS FROM 47 HOMES

2.0 Facility Description

Centrica Engineers audited the MVP Arena Parking Garage as summarized below.

Table 2: Summary of Audited Facilities

Facility	Address
MVP Arena Parking Garage	100 Beaver Street, Albany, NY

2.1 MVP ARENA PARKING GARAGE

The MVP Arena Parking Garage was originally constructed in approximately 1990. It has since undergone a recent renovation/rehabilitation to address some issues with waterproofing and concrete spalling and has had an LED lighting upgrade performed. It is an open-sided structure that provides parking for events at the adjacent arena, as well as for the Albany County fleet of vehicles. The existing top deck is open to the elements.

The garage is currently served by an 800 Amp, 208v electrical service that is nearing its full capacity. The County has recently installed several Level 2 EV chargers to allow for some of their electric vehicle fleet to charge on the ground level of the garage.

No other utilities were investigated at this facility as part of this investment grade audit.

3.0 Utility Usage Overview

3.1 UTILITY USAGE AND COST SUMMARY

Albany County currently spends **$37,338** annually on utilities for the MVP Arena Parking Garage. It is important to note that as part of this project, a new electrical service will be extended to the building. The existing account numbers, rates, and consumption are presented here for baseline comparison purposes only, but this account will not be directly impacted by the work as part of this project. A detailed month by month view of the baseline period usage data is provided in ***Appendix A.***

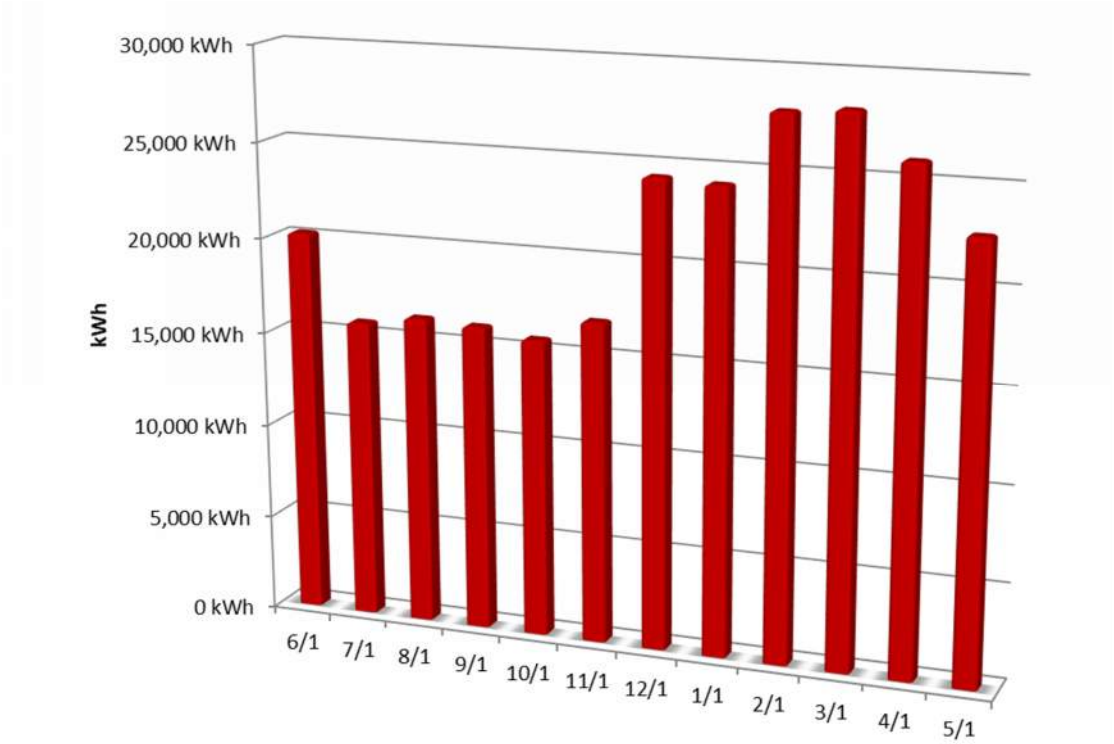
Table 3 summarizes the energy cost allocated to electricity for the baseline period of June 2022 – May 2023.

Table 3: Annual Utility Usage & Cost Summary

Electricity	
kWh/yr	$/yr
254,400	$37,338

Figure 2 displays the monthly utility usage for electricity during the baseline period.

Figure 2: Baseline Electrical Usage



3.2 UTILITY RATE REVIEW

Utilities and energy sources for the buildings reviewed for the MVP Arena Park Garage are limited to electricity only. ***Table 4*** lists the utility and the current supplier. Utility rates are listed in ***Table 5***.

Table 44: Utility/Energy Sources

Building	Electricity - Distribution	Electricity - Supply
MVP Arena Parking Garage	National Grid	National Grid

Table 55: Utility Rates Summary

Building	Electricity ($/kWh)	Electricity ($/kW)
MVP Arena Parking Garage	$0.0728	$0.304

3.4 RECONCILIATION OF USAGE TO BASELINE

The data used for the energy baseline has been reviewed and there are no unusual findings. The meter readings were based on actual readings during the baseline period of June 2022 to May 2023.

4.0 Facility Improvement Measures (FIMs)

4.1 FIM #1: INSTALL CANOPY MOUNTED SOLAR PV ARRAY AND UNDER CANOPY LIGHTING

OBSERVATION

Centrica and Albany County had multiple discussions about ways that the County could further its sustainability goals by producing carbon-free electricity. While the County has recently commissioned a large solar array that they are utilizing through a PPA, there was a limited amount of County-owned solar in their building portfolio.

Upon further investigation, the MVP Arena and Parking Garage were determined to be ideal candidates for evaluation of a siting a solar photovoltaic (PV) system, given the large loads of the arena. The garage itself has a structure that is ideally suited for mounting solar panels, and also houses a growing electric vehicle fleet that will increase the overall electrical consumption of the building.

Discussions with National Grid revealed that the existing electrical service in the building was not suitable for additional vehicle charging, or for connection of any type of distributed generation.

RECOMMENDATION

Centrica performed a preliminary engineering analysis of both the parking garage structure, as well as the electrical infrastructure. This electrical design was submitted to National Grid as part of the standard interconnection process, where it was determined that a new electrical service would need to be constructed, rather that connecting to the existing electrical system.

Centrica recommends the installation of a 1.06 MWdc canopy mounted solar array. A steel canopy will be constructed that will mount onto the existing parking garage structure and allow for a continuous superstructure of panels to be mounted on it. This will provide a roof-like appearance to the garage and will provide a significant amount of space for the necessary solar exposure for the PV panels.

Figure 3: Proposed Solar Canopy

As part of the installation of the new canopy, the existing pole mounted area lights will need to be removed. New LED under canopy lighting will be installed for safety and security as part of the construction of the canopy.

In order to connect the new PV array to the existing electrical grid, a new electrical service is required to be installed by National Grid. This additional work will be installed in concert with the new EV charging infrastructure. Centrica will be installing the necessary conduits and switchgear, while the final connections and wire pulling will be performed by National Grid.

The initial structural report for the parking garage is attached here as ***Appendix B***. Centrica's 10% design documentation for the PV array and associated electrical infrastructure are attached as ***Appendix C***. As

part of the next phase of the project, these designs will be taken to 100% in phases, with approvals by the utility and AHJ as appropriate.

As part of the scope of work for this measure, Centrica will complete the following:

- Design, procure, and install a fixed tilt, canopy-mounted photovoltaic system rated for 1.06 MWdc
- Engineering of the structure for attachment to the existing parking garage and to withstand the appropriate wind and snow loads for Albany, NY. Drawings to be stamped by a Professional Engineer licensed in the State of New York.
- Engineering of the system for construction and interconnection to the existing utility grid. Electrical drawings to be stamped by a Professional Engineer licensed in the State of New York.
- Provide and install a steel canopy structure for support of the new solar panels, under canopy lighting, and necessary electrical infrastructure. Canopy will be equipped with snow guards.
- Provide and install inverters to convert the DC output from the solar panels to AC input to the existing electrical grid. Basis of design is a Quantity of 12 60kW inverters.
- Provide and install solar modules (panels) provided by Silfab. These panels will meet the domestic content requirements as outlined in the Inflation Reduction Act (IRA) to allow for obtaining a direct pay incentive. Basis of design is the Silfab 580W module.
- Provide and install a cloud-based data acquisition system (DAS) for the array. Basis of design is manufactured by Also Energy.
- Provide and install wiring and conduit as needed to connect the panels and inverters to the newly installed electrical infrastructure. The system will connect to new electrical switchgear, and a newly installed utility meter.
- Provide and install necessary conduits for the new electrical service as required by National Grid
- Provide and install necessary overcurrent protection and disconnects as outlined by National Grid's connection standards and the results of the CESIR study.
- Create project submittals for Albany County, National Grid, and NYSERDA for interconnection and incentive approvals
- Testing, commissioning, and final inspections as required.
- Owner training on PV system operation, location of safety switches, setup of web-based monitoring, and review of maintenance for the PV system.
- Centrica will prepare a full set of turnover documentation upon completion of the project. This includes the 100% design drawings, product specification information, and all written warranties and warranty procedures.

SAVINGS SUMMARY

Savings from the installation of the solar array are based upon a model created using the Helioscope software. The software analyzes the tilt of the panels, the solar insolation that occurs throughout the year for Albany, NY, and the specifics of the components selected by Centrica for this design to estimate the annual system output. This output was then used for the NYSERDA VDER V3.1 (Value of Distributed Energy Resources) calculator to determine a cost savings for the first 25 years of the lifetime of the system.

Electricity production in the first year is estimated to be **1,157,693 kWh**, which results in an estimated cost savings of **$154,552**.

The Helioscope model can be found in ***Appendix D***. Product information on the proposed panels and inverters can be found in ***Appendix F.***

UTILITY INCENTIVES

Centrica will apply for incentives through NYSERDA as part of the NY-SUN program. We anticipate an incentive of $**52,983** for this FIM.

There is also a Direct Pay incentive available to Albany County as part of the Inflation Reduction Act. Centrica estimates that Albany County could receive 34% of the costs for this measure, or $1,673,405 as a direct pay once the project is completed. Centrica will supply the information required by the County to apply for this incentive.

4.2 FIM #2: ELECTRIC VEHICLE CHARGERS AND INFRASTRUCTURE

OBSERVATION

Albany County currently uses the lowest level of the MVP Arena Parking Garage for their vehicle fleet parking. As part of previous sustainability efforts, 8 electric vehicle charging stations have been installed that are connected to the existing buildings 208v 800A electrical service. The existing service is at capacity and is unable to support any additional chargers in the parking garage.

The County is moving towards electrifying the majority of its fleet vehicles and would like to be able to have a centralized location for both parking and charging its fleet, and to offer charging to patrons of the MVP arena when they attend for events to encourage electric vehicle adoption within the County.

RECOMMENDATION

Centrica will work with National Grid to install a new electrical service that is capable of supporting up to 72 new Level 2 electric vehicle chargers. As part of these efforts, the new electrical service will be sized and constructed in tandem with the new photovoltaic electrical service. Centrica will install the necessary conduit, wiring, switchgear, circuit breakers and distribution panels to support a full build out of 72 chargers and will install 52 Zerova chargers as part of this phase of construction. Product information can be found in ***Appendix F.***

As part of this measure, Centrica will provide the following:

- 32 EV Charging Stations for the County Fleet on the bottom floor.
- 4 Public EV Charging stations per floor on Floors 2-6, with electrical infrastructure (breaker spaces in panels, conduit and wire sized for future capacity) to support 8 chargers per floor at final build-out.
- Charging stations will be 48A, to support a maximum output of 9.9kW
- Cable management devices will be provided for each charger. This will support extended charging cables with a retractable device to keep them off the ground and to enable reaching any of the charge port locations that may be used by different manufacturers.
- Chargers will be configured with J1772 configuration, but have the potential to add in NACS ports if desired by the County
- Fleet stations will be activated via RFID cards/fobs
- Public Stations will have payments processed via scanning with a QR Code and will utilize the EVConnect app
- 5 Years of OM and software services
- With the support of National Grid, installation of a new electrical service, transformer, switchgear, conduits and conductors to provide the necessary capacity for the electric vehicle charging stations. These efforts will be coordinated with the service requirements needed for the new solar canopy to be installed on the garage.

SAVINGS SUMMARY

Savings anticipated for this measure are based upon the transition from purchasing gasoline to power the Albany County fleet to purchasing electricity. Centrica was provided information about the existing fleet makeup and average fuel economy for each of those vehicles.

Using an average gasoline cost of $3.23/gallon and a proposed electricity cost of $0.20/kWh, Centrica estimates that the County would save 12,920 gallons of gasoline, which would be replaced by 108,600 kWh of electricity. This results in a savings of **$16,942** each year of a fully electrified fleet.

Additional information on this calculation can be found in ***Appendix E***.

UTILITY INCENTIVES

There are several different incentives available for this measure. The first is the ChargeReady 2.0 program from NYSERDA. This is estimated to pay **$76,000** to help the County recoup the cost of the charging stations. Centrica has selected chargers that will comply with the requirements of the ChargeReady 2.0 program and will file the application forms when we are within the construction timeline required by that program.

The second incentive program is through the National Grid EV Make Ready program. This program provides a reimbursement for the electrical infrastructure upgrades that may be required for the installation of charging stations. For this project, we anticipate an estimated Make Ready rebate of $**412-691.** A portion of the available funds from this program will apply to the work that is to be performed by National Grid to install a new electrical service for the charging stations.

The final program available is the Federal Alternative Refueling Tax Credit, which the County is eligible for as a direct payment due to the Inflation Reduction Act. This amount is estimated to be $686,407, or approximately 30% of the total EV project costs.

5.0 Summary

5.1 FINANCIAL SUMMARY

Albany County will complete improvements valued at **$7,816,311**. In addition, the use of available utility incentives and Direct Pay Tax Credits has the potential to reduce the project costs by **$2,891,548**. ***Table 6*** provides an overview of the project costs and savings.

Table 6: Cost and Savings Summary

Project Total Investment	**$7,816,311**
Estimated NY-SUN Incentive	**($52,983)**
Estimated National Grid EV Make-Ready Incentive	**($412,691)**
Estimated NYSERDA ChargeReady 2.0 Incentive	**($76,000)**
Estimated Direct Pay Investment Tax Credit for Solar	**($1,673,405)**
Estimated Direct Pay Incentive for Alternative Refueling Tax Credit	**($642,646)**
Net Project Investment (After Incentives and Credits)	**$4,958,586**

5.2 PROJECT MANAGEMENT AND SCHEDULE

Our Centrica Senior Project Manager, Geoff Frey, who is based out of our Malta, NY office will have the overall responsibility for managing and executing the construction phase of this project. A detailed Work Breakdown Schedule will be provided as part of the Project Management Plan presented during the construction phase.

Appendix A – Utility Baseline Data

Baseline Year Data for National Grid Account 40312-79100

		Electricity	
Year	**Month**	**Consumption**	**Cost**
2022 - 2023	6/1	20,240 kWh	$3,162
	7/1	15,760 kWh	$2,674
	8/1	16,240 kWh	$3,642
	9/1	16,080 kWh	$3,065
	10/1	15,680 kWh	$2,535
	11/1	16,880 kWh	$1,708
	12/1	24,400 kWh	$3,632
	1/1	24,240 kWh	$4,591
	2/1	28,000 kWh	$4,494
	3/1	28,240 kWh	$3,059
	4/1	26,000 kWh	$2,683
	5/1	22,640 kWh	$2,092

Appendix B – Structural Analysis Report

RE: MVP Arena – Solar Panel Assessment / EV Load Assessment
MVP Arena Parking Garage, Albany, NY

To Centrica Business Solutions,

Pursuant to your request, KMB Design Group has performed a limited structural assessment of the parking garage at the above referenced site. The existing parking garage is a precast structural concrete system designed by Unistress in 1989.

Our assessment of the existing structure is broken down into 2 different scopes. The assessment is based on limited information gathered during the site visit performed on 06/09/2023 and as-built drawings provided to us.

Scope 1

- Evaluate the structural feasibility of installing a solar canopy supported directly from the garage columns above the roof framing. It is understood that such a solar canopy framing system, including the solar panels and related racking will weight approximately 15 PSF. Hence, we have determined the feasibility of supporting an additional 15 PSF on the existing building.

Scope 2

- In this scope the goal is to analyze the feasibility of the existing parking garage framing system to support EV vehicles and EV charging stations. The following are the EV vehicle and charging station requirements:

  1 ***- 42 Fleet spaces, these will be 3,800-4,800 lb EV sedans***
  2 *- 60 public spaces, could be 3,000-9,000 lb EVs including sedans and trucks. I would assume that will skew towards 4,500 lbs since not everyone will be driving the Hummer electric*
  3 – EV charging station at 550 lbs each and one (1) placed between every two (2) existing EV vehicle parking spaces.

Existing Structure

The structure is a parking garage with 6 levels. The structural framing of the parking garage consists of pre-cast double T concrete beams supported by an inverted T-beam on precast columns. The first level and half of the second level has an asphalt slab, and the rest of the remaining levels consist of a concrete slab.

Structural Data and Code Information

Our analysis was performed in accordance with the requirements of the 2020 Building Code of New York State, ASCE 7-16 and 1990 BOCA National Building Code. The pertinent design data is listed below (as per limited structural drawings and field assessment):

Existing Live load – Parking Garge:

Live Load:

BOCA Building Code 1990	50 PSF

NYC BC 2020 – ASCE 7-16	40 PSF
Load Credit per level	10 PSF

Snow Load:

Ground Snow Load, Pg:	40 PSF
Risk category	II
Importance Factor, Is	1.2
Thermal Factor, Ct	1.0
Exposure Factor, Ce	0.9
Flat Roof Snow Load, Pf (MAX {0.7*Is*Ct*Ci *Pg, Is*20})	30.2 PSF
Minimum Roof Snow Load, Pmin (Is*20)	30.2 PSF

Wind Load:

Wind speed (Ultimate)	110 MPH
Exposure	B
Minimum downward pressure	16.0 PSF

Additional notes

1. The analysis is based on the information gathered from the field and/or information provided and is assumed to be current and accurate.
2. Unless noted otherwise, the structure and the foundation system are assumed to be in good condition, free of defects, and can achieve theoretical strength.
3. It is assumed that the structure has been properly maintained and shall be properly maintained during its service. The superstructure and the foundation system are assumed to be designed with proper engineering practice and fabricated, constructed and erected in accordance with the design documents. MPP will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance.
4. The analysis results are only applicable for the proposed additions and alterations specified in this report. Any deviation of the proposed equipment and placement, etc., will require additional structural analysis.
5. The analysis does not include the design of the racking system or the ballast it requires. The analysis is performed to verify the capacity of the main structural system. Connections are assumed to have the capacity of the main structural members.
6. It is assumed that the existing building has NOT been modified or altered from its original design. Building landlord/client shall inform KMB with any kind of modification and/or alteration that may have been done to the existing building during its lifetime.

Existing Building Code Allowance

1. Pursuant to International Existing Building Code section 805.2, any existing gravity load-carrying structural element for which additions and/or alterations cause an increase in design gravity load of no more than 5 percent, shall be permitted to remain unaltered, thus considered to be code-compliant and adequate. Any existing gravity load- carrying structural element for which additions and/or alterations cause an increase in design gravity loads exceeding 5 percent is checked against the applicable Code criteria for new structures.
2. Pursuant to International Existing Building Code Sections 805.3, any existing lateral load-carrying structural element whose demand-capacity ratio with the addition and/or alteration considered is

no more than 10 percent greater than its demand-capacity ratio with the addition and/or alteration ignored shall be permitted to remain unaltered, thus considered to be Code-compliant and adequate. If the demand- capacity ratio increase is more than 10 percent, the subject structural element is checked against the applicable Code criteria for new structures.

Approach & Conclusions

Scope 1 –
This existing garage is suitable for a rooftop solar canopy. The anticipated loading of a rooftop solar canopy system, including solar panels and all related racking will be 15 PSF maximum. The system will be supported directly from the existing precast concrete walls and/or columns. See Figure 1 for a schematic illustration of the proposed solar canopy.

The existing garage was designed in 1989 following the BOCA Building Code which required parking garages to be designed for 50 PSF uniform live loads. However, current building codes have relaxed the required live load for parking garages to only 40 PSF. Based on this, there is a net reduction in the required live load of 10 PSF per floor equating to almost 50-60 PSF live load reserve for the entire 5-6 story parking garage structure.

It is understood that a solar canopy manufacturer will design the superstructure framing system to span between the existing precast columns and walls and be responsible for all aspects of the design, including but not limited to, the superstructure framing member sizes and connections to the existing precast structure, sub-purlin framing to support the solar panels and attachment of same.

Scope 2 –

As noted above, it is desired to park EV vehicles and place EV charging stations throughout the parking garage. In general, EV vehicles are heavier than gas vehicles. We have analyzed the feasibility of parking EV vehicles and placing EV charging stations with the understanding that the most critical aspect of this increased weight is to evaluate the loading on the typical pre-cast double T beams and to ensure that the original design live load of 50 PSF is not exceeded. As such, we have depicted two (2) scenarios as shown in the attached Figure 2 and as follows:

Scenario 1 – This scenario consists of parking spaces along essentially two (2) sides of parking garage where the layout of the parking spaces is such that up to 5-6 cars load a single 10 feet wide precast double T-panel spanning from inverted T-beams/columns (e.g., approximately 51 feet). In this configuration, our conclusion is the following:

1 – Place no more than two (2) EV hummer vehicles with a max weight of 9,000 lbs each in addition to:
2 – Four (4) regular EV vehicles with a weight of no more than 5,000 lbs each in addition to:
3 - Four (4) EV charging stations

Scenario 2 – This scenario represents the vast majority of the existing parking spaces/layout on all levels and as shown in the attached Figure 2. This includes the typical parking spaces along the long sides of the building and the ramps. In this configuration, our conclusion is the following:

1 – EV hummers with maximum weight of 9,000 lbs can be parked in any given parking space even while an EV hummer is in the drive lane passing by. In a nutshell, this configuration does NOT limit/restrict spacing/parking layout of either type of EV vehicle in addition to:
2 – One (1) EV charging station between any two (2) spaces.

*Please refer to Figure 2 for a visual illustration of scenario 1 & 2 ALLOWED EV vehicle and EV charging station quantity and configurations. These illustrations are based on NOT exceeding the originally designed live load capacity of 50 PSF of the parking garage.

*NOTE – Level 1 up to level 2 grid #8 - the framing is slab on grade and hence no restrictions on placing EV vehicles. Please refer to Figure 3 – 5.

We trust that this evaluation will provide you with the information required to continue with the design of an appropriate PV system, including EV vehicle parking spaces and EV charging stations. If you have any questions regarding this matter, please feel free to contact my office at 609-489-5511. We appreciate the opportunity to assist you with this evaluation.

Sincerely,

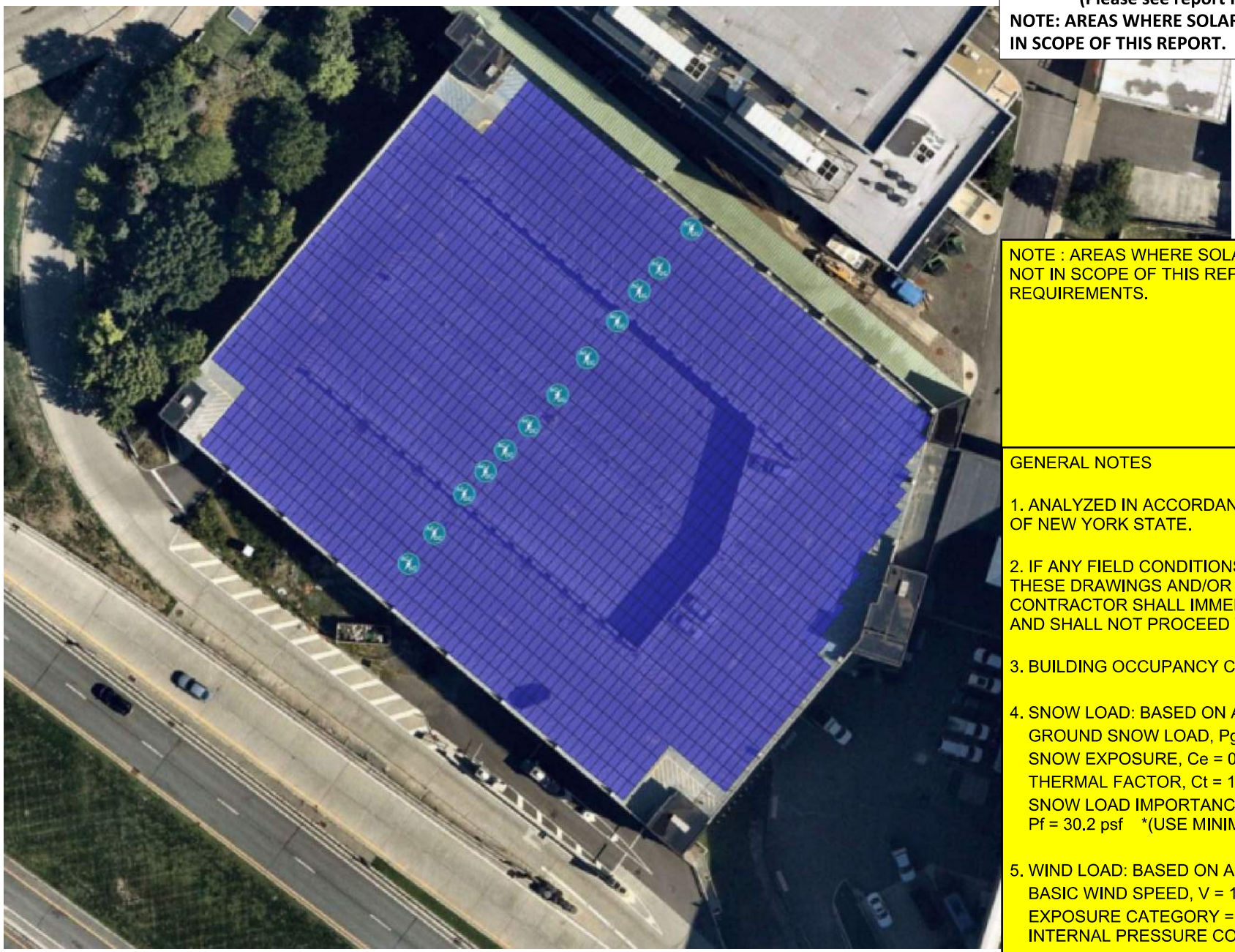
Victor Kang FE
Structural Engineer

Ashutosh Patel, P.E.

Attachments

1. Figure 1 - 5 – Overview Scopes
2. Calculation Report under separate cover

Figure 1



AVAILABLE RESERVE CAPACITY:

AREA#1:- 15.00 PSF RESERVE

(Please see report for additional requirements)

NOTE: AREAS WHERE SOLAR PANELS ARE NOT SHOWN ARE NOT IN SCOPE OF THIS REPORT.

NOTE : AREAS WHERE SOLAR PANELS ARE NOT SHOWN ARE NOT IN SCOPE OF THIS REPORT. SEE FIGURE FOR ADDITIONAL REQUIREMENTS.

GENERAL NOTES

1. ANALYZED IN ACCORDANCE WITH THE 2020 BUILDING CODE OF NEW YORK STATE.

2. IF ANY FIELD CONDITIONS ARE NOT IN COMPLIANCE WITH THESE DRAWINGS AND/OR CONDITIONS SPECIFIED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH THE AFFECTED WORK.

3. BUILDING OCCUPANCY CATEGORY : II

4. SNOW LOAD: BASED ON ATC HAZARDS BY LOCATION
   GROUND SNOW LOAD, Pg = 40 psf
   SNOW EXPOSURE, Ce = 0.9
   THERMAL FACTOR, Ct = 1.2
   SNOW LOAD IMPORTANCE FACTOR, Is = 1.0
   Pf = 30.2 psf *(USE MINIMUM REQUIREMENT Pm = 30.2 psf)

5. WIND LOAD: BASED ON ATC HAZARDS BY LOCATION
   BASIC WIND SPEED, V = 110 mph
   EXPOSURE CATEGORY = B
   INTERNAL PRESSURE COEFFICIENT = +/- 0.18

Figure 2

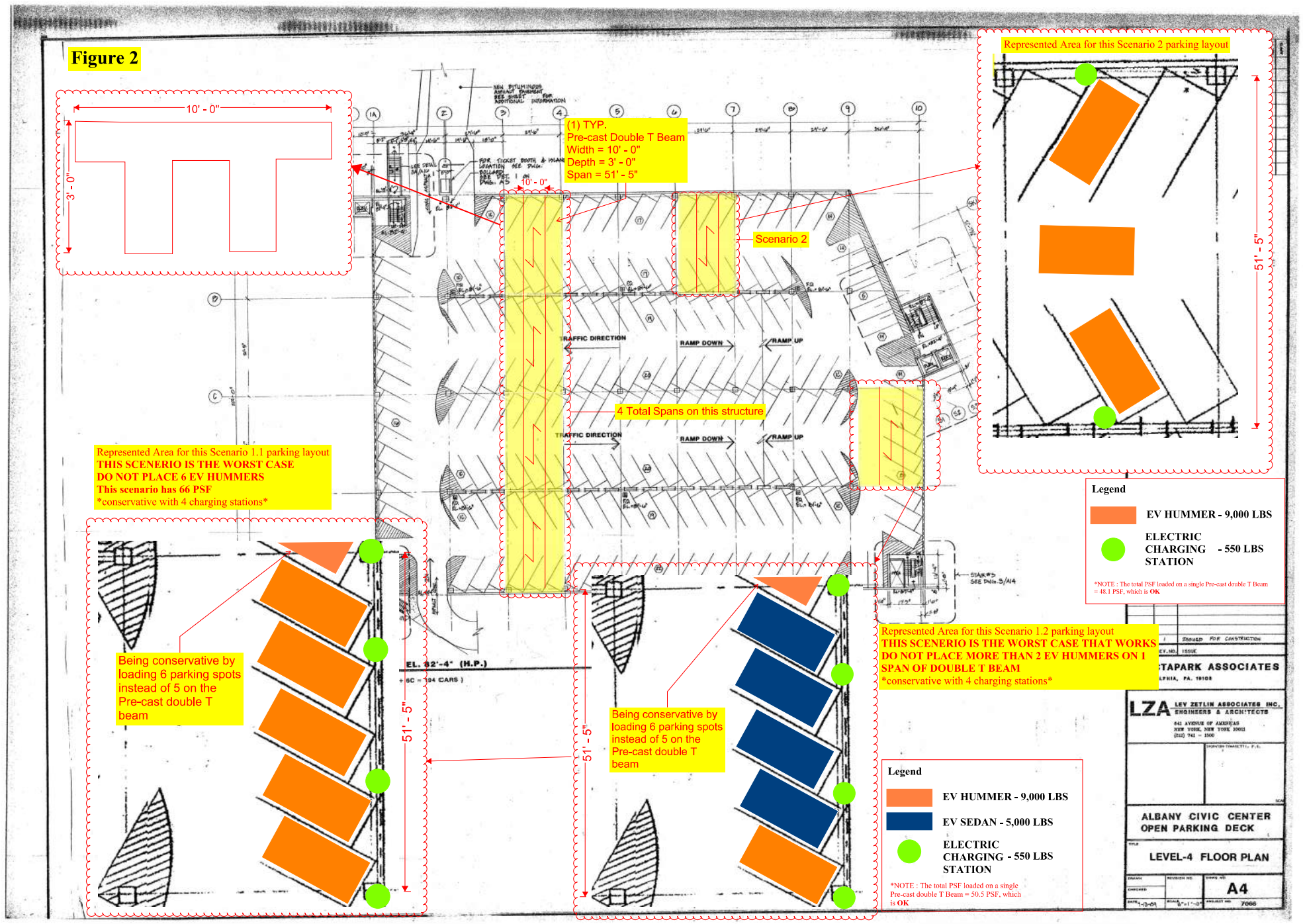
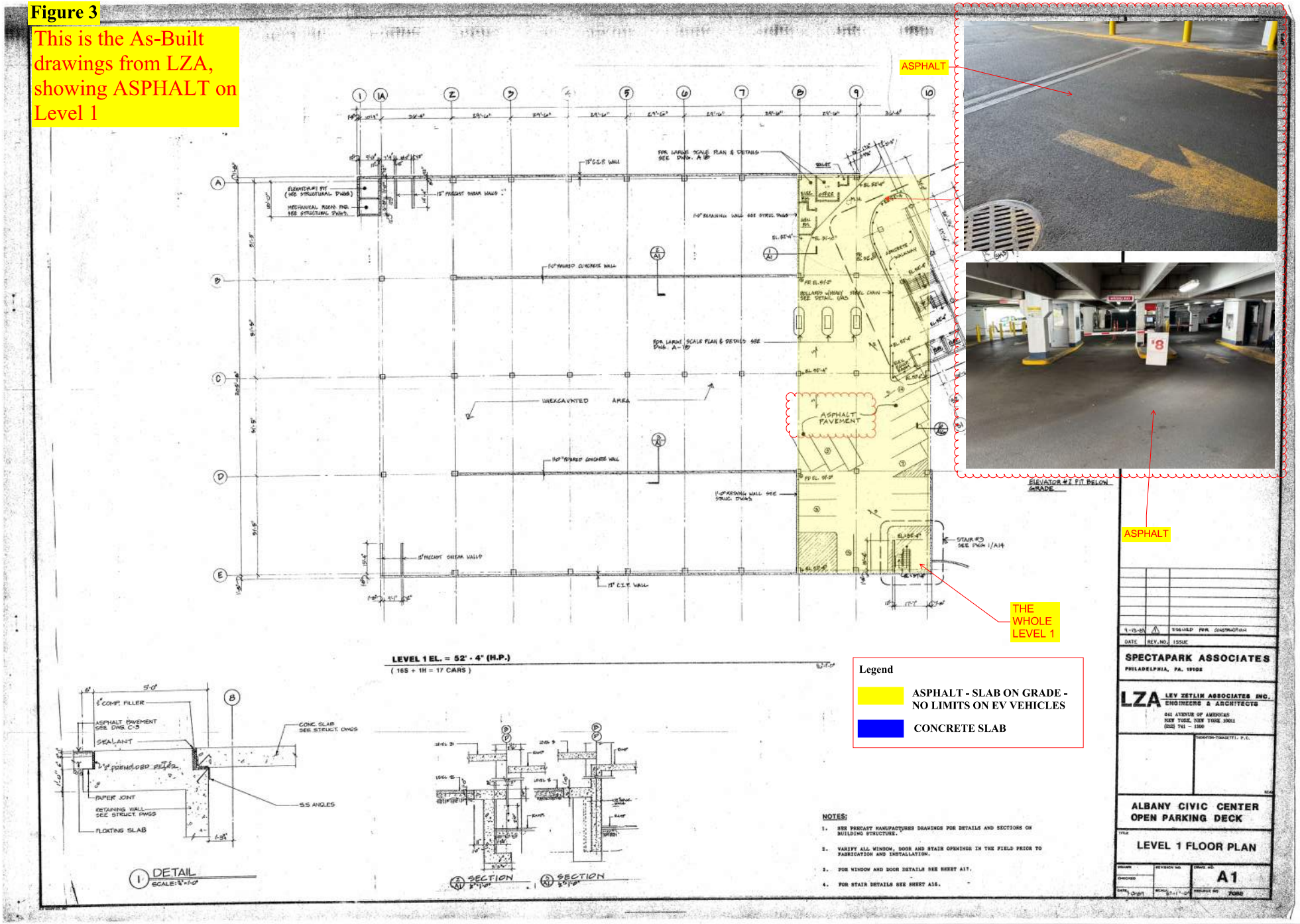

10' - 0"
3' - 0"
(1) TYP.
Pre-cast Double T Beam
Width = 10' - 0"
Depth = 3' - 0"
Span = 51' - 5"
Scenario 2
4 Total Spans on this structure
Represented Area for this Scenario 2 parking layout
51' - 5"
Represented Area for this Scenario 1.1 parking layout
THIS SCENERIO IS THE WORST CASE
DO NOT PLACE 6 EV HUMMERS
This scenario has 66 PSF
conservative with 4 charging stations
Being conservative by loading 6 parking spots instead of 5 on the Pre-cast double T beam
Being conservative by loading 6 parking spots instead of 5 on the Pre-cast double T beam
Represented Area for this Scenario 1.2 parking layout
THIS SCENERIO IS THE WORST CASE THAT WORKS
DO NOT PLACE MORE THAN 2 EV HUMMERS ON 1 SPAN OF DOUBLE T BEAM
conservative with 4 charging stations
Legend
EV HUMMER - 9,000 LBS
ELECTRIC CHARGING STATION - 550 LBS
*NOTE : The total PSF loaded on a single Pre-cast double T Beam = 48.1 PSF, which is OK
Legend
EV HUMMER - 9,000 LBS
EV SEDAN - 5,000 LBS
ELECTRIC CHARGING - 550 LBS STATION
*NOTE : The total PSF loaded on a single Pre-cast double T Beam = 50.5 PSF, which is OK
TRAFFIC DIRECTION
RAMP DOWN
RAMP UP
EL. 32'-4" (H.P.)
LZA LEV ZETLIN ASSOCIATES INC.
ENGINEERS & ARCHITECTS
ALBANY CIVIC CENTER
OPEN PARKING DECK
LEVEL-4 FLOOR PLAN
A4
7066

Figure 3

This is the As-Built drawings from LZA, showing ASPHALT on Level 1



This is the As-Built drawings from UNISTRESS, Showing ASPHALT AND CONCRETE SLAB LEVEL 2

Figure 4

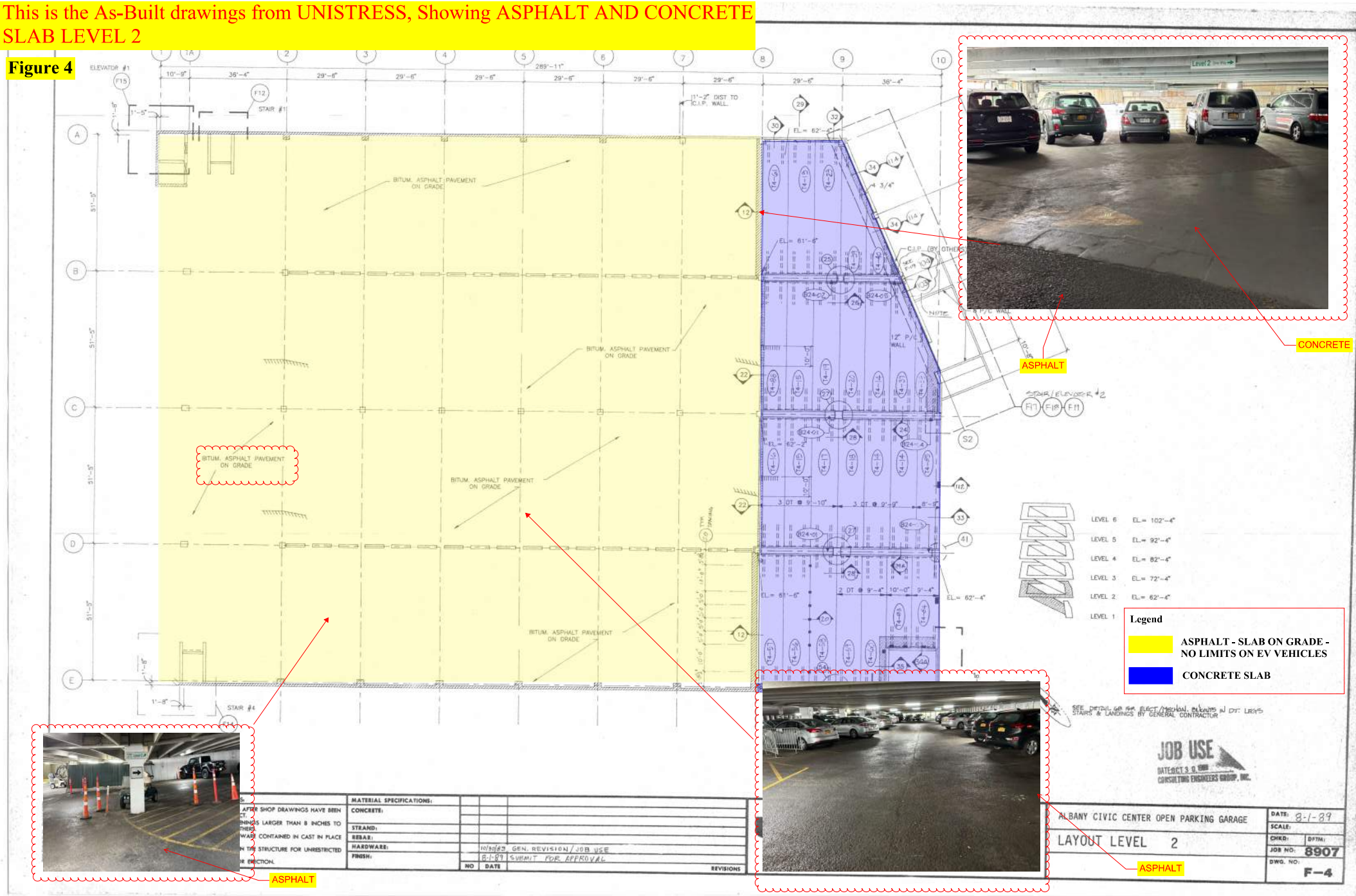


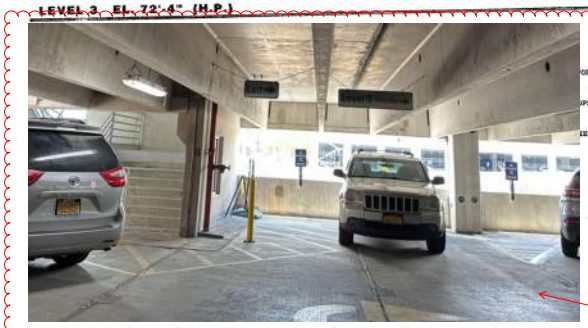
Figure 5

This is the As-Built drawings from LZA, Showing CONCRETE SLAB LEVEL 3

THE CONCRETE SLAB GOES UP TO LEVEL 6

CONCRETE SLAB

TRAFFIC DIRECTION
RAMP DOWN
RAMP UP
TRAFFIC DIRECTION
RAMP DOWN
RAMP UP



CONCRETE SLAB

Legend

ASPHALT - SLAB ON GRADE - NO LIMITS ON EV VEHICLES

CONCRETE SLAB

SPECTAPARK ASSOCIATES
PHILADELPHIA, PA. 19102

LZA LEV ZETLIN ASSOCIATES INC. ENGINEERS & ARCHITECTS

ALBANY CIVIC CENTER OPEN PARKING DECK

LEVEL-3 FLOOR PLAN

A3

Structural Feasibility Report

For

100 Beaver St,
Albany, NY

Prepared For:

Centrica Business Solutions

June 14, 2023

Reviewed By:

Ashutosh Patel, P.E.
NY PE License No. 080555

Overview of the MVP Arena Parking Garage

Scope 1

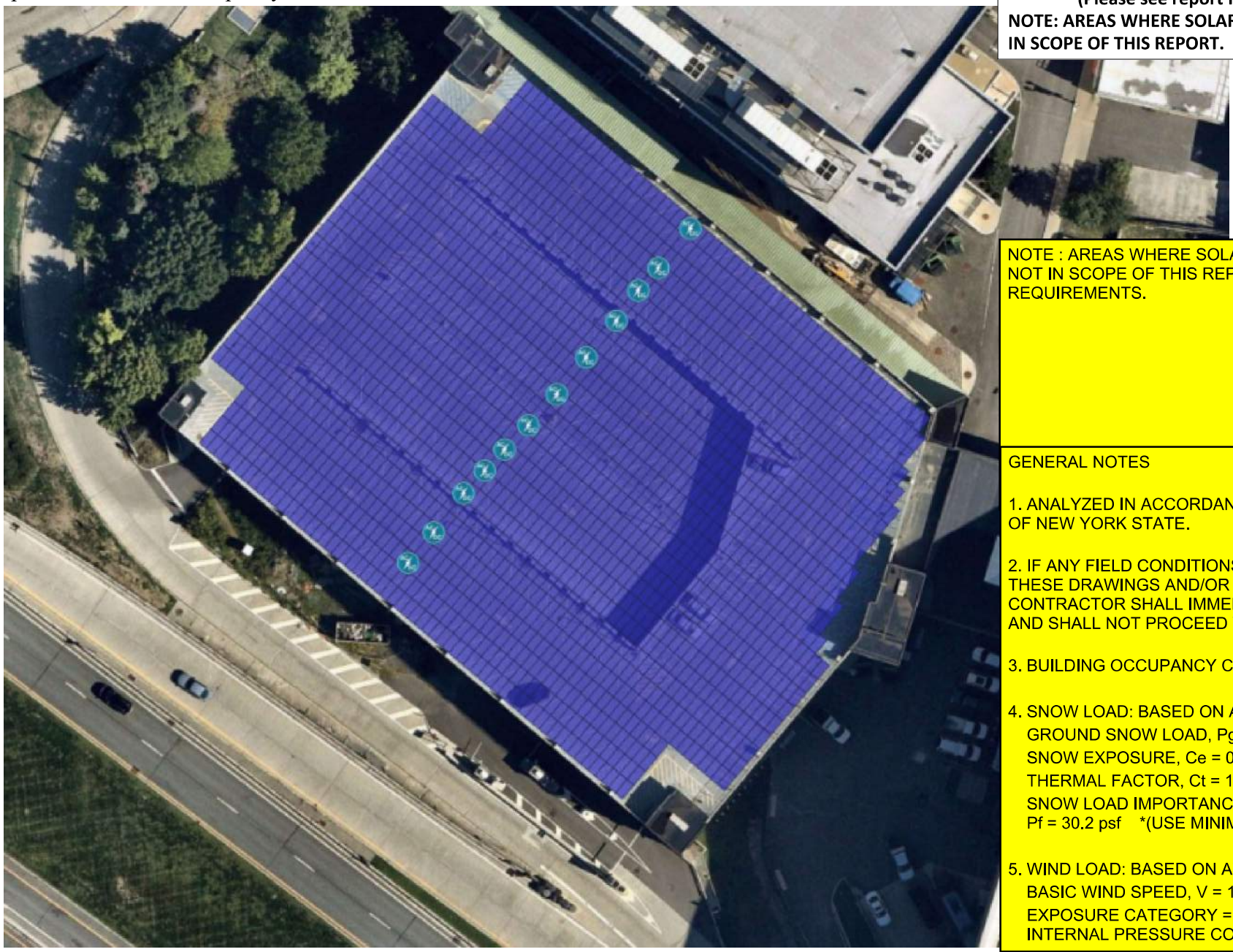
Evaluation of existing parking garage framing system for addition of canopy structure to hold solar panel with a reserve capacity of 15 PSF.

AVAILABLE RESERVE CAPACITY:

AREA#1:- 15.00 PSF RESERVE

(Please see report for additional requirements)

NOTE: AREAS WHERE SOLAR PANELS ARE NOT SHOWN ARE NOT IN SCOPE OF THIS REPORT.



NOTE : AREAS WHERE SOLAR PANELS ARE NOT SHOWN ARE NOT IN SCOPE OF THIS REPORT. SEE FIGURE FOR ADDITIONAL REQUIREMENTS.

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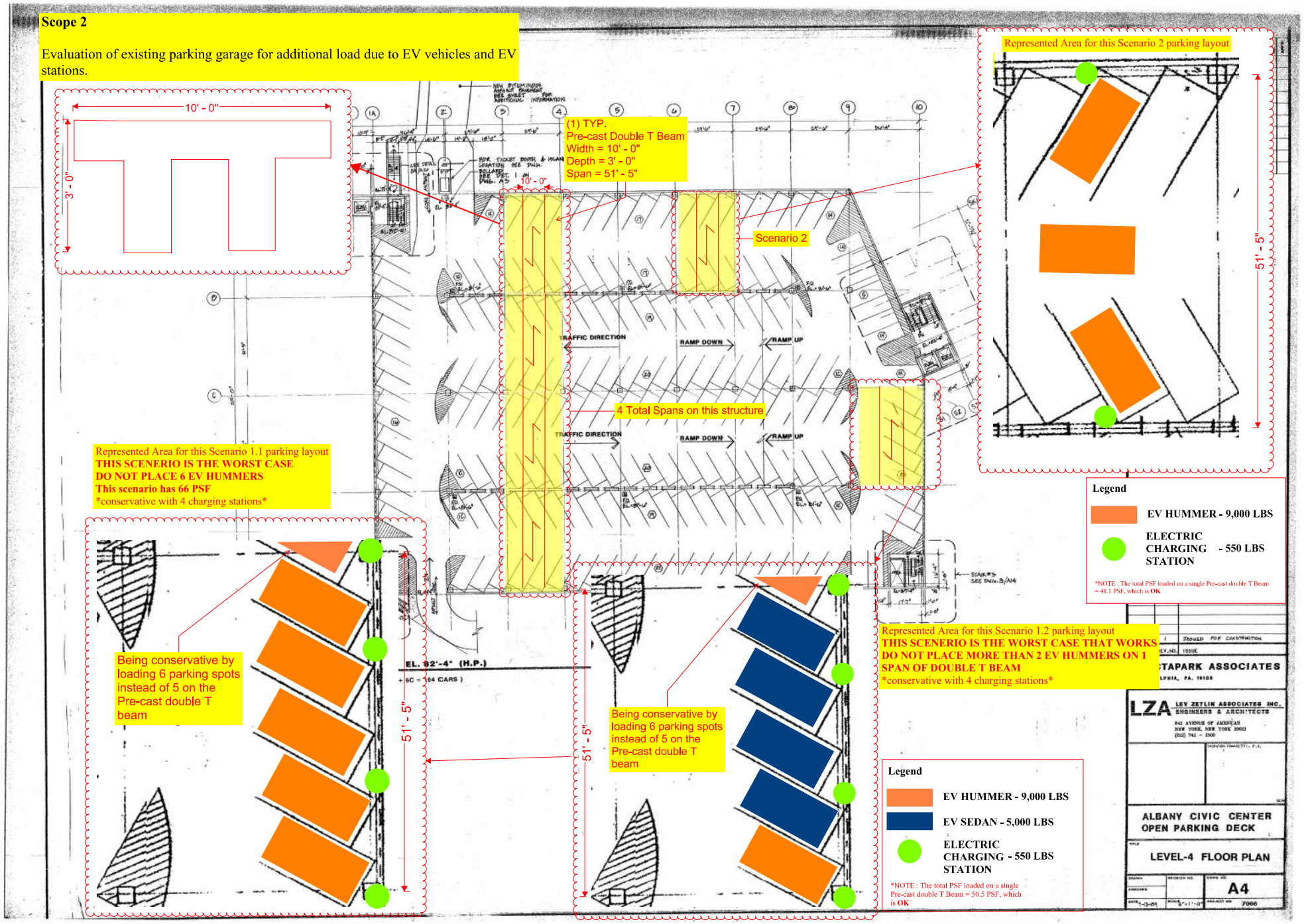
   GROUND SNOW LOAD, Pg = 40 psf
   SNOW EXPOSURE, Ce = 0.9
   THERMAL FACTOR, Ct = 1.2
   SNOW LOAD IMPORTANCE FACTOR, Is = 1.0
   Pf = 30.2 psf *(USE MINIMUM REQUIREMENT Pm = 30.2 psf)

5. WIND LOAD: BASED ON ATC HAZARDS BY LOCATION
   BASIC WIND SPEED, V = 110 mph
   EXPOSURE CATEGORY = B
   INTERNAL PRESSURE COEFFICIENT = +/- 0.18

Scope 2

Evaluation of existing parking garage for additional load due to EV vehicles and EV stations.

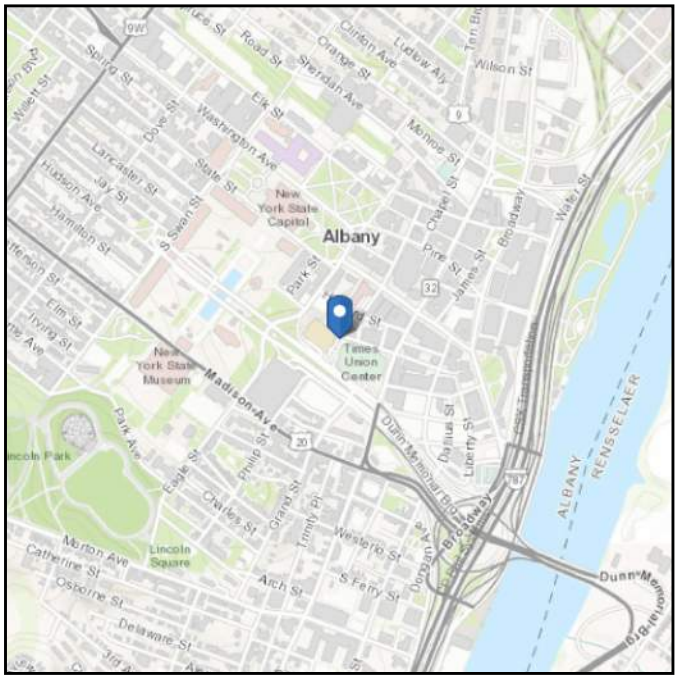


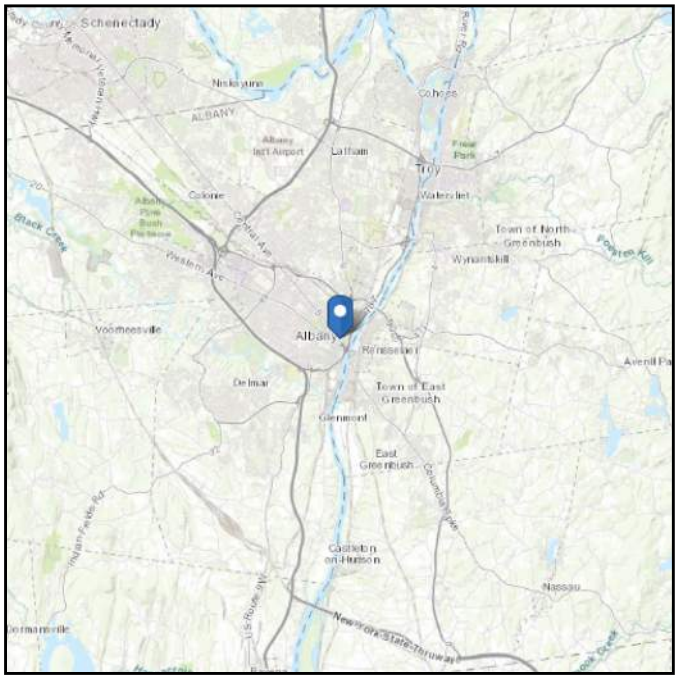
1.0 Field Information

ASCE 7 Hazards Report

Address:
100 Beaver St
Albany, New York
12207

Standard:	ASCE/SEI 7-16	**Latitude:**	42.649106
Risk Category:	II	**Longitude:**	-73.755555
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	48.396995672719555 ft (NAVD 88)





Wind

Results:

Wind Speed	110 Vmph
10-year MRI	75 Vmph
25-year MRI	82 Vmph
50-year MRI	88 Vmph
100-year MRI	93 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2

Date Accessed: Thu Jun 15 2023

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Snow

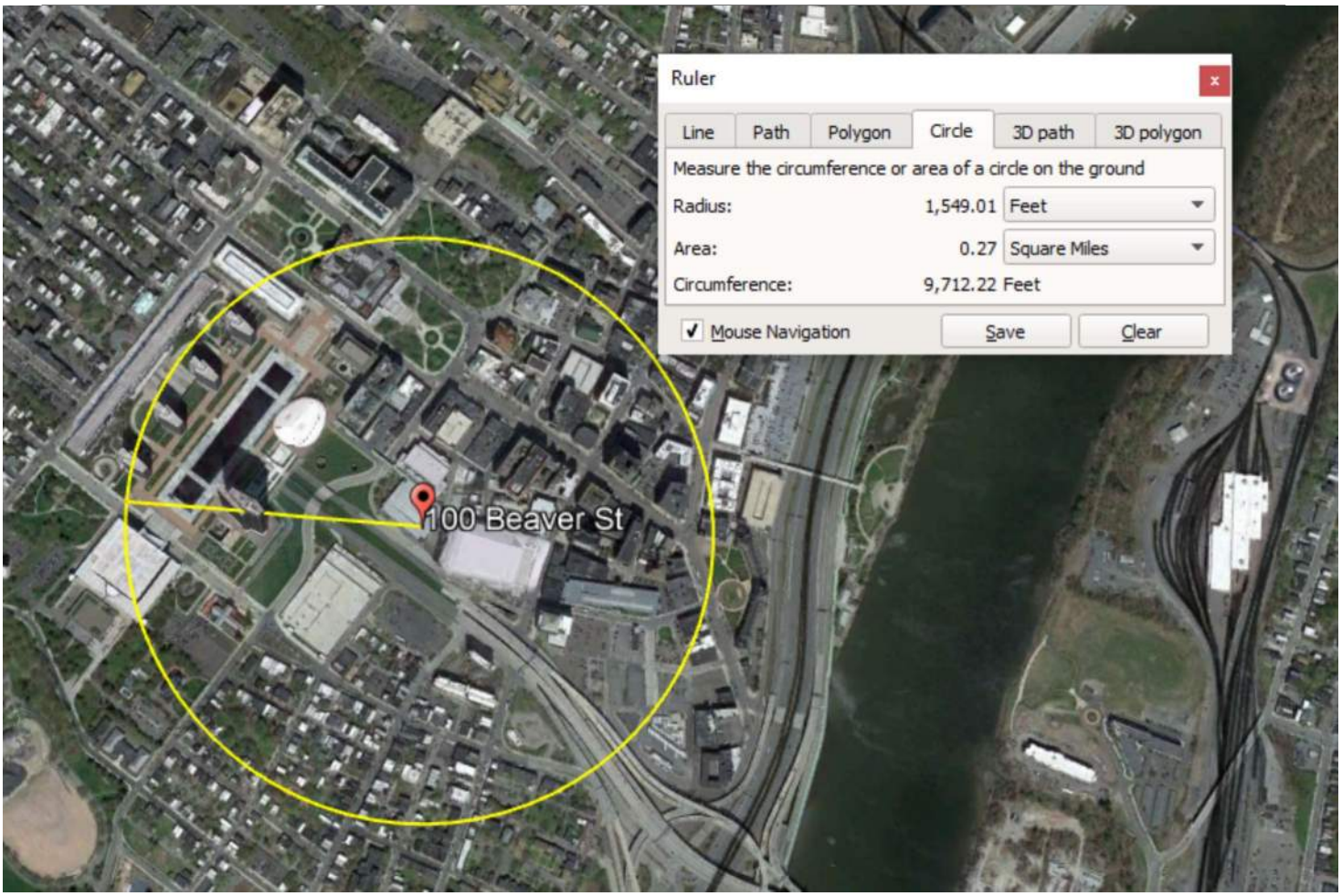
Results:

Ground Snow Load, p_g :	40 lb/ft^2
Mapped Elevation:	48.4 ft
Data Source:	ASCE/SEI 7-16, Table 7.2-8
Date Accessed:	Thu Jun 15 2023

Values provided are ground snow loads. In areas designated "case study required," extreme local variations in ground snow loads preclude mapping at this scale. Site-specific case studies are required to establish ground snow loads at elevations not covered.

Snow load values are mapped to a 0.5 mile resolution. This resolution can create a mismatch between the mapped elevation and the site-specific elevation in topographically complex areas. Engineers should consult the local authority having jurisdiction in locations where the reported 'elevation' and 'mapped elevation' differ significantly from each other.

EXPOSURE B



Structure Analysis

Site Photos

LOADING CALCULATIONS:

1. LIVE LOAD:

BOCA Building Code 1990 - Parking lot was built before IBC		50	PSF	
ASCE 7-16		40	PSF	
Load Credit per Level	**TOTAL**	**10**	**PSF**	

2. SNOW LOAD: *per chapter-7 ASCE-07-16*

Ground Snow load, P_g	40	PSF	*Table:7.3-2*
Thermal factor, C_t (unheated structures)	1.2		*Table:1.5-2*
Importance Factor, I_s	1		*Table:7.3-1*
Exposure factor, C_e	0.9		*Eq:7.3-1*
Flat roof snow load, $P_f = 0.7xC_txC_exI_sxP_g$	**30.2**	**PSF**	*S7.10 MAX(P_f,P_{min})*
Min. flat roof snow uniform load, Pfmin	**30.2**	PSF	

3. WIND LOADS: *per chapter-26,27,30 ASCE: 07-16*

Basic Ultimate wind speed, Vu	110	MPH	*S.26.7.3*
Exposure category	B		
Risk Category considered	II		*S:26.8.2*
Topography Factor, K_{zt}	1		*T:26.6-1*
Directionality factor, K_d	0.85		*S26.11*
Gust Effect factor, G	0.85		*T:26.10-1*
Velocity pressure coefficent, K_h for Comp&Cladding	0.7		*T:26.10-1*
Velocity pressure coefficent, K_z for MWFRS	0.57		*T:26.10-1*
Velocity pressure coefficent, K_z @ parapet top	0.57		*Eq:29.4-5*
Velocity Pressure, $q_h = 0.00256K_{zt}K_dK_zV^2$	**18.4**	**PSF**	
P_{Design}	**-3.3**	**PSF (-ve Down)**	
$P_{design\ (Min)}$	**16.0**	**PSF (Governs)**	

4.1. LOAD CREDIT

The total load credit in this structure is 60 PSF, which is derived by 10 PSF per level at 6 levels in this garage. Given that the solar canopies weight reserve is 15 PSF, it is by engineering judgement safe to conclude that the garage columns is adequate for the proposed solar canopies. It is important to note that scope 1 and 2 of the analysis do not corrolate or overlap in the structural analysis and evaluations.

SECTION 1106.0 UNIFORMLY DISTRIBUTED LIVE LOADS

1106.1 Uniform live load: The minimum uniformly distributed *live load* in pounds per square foot shall be as provided for in Table 1106.1, and for all concentrated *loads* wherever such *loads* occur as provided for in Section 1106.0. The *live loads* in Table 1106.1 are the minimum *loads* to be used for the occupancies listed. Where the building will be subjected to greater *live loads*, such *loads* shall be used for design.

1106.1.1 Trucks and buses: Minimum *live loads* for *garages* having trucks or buses shall be in accordance with lane loads of AASHTO HB-14 listed in Appendix A, but shall not be less than 50 psf (244 kg/m^2).

1106.1.2 Residential attics: A *live load* shall be applied to joists or to bottom chords of trusses or trussed rafters only in those portions of attic space having a clear height of 42 inches (1067 mm) or more between joist and rafter in conventional rafter construction; and between bottom chord and any other member in trusses or trussed rafter construction. However, joists or the bottom chords of trusses or trussed rafters shall be designed to sustain the imposed *dead load* or 10 psf (49 kg/m^2), whichever is greater, uniformly distributed over the entire span.

A further ceiling dead-load reduction to a minimum of 5 psf (24 kg/m^2) or the actual *dead load*, whichever is greater, applied to joists in conventional rafter construction or to the bottom chords of trusses or trussed rafters is permitted under either or both of the following conditions:

1. Where the clear height is not over 30 inches (762 mm) between joist and rafter in conventional construction and between the bottom chord and any other member for trusses or trussed rafter construction.
2. Where a clear height of greater than 30 inches (762 mm), as defined in item 1, does not exist for a horizontal distance of more than 12 inches (305 mm) along the member.

Table 1106.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS

Occupancy or use	Live load (psf)[a]
Apartments (see Residential)	
Armories and drill rooms	150
Assembly areas:	
Fixed seats	50
Movable seats	100
Platforms (assembly)	100
Stage floors	150
Balcony (exterior)	100
One- and two-family dwellings only	60
Bowling centers, poolrooms and billiard rooms	75
Cornices	60
Corridors, except as otherwise indicated	100
Dwellings (see Residential)	
Fire escapes	100
Single-family residential buildings only	40

Table 1106.1 (cont'd.)
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS

Occupancy or use	Live load (psf)[a]
Garages:	
Passenger cars	50
Trucks and buses — see Section 1106.1.1	50
Grandstands (see Reviewing stands)	
Gymnasiums, main floors and balconies	100
Hospitals:	
Operating rooms, laboratories	60
Private rooms	40
Wards	40
Corridors, above first floor	80
Hotels (see Residential)	
Institutional — residential care (see Residential)	
Libraries:	
Reading rooms	60
Stack rooms	150
Manufacturing:	
Light	100
Heavy	150
Marquees	75
Office buildings:	
Offices	50
Lobbies	100
Corridors, above first floor	80
File and computer rooms require heavier loads based upon anticipated occupancy	
Penal institutions:	
Cell blocks	40
Residential:	
Attics — see Section 1106.1.2	20
Multiple-family dwellings:	
Dwelling units	40
Public rooms	100
Corridors	80
One- and two-family dwellings	40
Sleeping rooms	30
Hotels:	
Guestrooms	40
Public rooms	100
Corridors serving public rooms	100
Corridors	80
Reviewing stands, grandstands and bleachers — see Section 1108.5	100
Schools:	
Classrooms	40
Corridors	80
Sidewalks, vehicular driveways, subject to trucking	250
Skating rinks	100
Stairs and exits	100
Storage areas:	
Light	125
Heavy	250

Table 4.3-1 Minimum Uniformly Distributed Live Loads, L_o, and Minimum Concentrated Live Loads

Occupancy or Use	Uniform, L_o psf (kN/m^2)	Live Load Reduction Permitted? (Sec. No.)	Multiple-Story Live Load Reduction Permitted? (Sec. No.)	Concentrated lb (kN)	Also See Section
Apartments (See Residential)					
Access floor systems					
Office use	50 (2.40)	Yes (4.7.2)	Yes (4.7.2)	2,000 (8.90)	
Computer use	100 (4.79)	Yes (4.7.2)	Yes (4.7.2)	2,000 (8.90)	
Armories and drill rooms	150 (7.18)	No (4.7.5)	No (4.7.5)		
Assembly areas					
Fixed seats (fastened to floors)	60 (2.87)	No (4.7.5)	No (4.7.5)		
Lobbies	100 (4.79)	No (4.7.5)	No (4.7.5)		
Movable seats	100 (4.79)	No (4.7.5)	No (4.7.5)		
Platforms (assembly)	100 (4.79)	No (4.7.5)	No (4.7.5)		
Stage floors	150 (7.18)	No (4.7.5)	No (4.7.5)		
Reviewing stands, grandstands, and bleachers	100 (4.79)	No (4.7.5)	No (4.7.5)		4.14
Stadiums and arenas with fixed seats (fastened to the floor)	60 (2.87)	No (4.7.5)	No (4.7.5)		4.14
Other assembly areas	100 (4.79)	No (4.7.5)	No (4.7.5)		
Balconies and decks	1.5 times the live load for the area served. Not required to exceed 100 psf (4.79 kN/m^2)	Yes (4.7.2)	Yes (4.7.2)		
Catwalks for maintenance access	40 (1.92)	Yes (4.7.2)	Yes (4.7.2)	300 (1.33)	
Corridors					
First floor	100 (4.79)	Yes (4.7.2)	Yes (4.7.2)		
Other floors	Same as occupancy served except as indicated				
Dining rooms and restaurants	100 (4.79)	No (4.7.5)	No (4.7.5)		
Dwellings (See Residential)					
Elevator machine room grating (on area of 2 in. by 2 in. (50 mm by 50 mm))		—	—	300 (1.33)	
Finish light floor plate construction (on area of 1 in. by 1 in. (25 mm by 25 mm))		—	—	200 (0.89)	
Fire escapes	100 (4.79)	Yes (4.7.2)	Yes (4.7.2)		
On single-family dwellings only	40 (1.92)	Yes (4.7.2)	Yes (4.7.2)		
Fixed ladders		—	—	See Sec. 4.5.4	
Garages (See Section 4.10)					
Passenger vehicles only	40 (1.92)	No (4.7.4)	Yes (4.7.4)	See Sec. 4.10.1	
Trucks and buses	See Sec. 4.10.2	—	—	See Sec. 4.10.2	
Handrails and Guardrails	See Sec. 4.5.1	—	—	See Sec. 4.5.1	
Grab bars		—	—	See Sec. 4.5.2	
Helipads (See Section 4.11)					
Helicopter takeoff weight 3,000 lb (13.35 kN) or less	40 (1.92)	No (4.11.1)	—	See Sec. 4.11.2	
Helicopter takeoff weight more than 3,000 lb (13.35 kN)	60 (2.87)	No (4.11.1)	—	See Sec. 4.11.2	
Hospitals					
Operating rooms, laboratories	60 (2.87)	Yes (4.7.2)	Yes (4.7.2)	1,000 (4.45)	
Patient rooms	40 (1.92)	Yes (4.7.2)	Yes (4.7.2)	1,000 (4.45)	
Corridors above first floor	80 (3.83)	Yes (4.7.2)	Yes (4.7.2)	1,000 (4.45)	
Hotels (See Residential)					
Libraries					
Reading rooms	60 (2.87)	Yes (4.7.2)	Yes (4.7.2)	1,000 (4.45)	
Stack rooms	150 (7.18)	No (4.7.3)	Yes (4.7.3)	1,000 (4.45)	4.13
Corridors above first floor	80 (3.83)	Yes (4.7.2)	Yes (4.7.2)	1,000 (4.45)	
Manufacturing					
Light	125 (6.00)	No (4.7.3)	Yes (4.7.3)	2,000 (8.90)	
Heavy	250 (11.97)	No (4.7.3)	Yes (4.7.3)	3,000 (13.35)	
Office buildings					
File and computer rooms shall be designed for heavier loads based on anticipated occupancy					
Lobbies and first-floor corridors	100 (4.79)	Yes (4.7.2)	Yes (4.7.2)	2,000 (8.90)	
Offices	50 (2.40)	Yes (4.7.2)	Yes (4.7.2)	2,000 (8.90)	
Corridors above first floor	80 (3.83)	Yes (4.7.2)	Yes (4.7.2)	2,000 (8.90)	

40 PSF for LL

continues

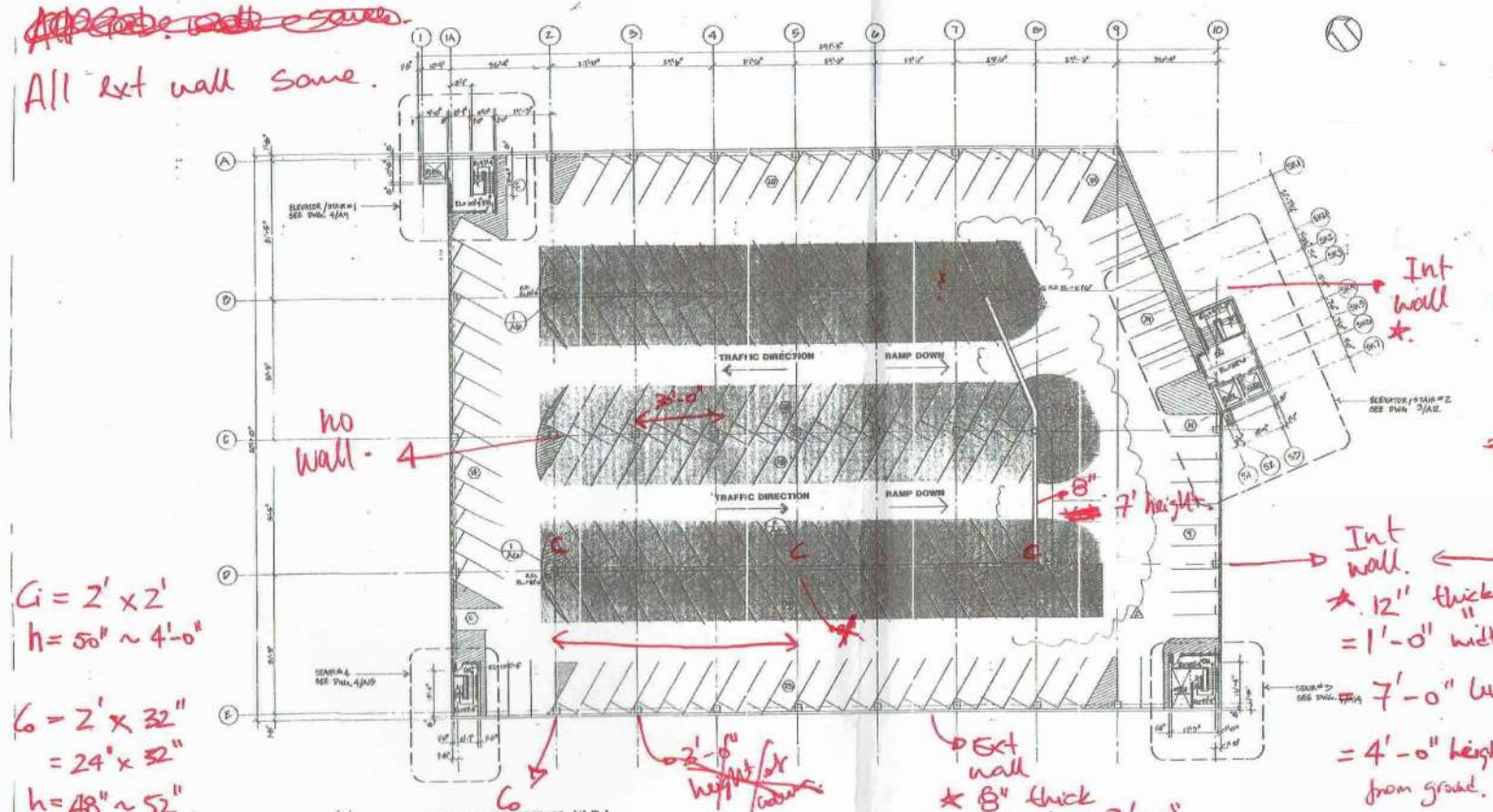
EV Loads Analysis

FIELD NOTES - 06-09-23

All ext. Column same size.

~~All ext. wall same.~~

All ext wall same.



Int wall ★.

no wall - 4

8" 7' height.

Int wall. ★ 12" thick = 1'-0" width 7'-0" length. = 4'-0" height from ground.

Gap between walls 34"

Ext wall ★ 8" thick h = 3'-0"

2'-0" height for ledge

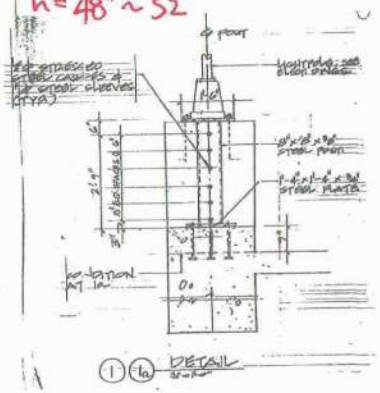
6

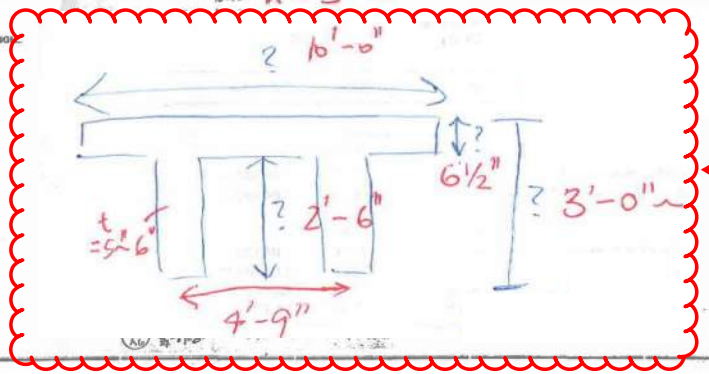
Straight parking 16' x 9'

diagonals. parking spot 16'-0" x 10'-0" wider diagonal 16'-0 x 10'-6"

Ci = 2' x 2' h = 50" ~ 4'-0"

C = 2' x 32" = 24" x 32" h = 48" ~ 52"





Crucial Information for LL load requirement calculations

SPECTAPARK ASSOCIATES

LZA

LEVEL-6 FLOOR PLAN

A6

Scenario 1.1 - Outer Parking
Worst Case Scenario
6 EV Hummer next to each other

DO NOT PUT 6 EV HUMMERS ON 1 DOUBLE T

*Note :
Parking spots dimensions : 16 FT X 10 FT.

This calculation condition is cars loaded on 1 single pre-cast double T.

This garage was built 1989, we will be using a LL = 50 because before 2000s the LL had a minimum of 50 PSF per BOCA National Building Code.

1 single pre-cast double T width = 10 FT
Parking space length = 16 FT Length
Assume,
10/16 = 62.5 % of the load of 1 car is loading into the pre-cast

Electric Hummer = 9,000 lbs
6 vehicles - 62.5 % of 9,000 lbs = 5625 lbs x 6 cars = 33,750 lbs loaded on pre-cast
Area loaded = 10 FT x 51.416 FT = 514.16 FT^2

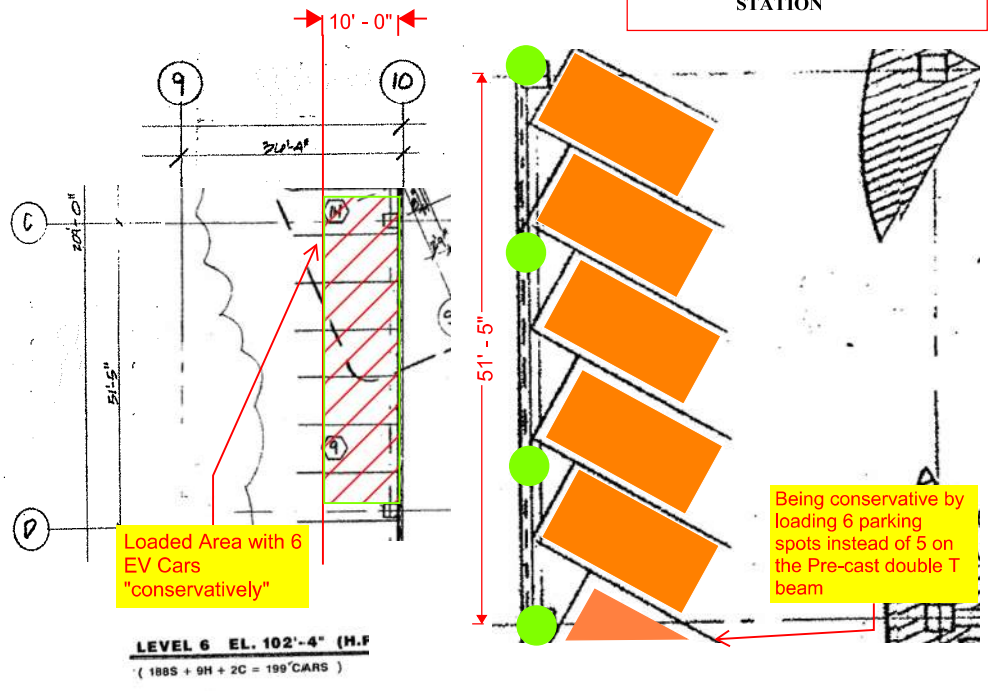
IF, 6 EV Hummers are loaded next to each other the PSF =
33,750 lbs / 514.16 FT^2 = 65.64 PSF > LL of 50 PSF

This violates the code. DO NOT WORK 6 HUMMERS

Legend

EV HUMMER - 9,000 LBS

ELECTRIC CHARGING STATION - 550 LBS



Scenario 1.2 - Outer Parking
Worst Case Scenario that works
2 EV Hummer loading + 4 EV Sedan + 4 Charging Stations

*Note :
Parking spots dimensions : 16 FT X 10 FT.

THIS IS OK

This calculation condition is cars loaded on 1 single pre-cast double T.

This garage was built 1989, we will be using a LL = 50 because before 2000s the LL had a minimum of 50 PSF per BOCA National Building Code.

Regular EV car = 5000 lbs
4 vehicles - 62.5% of 5,000 = 3125 lbs x 4 = 12,500 lbs 4 loaded EV cars on pre-cast
Area loaded = 514.16 FT^2

2 EV Hummer : 5625 lbs x 2 cars = 11,250 lbs loaded on pre-cast

IF,
2 EV Hummers are loaded next to each other +
4 regular EV cars + 4 charging stations the PSF

11,250 lbs + 12,500 lbs + (550 lbs x 4 stations)
= 27512.5 lbs / 514.16 FT^2
= 50.47 PSF ONLY 5% over is fine.

LIMIT THAT PARKING THAT ONLY 2 EV HUMMERS CAN PARK NEXT TO EACH OTHER.

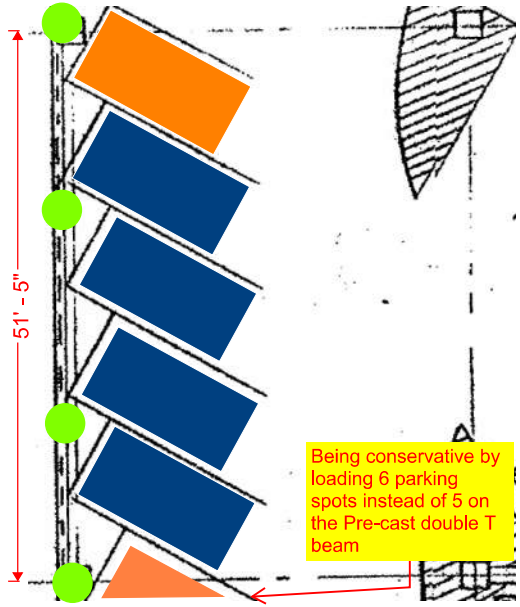
Legend

EV HUMMER - 9,000 LBS

EV SEDAN - 5,000 LBS

ELECTRIC CHARGING STATION - 550 LBS

*NOTE : The total PSF loaded on a single Pre-cast double T Beam = 50.5 PSF, which is **OK**



Scenario 2 - Center Parking
Worst Case Scenario
3 EV Hummer loading + 2 Charging Stations

*Note :
Parking spots dimensions : 16 FT X 10 FT.

This calculation condition is cars loaded on 1 single pre-cast double T.

This garage was built 1989, we will be using a LL = 50 because before 2000s the LL had a minimum of 50 PSF per BOCA National Building Code.

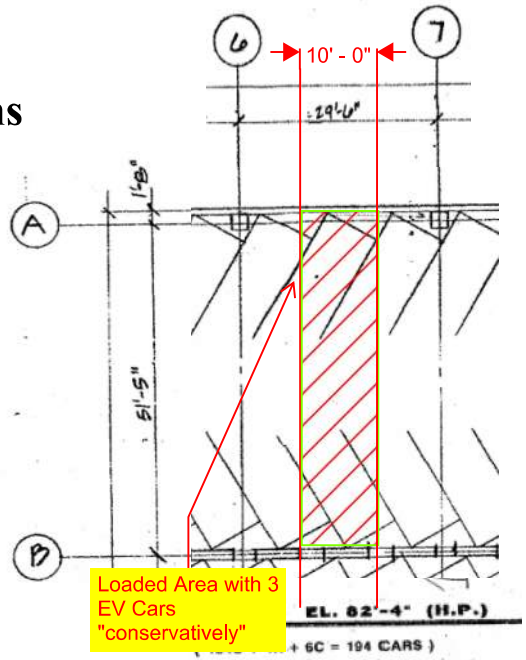
1 single pre-cast double T width = 10 FT
Parking space width = 10 FT Length

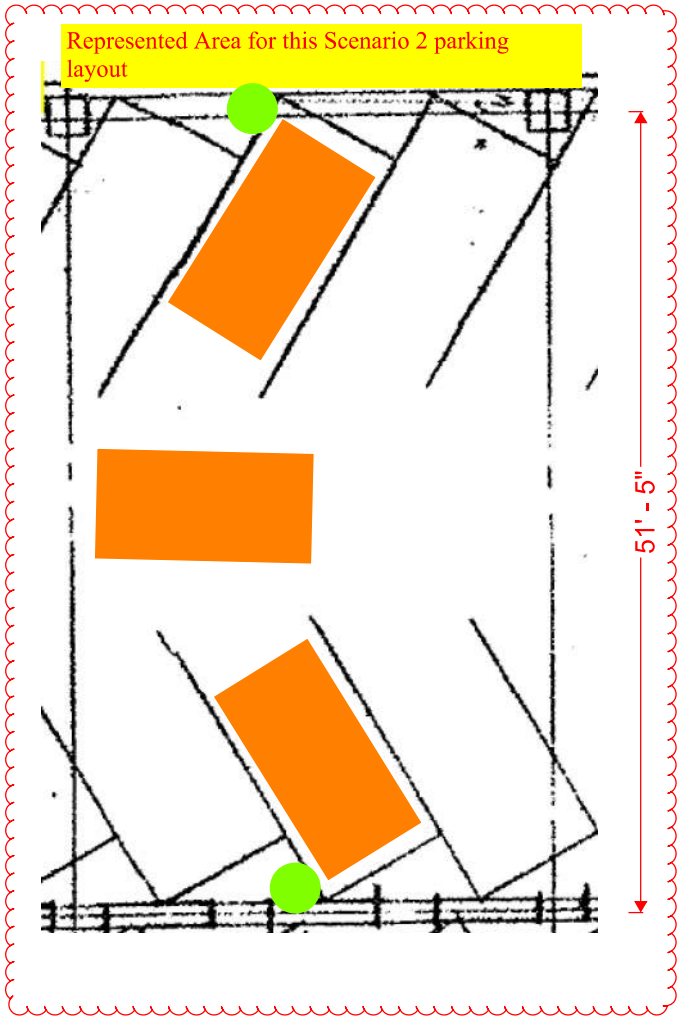
Electric Hummer = 9,000 lbs
2 vehicles - 9,000 lbs x 2 cars = 18,000 lbs loaded on pre-cast
1 vehicle - 62.5 % of 9,000 lbs = 5625 lbs loaded on pre-cast
Area loaded = 10 FT x 51.416 FT = 514.16 FT^2

Assuming 1 EV Hummer is driving by and 62.5% of the weight is loading onto the pre-cast

IF, 2 EV Hummers are loaded on the pre-cast + 1 EV Hummer drive-by + 2 charging stations the PSF
= 18,000 lbs + 5625 lbs + (550 lbs x 2 stations)
= 24725 lbs / 514.16 FT^2 = 48.1 PSF < LL of 50 PSF

THIS IS OK! VERY UNLIKELY WORST CASE SCENARIO





Legend

EV HUMMER - 9,000 LBS

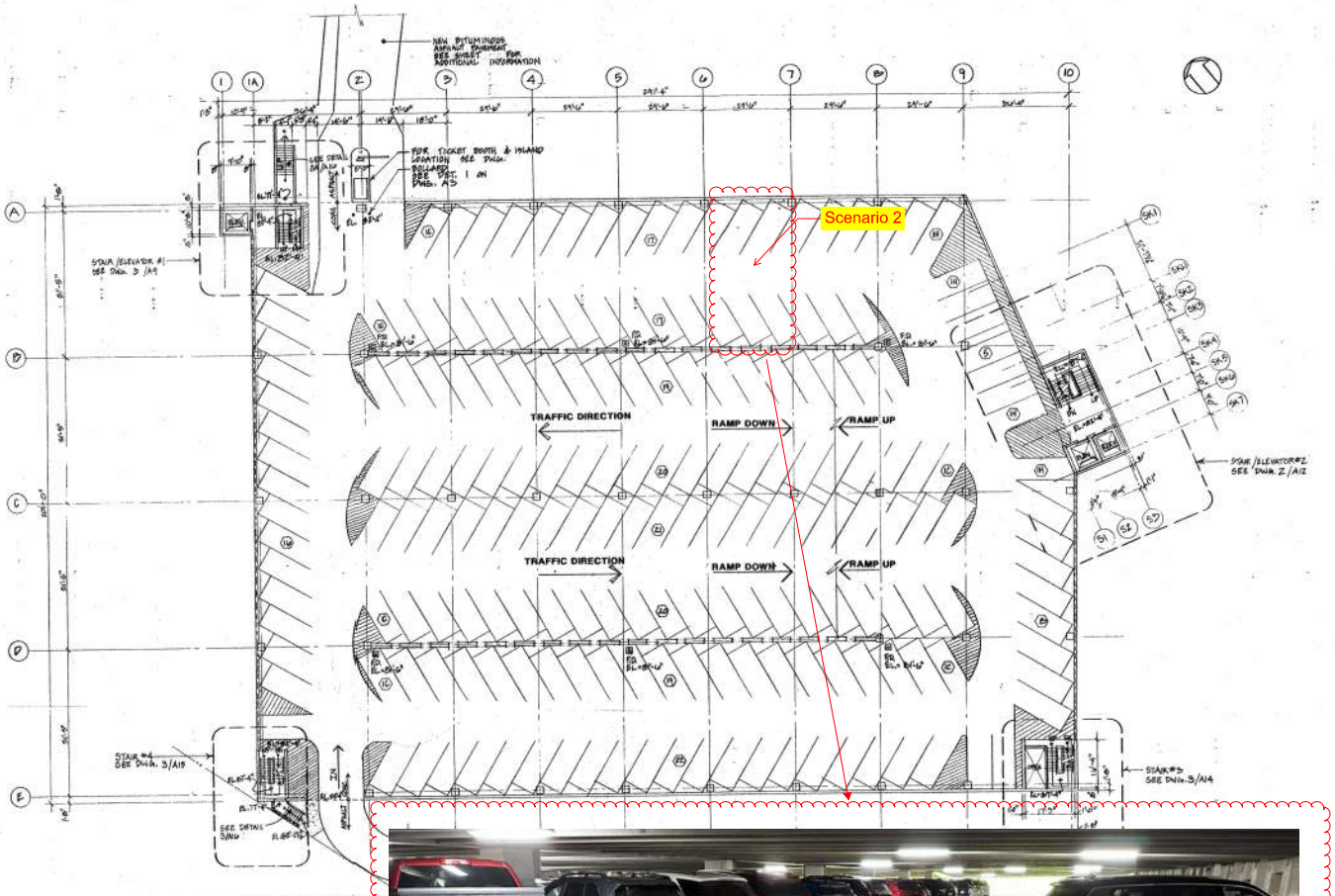
ELECTRIC CHARGIN G STATION - 550 LBS

2022 HUMMER EV EDITION 1 OFF-ROAD DRIVING SPECIFICATIONS

	Standard Settings	Terrain Mode	Available Extract Mode[1]
Wheelbase (in. / mm):	135.6 / 3445	135.6 / 3445	135.6 / 3445
Vehicle length (in. / mm):	216.8 / 5507	216.8 / 5507	216.8 / 5507
Width w/o mirrors (in. / mm):	86.7 / 2201	86.7 / 2201	86.7 / 2201
Width w/ mirrors (in. / mm):	93.7 / 2380	93.7 / 2380	93.7 / 2380
Max ground clearance (in. / mm):	10.1 / 257	11.9 / 302	15.9 / 404
Front overhang (in. / mm):	34.7 / 881	34.7 / 881	34.7 / 881
Rear overhang (in. / mm):	46.5 / 1181	46.5 / 1181	46.5 / 1181
Approach angle (deg.):	41.5	44.3	49.7
Departure angle (deg.):	31.6	33.7	38.4
Breakover angle (deg.):	22.3	25.4	32.2
Water fording depth (in. / mm):	26 / 660	28 / 711	32 / 813
Track width (in. / mm):	73.3 / 1863 (front and rear)	73.3 / 1863 (front and rear)	73.3 / 1863 (front and rear)
Turning circle – 2-wheel steering (ft. / m):	44.3 / 13.5	44.3 / 13.5	--
Turning circle – 4-wheel steering (ft. / m):	37.1 / 11.3	37.1 / 11.3	--
Suspension travel (in. / mm):	13 / 330 (front and rear)	13 / 330 (front and rear)	--

Front wheel to rear wheel distance

Wheel to Wheel Width



NOTES:

1. SEE PRECAST MANUFACTURES DRAWINGS FOR DETAILS AND SECTIONS ON BUILDING STRUCTURE.
2. VARIFY ALL WINDOW, DOOR AND STAIR OPENINGS IN THE FIELD PRIOR TO FABRICATION AND INSTALLATION.
3. FOR WINDOW AND DOOR DETAILS SEE SHEET A17.
4. FOR STAIR DETAILS SEE SHEET A16.

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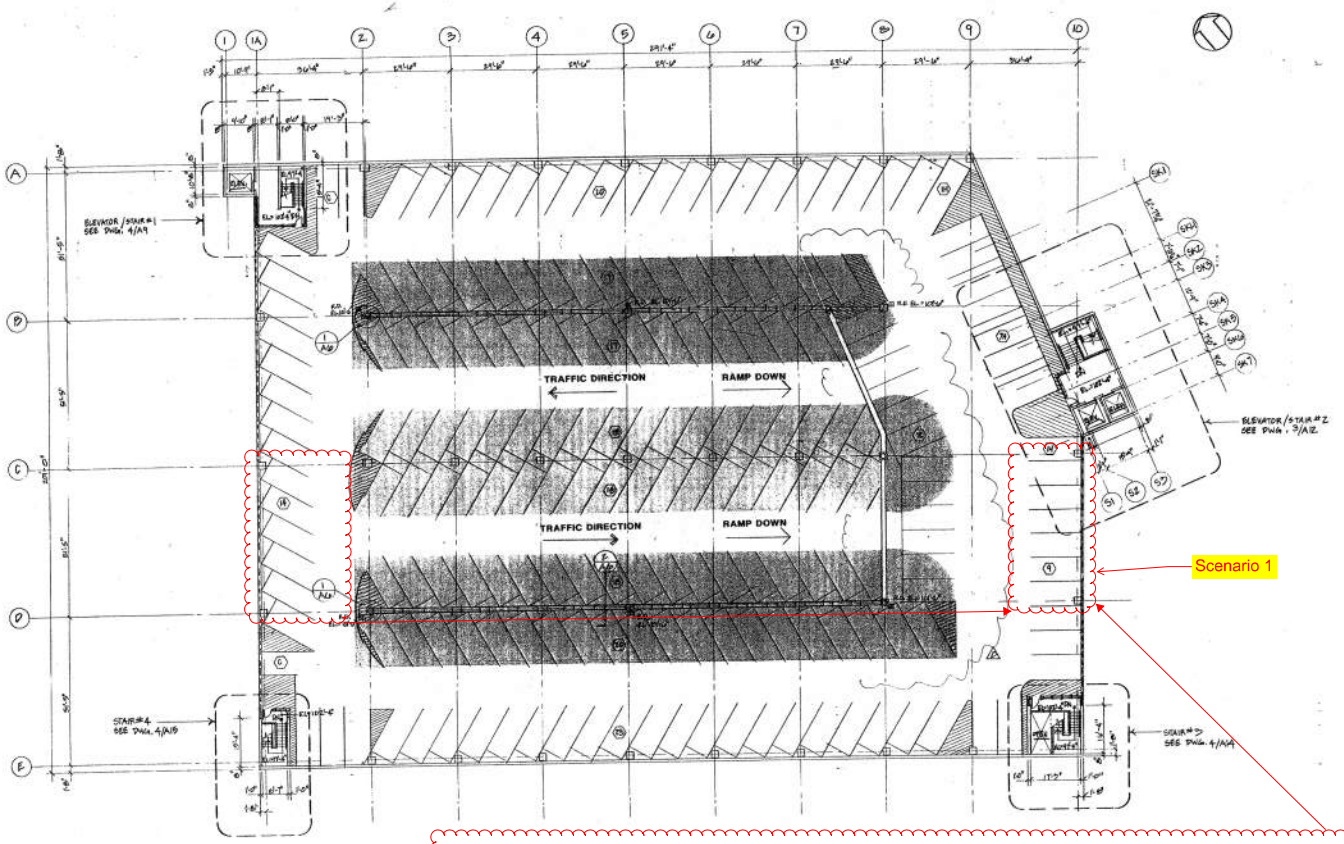
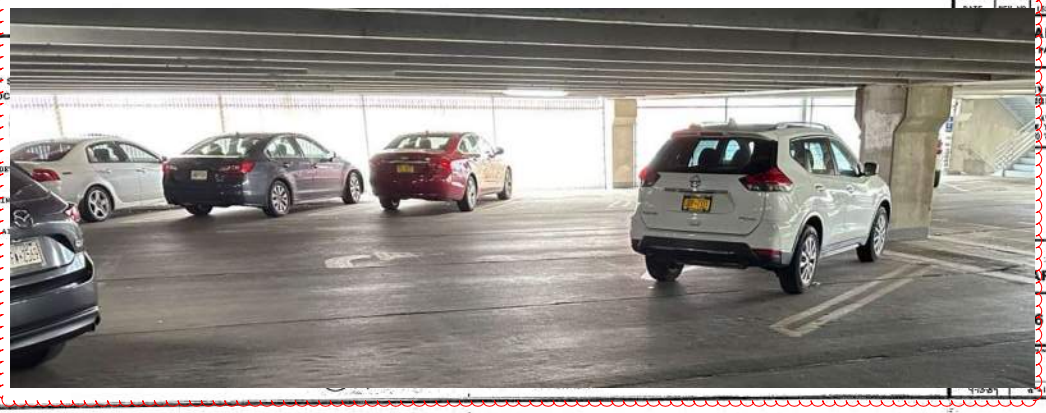
ENGINEERS & ARCHITECTS
641 AVENUE OF AMERICAS
NEW YORK, NEW YORK 10011
(212) 741 - 1500

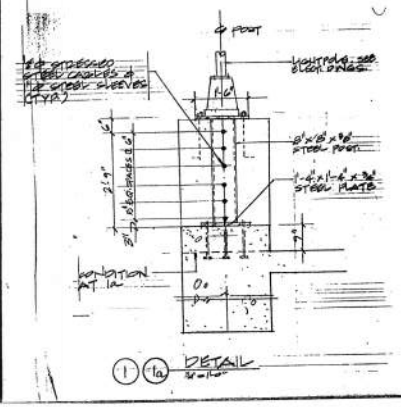
ALBANY CIVIC CENTER
OPEN PARKING DECK

LEVEL-4 FLOOR PLAN

DRAWN
CHECKED
DATE 1-13-07
REVISION NO.
SCALE 1/8"=1'-0"
DRWG NO. A4
PROJECT NO. 7066







LEVEL 6 EL. 102'-4" (H.P.)

(188S + 9H + 2C = 199 CARS)

INDICATES AREA OF
FOR LAMP POST LOC

NOTES:

1. SEE PRECAST MANUFACTURERS DRAWINGS FOR
BUILDING STRUCTURE.
2. VARIFY ALL WINDOW, DOOR AND STAIR OPEN
FABRICATION AND INSTALLATION.
3. FOR WINDOW AND DOOR DETAILS SEE SHEET
4. FOR STAIR DETAILS SEE SHEET A16.

DISTRIBUTION

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741 - 1500

CIVIC CENTER
RKING DECK

FLOOR PLAN

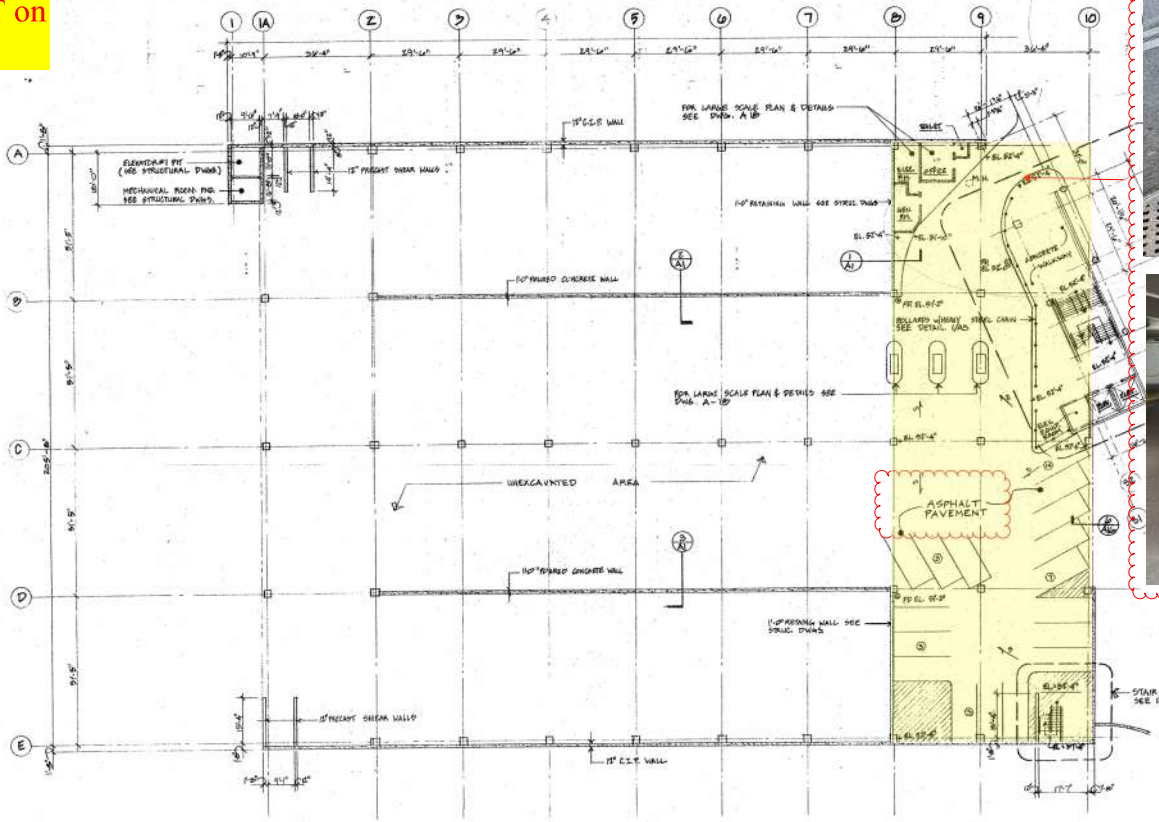
A6

7068

Garage Deck

This is the As-Built drawings from LZA, showing ASPHALT on Level 1

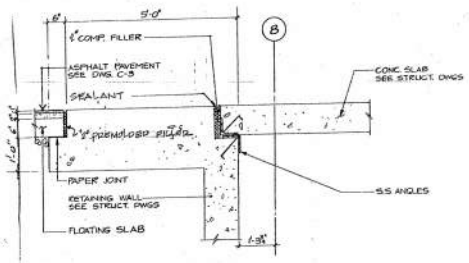
ASPHALT



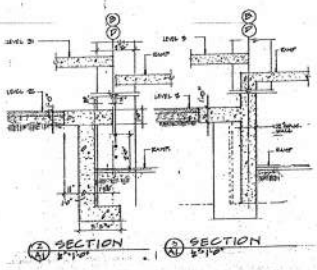
LEVEL 1 EL. = 52' - 4" (H.P.)
(16S + 1H = 17 CARS)

Legend

- ASPHALT - SLAB ON GRADE - NO LIMITS ON EV VEHICLES
- CONCRETE SLAB



1 DETAIL SCALE: 1"=1'-0"



2 SECTION 3 SECTION

NOTES:

1. SEE PRECAST MANUFACTURER DRAWINGS FOR DETAILS AND SECTIONS ON BUILDING STRUCTURE.
2. VARIFY ALL WINDOW, DOOR AND STAIR OPENINGS IN THE FIELD PRIOR TO FABRICATION AND INSTALLATION.
3. FOR WINDOW AND DOOR DETAILS SEE SHEET A17.
4. FOR STAIR DETAILS SEE SHEET A16.

9-19-08 ISSUED FOR CONSTRUCTION
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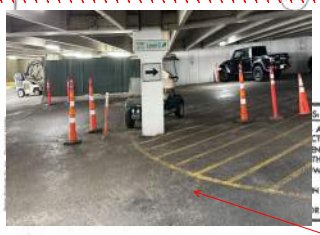
LZA LEV ZETLIN ASSOCIATES INC. ENGINEERS & ARCHITECTS
241 AVENUE OF AMERICAS NEW YORK, NEW YORK 10011 (212) 741 - 1300

ALBANY CIVIC CENTER OPEN PARKING DECK

LEVEL 1 FLOOR PLAN

DRAWN CHECKED DATE 1-Sept-08 REVISION NO. SCALE 1/8"=1'-0" DWG. NO. A1 PROJECT NO. 7080

This is the As-Built drawings from UNISTRESS, Showing ASPHALT AND CONCRETE SLAB LEVEL 2



Legend

ASPHALT - SLAB ON GRADE - NO LIMITS ON EV VEHICLES

CONCRETE SLAB

JOB USE

ALBANY CIVIC CENTER OPEN PARKING GARAGE

LAYOUT LEVEL 2

DATE: 8-1-89

JOB NO: 8907

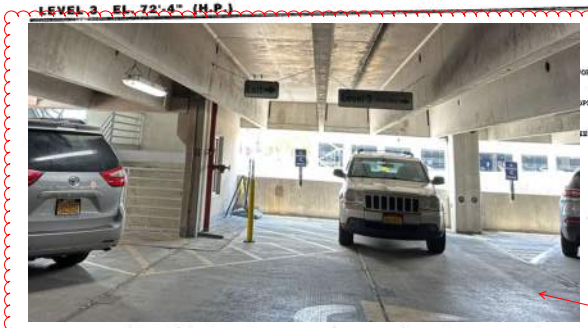
DWG. NO: F-4

This is the As-Built drawings from LZA, Showing CONCRETE SLAB LEVEL 3

THE CONCRETE SLAB GOES UP TO LEVEL 6

CONCRETE SLAB

TRAFFIC DIRECTION
RAMP DOWN
RAMP UP
TRAFFIC DIRECTION
RAMP DOWN
RAMP UP



CONCRETE SLAB

Legend

ASPHALT - SLAB ON GRADE - NO LIMITS ON EV VEHICLES

CONCRETE SLAB

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NEW YORK, NEW YORK 10011
(212) 741 - 1300

ALBANY CIVIC CENTER
OPEN PARKING DECK

LEVEL-3 FLOOR PLAN

A3

9-10-09 7066

BOLLARD DETAIL

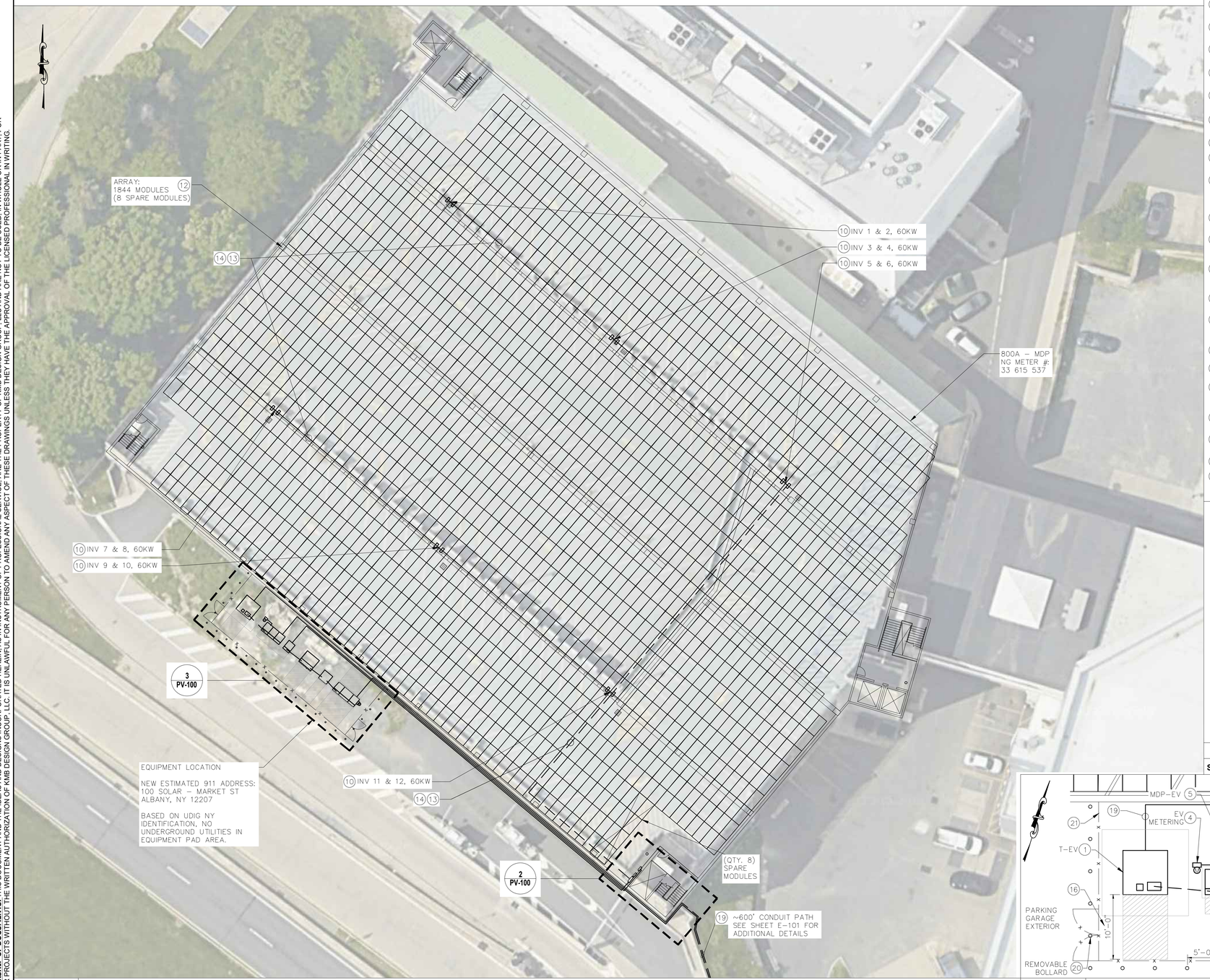
PLAN / SECTION

Appendix C – 10% Electrical Design Drawings

SYSTEM INFORMATION:

PV DC SIZE	991.44	KW
PV AC SIZE	720	KW
MODULE TYPE	BOVIET BVM7612M-540-H-HC-BF-DG	
MODULE QUANTITY	1836	MODULES
MODULE TILT	3°	
MODULE AZIMUTH	220°	
INVERTER TYPE	CHINT CPS SCA60KTL-DO-US	
INVERTER QUANTITY	12	INVERTERS
EV CHARGING TYPE	MODEL TBD	
EV CHARGING PORT CAPACITY	7.2	KW
EV CHARGING PORT QUANTITY	74	PORTS
TOTAL EV CHARGING CAPACITY	532.8	KW

PANEL	INVERTER MODEL	INVERTER SIZE (AC)	INVERTER QTY.	SYSTEM SIZE (AC)	MODULE MODEL	MODULE SIZE (W) NAMEPLATE	NUMBER OF STRINGS	MODULES PER STRING	NUMBER OF MODULES	TILT	AZIMUTH	SYSTEM SIZE (KWDC) NAMEPLATE	DC:AC
ACP-A	CHINT CPS SCA60KTL-DO-US	60	12	720	BOVIET BVM7612M-540 -H-HC-BF-DG	540	108	17	1,836	3°	220°	991.44	1.38
TOTAL:	-	-	12	720	-	540	108	-	1,836	-	-	991.44	1.38



1 **PHOTOVOLTAIC SYSTEM LAYOUT**

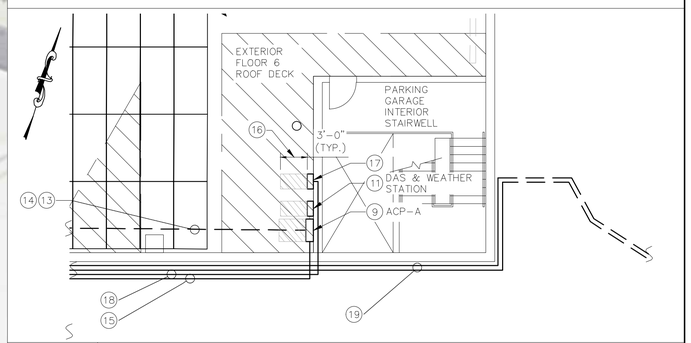
SCALE: 1" = 20'-0"

SYSTEM PLAN GENERAL NOTES:

1. PHOTOVOLTAIC INSTALLATION SHALL BE INSTALLED IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE 2017 EDITION & 2018 INTERNATIONAL BUILDING CODE.
2. THE SUBCONTRACTOR SHALL VERIFY EXISTING SITE CONDITIONS AND MAKE ANY ADJUSTMENTS NECESSARY TO AVOID INTERFERENCE.
3. SUBCONTRACTOR SHALL MAINTAIN ALL SITE SAFETY REGULATIONS AS OUTLINED BY ONSITE MANAGEMENT. SUBCONTRACTOR IS RESPONSIBLE FOR ALL MEANS AND METHODS OF SAFETY AND RIGGING. THESE PLANS SHOULD NOT BE UTILIZED AS VERIFICATION FOR POINTS OF ATTACHMENT OF SAFETY EQUIPMENT AND/OR PLACEMENT OF VERTICAL EQUIPMENT LIFTS.
4. SUBCONTRACTOR SHALL MINIMIZE DISRUPTION OF OWNER'S ONSITE ACTIVITIES. VERIFY SCHEDULE AND ALL STAGING AND STORAGE AREAS WITH CENTRICA PRIOR TO BEGINNING WORK.
5. THE DESIGN OF THE RACKING SYSTEM, BALLASTING AND/OR ATTACHMENT DESIGN, AND ALL ASSOCIATED CALCULATIONS ARE NOT INCLUDED IN THE SCOPE OF WORK PERFORMED BY KMB DESIGN GROUP, LLC(KMB), ARE NOT PART OF THESE DRAWINGS AND KMB MAKES NO REPRESENTATION WHATSOEVER WITH REGARD TO SAID RACKING, BALLASTING AND/OR ATTACHMENT DESIGN. ALL PARTIES ARE INSTRUCTED TO OBTAIN AND REFER TO THE RACKING DESIGN PLANS, PROVIDED BY OTHERS, FOR INFORMATION REGARDING THE RACKING SYSTEM AND METHOD OF SECURING/ATTACHMENT OF THE PHOTOVOLTAIC SYSTEM TO THE ROOF.

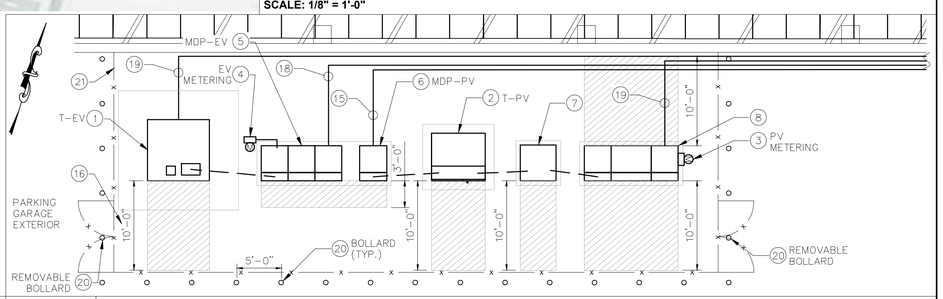
SYSTEM PLAN KEY NOTES:

1. NEW 750KVA PAD MOUNTED UTILITY EV TRANSFORMER, T–EV, WITH 480Y/277V, 3ø, 4W SECONDARY. TRANSFORMER INSTALLATION BY OTHERS. LOCATION TO BE COORDINATED WITH UTILITY.
2. NEW 1000KVA PAD MOUNTED CUSTOMER PV TRANSFORMER, T–PV, WITH 480Y/277V, 3ø, 4W SECONDARY. TRANSFORMER INSTALLATION BY OTHERS. LOCATION TO BE COORDINATED WITH UTILITY.
3. LOCATION OF NEW PV SERVICE C/T CABINET AND METER. METER LOCATION TO BE COORDINATED WITH UTILITY. SEE SINGLE LINE DIAGRAM ON SHEET E–200 FOR ADDITIONAL INFORMATION.
4. LOCATION OF NEW EV SERVICE C/T CABINET AND METER. METER LOCATION TO BE COORDINATED WITH UTILITY. SEE SINGLE LINE DIAGRAM ON SHEET E–203 FOR ADDITIONAL INFORMATION.
5. NEW 1200A, 480Y/277V, 3ø, 4W, EV MAIN SERVICE ENTRANCE SWITCHGEAR, MDP–EV WITH OCPD, SIZED AS INDICATED, LOCATED AT BUILDING EXTERIOR. SEE SHEET E–201 FOR ADDITIONAL DETAILS.
6. NEW 1200A, 480Y/277V, 3ø, 4W, PV MAIN SERVICE ENTRANCE SWITCHGEAR, MBP–PV WITH 1200A FUSED SWITCH ACD–A1 ON LOAD SIDE OF UTILITY CT'S. LOCATED AT BUILDING EXTERIOR. SEE SHEET E–201 FOR ADDITIONAL DETAILS.
7. NEW 75KVA PAD MOUNTED PV GROUNDING TRANSFORMER. LOCATION TO BE COORDINATED WITH UTILITY.
8. NEW MEDIUM VOLTAGE METAL ENCLOSED SWITCHGEAR WITH LOADBREAK DISCONNECT SWTICH, CUSTOMER RECLOSER, AND UTILITY METER. SEE SHEET E–200 FOR ADDITIONAL DETAILS.
9. NEW PV SUB AC COMBINER PANELBOARD ACP–A, 480/277V, 3ø, 4W, NEMA 3R, SIZED AS INDICATED, MOUNTED AT EXTERIOR BLOCK WALL OF GARAGE STAIRWELL ON UNISTRUT FRAME. DISCONNECT SHALL BE PROVIDED WITH DEDICATED 3P BREAKERS FOR INTERCONNECTION OF PV INVERTERS. BREAKERS SHALL BE LABELLED AS PV DISCONNECTS. SEE E–202 FOR INVERTER ALLOCATION DETAILS.
10. NEW CHINT STRING INVERTERS, 480V, 3ø, SIZED AS INDICATED, MOUNTED ON PARKING CANOPY COLUMN. SEE SYSTEM SUMMARY TABLE ON E–202 FOR NUMBER OF STRINGS PER INVERTER AND NUMBER OF MODULES PER STRING.
11. NEW REVENUE GRADE SREC METER, DAS, AND WEATHER STATION COMPONENTS IN NEMA 4 ENCLOSURES, MOUNTED AT EXTERIOR BLOCK WALL OF GARAGE STAIRWELL ON UNISTRUT FRAME. COORDINATE EXACT REQUIREMENTS WITH DAS MANUFACTURER.
12. PV ARRAY WITH BOVIET SOLAR BVM7612M–540–H–HC–BF–DG 540W MODULES MOUNTED ON CANOPY STRUCTURE AT PARKING GARAGE ROOF. MODULES WIRED IN SERIES. SEE SYSTEM SUMMARY CHART FOR QUANTITY OF MODULES PER STRING. STRINGS TO RUN BENEATH CANOPY TO EACH INVERTER.
13. APPROXIMATE ROUTE OF NEW AC CONDUCTORS BENEATH CANOPY FROM INVERTERS TO ACP–A. CONDUITS TO RUN FROM INVERTER COLUMNS, UP TO CANOPY, AND BACK DOWN TO ACP–A AT 6TH FLOOR ELECTRICAL AREA.
14. PROVIDE NEW CONDUIT FOR COMMUNICATION CABLES. CONDUIT SHALL RUN ALONG SIDE THE POWER CONDUCTORS FROM WEATHER SENSORS AND INVERTERS TO THE WEATHER STATION ENCLOSURE AND DAS LOCATED AT THE TOP FLOOR PARKING GARAGE.
15. APPROXIMATE ROUTE OF NEW AC CONDUCTORS FROM ACP–A TO GENERATOR DISCONNECT ACD–A1 (INTERCONNECTION POINT) WITHIN EXTERIOR MAIN DISTRIBUTION PANEL.
16. REQUIRED WORKING CLEARANCE IN FRONT OF ELECTRICAL EQUIPMENT.
17. NEW EV CHARGER DISTRIBUTION PANEL EV–6. 225A BUS, 225A MCB, 208Y/120V, 3ø, 4W, MOUNTED AT EXTERIOR BLOCK WALL OF GARAGE STAIRWELL ON UNISTRUT FRAME. SEE PANEL SCHEDULES ON E–203 FOR DETAILS ON REMAINING 6 EV DISTRIBUTION PANELS. PANELS TO BE STACKED AT SIMILAR LOCATIONS ON EACH SUBSEQUENT FLOOR.
18. APPROXIMATE ROUTE OF NEW AC CONDUCTORS FROM EV–6 TO EV DISTRIBUTION PANEL (SECTION 3 OF 3) WITHIN MDP–EV. TYPICAL ROUTING FOR EACH TRANSFORMER AT LOWER FLOORS.
19. APPROXIMATE ROUTING OF INCOMING MV SERVICE FEEDERS FROM NEW NATIONAL GRID DISTRIBUTION EQUIPMENT. SEE E–101 FOR CONTINUATION.
20. PROVIDE NEW BOLLARDS AS SHOWN. REMOVABLE BOLLARDS TO BE PLACED IN LOCATIONS AS SPECIFIED.
21. NEW 6' CHAIN LINK FENCE WITH KNOX BOX FOR FIRE/UTILITY ACCESS AROUND ELECTRICAL EQUIPMENT AREA. FENCE AND GATES SHALL COMPLY WITH NEC 110.26.



2 **ENLARGED ELECTRICAL EQUIPMENT PLAN**

SCALE: 1/8" = 1'-0"



3 **ENLARGED ELECTRICAL EQUIPMENT PLAN**

SCALE: 1/8" = 1'-0"

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	06.17.24	REVISED FOR INTERCONNECTION	MP	ADK
2	06.21.24	REVISED FOR INTERCONNECTION	MP	ADK
3	06.17.24	REVISED FOR INTERCONNECTION	MP	ADK
4	04.17.24	REVISED FOR INTERCONNECTION	MP	ADK
5	03.20.24	REVISED FOR INTERCONNECTION	MP	ADK
6	02.19.24	REVISED FOR INTERCONNECTION	MP	ADK
7	01.18.24	REVISED FOR INTERCONNECTION	MP	AK
8	10.16.23	ISSUED FOR INTERCONNECTION	MP	AK

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Business Solutions

NEW YORK MVP ARENA PARKING GARAGE

CANOPY SOLAR AND EV CHARGING STATIONS
100 SOLAR - MARKET ST.
ALBANY, NY 12207

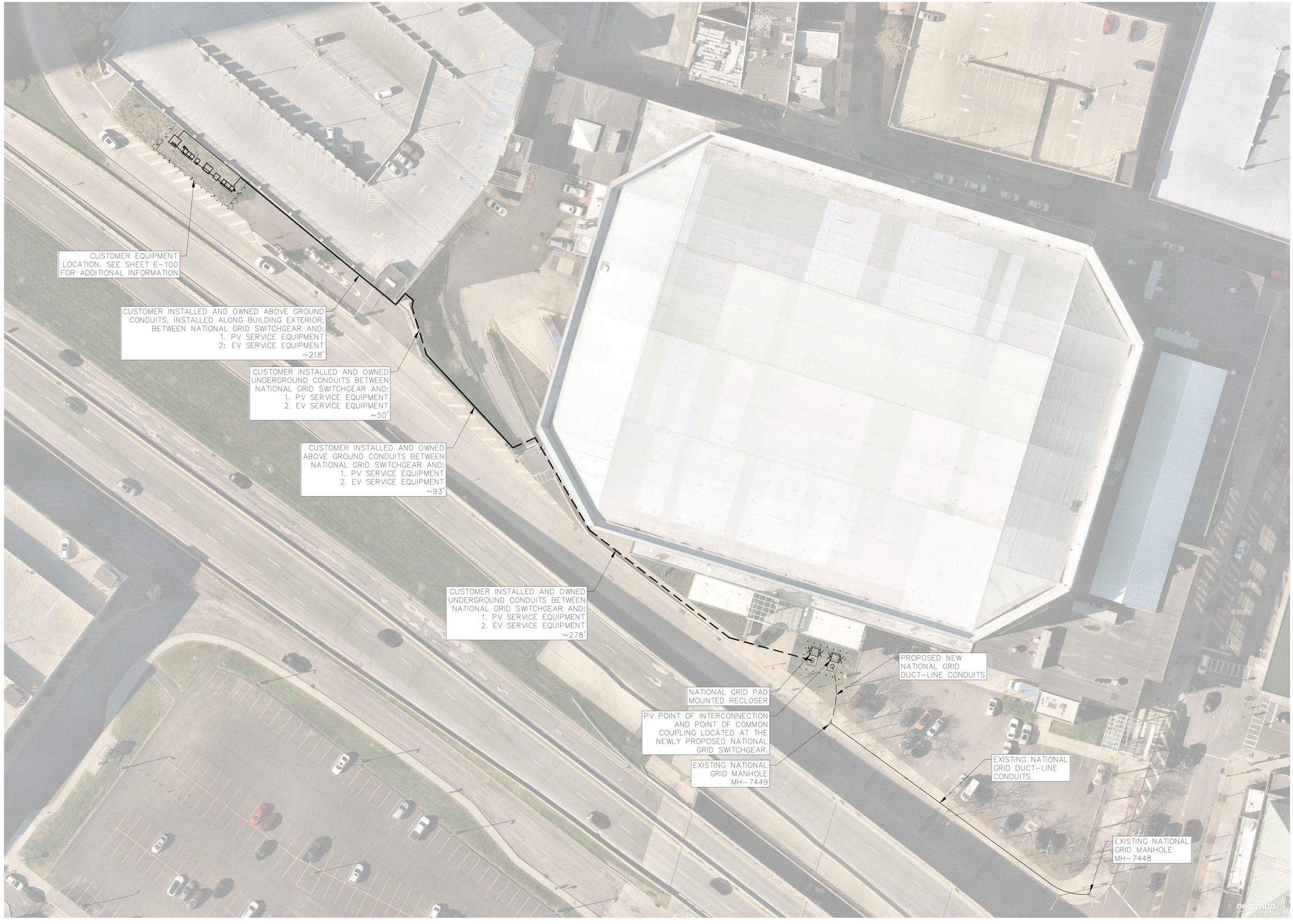
KMB PROJECT No:
732.1154

DRAWING TITLE
PHOTOVOLTAIC SYSTEM LAYOUT

DRAWING SCALE:
AS NOTED

DRAWN BY:	CHECKED BY:	DATE:
MP	ADK	10.11.23

DWG No.:
E-100



1 **MVP ARENA RADIAL SERVICE CONCEPT PLAN**

SCALE: NTS

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
7				
6				
5	06.17.24	REVISED FOR INTERCONNECTION	MP	ADK
4	06.31.24	REVISED FOR INTERCONNECTION	MP	ADK
3	06.17.24	REVISED FOR INTERCONNECTION	MP	ADK
2	04.17.24	REVISED FOR INTERCONNECTION	MP	ADK
1	10.20.24	REVISED FOR INTERCONNECTION	MP	ADK
0	12.19.24	REVISED FOR INTERCONNECTION	MP	ADK
	01.18.24	REVISED FOR INTERCONNECTION	MP	AK
	10.18.23	ISSUED FOR INTERCONNECTION	MP	AK

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ALBANY, NY 12207

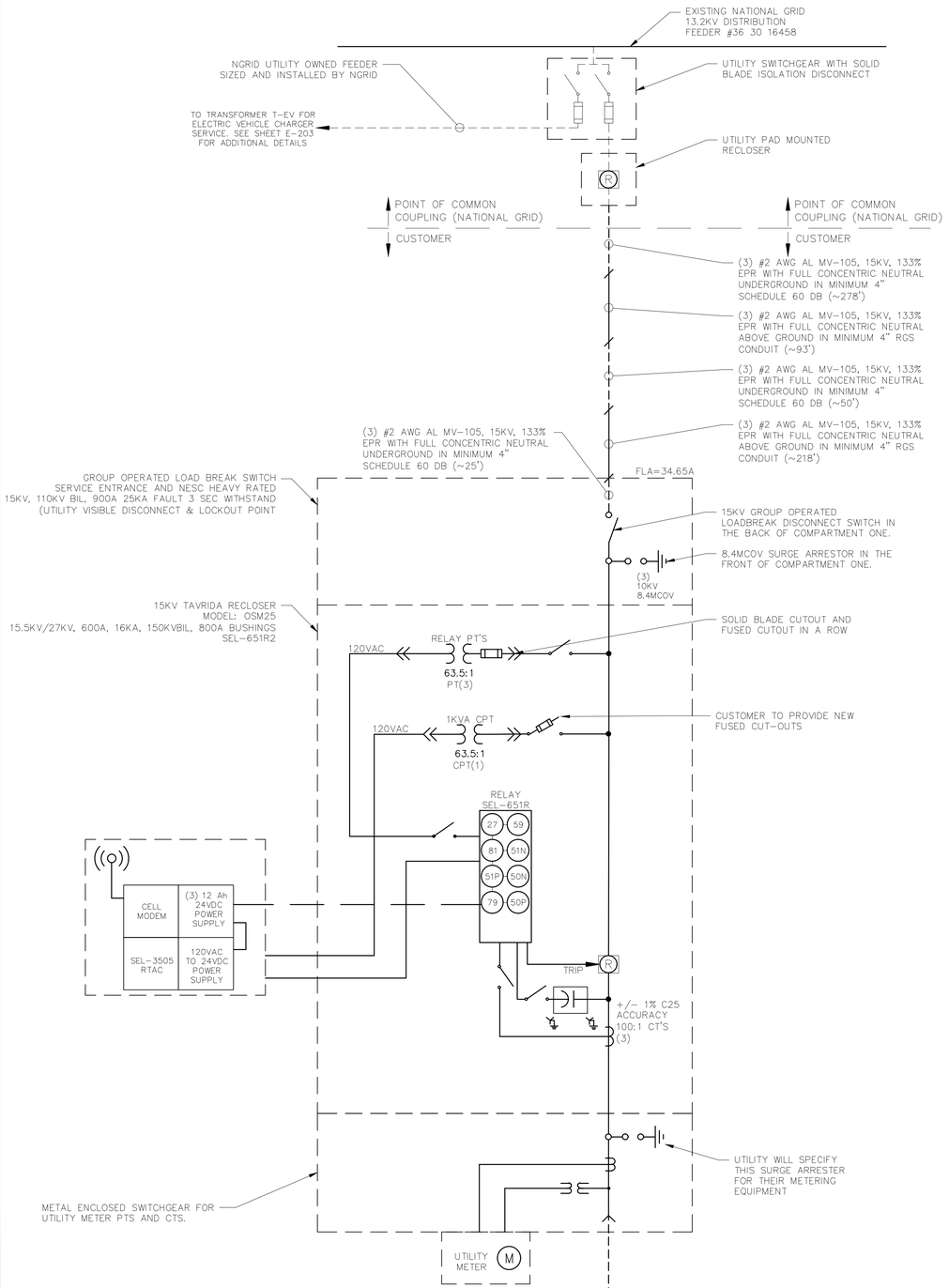
KMB PROJECT No.
732.1154

DRAWING TITLE
MVP ARENA RADIAL SERVICE CONCEPT

DRAWING SCALE
AS NOTED

DRAWN BY:	CHECKED BY:	DATE:
MP	ADK	10.11.23

DWG No.
E-101



SYSTEM SUMMARY:

PANEL	INVERTER MODEL	INVERTER SIZE (AC)	INVERTER QTY.	SYSTEM SIZE (AC)	MODULE MODEL	MODULE SIZE (W) NAMEPLATE	NUMBER OF STRINGS	MODULES PER STRING	NUMBER OF MODULES	TILT	AZIMUTH	SYSTEM SIZE (KWDC) NAMEPLATE	DC:AC
ACP-A	CHINT CPS SCA60KTL-DO-US	60	12	720	BOVIET BVM7612M-540-H-HC-BF-DG	540	108	17	1,836	3°	220°	991.44	1.38
TOTAL:	-	-	12	720	-	540	108	-	1,836	-	-	991.44	1.38

RELAY PROTECTIVE SETTINGS:

RECLOSER AND SEL-651R PROPOSED PROTECTIONS - 13.2 KV NOMINAL (L-N)											
ANSI #	PICKUP VPHASE, A, HZ						RELAY CLEARING SETPOINT (SEC)	RELAY CLEARING SETPOINT (CYCLES)	TOTAL CLEARING TIME (SEC)	TOTAL CLEARING TIME (CYCLES)	DELAY PER TCC
	PERCENTAGE	ACTUAL									
27-1	50%	3811	V L-N(PRIMARY)		60.00	V (SEC)	1.05	63.00	1.10	66.00	-
27-2	88%	6706	V L-N(PRIMARY)		105.60	V (SEC)	1.95	117.00	3.00	180.00	-
59-1	110%	8383	V L-N(PRIMARY)		132.00	V (SEC)	1.95	117.00	2.00	120.00	-
59-2	120%	9145	V L-N(PRIMARY)		144.00	V (SEC)	0.11	6.60	0.16	9.60	-
81/U-1	56.5 Hz						0.11	6.60	0.16	9.60	-
81/U-2	58.5 Hz						299.95	17997.00	300.00	18000.00	-
81/O-1	61.2 Hz						299.95	17997.00	300.00	18000.00	-
81/O-2	62.04 Hz						0.11	6.60	0.16	9.60	-
50P	-	51.96	A (PRIMARY)		0.52	A (SEC)	-	-	-	-	INSTANTANEOUS
51P	-	43.30	A (PRIMARY)		0.43	A (SEC)	-	-	-	-	0.5TD U3 CURVE
51N	-	8.66	A (PRIMARY)		0.09	A (SEC)	-	-	-	-	1.5TD U4 CURVE
50N	-	17.32	A (PRIMARY)		0.17	A (SEC)	-	-	-	-	INSTANTANEOUS
ALARM							-	-	-	-	-
79	95%<VNOM<105%		12540	<VNOM (PRIMARY)<	114.00	V (SEC)	299.95	17997.00	300.00	18000.00	-
			13860	<VNOM (SEC)<	126.00	V (SEC)					
	59.5HZ<FREQUENCY<60.5										
RELAY/RECLOSER CLEARING TIME	CLEARING TIME IS .05 SECONDS OR 3 CYCLES. TOTAL VALUES REFLECT SETTING + CLEARING TIME										
79-RECLOSE/UTILITY RESTORATION DETECTION	RELAY SHALL BE SET TO 5 MIN OPEN INTERVAL TIMER. AT THE END OF TIMER, RELAY WILL ATTEMPT TO CLOSE IF TRIP CONDITION IS CLEARED, LINE VOLTAGE FOR ALL PHASES IS BETWEEN 95% TO 105% OF NOMINAL AND FREQUENCY IS BETWEEN 59.5Hz TO 60.5Hz FOR 5 MINUTES. INVERTERS HAVE ADDITIONAL 5 MINUTE TIMER. TOTAL RESTORATION TIME = 10 MINUTED WHEN ALL CONDITIONS ARE MET. FAILURE TO CLOSE AFTER A 4 HOUR SENSING PERIOD WILL LOCKOUT RECLOSING.										
RELAY FAILURE PROTECTION	NORMALLY CLOSED ALARM OUTPUT CONTACT IS WIRED IN PARALLEL WITH TRIP OUTPUT CONTACT. IN THE EVENT OF HARDWARE FAILURE OR LOSS OF DC POWER, THE ALARM OUTPUT WILL DE-ENERGISE AND RETURN CONTACT TO ITS NORMALLY CLOSED STATE. A DIODE AND CAPACITOR IN THE TRIPPING CIRCUIT STORE THE ENERGY REQUIRED TO TRIP THE FAULT INTERRUPTER.										

REV:	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	06.17.24	REVISED FOR INTERCONNECTION	MP	ADK
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NEW YORK MVP ARENA PARKING GARAGE

CANOPY SOLAR AND EV CHARGING STATIONS
100 SOLAR - MARKET ST.
ALBANY, NY 12207

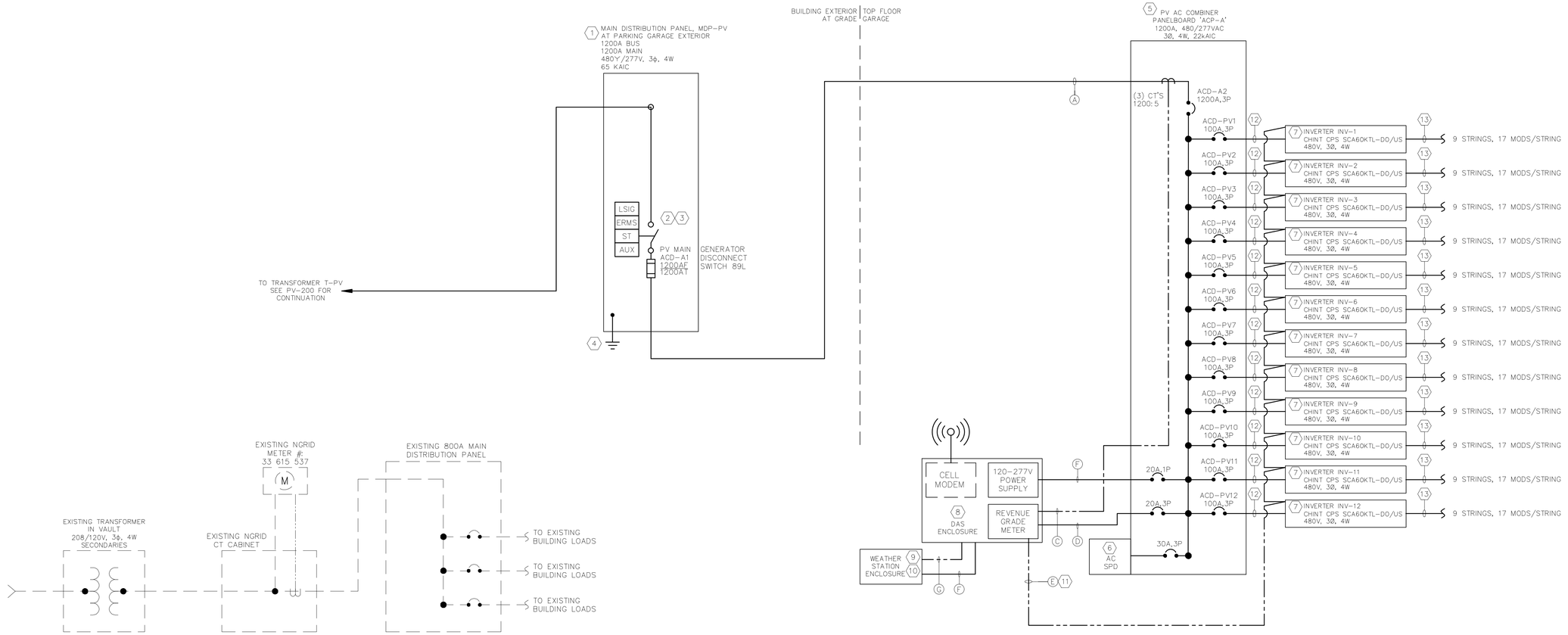
KMB PROJECT No:
732.1154

DRAWING TITLE:
PHOTOVOLTAIC MV ONE-LINE DIAGRAM

DRAWING SCALE:
NONE

DRAWN BY:	CHECKED BY:	DATE:
RTC	ADK	10.11.23

DWG No:
E-200



EQUIPMENT SPECIFICATIONS:

MODULE SPECIFICATIONS		
BOVIET BVM7612M-540-H-HC-BF-DG		
PARAMETER	UNIT	NAMEPLATE
MAX POWER OUTPUT	(WATTS)	540.00
SHORT CIRCUIT CURRENT	(AMPS)	13.55
OPEN CIRCUIT VOLTAGE	(VOLTS)	49.89
MAX CURRENT	(AMPS)	12.76
MAX VOLTAGE	(VOLTS)	42.40

INVERTER SPECIFICATIONS		
CHINT CPS SCA60KTL-DO-US		
RATED OUTPUT	(KW)	60
AC RATED OUTPUT	(VOLTS)	480
AC RATED CURRENT	(AMPS)	79.4
POWER FACTOR	-	0.99
PEAK EFFICIENCY	EFF%	98.5%

INVERTER PROTECTIVE SETTINGS:

PROPOSED INVERTER GRID PROTECTION SETTINGS (UL 1741 SB) - 480V NOMINAL (L-L)						
DEVICE SETTING	PICKUP	VALUE		TOTAL CLEARING TIME (SEC)	TOTAL CLEARING TIME (CYCLES)	DESCRIPTION
27-1	50%	138.57	V	1.10	66.00	UNDERVOLTAGE
27-2	88%	243.88	V	3.00	180.00	
59-1	110%	305	V	2.00	120.00	OVERVOLTAGE
59-2	120%	333	V	0.16	9.60	
81U-2	56.5Hz			0.16	9.60	UNDERFREQUENCY
81U-1	58.5Hz			300.00	18000.00	
81O-1	61.2Hz			300.00	18000.00	OVERFREQUENCY
81O-2	62.0Hz			0.16	9.60	

GENERAL NOTES:

1. THE INSTALLATION CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF THE NEMA RATING OF ALL INVERTER AND COMBINER BOX ENCLOSURES. ALL CONDUIT MUST ENTER THE EQUIPMENT AND BE PROPERLY GASKETED.
2. PROVIDE COMPRESSION LUGS AT BUS TERMINATIONS.
3. WITHIN 10 DAYS OF PROJECT COMMENCEMENT THE ELECTRICAL CONTRACTOR SHALL OPEN AND VISUALLY INSPECT EXISTING ELECTRICAL EQUIPMENT WHERE PV TIE-IN IS TO TAKE PLACE. IF ANY ISSUES OR DISCREPANCIES ARE OBSERVED WITH RESPECT TO WHAT IS SHOWN ON THE DRAWINGS AND THE DESIGN INTENT, THE CONTRACTOR SHALL NOTIFY THE CLIENT AND ENGINEER. ELECTRICAL CONTRACTOR SHALL PROVIDE DETAIL ON THE POTENTIAL ISSUE, AND INDICATE ALTERNATE APPROACH/ SUGGESTIONS FOR NEW TIE-IN.

LINETYPE LEGEND:

- EXISTING TO REMAIN
- NEW
- NEW COMMUNICATIONS
- (N) NEW
- (E) EXISTING

KEY NOTES:

1. NEW 1200A, 480/277V, 3Ø, 4W, MAIN SERVICE ENTRANCE SWITCHGEAR WITH OCPD, SIZED AS INDICATED, LOCATED AT PARKING GARAGE EXTERIOR. MAIN SERVICE ENTRANCE EQUIPMENT LOCATION TO BE COORDINATED WITH OWNER.
2. NEW PV MAIN DISCONNECT SWITCH, 1200AF/1200AT FUSED SWITCH ACD-A1 AT MAIN PV DISCONNECT. WITHIN SERVICE ENTRANCE SWITCHGEAR. CONNECTION TO BE ON LOAD SIDE OF UTILITY CT'S.
3. NEW ACD-A1 1200A, 480Y/277V, 3PH, 4W, NEMA 3R GENERATOR DISCONNECT SWITCH, FUSED AT 1200A. SWITCH SHALL BE LOAD BREAK RATED, GANG OPERATED, 24/7 ACCESSIBLE TO UTILITY, VISIBLE BREAK WITH VIEWING WINDOW AND LOCKABLE IN THE OPEN POSITION.
4. PROVIDE NEW #3/0 AWG CU GEC TO BUILDING GROUNDING ELECTRODE SYSTEM.
5. NEW PV SUB AC COMBINER PANELBOARD ACP-A, 480/277V, 3Ø, 4W, SIZED AS INDICATED, NEMA 3R PANELBOARD SHALL BE PROVIDED WITH DEDICATED 3P BREAKERS FOR INTERCONNECTION OF PV INVERTERS. BREAKERS SHALL BE LABELED AS PV DISCONNECTS. SEE E-201 FOR INVERTER ALLOCATION DETAILS.
6. PROVIDE NEW 480VAC AC SURGE PROTECTIVE DEVICE AT PANELBOARD.
7. NEW CHINT STRING INVERTERS, 480V, 3Ø, SIZED AS INDICATED, MOUNTED ON PARKING CANOPY COLUMN. SEE SYSTEM SUMMARY TABLE ON E-201 FOR NUMBER OF STRINGS PER INVERTER AND NUMBER OF MODULES PER STRING.
8. DAS COMMUNICATIONS ENCLOSURE & NETWORK GATEWAY.
9. NEW NEMA 3R WEATHER STATION ENCLOSURE.
10. NEW DAS WEATHER STATION SENSORS. CONFIRM FINAL CONFIGURATION WITH DAS PROVIDER.
11. NEW RS-485 MODBUS COMMUNICATION CABLE DAISY CHAINED BETWEEN INVERTERS AND MAIN DAS ENCLOSURE. CONFIRM CABLE CONFIGURATION WITH DAS PROVIDER.
12. REFER TO AC WIRING AND CONDUIT SCHEDULE ON PAGE E-201 FOR AC WIRE SIZING.
13. REFER TO DC WIRING SCHEDULE FOR DC WIRE SIZING. SEE SYSTEM SUMMARY, ON PAGE E-201, FOR NUMBER OF STRINGS FOR THE INVERTER.

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NEW YORK MVP ARENA PARKING GARAGE

CANOPY SOLAR AND EV CHARGING STATIONS
100 SOLAR - MARKET ST.
ALBANY, NY 12207

KMB PROJECT No.: 732.1154

DRAWING TITLE: PHOTOVOLTAIC ONE-LINE DIAGRAM

DRAWING SCALE: NONE

DRAWN BY:	CHECKED BY:	DATE:
RTC	ADK	10.11.23

DWG No.: E-201

SYSTEM SUMMARY:

PANEL	INVERTER NUMBER	INVERTER MODEL	INVERTER SIZE (KWAC)	MODULE MODEL	MODULE SIZE (W) NAMEPLATE	MPPT #	MPPT SIZE (KWAC)	NUMBER OF STRINGS	MODULES PER STRING	NUMBER OF MODULES	TILT	AZIMUTH	SYSTEM SIZE (KWDC) NAMEPLATE	DC:AC NAMEPLATE
ACP-A1	INV-1	CHINT CPS SCA60KTL-DO-US	60	BOVIET BVM7612M-540-H-HC-BF-DG	540	1	20.00	3	17	51	3°	220°	82.62	1.38
						2	20.00	3	17	51	3°	220°		
						3	20.00	3	17	51	3°	220°		
	INV-2	CHINT CPS SCA60KTL-DO-US	60	BOVIET BVM7612M-540-H-HC-BF-DG	540	1	20.00	3	17	51	3°	220°	82.62	1.38
						2	20.00	3	17	51	3°	220°		
						3	20.00	3	17	51	3°	220°		
	INV-3	CHINT CPS SCA60KTL-DO-US	60	BOVIET BVM7612M-540-H-HC-BF-DG	540	1	20.00	3	17	51	3°	220°	82.62	1.38
						2	20.00	3	17	51	3°	220°		
						3	20.00	3	17	51	3°	220°		
	INV-4	CHINT CPS SCA60KTL-DO-US	60	BOVIET BVM7612M-540-H-HC-BF-DG	540	1	20.00	3	17	51	3°	220°	82.62	1.38
						2	20.00	3	17	51	3°	220°		
						3	20.00	3	17	51	3°	220°		
	INV-5	CHINT CPS SCA60KTL-DO-US	60	BOVIET BVM7612M-540-H-HC-BF-DG	540	1	20.00	3	17	51	3°	220°	82.62	1.38
						2	20.00	3	17	51	3°	220°		
						3	20.00	3	17	51	3°	220°		
	INV-6	CHINT CPS SCA60KTL-DO-US	60	BOVIET BVM7612M-540-H-HC-BF-DG	540	1	20.00	3	17	51	3°	220°	82.62	1.38
						2	20.00	3	17	51	3°	220°		
						3	20.00	3	17	51	3°	220°		
	INV-7	CHINT CPS SCA60KTL-DO-US	60	BOVIET BVM7612M-540-H-HC-BF-DG	540	1	20.00	3	17	51	3°	220°	82.62	1.38
						2	20.00	3	17	51	3°	220°		
						3	20.00	3	17	51	3°	220°		
	INV-8	CHINT CPS SCA60KTL-DO-US	60	BOVIET BVM7612M-540-H-HC-BF-DG	540	1	20.00	3	17	51	3°	220°	82.62	1.38
						2	20.00	3	17	51	3°	220°		
						3	20.00	3	17	51	3°	220°		
	INV-9	CHINT CPS SCA60KTL-DO-US	60	BOVIET BVM7612M-540-H-HC-BF-DG	540	1	20.00	3	17	51	3°	220°	82.62	1.38
						2	20.00	3	17	51	3°	220°		
						3	20.00	3	17	51	3°	220°		
	INV-10	CHINT CPS SCA60KTL-DO-US	60	BOVIET BVM7612M-540-H-HC-BF-DG	540	1	20.00	3	17	51	3°	220°	82.62	1.38
						2	20.00	3	17	51	3°	220°		
						3	20.00	3	17	51	3°	220°		
	INV-11	CHINT CPS SCA60KTL-DO-US	60	BOVIET BVM7612M-540-H-HC-BF-DG	540	1	20.00	3	17	51	3°	220°	82.62	1.38
						2	20.00	3	17	51	3°	220°		
						3	20.00	3	17	51	3°	220°		
	INV-12	CHINT CPS SCA60KTL-DO-US	60	BOVIET BVM7612M-540-H-HC-BF-DG	540	1	20.00	3	17	51	3°	220°	82.62	1.38
						2	20.00	3	17	51	3°	220°		
						3	20.00	3	17	51	3°	220°		
TOTAL	-	-	720	-	540	-	-	108	-	1836	-	-	991.44	1.38

AC WIRING CHART:

LOW VOLTAGE AC WIRE AND CONDUIT SCHEDULE

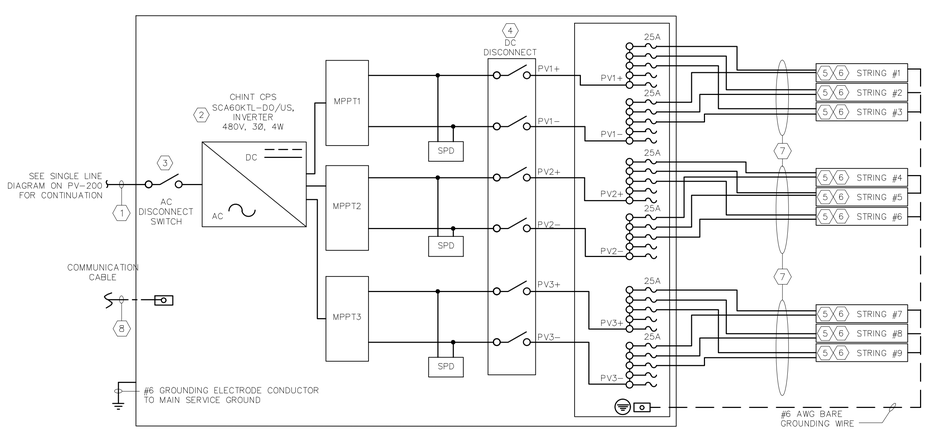
	CIRCUIT #	MINIMUM VOLTAGE	CONDUCTOR SIZE & TYPE	MINIMUM CONDUIT
-	INV-1	480V 3PH	(3) #2 AWG CU THWN-2 + #8 AWG GND	(1) 1-1/4"
-	INV-2	480V 3PH	(3) #2 AWG CU THWN-2 + #8 AWG GND	(1) 1-1/4"
-	INV-3	480V 3PH	(3) #2 AWG CU THWN-2 + #8 AWG GND	(1) 1-1/4"
-	INV-4	480V 3PH	(3) #2 AWG CU THWN-2 + #8 AWG GND	(1) 1-1/4"
-	INV-5	480V 3PH	(3) #2 AWG CU THWN-2 + #8 AWG GND	(1) 1-1/4"
-	INV-6	480V 3PH	(3) #2 AWG CU THWN-2 + #8 AWG GND	(1) 1-1/4"
-	INV-7	480V 3PH	(3) #2 AWG CU THWN-2 + #8 AWG GND	(1) 1-1/4"
-	INV-8	480V 3PH	(3) #2 AWG CU THWN-2 + #8 AWG GND	(1) 1-1/4"
-	INV-9	480V 3PH	(3) #2 AWG CU THWN-2 + #8 AWG GND	(1) 1-1/4"
-	INV-10	480V 3PH	(3) #2 AWG CU THWN-2 + #8 AWG GND	(1) 1-1/4"
-	INV-11	480V 3PH	(3) #2 AWG CU THWN-2 + #8 AWG GND	(1) 1-1/4"
-	INV-12	480V 3PH	(3) #2 AWG CU THWN-2 + #8 AWG GND	(1) 1-1/4"
A	ACP-A	480V 3PH	3 SETS OF: (3) 600 KCMIL CU THWN-2 + 250 KCMIL N+ #3/0 AWG GND	(3) 3-1/2"
B	MDP-PV	480V 3PH	3 SETS OF: (3) 600 KCMIL CU THWN-2 + 250 KCMIL N+ #3/0 AWG GND	(3) 3-1/2"
C	CT CABLE	-	18 AWG SHIELDED TWISTED PAIR - CT EXTENSION CABLE	-
D	PT REF	480V 3PH	(3) #12 THWN-2 + #12AWG CU GROUND	3/4"
E	INV-COMM	-	RS485 MODBUS COMMUNICATIONS CABLE	-
F	-	277V 1PH	(2) #12 THWN-2 + #12AWG CU GROUND	3/4"
G	COMM	-	CATSE ETHERNET CABLE	-

DC WIRING CHART:

DC WIRING CHART

INVERTER #	STRING HOME RUN WIRE SIZE AND TYPE		EQUIPMENT GROUND SIZE	MODULES PER STRING	NUMBER OF STRINGS
INV-1	#10	AWG 1KV PV WIRE	#6 AWG	17	9
INV-2	#10	AWG 1KV PV WIRE	#6 AWG	17	9
INV-3	#10	AWG 1KV PV WIRE	#6 AWG	17	9
INV-4	#10	AWG 1KV PV WIRE	#6 AWG	17	9
INV-5	#10	AWG 1KV PV WIRE	#6 AWG	17	9
INV-6	#10	AWG 1KV PV WIRE	#6 AWG	17	9
INV-7	#10	AWG 1KV PV WIRE	#6 AWG	17	9
INV-8	#10	AWG 1KV PV WIRE	#6 AWG	17	9
INV-9	#10	AWG 1KV PV WIRE	#6 AWG	17	9
INV-10	#10	AWG 1KV PV WIRE	#6 AWG	17	9
INV-11	#10	AWG 1KV PV WIRE	#6 AWG	17	9
INV-12	#10	AWG 1KV PV WIRE	#6 AWG	17	6

TYPICAL INVERTER SCHEMATIC:



KEY NOTES:

1. SEE INVERTER AC WIRING SCHEDULE ON THIS SHEET FOR WIRE SIZE.
2. CHINT CPS SCA60KTL-DO/US-480 STRING INVERTER, 480V, 3Ø, 4W.
3. AC DISCONNECT SWITCH, SUPPLIED INTEGRAL WITH THE INVERTER.
4. DC DISCONNECT SWITCH, SUPPLIED INTEGRAL WITH THE INVERTER.
5. BOVIET BVM7612M-540-H-HC-BF-DG 540W MODULES WIRED IN SERIES. SEE SYSTEM SUMMARY CHART FOR HOW MANY MODULES PER STRING. EACH MODULE INCLUDES 1 #10 AWG OUTDOOR RATED QUICK CONNECTS FOR MODULE INTERCONNECTION. DO NOT REMOVE THE QUICK CONNECTS, OTHERWISE THE MODULE WARRANTY AND THE UL LISTING MAY BE INVALIDATED. QUICK CONNECTS SHALL COMPLY WITH NEC 690.33(C).
6. INDIVIDUAL MODULES SHALL BE BONDED TO THE RACKING SYSTEM USING APPROVED RACKING GROUNDING LUG.
7. REFER TO DC WIRING SCHEDULE ON THIS SHEET FOR DC WIRE SIZING. SEE SYSTEM SUMMARY FOR NUMBER OF STRINGS FOR THE INVERTER.
8. COMMUNICATIONS CABLE BETWEEN INVERTERS AND DATA ACQUISITION SYSTEM.

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
6	06.17.24	REVISED FOR INTERCONNECTION	MP	ADK
5	05.31.24	REVISED FOR INTERCONNECTION	MP	ADK
4	05.17.24	REVISED FOR INTERCONNECTION	MP	ADK
3	04.17.24	REVISED FOR INTERCONNECTION	MP	ADK
2	03.20.24	REVISED FOR INTERCONNECTION	MP	ADK
1	02.19.24	REVISED FOR INTERCONNECTION	MP	ADK
0	01.18.24	REVISED FOR INTERCONNECTION	MP	AK
	10.18.23	ISSUED FOR INTERCONNECTION	MP	AK

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5622
N.Y. CERTIFICATE OF AUTHORIZATION: 581784

STATE OF NEW YORK
STEPHEN A. BRAY
086064
LICENSED PROFESSIONAL ENGINEER

Stephen A. Bray
PROFESSIONAL ENGINEER
NY LICENSE: 086064

6/17/24

centrica Business Solutions

NEW YORK MVP ARENA PARKING GARAGE

CANOPY SOLAR AND EV CHARGING STATIONS
100 SOLAR - MARKET ST.
ALBANY, NY 12207

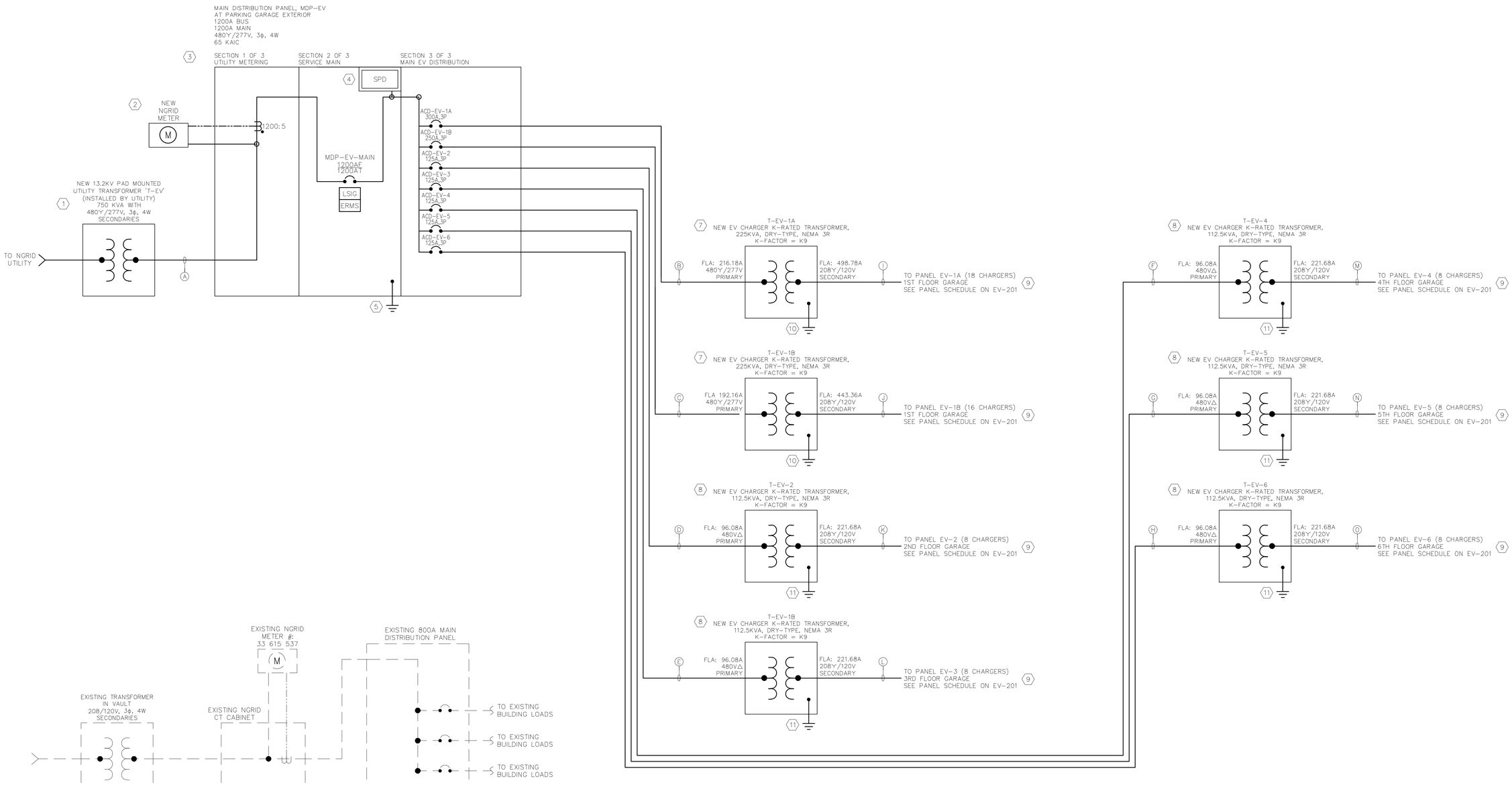
KMB PROJECT No:
732.1154

DRAWING TITLE:
PHOTOVOLTAIC SYSTEM INFORMATION

DRAWING SCALE:
NONE

DRAWN BY:	CHECKED BY:	DATE:
RTC	ADK	10.11.23

DWG No:
E-202



GENERAL NOTES:

1. THE INSTALLATION CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF THE NEMA RATING OF ALL CHARGERS AND ASSOCIATED ELECTRICAL EQUIPMENT. ALL CONDUIT ENTERING THE EQUIPMENT MUST BE PROPERLY GASKETED.
2. PROVIDE COMPRESSION LUGS AT BUS TERMINATIONS.

LINETYPE LEGEND:

- EXISTING TO REMAIN
- NEW
- NEW COMMUNICATIONS
- (N) NEW
- (E) EXISTING

KEY NOTES:

1. NEW 750KVA PAD MOUNTED UTILITY TRANSFORMER 'T-EV', WITH 480Y/277V, 3ø, 4W SECONDARY. TRANSFORMER INSTALLATION TO BE COORDINATED WITH UTILITY.
2. NEW NATIONAL GRID UTILITY METER. METER INSTALLATION LOCATION TO BE COORDINATED WITH UTILITY.
3. NEW 1200A, 480Y/277V, 3ø, 4W, MAIN SERVICE ENTRANCE SWITCHGEAR WITH OCPD, SIZED AS INDICATED, LOCATED AT PARKING GARAGE EXTERIOR. MAIN SERVICE ENTRANCE EQUIPMENT LOCATION TO BE COORDINATED WITH OWNER.
4. PROVIDE NEW 480VAC AC SURGE PROTECTIVE DEVICE AT PANELBOARD.
5. PROVIDE NEW #3/0 AWG CU GEC TO BUILDING GROUNDING ELECTRODE SYSTEM.
6. REFER TO PANEL SCHEDULES ON E-203 FOR EV PANEL DETAILS, EV CHARGER COUNTS, AND CHARGING CHARGING DEVICE CIRCUIT SIZES.
7. NEW TRANSFORMERS T-EV-1A AND T-EV-1B, 225KVA 480V-Δ PRIMARY, 208Y/120V SECONDARY, NEMA3R. LOCATED ON FIRST FLOOR PARKING GARAGE.
8. NEW TRANSFORMERS T-EV-2 THROUGH T-EV-6, 150KVA 480V-Δ PRIMARY, 208Y/120V SECONDARY, NEMA3R. LOCATED IN PARKING GARAGE ON SECOND THROUGH SIXTH FLOORS RESPECTIVELY
9. REFER TO PANEL SCHEDULES ON E-203 FOR EV PANEL DETAILS, EV CHARGER COUNTS, AND CHARGING DEVICE CIRCUIT SIZES.
10. PROVIDE NEW #2/0 AWG CU GEC TO BUILDING GROUNDING ELECTRODE SYSTEM
11. PROVIDE NEW #1/0 AWG CU GEC TO BUILDING GROUNDING ELECTRODE SYSTEM

AC WIRING CHART:

LOW VOLTAGE AC WIRE AND CONDUIT SCHEDULE

	CIRCUIT #	MINIMUM VOLTAGE	CONDUCTOR SIZE & TYPE	MINIMUM CONDUIT
A	MDP-EV	480V 3PH	3 SETS OF: (3) 600 KCMIL CU THWN-2 + #3/0 AWG GND	(3) 3"
B	ACD-EV-1A	480V 3PH	(3) 400 KCMIL CU THWN-2 + #4 AWG GND	(1) 2-1/2"
C	ACD-EV-1B	480V 3PH	(3) 300 KCMIL CU THWN-2 + #4 AWG GND	(1) 2-1/2"
D	ACD-EV-2	480V 3PH	(3) #1/0 AWG CU THWN-2 + #6 AWG GND	(1) 1-1/2"
E	ACD-EV-3	480V 3PH	(3) #1/0 AWG CU THWN-2 + #6 AWG GND	(1) 1-1/2"
F	ACD-EV-4	480V 3PH	(3) #1/0 AWG CU THWN-2 + #6 AWG GND	(1) 1-1/2"
G	ACD-EV-5	480V 3PH	(3) #1/0 AWG CU THWN-2 + #6 AWG GND	(1) 1-1/2"
H	ACD-EV-6	480V 3PH	(3) #1/0 AWG CU THWN-2 + #6 AWG GND	(1) 1-1/2"
I	T-EV-1A	208V 3PH	2 SETS OF: (4) 500 KCMIL CU THWN-2 + #1/0 AWG GND	(2) 2-1/2"
J	T-EV-1B	208V 3PH	2 SETS OF: (4) 400 KCMIL CU THWN-2 + #1 AWG GND	(2) 2-1/2"
K	T-EV-2	208V 3PH	(4) 400 KCMIL CU THWN-2 + #4 AWG GND	(1) 2-1/2"
L	T-EV-3	208V 3PH	(4) 400 KCMIL CU THWN-2 + #4 AWG GND	(1) 2-1/2"
M	T-EV-4	208V 3PH	(4) 400 KCMIL CU THWN-2 + #4 AWG GND	(1) 2-1/2"
N	T-EV-5	208V 3PH	(4) 400 KCMIL CU THWN-2 + #4 AWG GND	(1) 2-1/2"
O	T-EV-6	208V 3PH	(4) 400 KCMIL CU THWN-2 + #4 AWG GND	(1) 2-1/2"

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
7				
6				
5	06.17.24	REVISED FOR INTERCONNECTION	MP	ADK
4	05.31.24	REVISED FOR INTERCONNECTION	MP	ADK
3	05.17.24	REVISED FOR INTERCONNECTION	MP	ADK
2	04.17.24	REVISED FOR INTERCONNECTION	MP	ADK
1	03.20.24	REVISED FOR INTERCONNECTION	MP	ADK
0	02.19.24	REVISED FOR INTERCONNECTION	MP	ADK
A	01.18.24	REVISED FOR INTERCONNECTION	MP	AK
-	10.18.23	ISSUED FOR INTERCONNECTION	MP	AK

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centrica Business Solutions

NEW YORK MVP ARENA PARKING GARAGE

CANOPY SOLAR AND EV CHARGING STATIONS
100 SOLAR - MARKET ST.
ALBANY, NY 12207

KMB PROJECT No.: 732.1154

DRAWING TITLE: EV CHARGER PARTIAL ONE-LINE DIAGRAM

DRAWING SCALE: NONE

DRAWN BY: RTC | CHECKED BY: ADK | DATE: 10.11.23

DWG No.: E-203

Designation: **MDP-PV**
Panel Voltage: 480Y/277Volt 3 Phase 4 Wire — **Main Distribution Panel** — Main Circuit Breaker: **1200**
Comments: — Section Ampere Rating: **1200**

CKT. NO.	POLES	FRAME	TRIP	FEEDER DATA QTY	WIRE	GRD	COND	CONDUCTOR MATERIAL	DESCRIPTION	CONNECT LOAD (KW)	AMPS	DEMAND (KW)
1	3	1200	1200	3 SETS OF 3	600KCMIL	3/0	3 1/2"	COPPER	MDP MAIN (SECTION 2 OF 2)	792.00	952.7	
2									SPACE			
3									SPACE			
4									SPACE			
5									SPACE			
6									SPACE			
7									SPACE			
8									SPACE			
9									SPACE			
10									SPACE			
11									SPACE			
12									SPACE			
13									SPACE			
14									SPACE			
15									SPACE			
16									SPACE			
17									SPACE			
18									SPACE			
19									SPACE			
20									SPACE			
21									SPACE			
22									SPACE			
23									SPACE			
24									SPACE			

Panel Location: GARAGE EXTERIOR — Bus Size: **1200** — Total Connected Load KW: 792.00
Panel Fed From: — Voltage: **480** — Total Amps: 952.66

Designation: **MDP-EV**
Panel Voltage: 480Y/277Volt 3 Phase 4 Wire — **Main Distribution Panel** — Main Circuit Breaker: **1200**
Comments: — Section Ampere Rating: **1200**

CKT. NO.	POLES	FRAME	TRIP	FEEDER DATA QTY	WIRE	GRD	COND	CONDUCTOR MATERIAL	DESCRIPTION	CONNECT LOAD (KW)	AMPS	DEMAND (KW)
1	3	400	300	3	400	4	2.5"	COPPER	ACD-EV-1A	179.71	216.4	
2	3	400	250	3	300	4	2.5"	COPPER	ACD-EV-1B	159.74	192.4	
3	3	200	125	3	1/0	6	2"	COPPER	ACD-EV-2	79.87	96.2	
4	3	200	125	3	1/0	6	2"	COPPER	ACD-EV-3	79.87	96.2	
5	3	200	125	3	1/0	6	2"	COPPER	ACD-EV-4	79.87	96.2	
6	3	200	125	3	1/0	6	2"	COPPER	ACD-EV-5	79.87	96.2	
7	3	200	125	3	1/0	6	2"	COPPER	ACD-EV-6	79.87	96.2	
8									SPACE			
9									SPACE			
10									SPACE			
11									SPACE			
12									SPACE			
13									SPACE			
14									SPACE			
15									SPACE			
16									SPACE			
17									SPACE			
18									SPACE			

Panel Location: GARAGE EXTERIOR — Bus Size: **1200** — Total Connected Load KW: 738.82
Panel Fed From: — Voltage: **480** — Total Amps: 888.68

PANEL: ACP-A
LOCATION: FLOOR 6
FED FROM: MSB (ACD-A1)

Voltage: 480Y/277V 3 Phase 4W
MOUNTING: SURFACE ■ FLUSH □
A DENOTES ARC FAULT INTERRUPTER C.B.
S DENOTES SHUNT TRIP BREAKER
G DENOTES GFI C.B. REQ'D

MAINS
BUS: 1200A AMPS 35000 AIC
□ LUGS ONLY
■ MCB 1200A AMPS
COPPER BUS ONLY

CIR. #	EQUIPMENT SERVED	FEEDER SIZE Wire	GND	I.G.	Breaker Amps	Poles	Load VA	C	B	A	Load VA	Breaker Amps	Poles	FEEDER SIZE Wire	GND	I.G.	EQUIPMENT SERVED	CIR. #
1	INV-1	2	8	-	100	2	33000			66000	33000	100	2	2	8	-	INV-2	2
3							33000		66000		33000					-		4
5	INV-3	2	8	-	100	2	33000	66000			33000	100	2	2	8	-	INV-4	6
7							33000			66000	33000					-		8
9	INV-5	2	8	-	100	2	33000		66000		33000	100	2	2	8	-	INV-6	10
11							33000	66000			33000					-		12
13	INV-7	2	8	-	100	2	33000			66000	33000	100	2	2	8	-	INV-8	14
15							33000		66000		33000					-		16
17	INV-9	2	8	-	100	2	33000	66000			33000	100	2	2	8	-	INV-10	18
19							33000			66000	33000					-		20
21	INV-11	2	8	-	100	2	33000		66000		33000	100	2	2	8	-	INV-12	22
23							33000	66000			33000					-		24
25	SPARE	-	-	-	1				0				1	-	-	-	SPARE	26
27	SPARE	-	-	-	1			0					1	-	-	-	SPARE	28
29	SPARE	-	-	-	1		0						1	-	-	-	SPARE	30
31	SPARE	-	-	-	1				0	0			1	-	-	-	SPARE	32
33	SPARE	-	-	-	1			0					1	-	-	-	SPARE	34
35	SPARE	-	-	-	1		0						1	-	-	-	SPARE	36
37		-	-	-	50	3			0	0			1	-	-	-	SPARE	38
39	SPD	-	-	-				0					1	-	-	-	SPARE	40
41		-	-	-			0						1	-	-	-	SPARE	42

Remarks:
* EC shall obtain available short circuit amperage from utility for engineering review prior to ordering of all electrical equipment.

LINE TOTAL 264000 264000 264000
TOTAL CONN. KVA 792
TOTAL CONN. AMPS 953

PANEL SHALL BE EQUIPPED WITH BUSES FOR ALL CB'S AND SPACES SHOWN
□ 200% NEUTRAL BUS □ FEED THRU LUGS
□ ISOLATED GROUND BUS
■ GROUND BUS

PANEL: EV-1A
LOCATION: FLOOR 1
FED FROM: T-EV-1A

Voltage: 208Y/120V 3 Phase 4W
MOUNTING: SURFACE ■ FLUSH □
A DENOTES ARC FAULT INTERRUPTER C.B.
S DENOTES SHUNT TRIP BREAKER
G DENOTES GFI C.B. REQ'D

MAINS
BUS: 800A AMPS 35000 AIC
□ LUGS ONLY
■ MCB 700A AMPS
COPPER BUS ONLY

CIR. #	EQUIPMENT SERVED	FEEDER SIZE Wire	GND	I.G.	Breaker Amps	Poles	Load VA	C	B	A	Load VA	Breaker Amps	Poles	FEEDER SIZE Wire	GND	I.G.	EQUIPMENT SERVED	CIR. #
1	EV-1	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-2	2
3							4992		9984		4992					-		4
5	EV-3	6	10	-	60	2	4992	9984			4992	60	2	6	10	-	EV-4	6
7							4992			9984	4992					-		8
9	EV-5	6	10	-	60	2	4992		9984		4992	60	2	6	10	-	EV-6	10
11							4992	9984			4992					-		12
13	EV-7	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-8	14
15							4992		9984		4992					-		16
17	EV-9	6	10	-	60	2	4992	9984			4992	60	2	6	10	-	EV-10	18
19							4992			9984	4992					-		20
21	EV-11	6	10	-	60	2	4992		9984		4992	60	2	6	10	-	EV-12	22
23							4992	9984			4992					-		24
25	EV-13	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-14	26
27							4992		9984		4992					-		28
29	EV-15	6	10	-	60	2	4992	9984			4992	60	2	6	10	-	EV-16	30
31							4992			9984	4992					-		32
33	EV-17	6	10	-	60	2	4992		9984		4992	60	2	6	10	-	EV-18	34
35							4992	9984			4992					-		36
37		-	-	-	50	3				0						-	SPARE	38
39	SPD	-	-	-				0					1	-	-	-	SPARE	40
41		-	-	-			0						1	-	-	-	SPARE	42

Remarks:

LINE TOTAL 59904 59904 59904
TOTAL CONN. KVA 180
TOTAL CONN. AMPS 499

PANEL SHALL BE EQUIPPED WITH BUSES FOR ALL CB'S AND SPACES SHOWN
■ 200% NEUTRAL BUS □ FEED THRU LUGS
□ ISOLATED GROUND BUS
■ GROUND BUS

PANEL: EV-1B
LOCATION: FLOOR 1
FED FROM: T-EV-1B

Voltage: 208Y/120V 3 Phase 4W
MOUNTING: SURFACE ■ FLUSH □
A DENOTES ARC FAULT INTERRUPTER C.B.
S DENOTES SHUNT TRIP BREAKER
G DENOTES GFI C.B. REQ'D

MAINS
BUS: 600A AMPS 35000 AIC
□ LUGS ONLY
■ MCB 600A AMPS
COPPER BUS ONLY

CIR. #	EQUIPMENT SERVED	FEEDER SIZE Wire	GND	I.G.	Breaker Amps	Poles	Load VA	C	B	A	Load VA	Breaker Amps	Poles	FEEDER SIZE Wire	GND	I.G.	EQUIPMENT SERVED	CIR. #
1	EV-1	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-2	2
3							4992		9984		4992					-		4
5	EV-3	6	10	-	60	2	4992	9984			4992	60	2	6	10	-	EV-4	6
7							4992			9984	4992					-		8
9	EV-5	6	10	-	60	2	4992		9984		4992	60	2	6	10	-	EV-6	10
11							4992	9984			4992					-		12
13	EV-7	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-8	14
15							4992		9984		4992					-		16
17	SPACE	-	-	-			0						1	-	-	-	SPACE	18
19	SPACE	-	-	-			0						1	-	-	-	SPACE	20
21	SPACE	-	-	-			0						1	-	-	-	SPACE	22
23	SPACE	-	-	-			0						1	-	-	-	SPACE	24
25		-	-	-	30	3	0						1	-	-	-	SPACE	26
27	SPD	-	-	-			0						1	-	-	-	SPACE	28
29		-	-	-			0						1	-	-	-	SPACE	30

Remarks:

LINE TOTAL 49920 49920 59904
TOTAL CONN. KVA 160
TOTAL CONN. AMPS 443

PANEL SHALL BE EQUIPPED WITH BUSES FOR ALL CB'S AND SPACES SHOWN
■ 200% NEUTRAL BUS □ FEED THRU LUGS
□ ISOLATED GROUND BUS
■ GROUND BUS

PANEL: EV-2
LOCATION: FLOOR 2
FED FROM: T-EV-2

Voltage: 208Y/120V 3 Phase 4W
MOUNTING: SURFACE ■ FLUSH □
A DENOTES ARC FAULT INTERRUPTER C.B.
S DENOTES SHUNT TRIP BREAKER
G DENOTES GFI C.B. REQ'D

MAINS
BUS: 400A AMPS 35000 AIC *
□ LUGS ONLY
■ MCB 300A AMPS
COPPER BUS ONLY

CIR. #	EQUIPMENT SERVED	FEEDER SIZE Wire	GND	I.G.	Breaker Amps	Poles	Load VA	C	B	A	Load VA	Breaker Amps	Poles	FEEDER SIZE Wire	GND	I.G.	EQUIPMENT SERVED	CIR. #
1	EV-1	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-2	2
3							4992		9984		4992					-		4
5	EV-3	6	10	-	60	2	4992	9984			4992	60	2	6	10	-	EV-4	6
7							4992			9984	4992					-		8
9	EV-5	6	10	-	60	2	4992		9984		4992	60	2	6	10	-	EV-6	10
11							4992	9984			4992					-		12
13	EV-7	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-8	14
15							4992		9984		4992					-		16
17	SPACE	-	-	-			0						1	-	-	-	SPACE	18
19	SPACE	-	-	-			0						1	-	-	-	SPACE	20
21	SPACE	-	-	-			0						1	-	-	-	SPACE	22
23	SPACE	-	-	-			0						1	-	-	-	SPACE	24
25		-	-	-	30	3	0						1	-	-	-	SPACE	26
27	SPD	-	-	-			0						1	-	-	-	SPACE	28
29		-	-	-			0						1	-	-	-	SPACE	30

Remarks:
* EC shall obtain available short circuit amperage from utility for engineering review prior to ordering of all electrical equipment.

LINE TOTAL 19968 29952 29952
TOTAL CONN. KVA 80
TOTAL CONN. AMPS 222

PANEL SHALL BE EQUIPPED WITH BUSES FOR ALL CB'S AND SPACES SHOWN
■ 200% NEUTRAL BUS □ FEED THRU LUGS
□ ISOLATED GROUND BUS
■ GROUND BUS

PANEL: EV-3
LOCATION: FLOOR 3
FED FROM: T-EV-3

Voltage: 208Y/120V 3 Phase 4W
MOUNTING: SURFACE ■ FLUSH □
A DENOTES ARC FAULT INTERRUPTER C.B.
S DENOTES SHUNT TRIP BREAKER
G DENOTES GFI C.B. REQ'D

MAINS
BUS: 400A AMPS 35000 AIC *
□ LUGS ONLY
■ MCB 300A AMPS
COPPER BUS ONLY

CIR. #	EQUIPMENT SERVED	FEEDER SIZE Wire	GND	I.G.	Breaker Amps	Poles	Load VA	C	B	A	Load VA	Breaker Amps	Poles	FEEDER SIZE Wire	GND	I.G.	EQUIPMENT SERVED	CIR. #
1	EV-1	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-2	2
3							4992		9984		4992					-		4
5	EV-3	6	10	-	60	2	4992	9984			4992	60	2	6	10	-	EV-4	6
7							4992			9984	4992					-		8
9	EV-5	6	10	-	60	2	4992		9984		4992	60	2	6	10	-	EV-6	10
11							4992	9984			4992					-		12
13	EV-7	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-8	14
15							4992		9984		4992					-		16
17	SPACE	-	-	-			0						1	-	-	-	SPACE	18
19	SPACE	-	-	-			0						1	-	-	-	SPACE	20
21	SPACE	-	-	-			0						1	-	-	-	SPACE	22
23	SPACE	-	-	-			0						1	-	-	-	SPACE	24
25		-	-	-	30	3	0						1	-	-	-	SPACE	26
27	SPD	-	-	-			0						1	-	-	-	SPACE	28
29		-	-	-			0						1	-	-	-	SPACE	30

Remarks:
* EC shall obtain available short circuit amperage from utility for engineering review prior to ordering of all electrical equipment.

LINE TOTAL 19968 29952 29952
TOTAL CONN. KVA 80
TOTAL CONN. AMPS 222

PANEL SHALL BE EQUIPPED WITH BUSES FOR ALL CB'S AND SPACES SHOWN
■ 200% NEUTRAL BUS □ FEED THRU LUGS
□ ISOLATED GROUND BUS
■ GROUND BUS

PANEL: EV-4
LOCATION: FLOOR 4
FED FROM: T-EV-4

Voltage: 208Y/120V 3 Phase 4W
MOUNTING: SURFACE ■ FLUSH □
A DENOTES ARC FAULT INTERRUPTER C.B.
S DENOTES SHUNT TRIP BREAKER
G DENOTES GFI C.B. REQ'D

MAINS
BUS: 400A AMPS 35000 AIC *
□ LUGS ONLY
■ MCB 300A AMPS
COPPER BUS ONLY

CIR. #	EQUIPMENT SERVED	FEEDER SIZE Wire	GND	I.G.	Breaker Amps	Poles	Load VA	C	B	A	Load VA	Breaker Amps	Poles	FEEDER SIZE Wire	GND	I.G.	EQUIPMENT SERVED	CIR. #
1	EV-1	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-2	2
3							4992		9984		4992					-		4
5	EV-3	6	10	-	60	2	4992	9984			4992	60	2	6	10	-	EV-4	6
7							4992			9984	4992					-		8
9	EV-5	6	10	-	60	2	4992		9984		4992	60	2	6	10	-	EV-6	10
11							4992	9984			4992					-		12
13	EV-7	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-8	14
15							4992		9984		4992					-		16
17	SPACE	-	-	-			0						1	-	-	-	SPACE	18
19	SPACE	-	-	-			0						1	-	-	-	SPACE	20
21	SPACE	-	-	-			0						1	-	-	-	SPACE	22
23	SPACE	-	-	-			0						1	-	-	-	SPACE	24
25		-	-	-	30	3	0						1	-	-	-	SPACE	26
27	SPD	-	-	-			0						1	-	-	-	SPACE	28
29		-	-	-			0						1	-	-	-	SPACE	30

Remarks:
* EC shall obtain available short circuit amperage from utility for engineering review prior to ordering of all electrical equipment.

LINE TOTAL 19968 29952 29952
TOTAL CONN. KVA 80
TOTAL CONN. AMPS 222

PANEL SHALL BE EQUIPPED WITH BUSES FOR ALL CB'S AND SPACES SHOWN
■ 200% NEUTRAL BUS □ FEED THRU LUGS
□ ISOLATED GROUND BUS
■ GROUND BUS

PANEL: EV-5
LOCATION: FLOOR 5
FED FROM: T-EV-5

Voltage: 208Y/120V 3 Phase 4W
MOUNTING: SURFACE ■ FLUSH □
A DENOTES ARC FAULT INTERRUPTER C.B.
S DENOTES SHUNT TRIP BREAKER
G DENOTES GFI C.B. REQ'D

MAINS
BUS: 400A AMPS 35000 AIC *
□ LUGS ONLY
■ MCB 300A AMPS
COPPER BUS ONLY

CIR. #	EQUIPMENT SERVED	FEEDER SIZE Wire	GND	I.G.	Breaker Amps	Poles	Load VA	C	B	A	Load VA	Breaker Amps	Poles	FEEDER SIZE Wire	GND	I.G.	EQUIPMENT SERVED	CIR. #
1	EV-1	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-2	2
3							4992		9984		4992					-		4
5	EV-3	6	10	-	60	2	4992	9984			4992	60	2	6	10	-	EV-4	6
7							4992			9984	4992					-		8
9	EV-5	6	10	-	60	2	4992		9984		4992	60	2	6	10	-	EV-6	10
11							4992	9984			4992					-		12
13	EV-7	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-8	14
15							4992		9984		4992					-		16
17	SPACE	-	-	-			0						1	-	-	-	SPACE	18
19	SPACE	-	-	-			0						1	-	-	-	SPACE	20
21	SPACE	-	-	-			0						1	-	-	-	SPACE	22
23	SPACE	-	-	-			0						1	-	-	-	SPACE	24
25		-	-	-	30	3	0						1	-	-	-	SPACE	26
27	SPD	-	-	-			0						1	-	-	-	SPACE	28
29		-	-	-			0						1	-	-	-	SPACE	30

Remarks:
* EC shall obtain available short circuit amperage from utility for engineering review prior to ordering of all electrical equipment.

LINE TOTAL 19968 29952 29952
TOTAL CONN. KVA 80
TOTAL CONN. AMPS 222

PANEL SHALL BE EQUIPPED WITH BUSES FOR ALL CB'S AND SPACES SHOWN
■ 200% NEUTRAL BUS □ FEED THRU LUGS
□ ISOLATED GROUND BUS
■ GROUND BUS

PANEL: EV-6
LOCATION: FLOOR 6
FED FROM: T-EV-6

Voltage: 208Y/120V 3 Phase 4W
MOUNTING: SURFACE ■ FLUSH □
A DENOTES ARC FAULT INTERRUPTER C.B.
S DENOTES SHUNT TRIP BREAKER
G DENOTES GFI C.B. REQ'D

MAINS
BUS: 400A AMPS 35000 AIC *
□ LUGS ONLY
■ MCB 300A AMPS
COPPER BUS ONLY

CIR. #	EQUIPMENT SERVED	FEEDER SIZE Wire	GND	I.G.	Breaker Amps	Poles	Load VA	C	B	A	Load VA	Breaker Amps	Poles	FEEDER SIZE Wire	GND	I.G.	EQUIPMENT SERVED	CIR. #
1	EV-1	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-2	2
3							4992		9984		4992					-		4
5	EV-3	6	10	-	60	2	4992	9984			4992	60	2	6	10	-	EV-4	6
7							4992			9984	4992					-		8
9	EV-5	6	10	-	60	2	4992		9984		4992	60	2	6	10	-	EV-6	10
11							4992	9984			4992					-		12
13	EV-7	6	10	-	60	2	4992			9984	4992	60	2	6	10	-	EV-8	14
15							4992		9984		4992					-		16
17	SPACE	-	-	-			0						1	-	-	-	SPACE	18
19	SPACE	-	-	-			0						1	-	-	-	SPACE	20
21	SPACE	-	-	-			0						1	-	-	-	SPACE	22
23	SPACE	-	-	-			0						1	-	-	-	SPACE	24
25		-	-	-	30	3	0						1	-	-	-	SPACE	26
27	SPD	-	-	-			0						1	-	-	-	SPACE	28
29		-	-	-			0						1	-	-	-	SPACE	30

Remarks:
* EC shall obtain available short circuit amperage from utility for engineering review prior to ordering of all electrical equipment.

LINE TOTAL 19968 29952 29952
TOTAL CONN. KVA 80
TOTAL CONN. AMPS 222

PANEL SHALL BE EQUIPPED WITH BUSES FOR ALL CB'S AND SPACES SHOWN
■ 200% NEUTRAL BUS □ FEED THRU LUGS
□ ISOLATED GROUND BUS
■ GROUND BUS

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	06.17.24	REVISED FOR INTERCONNECTION	MP	ADK
2	05.31.24	REVISED FOR INTERCONNECTION	MP	ADK
3	05.17.24	REVISED FOR INTERCONNECTION	MP	ADK
4	04.17.24	REVISED FOR INTERCONNECTION	MP	ADK
5	03.20.24	REVISED FOR INTERCONNECTION	MP	ADK
6	02.19.24	REVISED FOR INTERCONNECTION	MP	ADK
7	01.18.24	REVISED FOR INTERCONNECTION	MP	IM
8	10.18.23	ISSUED FOR INTERCONNECTION	MP	IM

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL Sq DT7/8
(732) 280-5622

NY CERTIFICATE OF AUTHORIZATION: 081784

STATE OF NEW YORK — STEPHEN A. BRAY — 086064 — LICENSED PROFESSIONAL ENGINEER

Stephen A. Bray
PROFESSIONAL ENGINEER
NY LICENSE: 086064 — 6/17/24

centrica Business Solutions

NEW YORK MVP ARENA PARKING GARAGE

CANOPY SOLAR AND EV CHARGING STATIONS
100 SOLAR - MARKET ST.
ALBANY, NY 12207

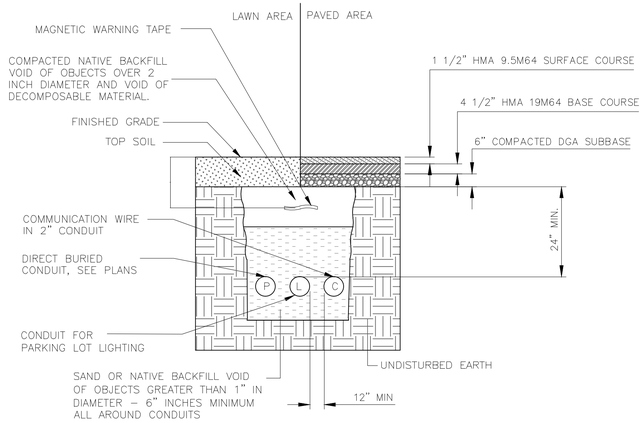
KMB PROJECT No.
732.1154

DRAWING TITLE
PANEL SCHEDULES

DRAWING SCALE:
NONE

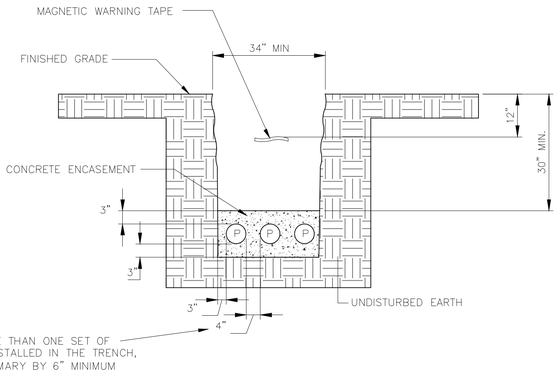
DRAWN BY:	CHECKED BY:	DATE:
RTC	ADK	10.11.23

DWG No.
E-204



1 LV TRENCHING DETAIL

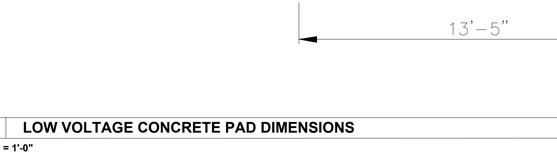
SCALE: NTS



THE MINIMUM SIZE CONDUIT SHALL BE 4" SCHEDULE 60 DB. ALL SWEEPS AT FOUNDATIONS AND RISERS SHALL HAVE A MINIMUM RADIUS OF THIRTY–SIX INCHES (36"). THE RISER SWEEP SHALL BE GALVANIZED STEEL. THE PAD MOUNT TRANSFORMER SWEEPS SHALL BE GALVANIZED RIGID STEEL OR SCHEDULE 40 – PVC, WITH THE TRANSFORMER SWEEPS RISING TYPICALLY 1" ABOVE THE CONCRETE PAD. THE CUSTOMER SHALL INSTALL BELL ENDS ON THE CONDUITS. THE CUSTOMER SHALL INSTALL CONDUIT PLUGS IN ALL UNUSED CONDUITS AND PULLING TAPE.

2 MV CONCRETE ENCASED TRENCHING DETAIL (BENEATH ROADWAY)

SCALE: NTS

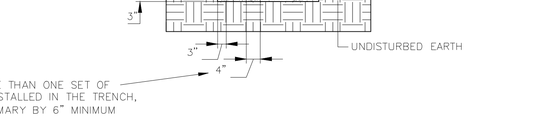


CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318 AND THE SPECIFICATION CAST–IN–PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3500 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE.
3. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST EARTH....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER.....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALL.....3/4 IN.
   BEAMS AND COLUMNS.....1 1/2 IN.
4. A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
5. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR ENGINEERING APPROVAL WHEN DRILLING HOLES IN CONCRETE.

3 CONCRETE PAD DETAIL

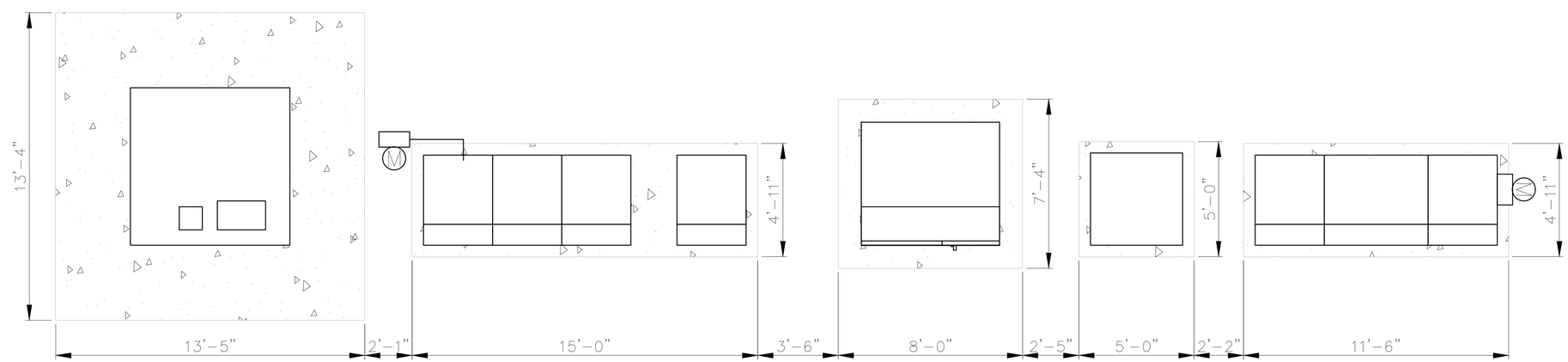
SCALE: NTS



THE MINIMUM SIZE CONDUIT SHALL BE 4" SCHEDULE 60 DB. ALL SWEEPS AT FOUNDATIONS AND RISERS SHALL HAVE A MINIMUM RADIUS OF THIRTY–SIX INCHES (36"). THE RISER SWEEP SHALL BE GALVANIZED STEEL. THE PAD MOUNT TRANSFORMER SWEEPS SHALL BE GALVANIZED RIGID STEEL OR SCHEDULE 40 – PVC, WITH THE TRANSFORMER SWEEPS RISING TYPICALLY 1" ABOVE THE CONCRETE PAD. THE CUSTOMER SHALL INSTALL BELL ENDS ON THE CONDUITS. THE CUSTOMER SHALL INSTALL CONDUIT PLUGS IN ALL UNUSED CONDUITS AND PULLING TAPE.

4 MV CONDUIT TRENCHING DETAIL (BENEATH NON-VEHICLE TRAFFIC AREAS)

SCALE: NTS



5 LOW VOLTAGE CONCRETE PAD DIMENSIONS

SCALE: 1/2" = 1'-0"

REV:	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	06.17.24	REVISED FOR INTERCONNECTION	MP	ADK
1	05.31.24	REVISED FOR INTERCONNECTION	MP	ADK
1	05.17.24	REVISED FOR INTERCONNECTION	MP	ADK
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1	02.19.24	REVISED FOR INTERCONNECTION	MP	ADK
1	01.18.24	REVISED FOR INTERCONNECTION	MP	PP
1	10.18.23	ISSUED FOR INTERCONNECTION	MP	PP

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NEW YORK MVP ARENA PARKING GARAGE

CANOPY SOLAR AND EV CHARGING STATIONS
100 SOLAR - MARKET ST.
ALBANY, NY 12207

KMB PROJECT No: **732.1154**

DRAWING TITLE: PHOTOVOLTAIC SYSTEM DETAILS SHEET

DRAWING SCALE: NONE

DRAWN BY:	CHECKED BY:	DATE:
YO	ADK	10.11.23

DWG No: **E-401**

Appendix D – Helioscope Design for Solar Canopy

Design 1.54 Silfab 580W MVP Arena - 405356, 100 Beaver St Albany NY, 12207

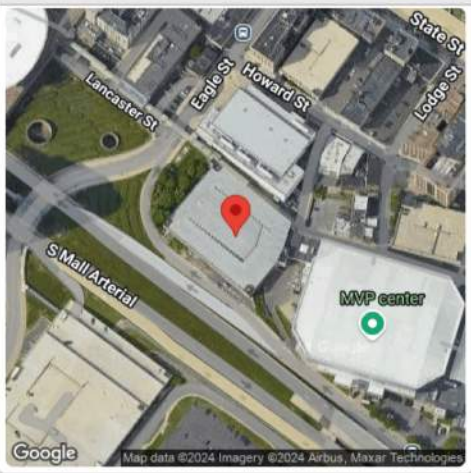
Report

Project Name	MVP Arena - 405356
Project Description	Car port
Project Address	100 Beaver St Albany NY, 12207
Prepared By	Jeff Kilmer jkilmer@smartwattinc.com

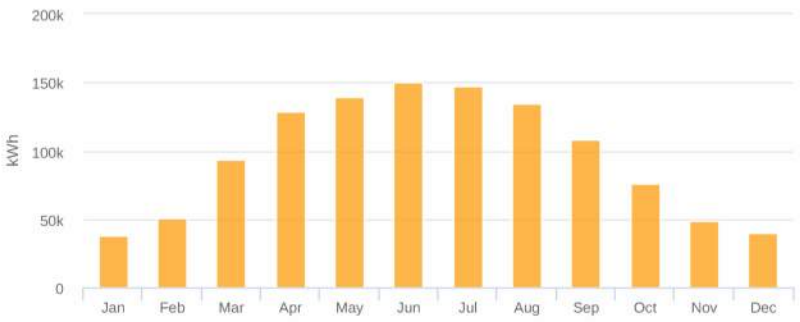
System Metrics

Design	Design 1.54 Silfab 580W
Module DC Nameplate	1.06 MW
Inverter AC Nameplate	720.0 kW Load Ratio: 1.47
Annual Production	1.158 GWh
Performance Ratio	77.1%
kWh/kWp	1,092.5
Weather Dataset	TMY, 10km grid (42.65,-73.85), NREL (prospector)
Simulator Version	c75c26fed3-08e6eff882-96f4e727c1-f1f4aff032

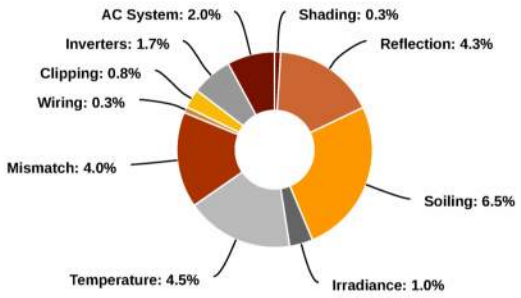
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,396.9	
	POA Irradiance	1,416.6	1.4%
	Shaded Irradiance	1,412.9	-0.3%
	Irradiance after Reflection	1,352.2	-4.3%
	Irradiance after Soiling	1,263.6	-6.5%
	Total Collector Irradiance	**1,263.7**	**0.0%**
Energy (kWh)	Nameplate	1,338,912.9	
	Output at Irradiance Levels	1,325,754.8	-1.0%
	Output at Cell Temperature Derate	1,265,791.9	-4.5%
	Output After Mismatch	1,214,801.0	-4.0%
	Optimal DC Output	1,211,761.6	-0.3%
	Constrained DC Output	1,202,037.9	-0.8%
	Inverter Output	1,181,319.6	-1.7%
	Energy to Grid	**1,157,693.2**	**-2.0%**
Temperature Metrics			
	Avg. Operating Ambient Temp		10.8 °C
	Avg. Operating Cell Temp		24.5 °C
Simulation Metrics			
	Operating Hours		4703
	Solved Hours		4703

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km grid (42.65,-73.85), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Spectral Adjustment Model (CdTe cells only)	First Solar Spectral Adjustment by Dew Point Temperature											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
	East-West	-3.56	-0.075	3°C								
	Carport	-3.56	-0.075	3°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	30	30	15	3	3	3	3	3	3	3	3	3
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	2.00%											
Trackers	Maximum Angle			Backtracking								
	60°			Enabled								
Module Characterizations	Module		Uploaded By	Characterization								
	SIL-580 XM+ (Silfab Solar)		HelioScope	Spec Sheet Characterization, PAN								
Component Characterizations	Device			Uploaded By	Characterization							
	CPS SCA60KTL-DO/US-480 (Chint Power Systems)			HelioScope	Default Characterization							

Components

Component	Name	Count
Inverters	CPS SCA60KTL-DO/US-480 (Chint Power Systems)	12 (720.0 kW)
Strings	10 AWG (Copper)	120 (16,920.1 ft)
Module	Silfab Solar, SIL-580 XM+ (580W)	1,827 (1.06 MW)

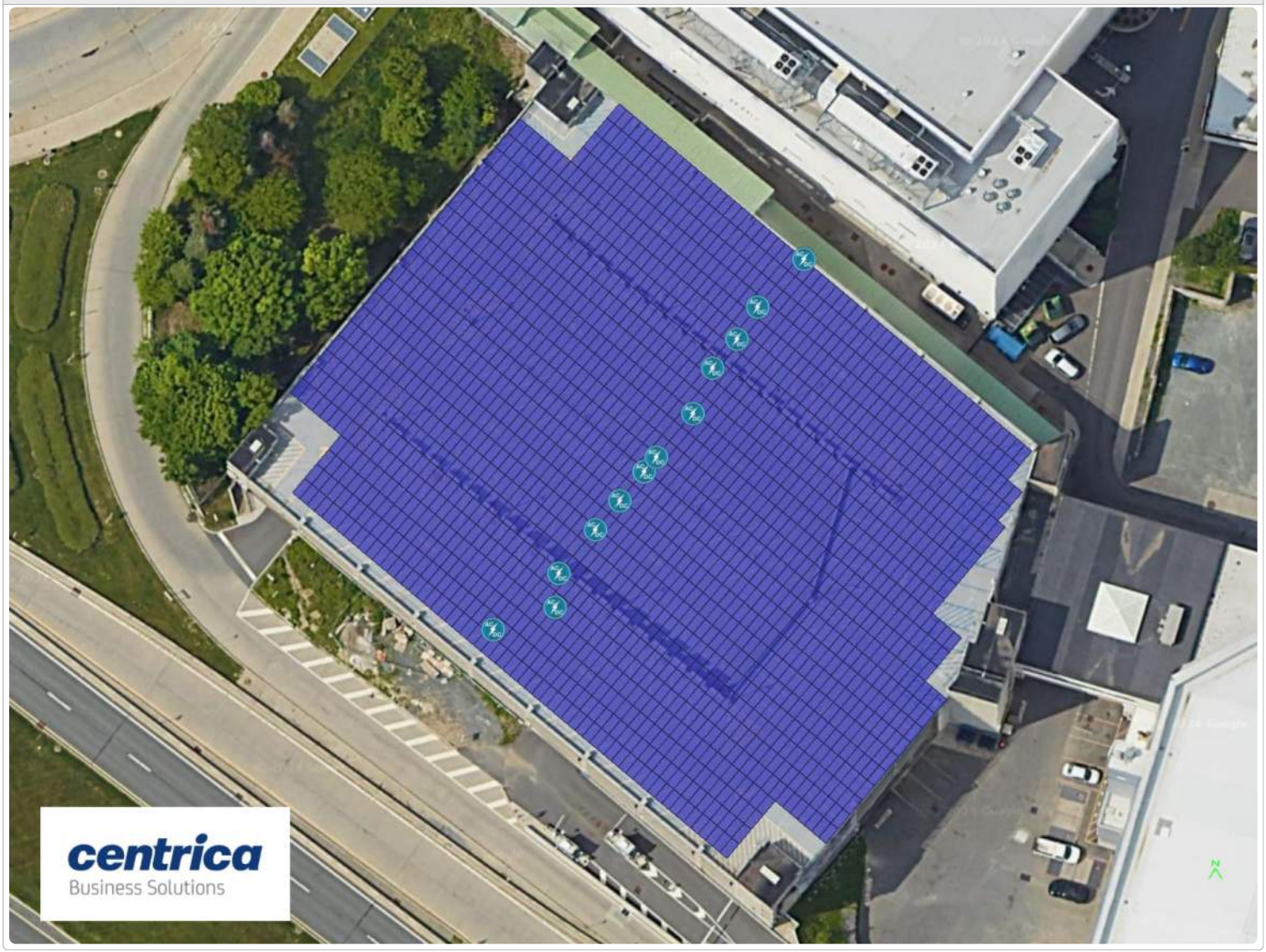
Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	-	5-17	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Portrait (Vertical)	2°	220.06079°	0.0 ft	1x1	1,827	1,827	1.06 MW

Detailed Layout



Appendix E – EV Fuel Savings Calculation

BASELINE FLEET

Internal Combustion Engine (ICE) Vehicles

Year	Vehicle Type	Count of Vehicle Type	Average Annual Miles Driven	Fuel Economy (MPG)	Average Price per gallon for fuel	Maint & Repair Cost per mile	Total Gallons of Gasoline Purchased	Fuel Costs	Maint & Repair Costs	Total Annual Costs
2024	Chevrolet Pickup 2500	1	10,000	16.1	$ 3.23	$ -	620	$ 2,002.60	$ -	$ 2,002.60
2021	Chevrolet Tahoe	1	10,000	17.9	$ 3.23	$ -	560	$ 1,808.80	$ -	$ 1,808.80
2020	Chevrolet Blazer	1	10,000	23.3	$ 3.23	$ -	430	$ 1,388.90	$ -	$ 1,388.90
2023	Chevrolet Pickup 1500	1	10,000	22.2	$ 3.23	$ -	450	$ 1,453.50	$ -	$ 1,453.50
2013	Chevrolet Pickup 1500	3	10,000	16.9	$ 3.23	$ -	1,770	$ 5,717.10	$ -	$ 5,717.10
2006	Dodge Caravan	1	10,000	20.0	$ 3.23	$ -	500	$ 1,615.00	$ -	$ 1,615.00
2007	Dodge Charger	1	10,000	17.9	$ 3.23	$ -	560	$ 1,808.80	$ -	$ 1,808.80
2008	Dodge Charger	1	10,000	17.9	$ 3.23	$ -	560	$ 1,808.80	$ -	$ 1,808.80
2019	Ford Escape	1	10,000	23.8	$ 3.23	$ -	420	$ 1,356.60	$ -	$ 1,356.60
2015	Ford Focus	4	10,000	30.3	$ 3.23	$ -	1,320	$ 4,263.60	$ -	$ 4,263.60
2016	Ford Focus	1	10,000	32.3	$ 3.23	$ -	310	$ 1,001.30	$ -	$ 1,001.30
2017	Ford Fusion	4	10,000	27.0	$ 3.23	$ -	1,480	$ 4,780.40	$ -	$ 4,780.40
2018	Ford Fusion	8	10,000	27.0	$ 3.23	$ -	2,960	$ 9,560.80	$ -	$ 9,560.80
2019	Ford Fusion	4	10,000	27.0	$ 3.23	$ -	1,480	$ 4,780.40	$ -	$ 4,780.40
2019	Ford Transit Van	1	10,000	14.9	$ 3.23	$ -	670	$ 2,164.10	$ -	$ 2,164.10

Total Annual Costs

ICE Total Annual Cost $ 45,510.70

Electric Vehicles (EV)

Year	Vehicle Type	Count of Vehicle Type	Average Annual Miles Driven	Battery Size (kWh)	Range (miles)	Average price per kWh	Maint & Repair Cost per mile	kWh purchased Purchased	Fuel Costs	Maint & Repair Costs	Total Annual Costs
2023	Chevrolet Bolt	13	10,000	72.5	259	$ 0.15	$ -	36,400	$ 5,460.00	$ -	$ 5,460.00
2023	Chevrolet Bolt EUV	3	10,000	71.6	247	$ 0.15	$ -	8,700	$ 1,305.00	$ -	$ 1,305.00
2020	Chevrolet Bolt	2	10,000	75.1	259	$ 0.15	$ -	5,800	$ 870.00	$ -	$ 870.00
2018	Chevrolet Bolt	2	10,000	66.6	238	$ 0.15	$ -	5,600	$ 840.00	$ -	$ 840.00
2023	Ford Lightning	1	10,000	117.6	240	$ 0.15	$ -	4,900	$ 735.00	$ -	$ 735.00

EV Total Annu $ 9,210.00

Existing Fleet Total Annual $ 54,720.70

Notes

1 Vehicle Fuel economy rates gathered from FuelEconomy.gov website

2 Price per gallon found from AAA website for Albany/Schenectady/Troy metro area, current average for September 2024

3 Price per kWh gathered from existing billing data

PROPOSED FLEET

Gasoline Vehicle

Year	Vehicle Type	Count of Vehicle Type	Average Annual Miles	Fuel Economy (MPG)	Average Price per gallon for fuel	Maint & Repair Cost per mile
2024	Chevrolet Pickup 2500	0	10,000	16.1	$ 3.23	$ -
2021	Chevrolet Tahoe	0	10,000	17.9	$ 3.23	$ -
2020	Chevrolet Blazer	0	10,000	23.3	$ 3.23	$ -
2023	Chevrolet Pickup 1500	0	10,000	22.2	$ 3.23	$ -
2013	Chevrolet Pickup 1500	0	10,000	16.9	$ 3.23	$ -
2006	Dodge Caravan	1	10,000	20.0	$ 3.23	$ -
2007	Dodge Charger	0	10,000	17.9	$ 3.23	$ -
2008	Dodge Charger	0	10,000	17.9	$ 3.23	$ -
2019	Ford Escape	0	10,000	23.8	$ 3.23	$ -
2015	Ford Focus	0	10,000	30.3	$ 3.23	$ -
2016	Ford Focus	0	10,000	32.3	$ 3.23	$ -
2017	Ford Fusion	0	10,000	27.0	$ 3.23	$ -
2018	Ford Fusion	0	10,000	27.0	$ 3.23	$ -
2019	Ford Fusion	0	10,000	27.0	$ 3.23	$ -
2019	Ford Transit Van	1	10,000	14.9	$ 3.23	$ -

Total Annual Costs

Total Gallons of Gasoline Purchased	Fuel Costs	Maint & Repair Costs	Total Annual Costs
-	$ -	$ -	$ -
-	$ -	$ -	$ -
-	$ -	$ -	$ -
-	$ -	$ -	$ -
-	$ -	$ -	$ -
500	$ 1,615.00	$ -	$ 1,615.00
-	$ -	$ -	$ -
-	$ -	$ -	$ -
-	$ -	$ -	$ -
-	$ -	$ -	$ -
-	$ -	$ -	$ -
-	$ -	$ -	$ -
-	$ -	$ -	$ -
-	$ -	$ -	$ -
670	$ 2,164.10	$ -	$ 2,164.10

Electric Vehicles

Year	Vehicle Type	Count of Vehicle Type	Average Annual Miles Driven	Battery Size (kWh)	Range (miles)	Average price per kWh	Maint & Repair Cost per mile
2023	Chevrolet Bolt	13	10,000	72.52	259	$ 0.20	$ -
2023	Chevrolet Bolt EUV	3	10,000	71.63	247	$ 0.20	$ -
2020	Chevrolet Bolt	2	10,000	75.11	259	$ 0.20	$ -
2018	Chevrolet Bolt	2	10,000	66.64	238	$ 0.20	$ -
2023	Ford Lightning	1	10,000	117.6	240	$ 0.20	$ -
2024	Ford Lightning (Replaces Chevy Pickups)	5	10,000	117.6	240	$ 0.20	$ -
2024	Chevrolet Blazer EV (Replaces Tahoe and Blazer)	2	10,000	119.88	324	$ 0.20	$ -
2024	Ford Mach E (Replaces Charger, Focus, Fusion)	23	10,000	102.4	320	$ 0.20	$ -
2024	Chevrolet Equinox EV (Replaces Ford Escape)	1	10,000	98.89	319	$ 0.20	$ -

kWh purchased Purchased	Fuel Costs	Maint & Repair Costs	Total Annual Costs
36,400	$ 7,280.00	$ -	$ 7,280.00
8,700	$ 1,740.00	$ -	$ 1,740.00
5,800	$ 1,160.00	$ -	$ 1,160.00
5,600	$ 1,120.00	$ -	$ 1,120.00
4,900	$ 980.00	$ -	$ 980.00
24,500	$ 4,900.00	$ -	$ 4,900.00
7,400	$ 1,480.00	$ -	$ 1,480.00
73,600	$ 14,720.00	$ -	$ 14,720.00
3,100	$ 620.00	$ -	$ 620.00

ICE Total Annual Cost $ 3,779.10

EV Total Annual Cost $ 34,000.00

Notes

1 Vehicle Fuel economy rates gathered from FuelEconomy.gov website
2 Price per gallon found from AAA website for Albany/Schenectady/Troy metro area, current
3 Price per kWh gathered from existing billing data

Existing Fleet Total Annual Costs $ 37,779.10

	Gallons of Gasoline Purchased	Fuel Rate	Total Gas Costs	kWh Purchased	kWh rate	Total Electric Costs	Total Fuel Costs	Maintenance and Repair Costs	Total Costs
Baseline Fleet Costs	14,090	$3.23	$ 45,510.70	61,400	$0.15	$ 9,210.00	$ 54,720.70	$ -	$ 54,720.70
Proposed Fleet Costs	1,170	$3.23	$ 3,779.10	170,000	$0.20	$ 34,000.00	$ 37,779.10	$ -	$ 37,779.10
Total Savings	12,920		$ 41,731.60	(108,600)		$ (24,790.00)	$ 16,941.60	$ -	$ 16,941.60

Results

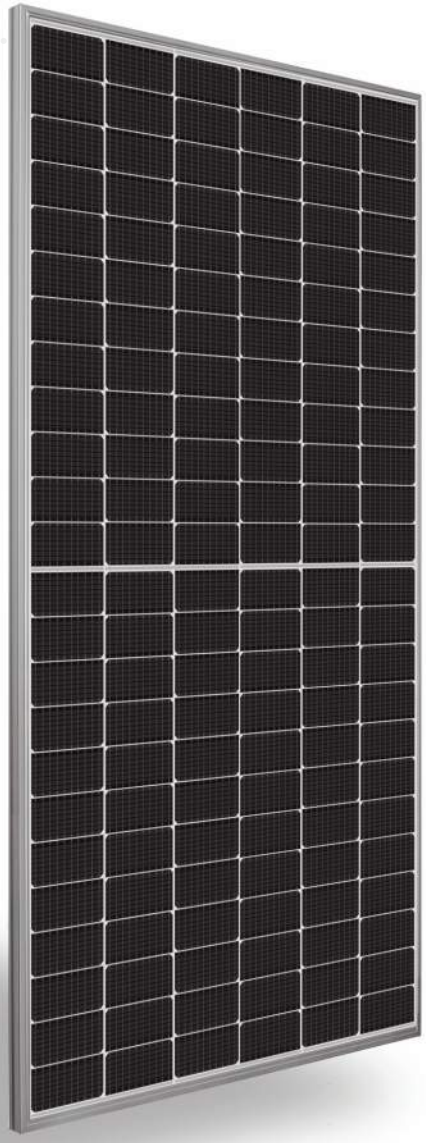
1. **The switch from ICE Vehicles to Electric Vehicles is estimated to save 12,920 gallons of gasoline.**
2. **This will also lead to an increase in energy usage of 108,600 kWh.**
3. **The total estimated Fuel Cost savings by switching to EV is estimated to be $16,941.60 annually.**

Appendix F – Product Cut Sheets

SILFAB COMMERCIAL NTC

SIL-580 XM+
BIFACIAL

SILFAB SOLAR®



NEXT-GENERATION N-TYPE CELL TECHNOLOGY

Manufactured exclusively in the USA.

- Improved Shade Tolerance
- Improved Low-Light Performance
- Increased Performance in High Temperatures
- Efficient Bifacial Energy Yield
- Enhanced Durability
- Reduced Degradation Rate
- 25-Year Product Warranty/ 30-Year Performance Warranty

SILFABSOLAR.COM

ELECTRICAL SPECIFICATIONS		580		
Test Conditions		STC	BSTC	NOCT
Module Power (Pmax)	Wp	580	632.8	428.2
Maximum power voltage (Vpmax)	V	44.27	44.27	40.73
Maximum power current (Ipmax)	A	13.10	14.29	10.51
Open circuit voltage (Voc)	V	52.27	52.32	48.08
Short circuit current (Isc)	A	13.85	15.11	11.12
Module efficiency	%	22.4%		
Maximum system voltage (VDC)	V	1500		
Series fuse rating	A	30		
Power Tolerance	Wp	0 to +10		
Bifaciality Factor	%	80±5		

Performance conditions: Measurement tolerance ≤ 3% • Standard Test Conditions (STC): 1000 W/m², AM 1.5, Temperature 25 °C • Nominal Operating Cell Temperature (NOCT): 800 W/m², AM 1.5 • Bifacial Standard Test Conditions (BSTC): 1000 W/m2 + φ × 135 W/m2 , φ = 80 % , AM 1.5 • Electrical characteristics may vary by ±5%.

MECHANICAL PROPERTIES / COMPONENTS	METRIC	IMPERIAL
Module weight	28.5 kg ±0.2 kg	62.8 lbs ±0.4 lbs
Dimensions (H x L x D)	2278 mm x 1133 mm x 35 mm	89.7 in x 44.6 in x 1.4 in
Maximum surface load (wind/snow)*	2400 Pa rear load / 5400 Pa front load	50.1 lb/ft² rear load / 112.8 lb/ft² front load
Hail impact resistance	ø 25 mm at 83 km/h	ø 1 in at 51.6 mph
Cells	144 Half cells - N-Type Silicon solar cell 182 mm x 91 mm	144 Half cells - N-Type Silicon solar cell 7.16 in x 3.58 in
Glass	3.2 mm high transmittance, tempered, anti-reflective coating	0.126 in high transmittance, tempered, anti-reflective coating
Cables and connectors (refer to installation manual)	1350 mm, ø 5.7 mm, EVO2 from Staubli	53.1 in, ø 0.22 in (12 AWG), EVO2 from Staubli
Backsheet	High durability, superior hydrolysis and UV resistance, multi-layer dielectric film, transparent PV backsheet	
Frame	Anodized Aluminum (Silver)	
Junction Box	UL 3730 Certified, IEC 62790 Certified, IP68 rated, 3 diodes	

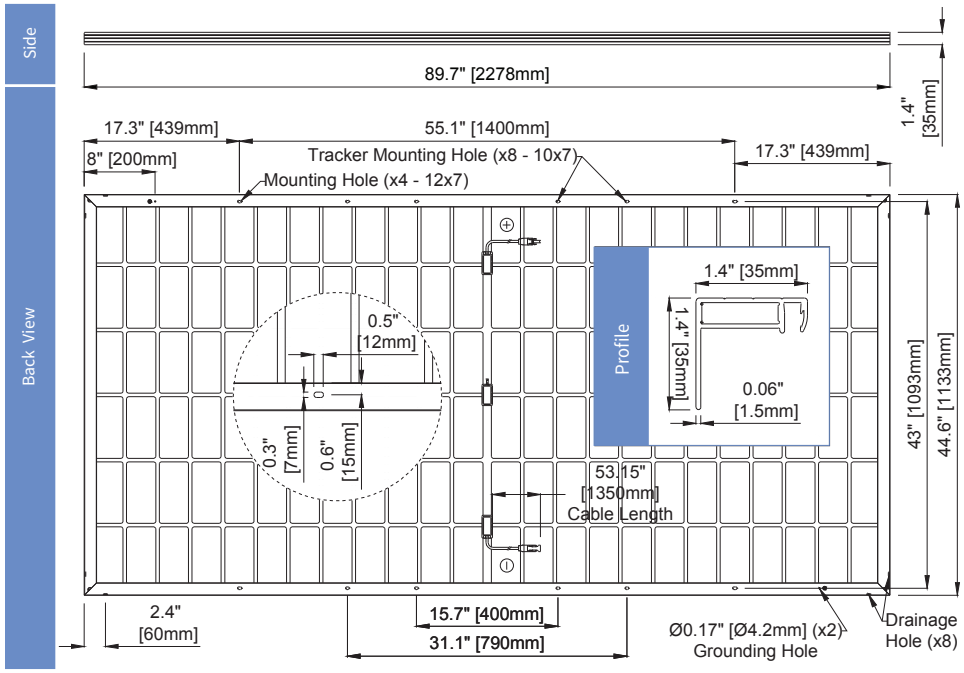
TEMPERATURE RATINGS	
Temperature Coefficient Isc	0.04 %/°C
Temperature Coefficient Voc	-0.24 %/°C
Temperature Coefficient Pmax	-0.29 %/°C
NOCT (± 2°C)	45 °C
Operating temperature	-40/+85 °C

WARRANTIES	
Module product workmanship warranty	25 years**
Linear power performance guarantee	30 years
	≥ 98% end 1st yr ≥ 94.7% end 12th yr ≥ 90.8% end 25th yr ≥ 89.3% end 30th yr

CERTIFICATIONS	
Product	UL 61215***, UL 61730*** , CSA C22.2#61730***, IEC 61215***, IEC 61730***, IEC 61701 (Salt Mist Corrosion), IEC 62716 (Ammonia Corrosion), CEC Listing***, UL Fire Rating: Type 1
Factory	ISO9001:2015

SHIPPING SPECS	
Modules Per Pallet:	29
California (Pallets per load)	21
Others (Pallets per load)	22

* ⚠ Warning. Read the Safety and Installation Manual for mounting specifications and before handling, installing and operating modules.
** 12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at silfabsolar.com.
PAN files generated from 3rd party performance data are available for download at: silfabsolar.com/downloads.
*** Certification and CEC listing in progress.



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Silfab - SIL-580-XM+-BIFACIAL 20240829

50/60 kW, 1000 Vdc String Inverters for North America

The 50 & 60 kW (55 & 66 kVA) medium-power CPS three-phase string inverters are designed for ground mount, large rooftop and carport applications. The units are high performance, advanced and reliable inverters designed specifically for the North American environment and grid. High efficiency at 98.8% peak and 98.5% CEC, wide operating voltages, broad temperature ranges and a NEMA Type 4X enclosure enable this inverter platform to operate at high performance across many applications.

The CPS 50/60KTL products ship with either the Standard Wire-box or the Rapid Shutdown Wire-box, each fully integrated and separable with touch-safe fusing, monitoring, and AC and DC disconnect switches. The integrated PLC transmitter in the Rapid Shutdown Wire-box enables PVRSS certified module-level rapid shutdown when used with APS RSD-S-PLC/RSD-D products. The CPS FlexOM Gateway enables monitoring, controls and remote product upgrades.

CPS SCA50KTL-DO/US-480
CPS SCA60KTL-DO/US-480

Key Features

- NEC 2017/2020 PVRSS certified for rapid shutdown
- 55 & 66 kVA rating allows max rated active power @ ±0.91 PF
- Selectable max AC apparent power of 50/55 kVA and 60/66 kVA
- NEC compliant and UL listed arc-fault circuit protection
- 15-90° mounting orientation for low profile roof installs
- Optional FlexOM Gateway enables remote firmware upgrades
- Integrated AC and DC disconnect switches
- 3 MPPTs with 5 inputs each for maximum flexibility
- NEMA Type 4X outdoor rated enclosure
- UL 1741-SA certified to CA Rule 21, including SA8 - SA18
- UL 1741-SB and IEEE 1547-2018 certified
- Separable wire-box design for fast service
- Standard 10-year warranty with extensions up to 20 years

50/60KTL Standard Wire-box

50/60KTL Rapid Shutdown Wire-box

C US

This device complies with part 15 of the FCC Rules

Chint Power Systems America
1380 Presidential Drive, Suite 100, Richardson, TX 75081
Tel: 855-584-7168 Mail: AmericaSales@chintpower.com Web: www.chintpowersystems.com

Model Name	CPS SCA50KTL-DO/US-480	CPS SCA60KTL-DO/US-480
DC Input		
Max. PV power	90 kW (33 kW per MPPT)	
Max. DC input voltage	1000 Vdc	
Operating DC input voltage range	200-950 Vdc	
Start-up DC input voltage / power	330 V / 80 W	
Number of MPP trackers	3	
MPPT voltage range @ PF>0.99	480-850 Vdc	540-850 Vdc
Max. PV short-circuit current (Isc x 1.25)	204 A (68 A per MPPT)	
Number of DC inputs	15 inputs, 5 per MPPT	
DC disconnection type	Load-rated DC switch	
DC surge protection	Type II MOV	
AC Output		
Rated AC output power @ PF>0.99 to ±0.91[1]	50 kW	60 kW
Max. AC apparent power (selectable)	50 / 55 kVA	60 / 66 kVA
Rated output voltage	480 Vac	
Output voltage range[2]	422 - 528 Vac	
Grid connection type	3Φ / PE / N (Neutral optional)	
Max. AC output current @ 480 Vac	60.2 / 66.2 A	72.2 / 79.4 A
Rated output frequency	60 Hz	
Output frequency range[2]	57 - 63 Hz	
Power factor	>0.99 (±0.8 adjustable)	
Current THD @ rated load	<3%	
Max. fault current contribution (1 cycle RMS)	64.1 A (1.06/0.88 PU)	
Max. OCPD rating	110 A	125 A
AC disconnection type	Load-break rated AC switch	
AC surge protection	Type II MOV	
System and Performance		
Topology	Transformerless	
Max. efficiency	98.8%	
CEC efficiency	98.5%	
Stand-by / night consumption	<1 W	
Environment		
Enclosure protection degree	NEMA Type 4X	
Cooling method	Variable speed cooling fans	
Operating temperature range[3]	-22°F to +140°F / -30°C to +60°C	
Non-operating temperature range[4]	No low temp minimum to +158°F / +70°C maximum	
Operating humidity	0 to 100%	
Operating altitude	13123 ft / 4000 m (derating from 9843 ft / 3000 m)	
Audible noise	<60 dBA @ 1 m and 25°C	
Display and Communication		
User interface and display	LCD+LED	
Inverter monitoring	SunSpec, Modbus RS485	
Site-level monitoring	CPS FlexOM Gateway (1 per 32 inverters)	
Modbus data mapping	CPS	
Remote diagnostics / firmware upgrade functions	Standard / (with FlexOM Gateway)	
Mechanical		
Dimensions (H x W x D)	39.4 x 23.6 x 10.24 in (1000 x 600 x 260 mm)	
Weight	Inverter: 123.5 lbs (56 kg); Wire-box: 33 lbs (15 kg)	
Mounting / installation angle[5]	15 to 90 degrees from horizontal (vertical or angled)	
AC termination	M8 stud type terminal block (wire range: #6 - 3/0 AWG CU/AL; lugs not supplied)	
DC termination[6]	Screw clamp, neg. busbar (RSD version[6]) wire range: #14 - #6 AWG CU	
Fused string inputs (5 per MPPT)[7]	RSD[6] and Standard Wire-box: 20 A fuses provided (fuse values up to 30 A acceptable)	
Safety		
Certifications and standards	UL 1741-SA/SB Ed. 3, UL 1699B, UL 1998, CSA-C22.2 NO.107.1-01, IEEE 1547-2018, FCC PART15	
Selectable grid standard	IEEE 1547a-2014, IEEE1547-2018[8], CA Rule 21, ISO-NE, HECO	
Smart-grid features	Volt-RideThru, Freq-RideThru, Ramp-Rate, Specified-PF, Volt-VAR, Freq-Watt, Volt-Watt	
Warranty		
Standard	10 years	
Extended terms	15 and 20 years	

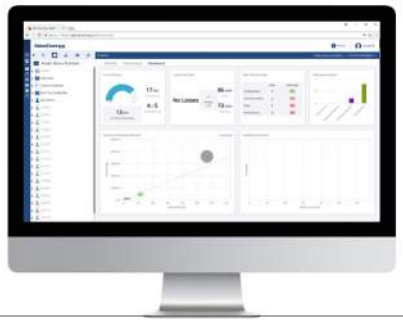
1) Active power derating begins at PF = ±0.91 to ±0.80 when max AC apparent power is set to 55 or 66 kVA.
2) The "output voltage range" and "output frequency range" may differ according to the specific grid standard.
3) Active power derating begins at 40°C when PF = ±0.9 and MPPT≥Vmin; at 45°C when PF = 1 and MPPT≥Vmin; and at 50°C when PF = 1 and MPPT≥700 Vdc.
4) See user manual for further requirements regarding non-operating conditions.
5) Shade cover accessory required for installation angles of 75 degrees or less.
6) RSD wire-box only includes fuses and fuse holders on the positive polarity, compliant with NEC 2017/2020.
7) Fuse values above 20 A have additional spacing requirements or require the use of the Y-Comb Terminal Block. See user manual for more details.
8) Firmware version 17.0 or later required.

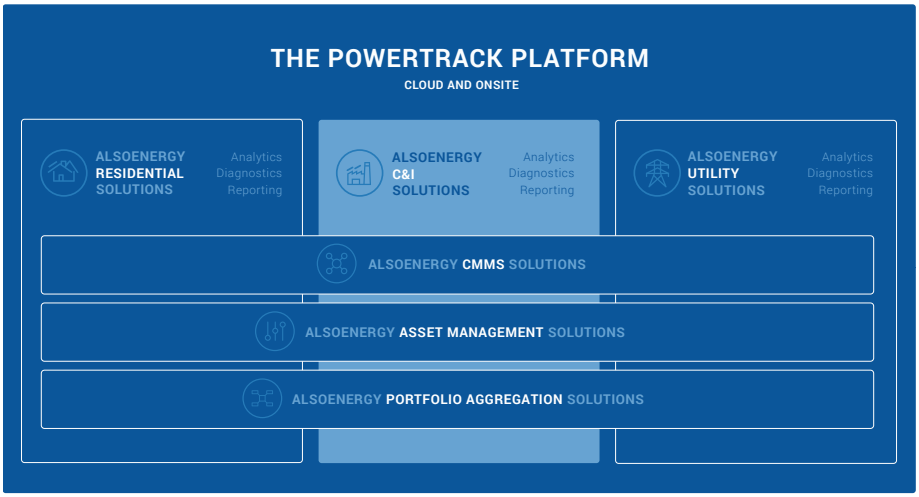
AlsoEnergy

The operating system for the grid of the future

AlsoEnergy Commercial & Industrial Solution

Pull all data onto a single, shared platform for a 360° view of project and portfolio performance and the power to optimize outcomes.





Optimize energy harvest

- Improve understanding of projects and portfolios
- Identify and address areas of low performance
- Utilize advanced diagnostics and analytics

Streamline workflow

- Integrate project design data, track activities, report on performance
- Extend to all management systems
- Stay connected with mobile apps

Avoid unnecessary costs

- Identify and address high-impact issues first
- Automate repetitive tasks
- Avoid truck rolls leveraging smart two-way communications technology

Maximize value

Hone in on key performance indicators to manage project lifecycles and portfolios more effectively

Optimize financial process

- Combined financial and management data
- Unified recordkeeping
- On-the-fly analysis

Simplify accounting

- Protect assets
- Improve performance
- Monitor entire chain of responsibility

Mitigate risk

- Manage risk and compliance
- Cross-portfolio analysis
- Audit trails to maintain data quality

Keep collaborative work on track and under control

Share the latest information to eliminate resource waste.

Expert support

- Accelerate innovation
- Easy, flexible implementation
- On-site, cloud resources

Future-proof platform

- Work with Big Data
- Stable and reliable architecture
- Enable partnerships and integrations

3rd-party resource management

- Streamline process
- Take advantage of proactive intervention
- Analyze and understand drivers of profitability

One comprehensive view of the entire asset portfolio

Increase productivity and reduce maintenance costs.

Maximum resource uptime

- Pinpoint and address areas of low performance
- Drive maintenance with CMMS
- Analyze and identify poor performance trends early

Exception-based alerting

- Real-time insight, anywhere, anytime
- Minimized nuisance alerts
- Automated or on-demand reports

Management mapping

- Achieve high-performance verification
- Flag deficiencies instantly
- Collaborate throughout the organization

Transform and modernize the supply chain

Open pathways for real-time feedback and resource optimization

Seamless procurement

- End-to-end business process
- Streamline and automate documentation
- Adapt to engineering changes quickly

Optimized commissioning, installation

- Increase productivity
- Reduce waste
- Manage project risk

Specialized C&I service

- Control solutions for C&I sites that need active management
- Accelerate plant validation
- Automate performance analytics

Harmonize data to attain operational excellence

Knock down data silos, bringing all project and portfolio information together to form a single version of the truth.

Practice proactive management

- Empower users to manage large portfolios
- Identify and apply corrective actions quickly
- Tie costs back to specific events

Control the health of your portfolio

- Rapid response time
- Notifications on occurrence or schedule
- Device, plant, or portfolio-level diagnosis

Run the business your way

- Custom displays to match business needs
- A single platform to manage all sites
- Third-party software integration

Intelligent planning, maintenance and documentation

Get the right information to the right person at the right time for efficient service in the field.

Act quickly and efficiently

- Simplify processes
- Schedule and report on tickets directly
- Use field technician-focused mobile app

Accurate alerts

- Scheduled maintenance or an immediate truck roll
- Priority for maintenance technician activities
- Easy alert-to-ticket creations

Specialized customer support

- Remote and on-site training
- Localized support from regional offices
- Extensible architecture supports third-party integration

Maximize value with actionable insights

Drive process innovation to make better decisions faster.

Flexible technology platform

- Extend solutions around machine learning, other emerging technologies
- Scale up service as your business grows
- Expand built-in performance modeling capability

Optimized design

- Detailed historical and real-time analysis
- Rapid retrieval of commonly used charts and reports

Unparalleled decision support

- View projects and portfolios from all angles
- Leverage real-time data
- Increase productivity

To find out more or schedule a demo, contact us at alsoenergy.com

AlsoEnergy Commercial & Industrial

Solution Components

Software

- PowerTrack Web
- Analytics
- Diagnostics
- Reports
- PowerTrack Mobile
- CMMS Solutions
- Asset Management Solutions
- Portfolio Aggregation Solutions
- Public displays
- Cybersecurity and remote access solutions
- Export control supervisory dashboards

Hardware

- PowerLogger 1000 / dataloggers
- Weather stations / sensors
- Revenue-grade meters
- Field I/O
- Site Controllers
- UPS
- Cell modem & plan
- Networking equipment
- Weatherproof enclosures

Professional Services

- Expert support
- Portfolio aggregation / site migration
- Hardware testing, configuration, assembly, support
- Hardware warranty management
- Third-party hardware integration
- Third-party API app integration
- Agency reporting
- Software configuration and customization
- System modeling
- System engineering
- On-site or remote commissioning support
- Switchgear interfacing
- Telemetry
- Project management
- Project consultation and planning
- Deployment and implementation management
- SCADA system design

AlsoEnergy

AX SERIES

48A/11.5kW EV Wall Mount

AC Charger

ZEROVA

FEATURES

- Residential and Commercial EV Charging
- Wired/Wireless Connection for Central Management System
- Supports RFID Card, QR Code and Optional Third Party Payment System
- Input: 200Vac~240Vac
- Modern, Ergonomic and Customizable Design
- 5-Inch LCD Display, Optional Non-Display
- IP56/NEMA 4 Rated for Indoor/Outdoor Applications
- Charging Interface: SAE J1772 (Type 1)/IEC 62196-2 (Type 2)
- OCPP 1.6 JSON (Upgradeable to 2.0 OTA)
- ISO 15118 Protocol (Plug&Charge, Bi-Directional)
- OCPP or Local Load Management (Parent/Child)
- Over the Air Technology
- Energy Star, CTEP and NTEP (NIST Handbook 44)

For information on the optional pedestal, please refer to the accessory section.

INDUSTRY

Residential/MUD

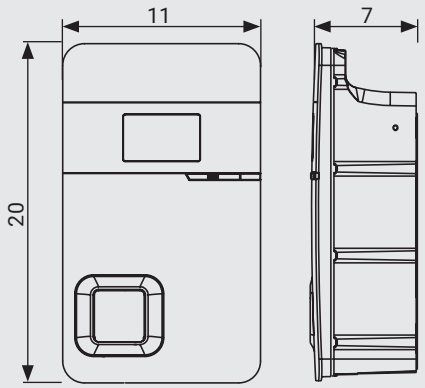
Commercial

Retail

Parking + Fleet

EV WALL MOUNT AC CHARGER

SPECIFICATION

Model Name	AXLU111
Safety	UL/Cul
Outline (in)	

Power Specification

AC Input	Input Rating	Single-Phase: 200~240Vac
	AC Input Connection	L1, L2, GND or L, N, PE
	Input Current	48A
	Frequency	50Hz/60Hz
AC Output	Output Current	48A

User Interface & Control

Display	LED Indicator (Standard), 5" LCD Display (Optional)
User Authentication	RFID, Smart Phone App, QR Code Optional Third Party Payment System
Meter	Meter IC (1% Accuracy)

Communication

Vehicle to Grid Communication Interface	ISO 15118 (Plug&Charge, Bi-Directional)
Network Interface	Ethernet + Wi-Fi (IEEE802.11 b/g/n) (standard) Ethernet + Wi-Fi (IEEE802.11 b/g/n) + 4G (optional)
Charging Protocol	OCPP 1.6 JSON (Upgradeable to 2.0 OTA)

Environmental

Operating Temperature	-22°F~122°F (-30°C to +50°C)
Humidity	< 85% (RH) @122°F (50°C)
Altitude	≤6562ft (2000m)
IP Level	NEMA TYPE 4/IK08
Cooling Method	Natural Cooling

Mechanical

Dimensions (WxDxH)	11 x 7 x 20in (280 x 178 x 508mm)
Weight	<22lbs (10kg)
Cable Length	16.4ft (5m) or 25ft (7.5m) with Optional Cable Management

Protection

RCD/CCID	CCID 20
Input	UVP, OVP, Surge Protection, Ground Fault
Output	OCP, Control Pilot Fault, Residual Current Protection
Internal	OTP, Relay Welding Detection, CCID Self-Test, MCU Function Fault Detection

Regulation

Certification	UL2594, UL2231-1/-2 Energy Star CTEP NTEP (NIST Handbook 44)
Wireless Certification	FCC/IC
Charging Interface	SAEJ1772 Type 1 Plug