

# Backbone Creek BESS Project

# Executive Summary

- This presentation provides an introduction to the proposed 174 MWh Backbone Creek Battery Energy Storage System (BESS) project, including an overview of BESS technological reliability, key safety features, and suggested emergency response procedures.
- As of October 2022, 7.8 GW of battery energy storage was installed in the United States, with an expected 1.4 GW of additional capacity to be added before the end of the year (2022). The Energy Information Administration expects another 20.8 GW of additional capacity to be added from 2023 – 2025 (U.S. Battery storage capacity). Lithium iron phosphate batteries are the preferred choice of battery for grid-scale energy storage (Grid Scale Storage).
- The project is a stand-alone energy storage project utilizing proven battery storage technology with over 850 MWh of systems deployed by CSI to date.
- Major equipment will be provided by Canadian Solar, Inc., one of the world's largest solar power and battery storage companies and a leading vertically-integrated provider of solar power and battery storage products, services and system solutions with operations in North America, South America, Europe, South Africa, the Middle East, Australia and Asia.
- The installed equipment will feature a full stack of safety features, controls, and monitoring, which will be detailed later in this presentation.
- Further discussions will be scheduled as the project's design is finalized.

# Local Tax Benefits

- **Initial Property Tax Valuation: \$85,000,000 in Tax Year 2026**
- Estimated Taxes to Schools, supporting Education in the local community of Marble Falls ISD:  
**~\$9,000,000**
- Estimated Taxes to Burnet County, supporting Roads, Bridges, and Infrastructure: **~\$1,900,000\***
- Estimated Taxes to Emergency Service District #6, supporting First Responders: **~\$420,000\***

*\*10 year, 60% tax abatement included in calculations*



**Marble Falls ISD**



**Burnet County Emergency Services  
District No. 6**

# Grid Resiliency Benefits

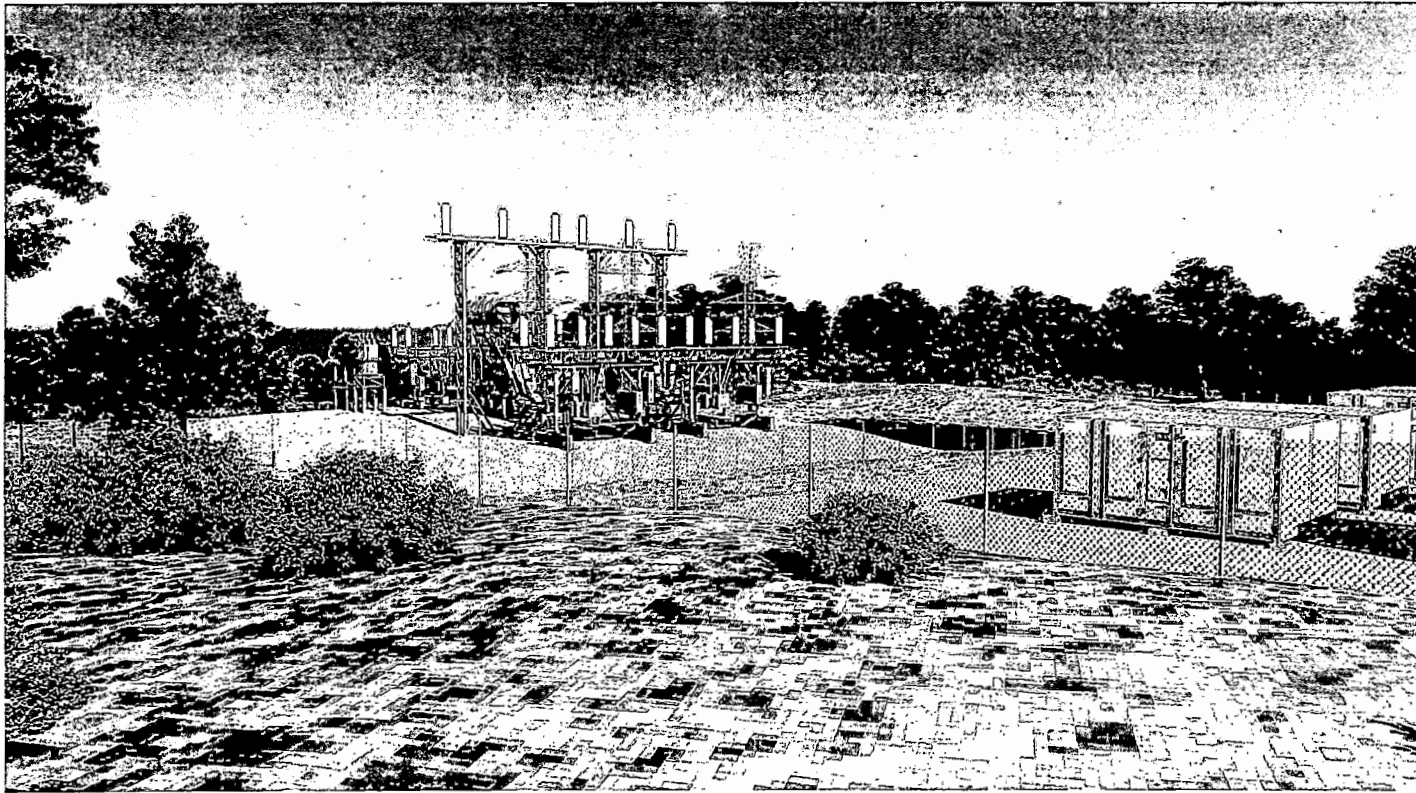
- Battery Energy Storage Systems (BESS) can be used to provide services as the bulk energy / transmission levels while providing localized benefits, unachievable for traditional capacity, that can bring balance and resiliency to the grid. This is due to the scalable, flexible, and responsive nature of the BESS
- As opposed to systems that serve on-site load, a Front-of-the-Meter BESS can serve multiple purposes by offering ancillary services and balancing grid supply and demand in real time to mitigate any fluctuations in frequency.
- In the case of emergency situations and grid blackouts, the BESS can act as a local resiliency asset for the grid. In some cases, the BESS could be used by utilities to black-start the grid during an outage.
- Additionally, the implementation of a BESS can defer investments of peaking capacity and/or transmission system upgrades, especially in regions experiencing load or generation growth, as the BESS can charge and discharge energy optimally and as needed.

Sources: US Department of Energy, NREL, Energy Storage Association

# Backbone Creek – Project Perimeter



# Backbone Creek – Project Substation



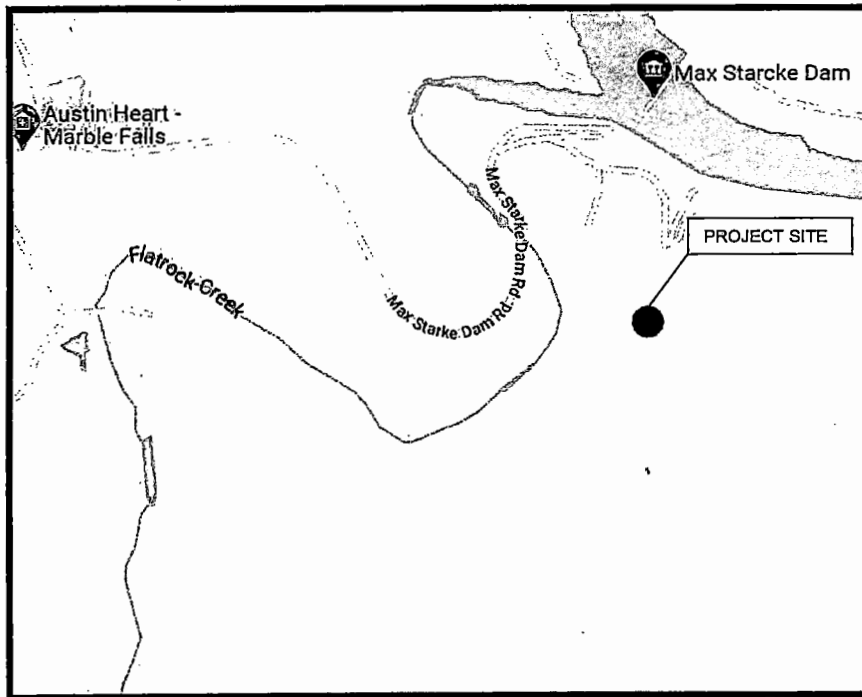
# Project Description and Schedule

- Location: 696 Bluebonnet Circle, Marble Falls, TX 78654
- Size/Capacity: 100 MW / 174 MWh
- Schedule:
  - Construction Start Date: February 2025
  - Anticipated Equipment Delivery: June 2025
  - Initial Site Energization: September 2025
  - Planned Land Decommissioning Date: September 2045

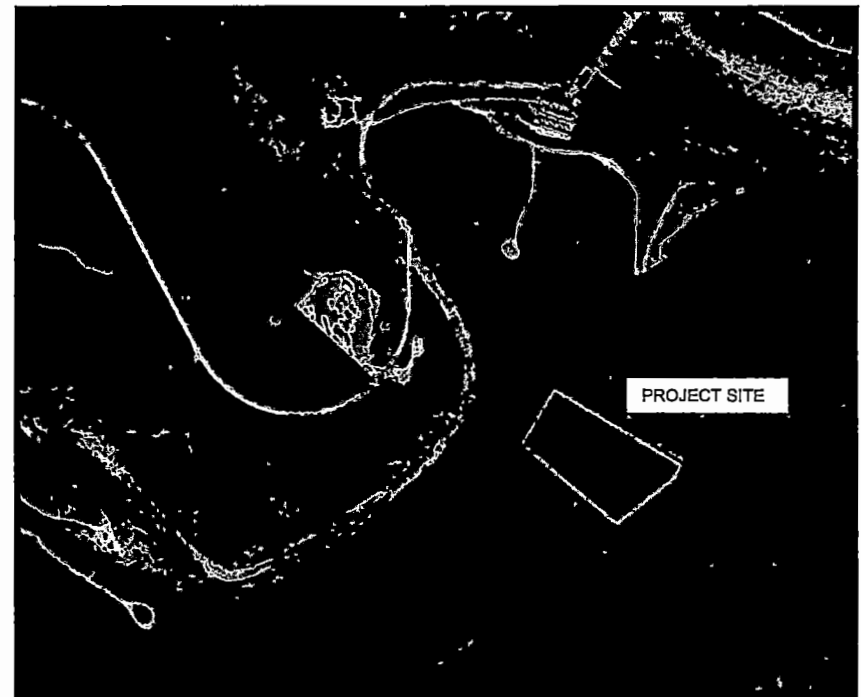
# Project Location

The Backbone Creek project site is located approximately 2.15 miles northeast of the Marble Falls Fire Department.

Street Map:

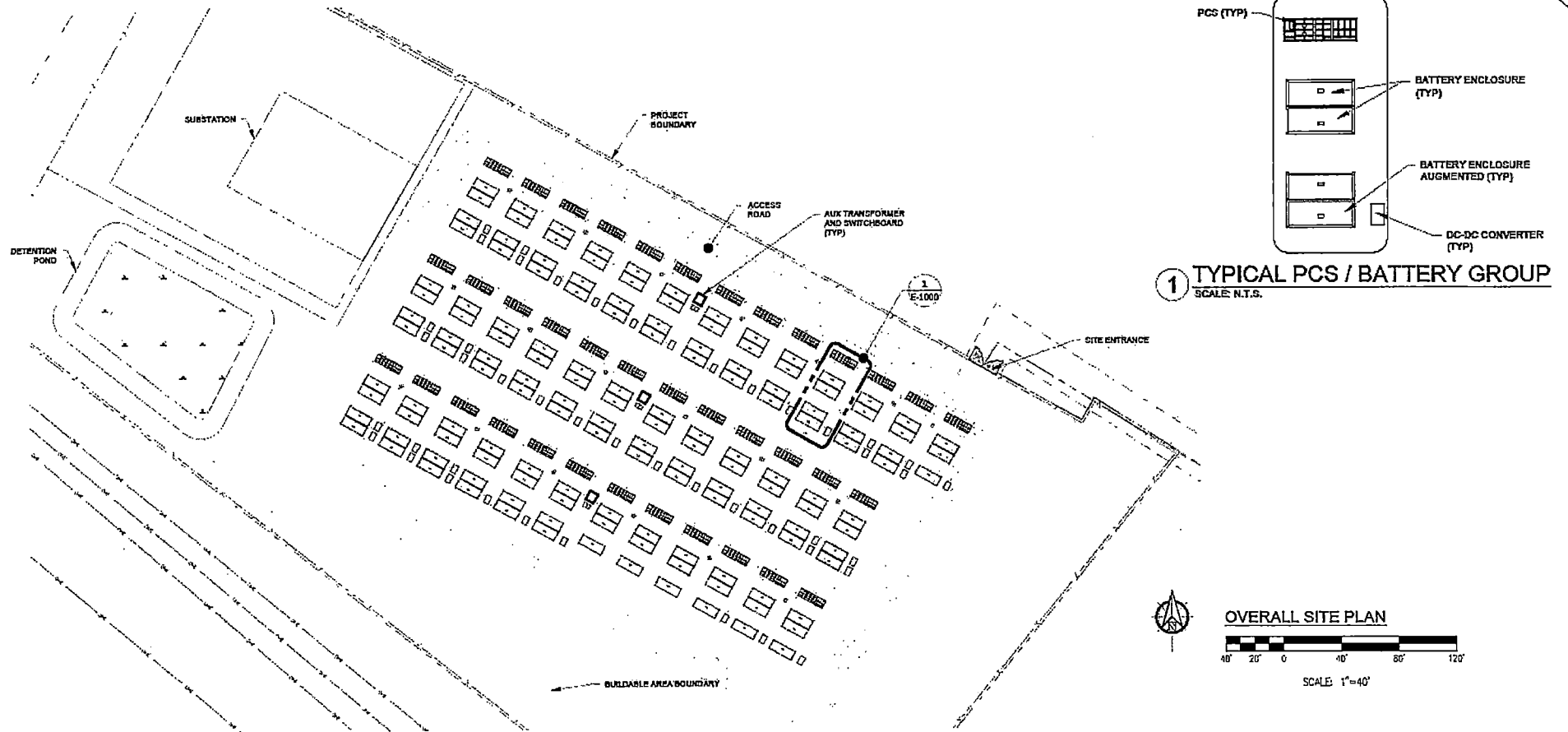


Aerial View:





# Site Layout

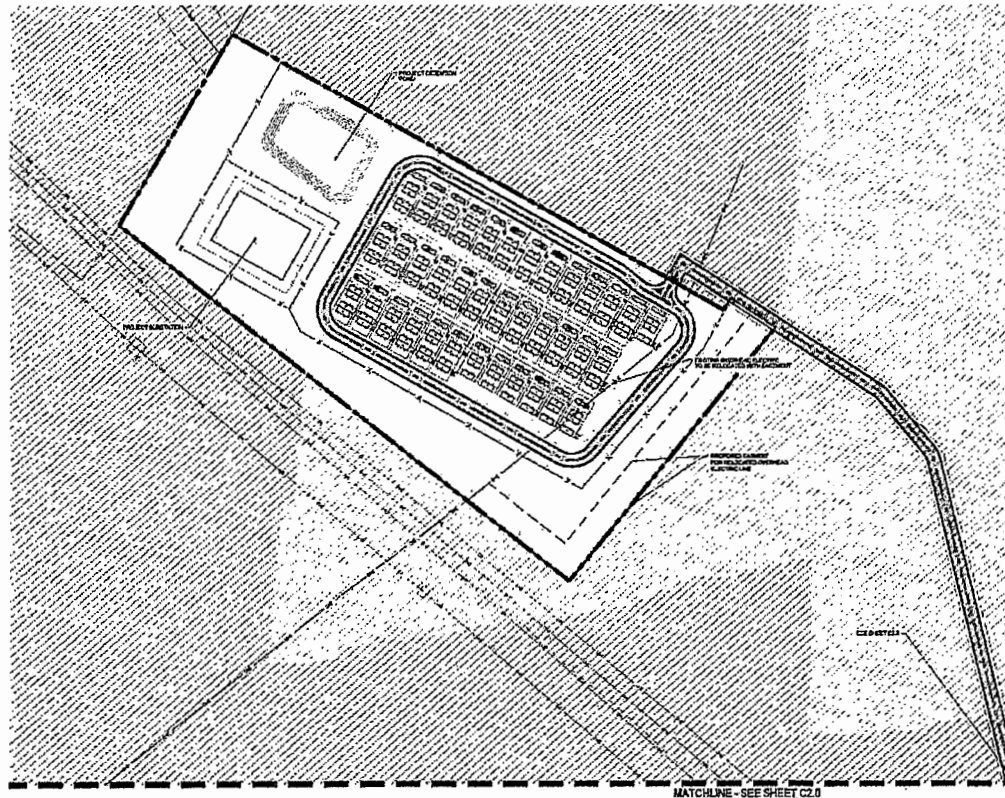


2/27/2023

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# Site Layout – Site Access Detail

Site layout will be finalized by April 1, 2023



## LEGEND

|  |                          |
|--|--------------------------|
|  | SITE ACCESS ROAD         |
|  | NON-PARTICIPATING PARCEL |
|  | PROJECT BOUNDARY         |
|  | UTILITY EASEMENT         |
|  | INVERTER                 |
|  | BATTERY                  |

## NOTES:

- ACCESS ROAD HAS BEEN DESIGNED WITH 30', 40', AND 50' RADII.
- TOTAL ROAD ACCESS LENGTH IS 7,222 FEET.

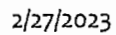
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OVERALL SITE

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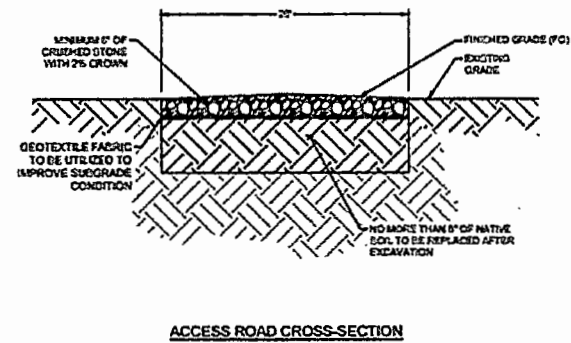
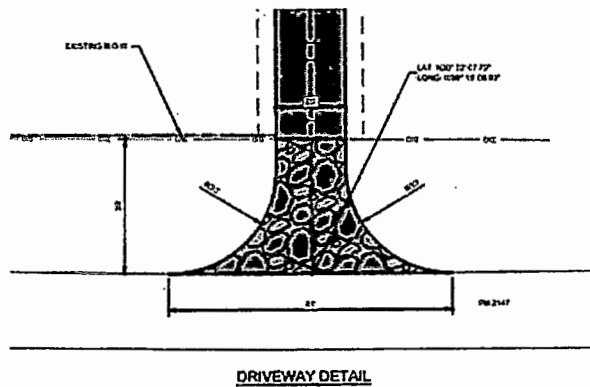
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Site layout will be finalized by April 1, 2023



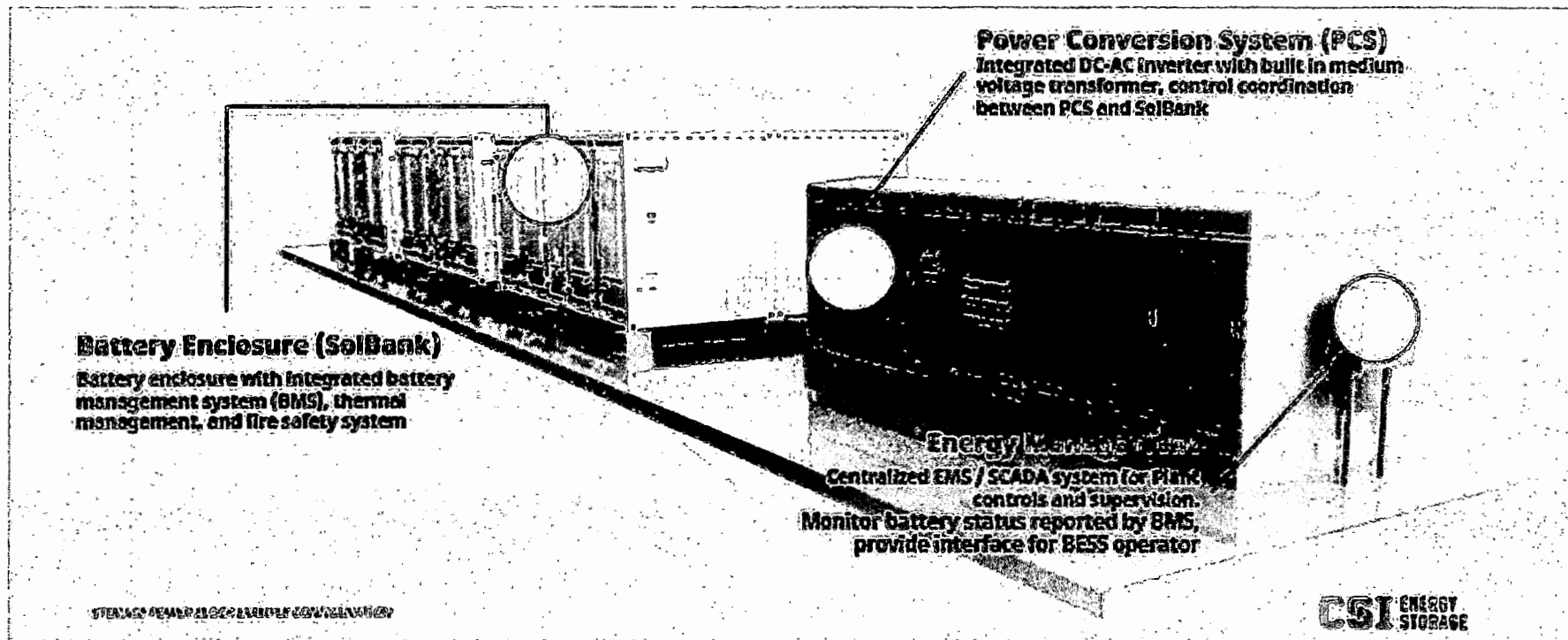
# Site Access Driveway Details

Site layout will be finalized by April 1, 2023



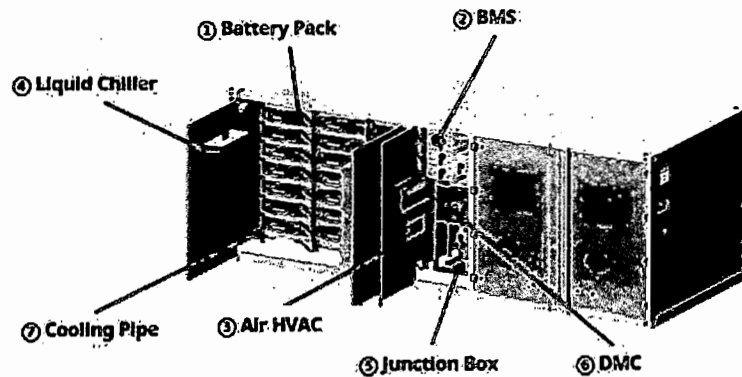
# BESS Energy Station

The main components of the project consist of the SolBank Battery Enclosures and Power Conversion Systems (PCS).



# Solbank Specifications

This project will utilize 160 connected SolBank enclosures. Specifications for the system are included below and can be shared upon the request of the Fire Department.



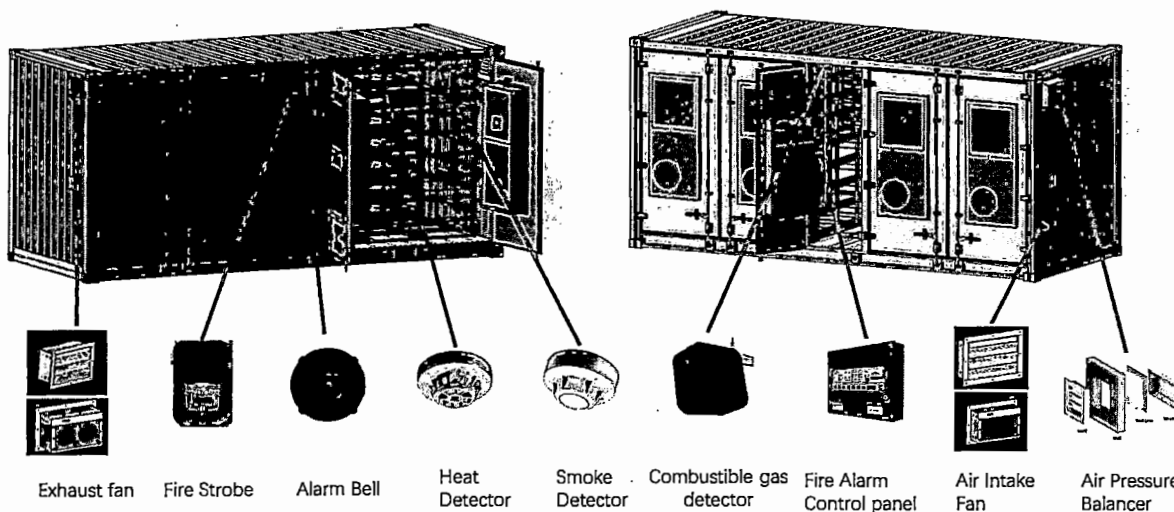
- BMS: Battery Management System
- DMC: Distribution Management System

|                                      |                                                                                                         |
|--------------------------------------|---------------------------------------------------------------------------------------------------------|
| Battery Chemistry                    | Lithium Iron Phosphate (LFP)                                                                            |
| System Configuration                 | 6 Racks                                                                                                 |
| Rated DC Voltage Range               | 1159.2V-1490V                                                                                           |
| Rated DC Power                       | 1.3 MW                                                                                                  |
| Capacity at Point of Interconnection | 1.95 MWh                                                                                                |
| Constant Power (CP) Rate             | 1.5 hours to full discharge                                                                             |
| Thermal Management System            | Liquid cooling / heating for battery system, air cooling for electrical components and humidity control |
| Enclosure Ingress Rating             | IP55 / NEMA 3R                                                                                          |
| Dimensions (L*W*H)                   | 20' x 8' x 9.5'                                                                                         |
| Enclosure                            | 20 ft. long cabinet-based system                                                                        |
| Weight                               | 24,900 kg (54,895 lbs)                                                                                  |
| Seismic Parameter                    | Zone 4                                                                                                  |

# Fire Safety Features

The enclosure features a broad range of fire detection and prevention mechanisms with built-in redundancy.

## Fire Alarming Components Layout



## Safety features

- Fire detection (smoke + heat detectors)
- Fire alarm (remote and local)
- Explosion prevention (combustible gas detection, active ventilation)
- Emergency shutdown (E-Stop)
- Non-walk-in container design with open door sensors
- Lockable disconnect switch for LOTO

## Redundancy designs

- Two sets of smoke, heat detectors, trigger of any will report fire alarm
- Two gas detectors, trigger of any will report gas alarm
- Built in UPS for battery monitoring, ventilation, fire detection and alarming
- Backup aux power supply for fire safety system

# Completed Full-Scale Fire Testing

- The UL9540A test method was created to address safety concerns identified by building codes and fire services through developing data on the fire and deflagration hazards from thermal runaway and its propagation through energy storage systems. The test consists of four stages of testing where the cell, module, unit, and installation are forced into a thermal runaway condition.
- The BESS units will be fully tested and certified in accordance with UL9540A.
- UL9540A – SolBank Unit Level Fire Test Results
  - No module-to-module thermal runaway propagation.
  - No flying debris or explosive discharge of gases during the test.
  - No electrical arcs, or other electrical events during test.
  - No external flaming was observed.
  - Note:** Above summaries are based on draft test report from the NRTL based on recent completed UL9540A tests. Final report to be expected imminently.

UL9540A-Cell level

UL9540A-Module level

UL9540A-Unit level



# Integrated Safety System

In addition to UL9540 certifications, the system will benefit from a Long Term Service Agreement with the equipment provider and has the following certifications:

## Certification Standard

- Battery Cell, Module and Rack – UL1973, IEC62619, UL1642
- SolBank - UL9540, UL9540A (cell, module, unit level), UN38.3
- SolBank Explosion Prevention System – NFPA69
- Inverter – UL1741
- Integrated system – UL9540

- Independent Engineering Report
  - SolBank product review - DNV



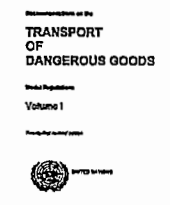
- Owner Support under Long Term Service Agreement (LTSA)
  - 24\*7 monitoring of the system through CSI remote operation center
  - O&M service with preventive maintenance and corrective maintenance of the equipment
  - Onsite and remote training to ensure adequate professionalism of O&M team members
- Owner Support of Fire Department
  - Project owner will provide training to the fire department prior to commissioning and on an ongoing basis



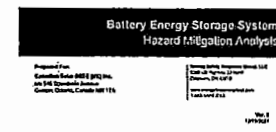
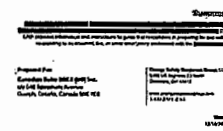
UL 1973, Edition 3



UL 9540, Edition 2



CANADIAN SOLAR  
EMERGENCY RESPONSE PLAN



## Control and Monitoring

The system's remote controls and monitoring will ensure safe operation of the BESS through 24/7 monitoring and automatic and redundant safeguards.

- **Battery Management System (BMS)**
  - Monitors battery status to cell level in real time, including temperature, voltage, power level, fault and alarms, protections
  - Report any faults, alarms to the control and monitoring system (BCI and EMS)
  - Built in UPS for monitoring during power outage
- **Battery Control Interface (BCI)**
  - Control the inverter and SolBank in real time, coordinate behaviors between these components
  - Stop all inverter and SolBanks within the same energy station when there is a fire alarm, minimize fault impact
- **Energy Management System**
  - Monitors status of all BESS equipment and report any fault detected to the operator
  - Allow service team to read and analyze operating data of the equipment, to optimize system health and identify issues from early stage

