Hummingbird Energy Storage Project

File No. CP19-020

Initial Study / Mitigated Negative Declaration

RESPONSES TO PUBLIC COMMENTS

May 2020

CEQA Lead Agency:

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SECTION 1 SUMMARY OF COMMENTS

The Hummingbird Energy Storage Project Initial Study /Mitigation Negative Declaration (IS/MND) was circulated for public review for a 20-day review period, from March 18th to April 7th, 2020. During the circulation period, the City of San José received a comment letter from Adams, Broadwell, Joseph, and Cardozo, PC.

In summary, this comment received on the draft IS/MND did not raise any new issues about the project's environmental impacts, or provide information indicating the project would result in new environmental impacts or impacts substantially greater in severity than disclosed in the IS/MND. CEQA does not require formal responses to comments on an IS/MND, only that the lead agency consider the comments received [CEQA Guidelines §15074(b)].

Nevertheless, responses to the comments are included in this document to provide a complete environmental record.

The following pages contain a list of the agencies and persons that submitted comments on the IS/MND and the City's responses to comments received on the IS/MND. The specific comments have been excerpted from the letter and are presented as "Comment" with each response directly following ("Response"). Copies of the actual letters and email submitted to the City of San Jose are attached to this document.

SECTION 2 COMMENTS RECEIVED SUMMARY

Comment Received From	Date of Letter
A. Adams, Broadwell, Joseph, and Cardozo	April 7, 2020

ATTACHMENTS

Attachment A: PG&E Advice Letter 5322-E
Attachment B: Revised Plans

SECTION 3 RESPONSE TO COMMENTS

This memo responds to comments on the IS/MND as they relate to the potential environmental impacts of the project under CEQA. Numbered responses correspond to comments in the comment letter. A copy of the comment letter is attached.

RESPONSE TO ADAMS, BROADWELL, JOSEPH, CARDOZO

Comment A.1: The IS/MND omits crucial details about how the batteries in the Battery Energy Storage System (BESS) will operate. Although the IS/MND suggests that the Project will store and use energy from renewable sources, it fails to include information on how it will do so or to include a commitment to charging the batteries with clean energy to the exclusion of more abundant fossil fuel resources. As explained in Section IV, this can lead to significant GHG and air quality impacts. Moreover, the IS/MND provides no information about gross or net generation of electricity to operate the facility. Without clear numbers regarding how much energy will be stored and what the expected energy output of the batteries will be, it is extremely hard for the public to accurately assess the emissions from operating the facility

> **Response A.1:** As explained in the IS/MND, the project would store excess energy generated by intermittent resources (e.g., wind and solar), which energy otherwise would be wasted (curtailed). That renewable energy is then stored by the project and redistributed for later use when demand is high. The energy storage capacity created as part of the project would assist the City and the State of California in meeting their carbon-free electricity goals.
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> Pursuant to California Public Utilities Corporation (CPUC) Resolution E-4909 and consistent with the identified goals of GHG emissions reduction, renewable integration, and grid optimization identified in CPUC Decision 13-10-040, PG&E received approval of Advice Letter (AL) 5322-E (Attachment A) for development of four energy storage projects totaling 567.5 megawatts (MW) of capacity, of which the proposed project is one of these four project. The proposed projects mitigate the risk of ongoing capacity contracts with existing gas-fired generation, provide needed additional flexible capacity to the system, and will result in significant air quality and climate benefits. CPUC Resolution E-4909 and AL 5322-E are models for how ratepayer investments can be redirected from maintaining fossil-fueled generation to deploying new clean energy resources critical to achieving California's aggressive decarbonization objectives.
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> As stated in the project description and applicant submittal materials, the project will provide non-fossil flexible capacity to the system—consistent with the CPUC filings and decisions. Battery energy storage is needed in California to allow the integration of existing and expected future renewable energy. The CPUC has studied the issue of meeting stat GHG reduction targets which were set by SB 350 and determined that in order to meet those GHG reduction targets a combination of increased renewables and increased battery energy storage

is required.[1] Deployment of additional energy storage is both timely and needed given that energy use curves have more steeply ramped up in the evening and down in the morning than state energy regulators have anticipated, largely due to faster-than-anticipated growth in rooftop solar PV and progress toward the 2030 RPS goal.[2] This comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices. .

Comment A.2: Relatedly, the IS/MND does not include vendor specifications for ancillary equipment to support the batteries, such as cooling systems, inverters, transformers, and heating, ventilation, and air conditioning (HVAC) units. The CalEEMod emissions model used by the IS/MND only accounts for emissions from lights and water supply and does not include emissions produced in relation to the electricity needed to operate this equipment.

Response A.2: The inclusion of vendor specifications is not required by CEQA, as there could be numerous equipment options utilized over the life of the project. CEQA requires analysis of the project based on reasonable assumptions and information available at the time of the analysis. The calculations in the IS/MND and associated technical reports assumed the equipment specifications based on CalEEMod background data, which includes assumptions for plug-in appliances (refrigeration, office equipment, etc.) and mechanical systems (HVAC systems, water heating, and lighting); thus, the IS/MND did discuss the emissions. See also Response A1. This comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.3: Furthermore, the IS/MND does not explain the function of components such as the inverters and transformers. The voltages involved in charging and discharging the batteries need to be disclosed to calculate electricity demand. The IS/MND even fails to state how many transformers will be in the substation.

Response A.3: The total number of and function of components, such as the inverters and transformers and the voltages involved in charging and discharging the batteries is not specifically relevant for the energy analysis as the information would be speculative at best. The equipment would not be connected to the San José Clean Energy system but rather would be connected to the larger California Independent System Operator (CAISO) grid, which will dispatch the system to both place energy onto the grid (discharge) during times of high load and to take energy off the grid (charge) in times of low load relative to generation. This is consistent with the stated purpose of the project to store energy and not create an additional energy "demand". The energy storage facility is intended to satisfy regional electricity demand. This comment does not result in new CEQA analysis, new significant

[1] CPUC. 2019-2020 IRP Events and Materials. Accessed May 5, 2020. https://www.cpuc.ca.gov/General.aspx?id=6442459770.
[2] California Energy Commission. Tracking Progress, Resource Flexibility, p. 1. December 2017. https://www.energy.ca.gov/renewables/tracking progress/documents/resource flexibility.pdf.

impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.4: The IS/MND does not disclose the layout of the BESS despite the fact that fire codes indicate that spacing out combustible objects, setting up thermal barriers, using safe materials, and properly designing rack enclosures—among other safety measures—is critical to preventing fires. The IS/MND fails to describe the fire suppression system that would be used to control accidents at the facility and resorts to uncertain language such as "may" when describing technologies that might be used.

Response A.4: Detailed plans were submitted to the City by the applicant (dated 8/29/19) and are the basis for the analysis within the IS/MND. While a figure showing the interior configuration of the batteries was not included in the IS/MND, the figure is part of a larger project site plan that is available upon request. The latest site plan is available as part of the Attachment B in this document. is available at the City for review. The following information, while not all CEQA-related, is included for information purposes in response to the comment. It should be noted that fire risk at and upon the project site itself would not be a CEQA impact and there is not excessive fire risk for adjacent commercial and industrial uses from operating the facility. Measures would be taken to reduce the risk of potential for a battery fire at the site. As indicated by the commenter, any potential fire risk that the traditional lithium-ion cells have will most likely be caused by over-charging or through short circuit due to age.

The battery modules (a module is comprised of numerous cells) are delivered from the manufacturer in preassembled "stacks" that can be moved in place by forklifts. These stacks are connected in parallel to aggregate the required energy capacity. Additionally, the energy storage building would include a fire protection system consisting of an ungraded water-based, ceiling-mounted sprinkler system covering all areas of the building. Although not always required for all configurations, an in-rack chemical suppression system (or similar technology) would be installed to supplement the water sprinkler system. The smoke detection and fire suppression system would not only quash a fire, but would also automatically shut down all other batteries if smoke or fire is detected. In addition to fire suppression improvements, the facility would be comprised of UL Certified, high-safety lithium iron phosphate lithium ion batteries, and would include built-in fail-safes designed specifically to prevent thermal runaway and the spread of fire.

The energy storage facility will be controlled by a battery management system. The system will continuously monitor the batteries down to a cell-level on a continuous basis, checking state of health factors such as battery charge, voltage, current, and temperature. If faults are detected, the system diagnoses the issue and automatically sends alerts to operational personnel. Depending on the fault's severity, the energy storage facility can automatically shut down in part or in whole to maintain safety and protect equipment. The basic software

architecture of the battery management system provides distributed intelligence, controls, and data management at the system, array, stack, module and cell levels.

The fire protection system will be designed by a certified engineer and installed by a professional contractor licensed in California and in accordance with all relevant building and fire codes in effect in the City at the time of building permit submission. Because fire risk will be alleviated through monitoring and a fire suppression system with smoke detectors, control panel, alarm, water piping and nozzles, hazards and wildfire impacts described in the IS/MND are adequately described as being less than significant.

Furthermore, the project has been reviewed by the Department of Fire for compliance with applicable City's regulations and standards and any conditions are included as part of the project permit. Therefore, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.5: The Material Safety Data Sheet ("MSDS") for the batteries was not included with the IS/MND and only became available in response to a Public Records Act ("PRA") request. The MSDS does not commit the Project to using the lithium-ion batteries described therein. Furthermore, the MSDS identifies the manufacturer as Trust Power Group while a memorandum obtained through the PRA request says Powin lithium ion batteries would be used. Thus, there is uncertain and contradictory information in the description of something as fundamental as the exact origin of batteries that will be used in the BESS for the Project.

Relatedly, the IS/MND is silent on the impacts that could occur in the event of an accident. The composition of the batteries being used and the fact that they contain hazardous chemicals should have been a central part of the Project description and is essential information for evaluating the environmental and health risks associated with accidental release of toxic chemicals into the air of the nearby community.

The IS/MND therefore fails its fundamental purpose under CEQA as an informational document because it does not give information to adequately evaluate the environmental impacts that could result from battery fires or other accidents. Because "Project" is defined as a "direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment," the physical and technical aspects of the Project that are directly related to the environmental health risks presented by potential fires or other malfunctions are well within the scope of what should be described by the IS/MND. An EIR must be prepared that will include a proper project description as required by CEQA.

Response A.5: The IS/MND and associated technical reports include references to data including modeling fact sheet, websites, public documents readily available online and similar documents as part of the analysis. The IS/MND and associated technical reports provided thorough summary of those information and disclosed date and sources. The

detailed references to those technical reports and IS/MND was not posted directly on the website for clerical reasons but is available upon public request. The commenter requested for all references and citation documents to all technical reports of the IS/MND and to the IS/MND on March 18, 2020 at 4:43 p.m. and the City timely released the documents on March 19, 2020 at 11:01 a.m. to continue to allow the commenter sufficient time for review.

Furthermore, the following detailed project information was submitted to the City of San José in the application memo dated 8/29/19 prepared by the project applicant (Collin Ramsey, Dudek). It is included below for the administrative record and for information purposes. The information supplements and confirms basic project information in the IS/MND, which clearly states that lithium-ion batteries would be employed, and therefore, the project description and components thereof are consistent throughout the entirety of the document and analysis. As noted in prior Response A.2, inclusion of vendor specifications (in this case for batteries) is not required by CEQA, as there could be numerous equipment options utilized over the life of the project, and the City is not required to regulate and enforce particular vendor specifications throughout the life of the project.

The project applicant has selected an integrated energy storage system to be provided by Powin Energy, in part because of the system's safety design features, including its fire-resistant chemistry. The Powin lithium ion battery array would consist of lithium iron phosphate (LiFePO4) battery cells. Lithium iron phosphate is safer than other commonly used lithium ion alternatives, such as cobalt-based chemistries. As the comment letter describes, the batteries are manufactured in Oregon and would be shipped to the project site.

The energy storage system will be installed within racks/cabinets that are seismically anchored to the building foundation and constructed of non-flammable aluminum and steel. During the plan check process, the City will be provided detailed structure engineering drawings of the proposed seismic anchoring, prepared, reviewed and approved by a licensed structural engineer to ensure that in the event of an earthquake, the racks/cabinets will remain upright and will not result in property loss or injury.

In general, chemicals are contained within the individual sealed battery cells. As stated in the IS/MND in Section 4.9.2 under Impact HAZ-1, risk of exposure occurs only if the battery is mechanically or electrically abused or altered, leading to rupture of the cells. Overall, the batteries are not hazardous as the active electrolyte utilized is non-toxic (no cobalt or other toxic elements) and contain very minimal liquid volume (as provided in the project application to the City of San José). The phosphate-based chemistry virtually eliminates risk of battery fire propagation or explosion because of its very high thermal runaway point.[3] In addition, due to the fact that these battery cells are largely solid state, the environmental risk of chemicals entering the environment through improper disposal is greatly minimized (as

[3] Applied Sciences. "A Review on the Thermal Hazards of the Lithium-Ion Battery and the Corresponding Countermeasures". June 18, 2019. https://www.mdpi.com/2076-3417/9/12/2483/htm.

described further below). For these reasons, the IS/MND (Section 4.9.2) adequately discusses the impacts that could occur in the event of an accident, and accurately discloses that the batteries do not contain hazardous chemicals.

Design features as well as adherence to applicable codes and regulations relevant to fire prevention and suppression would reduce impacts to less than significant (as described in the Section 4.9.2 of the IS/MND). Measures would be taken to reduce the risk of potential lithium-ion battery fire at the site. This risk is addressed through the installation of a monitoring and fire suppression system designed by a certified engineer and installed by a license contractor and in accordance with all relevant building and fire codes. The fire protection plan would include a combination of prevention, suppression, and isolation methods and materials. The primary approach to fire mitigation would be prevention of an incident, followed by incident isolation and control, then fire suppression to reduce damage to uninvolved equipment. The project would also comply with applicable City and state fire code requirements, standards from UL (safety organization), and the National Fire Protection Association (UL-9540A), as described further below.

As described in the manufacturer's literature, each cell and module would have redundant safety features, including electrical fuses and overcharge protection. Every battery cell bank would be remotely monitored for voltage, temperature, and current, and an automated control system would disconnect any battery with irregular behavior, which will be inspected before it will be returned to operation. Safety measurement points throughout each battery pack (and within the system as a whole) would alert the operations and maintenance organization if there is a deviation from normal operating conditions.

The battery modules would include high voltage DC isolation switches for separating each battery zone into low voltage blocks safe for maintenance. A hierarchical fusing system of protection would be used offering system safety even if the software control system is not functional. These battery cells are designed to clear in the proper order under overcurrent and/or short-circuit situations, preventing uncontrolled discharge of stored energy. The project would comply with all applicable California Fire Code requirements. The analysis in the IS/MND found that project compliance with these requirements would reduce impacts associated with hazard through upset/release of hazardous materials resulting from risk of fire during operation to less than significant.

Large quantities of hazardous materials are not required as part of construction, operation, or decommissioning of the proposed project. Although the project's lithium ion batteries can be flammable, they would be enclosed, equipped with a fire safety system and would be required to meet applicable California Fire Codes prior to obtaining a Building Permit. The batteries for the project are in an enclosed facility. An added level of protection is included as part of project design by housing the battery units in enclosed structures to provide containment should a fire break out. In addition, housing the battery units in an enclosure also mitigates the risk of potential spills. As stated in the IS/MND, the project is also required

to comply with state laws and City requirements that regulate and control hazardous materials handled on-site. Workers would be trained on how to properly and safely handle the batteries with the proper personal protective equipment (PPE) based upon the material safety data sheets (MSDS) of the batteries.

No hazardous materials, liquids, or chemicals are required to construct or operate the energy storage facility. Similar to the numerous other existing transformers and substations found throughout the City, the transformers located within the substation will use mineral transformer oil (sometimes referred to as insulating oil). It is used in oil-filled transformers, some types of high-voltage capacitors, fluorescent lamp ballasts, and some types of high-voltage switches and circuit breakers. As described in Section 3.2.1.2 of the IS/MND, the project applicant is also exploring the use of Envirotempo FR3 Fluid, a biodegradable and non-toxic transformer cooling fluid derived from renewable vegetable oils. Envirotempo FR3 Fluid has successfully been used by the applicant on smaller applications, so they are exploring whether it would also be successful for larger applications, such as the proposed project. The use of either mineral transformer oil or Envirotempo FR3 would not present a substantial risk of accidental release of toxic chemicals into the air of the nearby community.

The battery system is designed with open relays that require power to close and automated software safeties. This system is a combination of monitoring the system and either taking individual stacks offline or powering the whole system down, depending on the input. In the case of smoke or fire detection, loss of grid power, or other similar high-level threats, the system will automatically power down. In the case of equipment failure, the system has been designed to “fail-open” so that the batteries are isolated from each other, the power conversion system, and the grid.

During the building permit process, the project applicant would work with the City to ensure that the design is compliant with relevant local codes and standards. The project would be designed and built to the latest safety standards with multiple redundant forms of protection against electrical faults and fire events at every level of the system. An automatic smoke and fire detection and alarm system coupled with a suppression system would be utilized.
The battery management system coordinates with cloud-based Powin Fleet Management tools at the Powin Energy’s operations headquarters, where a secure server provides remote monitoring and control capabilities (although the project can also perform autonomously, if necessary). Site communications are performed through MODBUS via a hardline connection with 4G wireless backup. Numerous safety-related codes, standards and regulations are applicable to design, installation, and operation of stationary battery energy storage facilities. The project would be operated in accordance with industry practices, applicable laws, and applicable safety standards as related to energy storage use.

For the reasons identified above, the IS/MND adequately evaluates the environmental impacts that could result from battery fires or other accidents, by explaining there is minimal risk from any such accidents and by doing so fulfills its fundamental purpose under CEQA of

an informational document. Therefore, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.as required by CEQA. Therefore,

Comment A.6: Accidents could also occur during transport, on-site storage, and disposal. Yet the IS/MND does not disclose where the batteries will be manufactured, the means of transportation to the Project site, the transportation routes, how the batteries will be stored during construction, where and how the batteries will be recycled, and the routes and means of transportation to the recycling center. While the MSDS we received in response to our Public Records Act ("PRA") request suggests that the batteries will be manufactured in China, this is not stated explicitly in the IS/MND. A memorandum obtained through the PRA request indicates that Powin Energy is the battery manufacturer with operations near Portland, Oregon.

Regardless of the battery source, information about how the batteries will be transported and secured remains absent. Such information is crucial to proper evaluation of the environmental risks posed by a possible accident, especially given that the route will likely pass through densely populated areas of the San Francisco Bay Area. The City must prepare an EIR to disclose this information and evaluate potential environmental impacts from an accident during shipping and handling.

Response A.6: See Response A.4 and A.5 for more information. Batteries would be transported consistent with state and federal requirements for safety, further assumption of accidents of source materials outside of the project site is speculative. As stated in the IS/MND, construction waste, including asphalt removed as part of construction of the Project substation, will be generated during the construction phase. Waste generated during the operational stage would be minimal (given that the facility will be unmanned) and would be associated with operation and maintenance work. This type of operational waste may include shipping materials, as well as some electronic waste generated from battery repair. All waste, whether generated during project construction, operation, or upon termination of the project at the end of its life, would be disposed of in accordance with all applicable local, state, and federal requirements and the impact would be less than significant as described in the IS/MND. Therefore, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.7: As with the substation discussed above, the IS/MND lacks basic information about the proposed 115 kV transmission line. Missing information includes the number of circuits to be installed, the type of cable and/or conduit to be used for the 2.5-mile underground line, the physical space necessary for the underground transmission line, and the availability of underground space given other underground utilities such as gas, sewer, water, and telephone lines. The IS/MND says that the Project would use a 2-foot by 6-foot trench for the underground transmission line but provides no documentation that a trench of such size would adequately accommodate the 115 kV line. Finally, the IS/MND fails to address the number of streetlight loop repairs that would be

required due to trenching. These are major oversights that require amendments to the IS/MND to provide necessary information to allow the public to fully comment on the effects of the Project.

> **Response A.7:** The project applicant has specified the necessary right-of-way and trench size and depth/width needed in order to accommodate the conduit, as shown on Figure 3.2-2 of the IS/MND and described within the project description. The project has been reviewed by the City of San José Public Works Department. The project has been reviewed by the City of San José Public Works Department. The Public Works Department and the project applicant are presently coordinating on the alignment and on the necessary right-of-way needed within Monterey Road. As part of this ongoing effort, the Public Works Department has reviewed, among other things, the route and the trench size and has provide no comments that would convey that City cannot support the proposed gen-tie route or the trench needed to adequately accommodate the line.
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> The number of circuits to be installed, the type of cable/conduit to be used, and number of streetlight loop repairs needed (none) are the CEQA analysis in the IS/MND, unless they were to result in substantial additional construction activity or long-term changes to the environment beyond what has been described in the IS/MND. The description of the construction process for the 115kV transmission line includes the associated minor improvements noted in this comment as being within the nine-month timeframe for construction activity. Therefore, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.8: As explained below and in the Fox Comments, the IS/MND analysis makes an unsupported claim that it will use and encourage the production of renewable energy when there is no evidence supporting this claim. In fact, the evidence shows it us more likely to incentivize fossil-fuel based energy, leading to more GHG and air pollutant emissions. Second, the IS/MND does not account for all energy use of the project—most significantly it does not account for energy used for batteries charging and discharging.

The IS/MND claims the Project would "store clean energy (wind and solar)" and that "[t]he energy storage capacity created as part of the project would assist the City and State of California in meeting their carbon-free electricity goals." The IS/MND also contends that the Project will store clean energy "so peak-hour dependence on natural gas or coal-fired electricity could be lessened" and will store "excess energy" from electricity generation in the South Bay-Moss Landing area. However, the MND/IS contains no mandatory conditions or mitigation measures that will guarantee that the Project will actually use and store renewable energy. In fact, for several reasons described below, including the Project's location; storage capacity and economic incentives for its operation, it is likely that the Project will incentivize production of more fossil-fuels based energy, by creating more demand in the form of storage capacity. This, in turn, will lead to more GHG and air pollutants emissions.

First, the failure of the IS/MND to define "excess energy" renders it deficient as an informational document under CEQA. As explained in the Fox Comments, because the grid is required to run with supply and demand balanced at all times, there technically is no such thing as excess energy. One possibility of what the IS/MND intended is that it refers to energy capable of being produced but without the storage provided by the Project is being curtailed or not produced. Yet, for the IS/MND to pursue its goal of supporting clean energy to reduce dependence on fossil fuel energy, there would need to be a commitment that the batteries will only be charged with renewable energy. The IS/MND makes no such commitment.

The IS/MND also provides no assurances via mitigation measures that it will actually store excess energy generated by the electrical grid during the day to lessen natural gas demand when the sun goes down and solar power loses productivity. The Fox Comments explain that commercial BESS projects are motivated by economic productivity and therefore store energy whenever grid prices are lowest and discharge energy whenever prices are highest to make a profit. Accordingly, it is unreasonable to expect storage of only clean energy without legally binding commitments to do so. As the. Fox Comments highlight, limiting charging to daytime hours, hours when there is "excess" energy, and only allowing charging with electricity produced from renewable energy will prevent some economical charging and potentially limit the ability of the Project to discharge the full claimed 300 MWh of storage capacity. Unless the IS/MND incorporates "enforceable conditions that will limit charging to daytime periods when there is otherwise- curtailed renewable energy available," there is no support to the claim that the Project will use renewable energy. Therefore, the City must prepare an EIR to analyze the significant GHG and air quality impacts from the BESS not being limited to using renewable energy for charging.

Furthermore, the IS/MND needs to be amended to quantify the extent to which it will be able to store up to 300 MWh of electricity over the course of a year if it is not using CO2-emitting generation as its source of charging energy and explain how it can rely on electricity generated within the South Bay-Moss Landing area. The Fox comments show that 96 percent of the 2,377 MW of generation capacity in the South Bay-Moss Landing area is gas-fired and not renewable. In the absence of enforceable operating conditions to require sourcing of otherwise-curtailed renewable sources in the South Bay-Moss Landing area, it is completely baseless for the IS/MND to argue it will encourage renewable energy and to conclude that there will not be significant GHG and air quality impacts.

Thus, an EIR must be prepared to evaluate the GHG and air quality impacts that will be created by the Project's reliance on fossil-fuel energy. Alternatively, an EIR must be prepared to include sufficient binding conditions to guarantee the Project will in fact use and store renewable energy.

> **Response A.8:** This comment confuses storage of energy and the emissions that go with that energy with the uses that create the demand for the energy. The energy demand of the energy storage facility is minimal, it is intended to meet societal demands by providing electricity derived from clean renewable sources. The point of the project is to allow future renewable sources to have a place to store excess capacity.

This comment also attempts to redefine the project as something that the proposal does not include, and claims the project will further the opposite of the project's stated purpose by alleging that instead of facilitating the use of renewable energy by storing such power when it is generated so it can be used when needed, that rather the project will serve to increase the use of fossil fuels, which is false. The source of the energy is irrelevant to the CEQA analysis as the project will store energy and not create an additional new demand on the system such that additional energy would need to be "created". This comment, in essence addresses a different project than what is proposed, for the purpose of alleging GHG and air quality impacts from increased fossil fuel use. It should also be noted the demand for electricity being served by this project is from land uses and activities within the service area, not the energy storage project itself.

Operation of the project does not create pollutant emissions when charging or discharging. The project does not create energy. The project does not convert energy (e.g., wind energy to electric energy or energy from combustion to electric energy). Since it does not create or convert energy it does not create GHG emissions. By providing a method to store energy created from other energy resources on the electric grid, it improves the efficient utilization of other energy resources. As stated in the project description in Section 3.0 of the IS/MND, the intent of the project is to receive, store, and return electric energy to the electric grid that will facilitate the efficient use of renewable energy.

The commenter speculates that fossil-fuel derived energy generation would increase as a result of the project and would increase GHG emissions. Senate Bill (SB) 100 requires that retail sellers and local publicly owned electric utilities procure a minimum quantity of electricity products from eligible renewable energy resources so that the total kilowatt hours of those products sold to their retail end-use customers achieve 44 percent of retail sales by 2024, 52 percent by 2027, and 60 percent by December 2030. SB 100 further states that eligible renewable energy resources and zero-carbon resources supply 100 percent of retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045. The bill requires that the achievement of this policy for California not increase carbon emissions elsewhere in the western grid and that the achievement not allow resource shuffling. The bill would require that transition to a zero-carbon electric system for the state not cause or contribute to GHG emissions increases elsewhere in the western grid.[4]

The comment complains the IS/MND contains no mandatory conditions or mitigation measures that will guarantee that the Project will actually use and store renewable energy. This is the project objective, not something to mandate or mitigate; it is the basic purpose and need for the project, as clearly stated in the IS/MND Project Description. Further, the

[4] California Legislative Information. "SB-100 California Renewables Portfolio Standard Program: emissions of greenhouse gases." Accessed April 19, 2020. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100.

comment claims the project is somehow reliant on fossil-fuels. The project does not control or mandate the supply of electricity within the CAISO grid, and the City cannot mandate or mitigate the electricity source. Electricity will not, however, be be created in order to store. The overall long-term intent of the project is to construct an energy storage facility to meet demand for electricity by storing electricity derived from renewable sources when there is currently a lack of storage.

The following description of the battery function is included for information purposes (based on the applicant's memo dated 8/29/19). When the energy storage system runs, the batteries will heat up, as they are not 100 percent efficient, and thus, generate heat in the resistive and electrochemical components of the system. Part of what the battery management system does is monitor cell temperatures and report these temperatures to both the human controllers as well as to the algorithms within the monitoring software that determines the limits of system activity. This maintains the safety and longevity of the system.

The batteries move energy on and off the transmission power grid based on market and utility demand. In general, CAISO will dispatch the system to both place energy onto the grid (discharge) during times of high load and to take energy off the grid (charge) in times of low load relative to generation. PG&E and San José Clean Energy may have different requirements for when to dispatch the system, potentially dictated by the status of critical equipment on their grid. The undergrounding from the substation is only for connecting the batteries to the grid and doesn't have any relevance to system dispatch schedules.

As mentioned in Response A1 and A5, following Calpine's retirement announcement for the Metcalf Power Plant, CAISO approved transmission projects to reduce Local Capacity Requirement need in the South Bay-Moss Landing sub-area to 1,653 MW. However, CAISO's 2023 Local Capacity Technical Analysis (May 15, 2018) forecasts an increase in local area need to 1,977 MW.[5] Without additional resource procurement in the sub-area, existing gas-fired generators will remain in a position to leverage capacity constraints to obtain elevated capacity payments and will continue operating. Approval of the proposed energy storage contracts will protect the air and climate from the need for additional local gas-fired generation by allowing for the storage of electricity derived from renewable sources, some of which do not yet exist, but would have an economic incentive once additional storage capacity was available to receive the electricity. While the commenter shows that 96 percent of the 2,377 MW of generation capacity in the South Bay-Moss Landing area is gas-fired and not renewable, that is a reflection of current conditions, and the point of the project is to allow future renewable sources to have a place to store excess capacity.

[5] CEC. Electricity Resource Supply Plans. 17-IEPR-02, TN 217851, PG&E Supply Forms S1, S2 and S5 Revised, Table S-5, Line 43. https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=17- IEPR-02.

For the reasons above, the IS/MND and associated technical reports have adequately disclosed the potential impacts of the construction and operation of the project site and therefore, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices, or the need for an EIR. For all of the above reasons, the IS/MND's analysis of air quality and GHG was proper, and the commenter has not provided substantial evidence supporting a fair argument that any air quality of GHG impacts would occur.

Comment A.9: The IS/MND also fails to account for all energy use, and its correlating GHG and air pollution emission, of the Project. Using CalEEMod, the IS/MND estimates operational GHG emissions of 127.6 metric tons (MT) per year, 125 MT of which for electricity consumption by supporting equipment such as facility lighting, water heating, and air conditioning. However, the model fails to include other sources of energy consumption: first, it fails to include electricity required to operate equipment such as the inverters, transformers, switchgear, and other specialized BESS equipment.

Second, and more importantly, the IS/MND fails to account for the battery energy storage system (BESS) itself, "thereby significantly underestimating GHG and criteria pollutant (e.g., NOx) emissions." As explained in the Fox comments: Batteries are imperfect instruments: energy is lost every time a battery is charged and discharged. This means that if a battery absorbs 1 MWh of electricity, it will discharge less than 1 MWh back to the grid. The ratio of how much the battery consumes during charging versus its production while discharging is referred to as the energy efficiency of the batteries.

The Fox comments explain that the IS/MND fails to provide information regarding battery efficiency. However, based on information gathered from existing battery energy storage projects on the CAISO system, Mr. Marcus was able to calculate their efficiency and as a result, their energy consumption. He found that the Project's annual net energy consumption is 15.2 GWh. This energy use and its impacts are entirely missing from the IS/MND. This means that the Project's actual GHG emissions and indirect pollutant emissions are significantly higher than what the IS/MND claims.

Response A.9: To assume energy generation from fossil-fuel sources would increase through operation of the project is speculative and ignores established statewide GHG-reduction goals associated with the adopted Renewables Portfolio Standard. Charging energy for the project will be provided from the CAISO wholesale electric grid and the project will operate depending on CAISO's needs and market conditions. The potential of GHG emissions from the project's electric use were, therefore, accurately analyzed using CalEEMod. See also Response A.8 for additional background information and response. Therefore, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.10: As described above, the IS/MND estimated GHG emissions as 127.6 metric tons of CO2 equivalents per year (MT CO2e/yr). The IS/MND than compared these emissions to a GHG significance threshold of 660 MT CO2e/yr, concluding no significant impact from GHG emissions. As described below, substantial evidence shows that the Project's GHG emissions are significantly higher and go well beyond the significance threshold utilized in the IS/MND.

As the Fox Comments explain, GHG emissions contribute to global climate change regardless of where they occur and criteria pollutant emissions can still be significant even if they are not emitted directly from the Project itself. Operation of the Project promotes increases in GHG emissions and other emissions elsewhere in California from generation of electricity to support the on-site facility and to charge the batteries. The most glaring omission in the IS/MND analysis of GHG impact is in its failure to account for battery charging emissions. Mr. Marcus was able to calculate that existing battery energy storage projects on the CAISO system operate at about a 9.7 percent capacity factor and have a round-trip efficiency of approximately 80.7 percent.101 For the Project, those numbers translate to annual generation of 63.7 GWh/yr, annual charging energy requirements of 79 GWh/yr, and thus annual net energy consumption of 15.2 GWh/yr.

Response A.10: The project would not promote GHG emissions elsewhere based on CPUC filings. Pursuant to CPUC Resolution E-4909[6], the CPUC required PG&E to solicit bids for battery storage or other preferred resources to replace fossil fuel power plants to meet specific local area needs. In this resolution, the CPUC acknowledged that energy storage is a clean energy resource that can be fast-responding, reliable, and constructed in a short timeframe. The intent of this resolutions was to replace three Calpine fossil fuel plants (Feather River, Yuba, and Metcalf) that do not have long-term contracts with utilities but that have been identified by the California Independent System Operator (CAISO) as needed to serve local reliability needs. The energy storage projects awarded by PG&E as a result of CPUC Resolution E-4909 would replace the three gas-fired plants, and thus, remove non-renewable, fossil fuel-powered sources of energy from the electrical grid.

CPUC Decision 13-10-040[7], which set an energy storage procurement target of 1,325 megawatts MW by 2020, was formulated with three primary goals, as summarized below:

- Grid optimization, including peak reduction, contribution to reliability needs, or deferral of transmission and distribution upgrade investments;
- Integration of renewable energy; and
- GHG reductions in support of the state's targets.

For the reasons described in the IS/MND and herein, the project would be consistent with the intent of this decision. Also see Responses A1 and A.8.

[6] CPUC. Resolution E-4909. January 11, 2018. http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M200/K602/200602742.PDF.
[7] CPUC. Energy Storage. Accessed May 5, 2020. https://www.cpuc.ca.gov/General.aspx?id=3462.

Comment A.11: Accounting for approximated BESS energy losses of 15.2 GWh/yr and using the 1080 MW Moss Landing combined cycle power plant in the South Bay-Moss Landing area as a reference for emissions characteristics encouraged by the Project, Dr. Fox and Mr. Marcus estimate 5,682 MT/yr of GHG emissions. Alternatively, using the IS/MND's calculations of 125 MT/yr associated with 0.36359 GWh/yr of electricity usage, Dr. Fox and Mr. Marcus use the battery-related net electricity consumption of 15.2 GWh/yr to estimate additional GHG emissions of 5,240 MT/yr. Either way, the amount of GHG emissions greatly surpasses both the 127.6 MT/yr reported in the IS/MND and the 660 MT/yr significance threshold relied upon by the City's CEQA analysis. The calculations in the Fox Comments also yield incremental emissions of 919 lb/yr of NOx, which the IS/MND fails to consider in its air quality analysis.

> **Response A.11:** As stated in the IS/MND, energy to be stored at the project will not come from the Moss Landing combined cycle power plant, which is slated to close in 2023.[8] The GHG emissions and energy use described in the above comment (15.2 GWh, enough to power over 3,200 homes for a year) are vastly overstated and would not occur as a result of the project.[9] Thus, this comment is not relevant to the CEQA impact discussion with regard to GHG emissions or NOx emissions. The commenter's calculated emissions based on other sources that would not serve the project are not relevant and do not constitute substantial evidence given they are inapplicable to the project. See further details in Response A.1 and A.8.

Comment A.12: The Fox Comments point out another flaw in the IS/MND analysis with regard to energy impacts: IS/MND Impact EN-2 incorrectly states that the Project would not conflict with state or local plans for renewable energy or energy efficiency because it would meet General Plan policies related to renewable energy and efficiency and would facilitate efforts to comply with California Renewable Portfolio Standards. Rather, for the reasons explained above, the Project would "hamper compliance with RPS goals" and other clean energy policies by incentivizing gas fired generation. Without suitable mitigation measures to ensure the BESS only utilizes renewable energy, the Project is likely to cause significant energy impacts triggering the need for an EIR under CEQA.

As described above, substantial evidence shows that the Project may result in significant impacts from GHG, air pollutant emissions and energy use. Because CEQA requires evaluation of potentially significant indirect GHG and air quality impacts, an EIR must be prepared to analyze and mitigate those significant impacts.

> **Response A.12:** See Response A.1 and A.8 for more responses regarding project description, objectives, source, and overall operation. As described in Section 4.6 of the IS/MND, the proposed energy storage facility itself would not prevent compliance with state

[8] Gheorghiu, Julia. "California proposes extending 4.8 GW gas capacity as bridge to 3.3 GW of new clean energy by 2023". Accessed April 15, 2020. https://www.utilitydive.com/news/california-proposes-extending-48-gw-gas-capacity-as-bridge-to-33-gw-of-ne/567035/.

[9] EIA. "Household Energy Use in California". Accessed April 15, 2020. https://www.eia.gov/consumption/residential/reports/2009/state_briefs/pdf/ca.pdf.

or local energy goals given its relatively small size and CPUC-disclosed purpose to store renewable energy.

Comment A.13: Because the IS/MND finds no significant impact from GHG emissions, it also fails to adopt any mitigation measures. The GHG analysis, however, includes some discussion of GHG reductions measures that purportedly apply to the Project, namely a "GHG Reduction Strategy" based on the City's General Plan for mitigation of GHG emissions. However, as explained in the Fox Comments, none of the measures cited will reduce GHG emissions from the Project.

The Land Use /Transportation Diagram consistency and pedestrian/bicycle site design measures are negligible sources of mitigation because the Project facility will be unmanned. Furthermore, implementation of Green Building Measures are irrelevant because the batteries will be installed in an existing building with no modifications to that building. Finally, the IS/MND erroneously claims the Project is consistent with the General Plan designation for the site because it is "not an energy-intensive use." Yet, as explained above, the nature of energy storage is bound up with intensive energy use. "The fact that roughly 80 percent of the energy use is then recovered when the batteries discharge does not change the energy-intensive nature of the Project." The City must prepare an EIR that will properly analyze GHG emissions, and will include effective and enforceable mitigation to mitigate GHG impacts.

Response A.13: CEQA asks whether the project would conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs. The project does not conflict with the Land Use/Transportation Diagram or pedestrian/bicycle site design. Consistency is not synonymous with requiring or being a source of "mitigation", as the comment asserts. Section 4.8 of the IS/MND, specifically checklist Question 1, analyzed the project based on the 2030 threshold for all current project and found no impacts above the threshold and therefore, does not result in mitigation measures. Refer to Response A.10 above as well. Further, the project is an unmanned battery storage facility meant to store renewable energy and redistribute it to the grid. While the project is meant to store and redistribute energy, the project operations in itself are not an "energy-intensive" use. An EIR is not required for the project as there are no significant and unavoidable impacts. This comment also does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.14: CEQA mandates that a lead agency find a project may have a significant effect on the environment and "thereby require an EIR to be prepared for the project where this is substantial evidence" that the project has "possible environmental effects that are individually limited but cumulatively considerable." Specifically, CEQA recognizes that incremental effects of an individual projects can be significant when viewed in connection with the effects of past projects, current projects, and probable future projects and therefore requires lead agencies to evaluate cumulative impacts from other projects with similar effects on the environment. "An EIR must be prepared if the cumulative impact may be significant and the project's incremental effect, though

individually limited, is cumulatively considerable." Even if the lead agency determines that a project's incremental contribution to a cumulative effect is not cumulatively considerable because the project complies with a previously approved plan or mitigation program, an EIR must be prepared if there is "substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding that the project complies with the specified plan or mitigation program." Moreover, "[w]hen relying on a plan, regulation or program, the lead agency should explain how implementing the particular requirements in the plan, regulation or program ensure that the project's incremental contribution to the cumulative effect is not cumulatively considerable.

> **Response A.14:** This comment summarizes generally understood concepts regarding the assessment of cumulative impacts under CEQA but makes no specific comment on the project nor cumulative conditions evaluated in the IS/MND. As this comment does not raise specific environmental issues, no further response is required.

Comment A.15: The IS/MND claims that all cumulative impacts will be less than significant but fails to adequately explain why compliance Standard Permit conditions and City policies will ensure impacts are not cumulatively considerable. Moreover, the IS/MND fails to identify or analyze any other projects in the area that could lead to cumulatively considerable impacts. Therefore, it fails to follow either of the options offered by CEQA for an adequate cumulative impact analysis.

> **Response A.15:** It is unclear what specific resource area of the cumulative analysis that this comment addresses. It is assumed to address the Air Quality and GHG resource areas. As described in the Air Quality section of the IS/MND, a cumulative Air Quality analysis was conducted consistent with the Bay Area Air Quality Management District (BAAQMD) thresholds (used regularly and appropriately by the City of San José) and impacts were determined to be less than significant. GHG emissions were also below the City's accepted 660 MT bright-line threshold and were also, therefore, less than significant. Because there was no project-level impact, there was therefore also no cumulative impact for those resource areas and the cumulative analysis in the IS/MND is adequate. As stated in the IS/MND, there are no other cumulative projects on or near the project site, nor along the Monterey Road corridor, with the potential to combine with the project to result in significant cumulative impacts. Therefore, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.16: The Fox Comments analyzed the potential for cumulatively considerable impacts in light of a construction boom in the South Bay Area. About 68 projects are planned within the City and in the adjacent City of Santa Clara between 2019 and 2030. The Fox Comments evaluated cumulative reactive organic gas (ROG) and NOx emissions and GHG emissions from the Project and five data center projects. Dr. Fox selected data centers because they emit the same pollutants associated with this Project, including ROG, NOx, and GHGs and are located in the same air basin as the Project. The analyses concluded that cumulative mitigated annual ROG emissions and cumulative mitigated daily ROG and NOx emissions are significant. Dr. Fox also concluded that cumulative

annual GHG emissions are significant. Dr. Fox's analyses constitute substantial evidence showing that compliance with the City's General Plan is not sufficient to ensure impacts are not cumulatively considerable. The results of her analyses are summarized in the tables below.

Table 1: Cumulative Mitigated Annual Emissions (ton/yr)

Project	ROG	NOx	PM10	PM2.5
Hummingbird	0.46	0.48	0.001	0.001
Stack	1.8	9.9	0.2	0.1
Equinix	-1.2	6.6	-0.5	-0.3
San Jose	4.6	-4.71	0.25	0.21
Laurelwood	6.2	-2.3	0.18	0.16
Total	**11.9**	**9.97**	**0.13**	**0.17**
Significance Threshold (ton/yr)	10	10	15	10
Significant?	**Yes**	**No**	No	No

Table 2: Cumulative Mitigated Daily Emissions (lb/day)

Project	ROG	NOx	PM10	PM2.5
Hummingbird	2.5	2.6	0.007	0.007
Stack	8.8	51.9	1.0	0.4
Equinix	4.7	49.1	6.2	2.4
San Jose	25.3	-26.2	1.37	1.17
Laurelwood	33.9	560	1.18	1.07
Sequoia	16.3	23.8	0.23	0.22
Total	**91.5**	**661.2**	**9.99**	**5.27**
Significance Threshold (lb/day)	54	54	82	54
Significant?	**Yes**	**Yes**	No	No

Table 3: Cumulative Greenhouse Gas Emissions: Data Centers ($MTCO_2e$/yr)

Project	GHG
Hummingbird	5,810
Stack	9,489
Equinix	-
San Jose	3,529
Laurelwood	6,142
Sequoia	4,301
Total	**29,271**
Significance Threshold (ton/yr)	660
Significant?	**Yes**

Response A.16: An energy storage (the proposed project) and a data center are not a comparable type of use as their operation and construction could vastly different. Furthermore, given that the project involves interior tenant improvements at an existing building, operation of an unmanned facility, and minor utility improvements in the public right-of-way and on private property, an exhaustive list-based cumulative analysis is not warranted. Data Centers are energy-intensive land uses, the proposed project is not a data center. For example, the Sequoia Data Center (as suggested for the cumulative analysis by the commenters letter) would use 867,240 mega-watt hours (MWh)/year of electricity and includes 54 approximately 2.25-MW diesel-fired standby generators. The proposed project energy use was estimated to be 63,590 kWh/year, which is 0.007 percent of the energy use of the Sequoia Data Center. Any comparison to or cumulative analysis with area data centers (in terms of Air Quality and GHG emissions impacts) is not germane to a CEQA-level cumulative analysis and an EIR is not required.

Further, the comment misapplies the BAAMQD thresholds for regional criteria pollutants. The tons per year and pounds per day thresholds noted in the tables provided in the comment are to be applied to individual project emissions, they are not intended to be compared to the combined effects of multiple projects, given the geographic scale for regional criteria pollutants is the Bay Area air basin (as described in the BAAQMD CEQA Air Quality Guidelines. The thresholds are the basis that a lead agency concludes whether a project has a cumulatively considerable contribution to regional air quality, given the air basin is affected by thousands (or more) sources. Therefore, BAAQMD does not suggest or itself employ the list-based approach taken in the comment, given that approach ignores the numerous other cumulative sources across the Bay Area air basin. Rather BAAQMD has identified the daily and annual thresholds as the basis for a lead agency to conclude whether a project is contributing to significant cumulative regional air quality impacts, based on the regional forecast emissions in the latest Clean Air Plan, given in this instance a Plan-based cumulative approach is superior to the list-based approach mistakenly taken in the comment. The comment has, therefore, misapplied those thresholds, and does not constitute substantial evidence of a significant cumulative impact. To the contrary, the fact the project emissions will be below the relevant daily and annual thresholds is substantial evidence the project does not contribute to cumulative impacts, i.e. its impacts are less than cumulatively considerable. Therefore, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.17: The MND states that "Construction activity is expected to have less than significant impacts in terms of construction impacts associated with exposure of sensitive receptors to TACs and PM2.5," summarily explaining that "construction activities near sensitive receptors …is expected to be temporary activities at any one location" and that "if best management practices (described above as Standard Permit Conditions) are implemented" the impacts will be less than significant.

Using the estimated emissions of PM2.5 from the IS/MND's Air Quality Analysis in Appendix A, Dr. Fox and Mr. Kapahi modeled hazards impacts from PM2.5. Their analysis showed exceedance of BAAQMD's significance threshold of 0.3 μg/m3 for annual average PM2.5 emissions at several locations around the Project site. This is substantial evidence supporting a fair argument that construction health hazards are significant and an EIR should be prepared. Dr. Fox and Mr. Kapahi point out that their analysis is not even reflective of the real magnitude of the impact, because it is based on the CalEEMod analysis which underestimated PM2.5 emissions, for several reasons.

A spreadsheet with data supporting the Air Quality Appendix that we obtained from a PRA request indicates that construction would occur between 7:00 a.m. and 7:00 p.m. even though the IS/MND's CalEEMod analysis assumed an 8-hour workday. There are also inconsistencies between the amounts of paving and paving demolition required during construction. The CalEEMod model does not include PM2.5 emissions from windblown dust from graded areas and storage piles and fugitive dust from off-road travel. As the Fox Comments explain, these emissions should have been separately calculated and added to the CalEEMod.

In sum, even a conservative analysis points out an obvious health risk from PM2.5. An EIR must be prepared that will correct the CalEEMod analysis flaws described above and properly analyze and mitigate health impacts from PM2.5 Moreover, the IS/MND did not evaluate construction health impacts from diesel particulate matter (DPM) emitted by construction equipment. The Office of Environmental Health Hazard Assessment (OEHHA) risk assessment guidelines require a formal risk assessment for short-term construction exposures lasting longer than two months. The IS/MND estimates that the total construction period will be about six months. The Fox Comments conclude that the duration of construction along with the proximity of identified sensitive receptors means that a health risk assessment should have been prepared for the Project. The failure to do so renders the IS/MND deficient as a CEQA informational document.

Assuming that the cancer and acute health impacts from DPM, equal to PM2.5, would be significant for on-site construction workers and nearby residents, Dr. Fox and Mr. Kapahi modeled construction exhaust in the area over the six-month construction period. Modeling yielded significant cancer risks greater than the threshold of 10 in one million on the Project site and at nearby commercial facilities surrounding the BESS. And as explained above with regard to PM2.5, these emissions are underestimated and cancer risks would be even greater when the errors in the CalEEMod analysis are corrected. As a result, there is substantial evidence supporting a fair argument of significant health impacts due to construction that must be analyzed in an EIR.

> **Response A.17:** Section 4.4 of the IS/MND and associated Appendix A disclosed construction impacts as it pertains to air quality. A conservative eight-hour work day and six-month construction schedule was assumed, which results in a compressed timeframe for emissions and thus results in a conservative analysis for the purposes of CEQA. A longer timeframe or work hours would result in lower emissions than were modeled. It should be noted that the commenter-prepared analysis shows PM2.5 levels of less than 0.3 μg/m3 at sensitive receptors (Figure 1, page 26 of Exhibit A), which are not even shown on the figure

(nearest receptor to the substation is 750 feet northeast). Commercial uses are not considered sensitive receptors for the purpose of the CEQA analysis given workers and customers are not residing at the site, nor are there assumed to be infants, who are the most vulnerable to exposure due to increased breathing rates. This error in the commenters analysis is also shown on Figure 2 on page 29 of Exhibit A with regard to cancer risks, sensitive residential receptors are located outside of the area of increased cancer risk shown. Thus, even the commenter-prepared analysis is consistent with the IS/MND less than significant impact determination with regard to health risk impacts, and therefore an EIR is not required.

As it relates to dust-related PM2.5, per the BAAQMD CEQA Guidelines impacts during construction would be less than significant with implementation of the BAAQMD best management practices that are included as Standard Permit Conditions for the project. As disclosed in the IS/MND Section 4.3.2, the project would not result in significant impact during construction activities and therefore, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.18: As described above in Section III, the IS/MND neglects to include key information about the composition of the batteries, the layout of the facilities, and the safety measures to be taken to mitigate the risk of accidents that can release hazardous materials into the surrounding community. The Fox Comments explain that fires and explosions have occurred at existing BESS facilities as a result of overcharging, short-circuiting, manufacturing defects, battery aging, thermal runaway, and malfunctioning of the cooling system. Lithium-ion batteries are sensitive to high temperatures, overcharge, over-discharge, and short circuiting. “The loss of a single battery can rapidly cascade to surrounding batteries, resulting in a large fire.” Even in the absence of battery defects, natural disasters and nearby accidents that damage electrical infrastructure can trigger explosions and fires in BESS facilities. The Fox Comments estimate, using a report on a fire at the battery facility in Flagstaff, Arizona, that an explosion at a facility with the capacity of this Project would be equivalent to 65 tons of TNT—enough to “seriously damage the adjacent commercial properties and nearby residential neighborhoods, resulting in mortality of nearby residents and workers from the blast.” In addition to the inherent risks of explosions and fires themselves, battery fires produce poisonous gases and other hazardous air pollutants that can have severe health consequences for firefighters and nearby people.

Yet the IS/MND says nothing about how these risks of fire, explosion, and toxic gas release would be prevented during transport, construction, and operation of the facility. CEQA Guidelines section 15126.2(d) requires a discussion of significant irreversible environmental change that could be caused by a project, including potential environmental accidents associated with the project. Appendix G of the CEQA Guidelines provides a list of potential hazards and hazardous materials impacts agencies should analyze, including the potential for “reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.” Despite that, the IS/MND completely failed to analyze the potential for fire, explosion, and toxic gas release posed by battery storage projects such as this Project. The hazardous materials impact analysis is limited to

studying soil contamination on the site and does not even consider the potential dangers posed by the batteries themselves.

As discussed above with regard to deficiencies in the IS/MND's Project description, the failure to evaluate handling and transportation of the batteries is violative of CEQA. Given that the batteries will likely either come from Portland, Oregon or China and that batteries are sensitive to damage during handling and transport, the IS/MND should have considered these issues as part of its hazardous materials and health risk analyses. The IS/MND also does not evaluate the risks of fires, explosions, and release of toxic gases during operation of the BESS facility. As detailed below, the Fox Comments provide substantial evidence showing potentially significant impacts from modeling a battery accident at the proposed Project site releasing hazardous materials into the air., the failure to evaluate battery fires, explosions, or release of toxic gases during travel, storage, or use of the batteries renders the IS/MND inadequate under CEQA. An EIR must be prepared to consider these potentially irreversible environmental impacts.

> **Response A.18:** Fires at battery facilities can be controlled with application of water, and the project proposes a fire-sprinkler system. Subsequent release of hazardous gasses (which has not been recorded in replicated studies) would be controlled with application of water during a fire.[10] Further, the project would be reviewed by the City of San José Department of Fire for compliance with fire code and federal, state, and local requirements (as stated in the IS/MND). Required adherence to these protocols and practices would ensure impacts with regard to hazards are less than significant. For these reasons, the Fox Comments do not provide substantial evidence showing potentially significant impacts, as they are misplaced and unrepresentative of the actual proposed project. See Response A.4 and A.5 for a description of the safety and fire protocols that are incorporated into the project.
>
> The comment cites CEQA Guidelines section 15126.2(d), which requires a discussion of significant irreversible environmental change that could be caused by a project, including potential environmental accidents associated with the project. That section pertains to EIRs, as it is located within *Article 9. Contents of Environmental Impact Reports*, while the project qualifies for an IS/MND, and the cited guideline is inapplicable. Therefore, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.19: Dr. Fox and Mr. Kapahi modeled possible accident scenarios and estimated acute health impacts for two hazardous air pollutants: hydrogen fluoride ("HF") and hydrogen cyanide ("HCN"). They advise, however, that an EIR should be prepared to evaluate the cumulative impacts of *all* hazardous air pollutants that would be present in the fumes from a BESS fire. The risks of both HF and HCN are well-documented. HF may result from contact between water and a widely used electrolyte salt in batteries and is very toxic in confined spaces. The IS/MND fails to identify the

[10] Blum, Andrew F. and Long, Thomas J. Fire Hazard Assessment of Lithium Ion Battery Energy Storage Systems. February 2016. https://www.nfpa.org/News-and-Research/Data-research-and-tools/Hazardous-Materials/Hazard-Assessment-of-Lithium-Ion-Battery-Energy-Storage-Systems.

solvent used in the batteries and a memorandum obtained in a PRA request suggests that water may be used as part of a fire suppression system. HCN has acute impacts to respiratory, central nervous, and cardiovascular systems. A few breaths at high concentrations can lead to rapid cessation of respiration and continued exposure can lead to death.

Analyses conducted for fire involving 10 percent of battery cells illustrate that acute hazard indices for both HF and HCN exceed the significance threshold of 1 over the entire 1.5-mile modeling domain. Many homes and businesses would have hazard indices exceeding 10. The Fox Comments explain that this would result in significant acute health impacts at all sensitive receptors in the Project area. Modeling of HCN release for fires involving 50 percent and 100 percent of battery cells yield even more startling results. Dr. Fox and Mr. Kapahi used varying wind conditions for the models and found mortality or serious health impacts would occur in all cases. With 50 percent of cells damaged, 293 pounds of HCN would be released. Mortality would occur at nearby commercial properties and acute health impacts would occur over a much larger area. Mortality would also likely extend into the residential area north of the freeway if measured from the edge of the BESS. In the worst case scenario of 100 percent of cells releasing HCN, 593 pounds of HCN would be released. Dr. Fox's figures in her full letter illustrate the substantial area that would likely lead to fatalities.

The IS/MND does not acknowledge these significant acute hazards and health impacts to sensitive receptors. The Fox Comments present substantial evidence supporting a fair argument that these impacts may be significant. The City must prepare an EIR to address the severe health consequences of a potential failure of the batteries used in this facility and adopt suitable mitigation measures to reduce the risk of such accidents.

> **Response A.19:** This comment speculates by citing modeled accident scenarios that have no relevance to the project, and therefore the results of the modeling do not constitute substantial evidence the project would lead to reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment, especially in light of local and state hazardous materials and emergency protocols. See Response A.4 and A1.8. For these reasons, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices. The commenter's general statements do not constitute substantial evidence supporting a fair argument that any such fire, hazard, or other safety impacts would occur.

Comment A.20: The IS/MND's Biological Resources Report explains that there are 18 species within the Santa Clara Valley Habitat Plan ("VHP") area. The IS/MND seeks to comply with the conditions of the VHP to mitigate impacts to those 18 covered species to below significant levels.

In particular, the IS/MND acknowledges that Western Pond Turtles or their eggs that are present in work areas "may be harmed or killed due to crushing by construction personnel or equipment, or as a result of desiccation or burying (e.g., during grading), but claims that compliance with VHP Conditions 3, 7, and 11 will mitigate the impact. However, the IS/MND fails to explain *how*

implementation of VHP Conditions 3, 7, and 11 will prevent turtles or their nests from being harmed or killed by construction workers or equipment. Under CEQA, even where a public agency has demonstrated compliance with a plan or regulatory standard, that public agency must still consider evidence that a significant effect may occur under the fair argument standard.

As Mr. Cashen explains, none of the conditions laid out by the habitat plan commits to the necessary measures to prevent the significant impacts to pond turtles recognized by the IS/MND. Condition 3 is limited to measures designed to maintain hydrology and protect water quality. Condition 7 contains a list of design and construction requirements, but none of them would mitigate risks of crushed turtles and eggs posed by construction personnel and equipment. Condition 11 prohibits project activities within a stream setback zone. The IS/MND and its Biological Resources Report in Appendix B call for a 100-foot buffer (less than the 150-foot standard setback for Coyote Creek), however, Mr. Cashen explains that pond turtles may use habitat as far as 500 meters (1,640 feet) from a watercourse.

Furthermore, the IS/MND concedes that Project construction activities will occur within the stream setback zone. This nullifies the ability of Condition 11 to prevent impacts to turtles that occur within that zone. The IS/MND's reliance on these ineffective mitigation measures to claim reductions in impacts to pond turtles below significant levels violates CEQA. CEQA requires that public agencies adopt feasible mitigation measures that are enforceable through permit conditions, agreements, or other legally-binding instruments to substantially lessen significant environmental impacts. Because Mr. Cashen has presented a fair argument that the measures used by the IS/MND will not prevent significant impacts to pond turtles from construction, the City has not complied with CEQA.

Mr. Cashen proffers four measures to which the City should commit if it wishes to mitigate impacts: "(a) preconstruction surveys for turtles and turtle nests in the work area; (b) translocation of any turtles that occur in the work area; (c) buffers around any turtle nests that are discovered in the work area; and (d) installation of exclusion fencing to prevent turtles from entering the work area after it has been cleared of turtles." Rather than being part of a general habitat plan, these measures are tailored to identify the presence of turtles and their nests, move turtles to safety, and mitigate risks construction personnel and equipment pose to this special-status species. In the absence of a clear commitment to incorporate such mitigation measures into the Project plan, Mr. Cashen presents substantial evidence supporting a fair argument that potentially significant impacts to the pond remain unmitigated. An EIR must be prepared to address these impacts.

> **Response A.20:** The City, through its partnership in the adoption of Santa Clara Valley Habitat Plan (VHP) in 2013, is a co-permittee for federal and state incidental take permits and applies the VHP conditions to projects that do not opt to obtain their own clearance from those wildlife agencies. This VHP was developed in association with the U.S. Fish and Wildlife Service (USFWS), and the California Department of Fish and Wildlife (CDFW), and in consultation with stakeholder groups and the general public. Permits issued by the USFWS and CDFW (jointly the Wildlife Agencies) would authorize incidental take of 18 plant and animal species included in the VHP. Rather than separately permitting and

mitigating individual projects, the VHP evaluated natural-resource impacts and mitigation requirements comprehensively in a way that is more efficient and effective for at-risk species and their essential habitats. In addition, the City includes policies to adopt the VHP in the 2040 General Plan and the City approved the Final joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS) on January 29, 2013 (Resolution No. 76546). Therefore, compliance with the VHP's conditions, which includes payment of fees and additional surveys means that the ground disturbing activity is permitted under local regulations, state and federal law. This project is required to pay VHP fees and conform to applicable conditions that will contribute to the creation and maintenance of the VHP's conservation program, which will preserve and manage a minimum of 33,205 acres for the benefit of covered species, natural communities, biological diversity, and ecosystem function in Santa Clara Valley.

The Santa Clara Valley Habitat Plan (VHP) does not include species-specific measures specifically to avoid and minimize the injury or death of western pond turtles due to crushing or trampling by construction personnel and equipment. However, there are numerous measures in the VHP related to the avoidance and minimization of impacts on western pond turtle habitat, including Conditions 3, 7, and 11, which require projects to minimize their impact footprint and protect water quality. With the implementation of these measures, the project will reduce the potential for, and magnitude of, impacts on western pond turtles by avoiding and minimizing impacts on habitat where western pond turtles are most likely to occur.

In addition, theVHP is both a habitat conservation plan and natural community conservation plan, or HCP/NCCP, and it has a robust conservation program that not only offsets impacts of covered projects (such as the Hummingbird Energy Storage Project) but also contributes to the regional recovery of covered species, including western pond turtles. The Habitat Plan identifies regional lands (called reserves) to be preserved or restored to the benefit of at-risk species, and describes how reserves will be managed and monitored to ensure that they benefit those species. In providing long-term, coordinated planning for habitat restoration and conservation, the VHP aims to enhance the viability of western pond turtle populations throughout the Santa Clara Valley. The project would pay VHP fees for impacts; these fees would contribute to the 's conservation program, which includes habitat acquisition, restoration, preservation, and management targeted at the western pond turtle to help compensate for any residual impacts through conservation of these species' populations and habitats.

Impacts of the VHP program on covered species, including the potential for the injury or death of western pond turtles due to crushing or trampling by construction personnel and equipment as a result of covered projects, were analyzed in the VHP's Environmental Impact Report1 (EIR). The EIR concluded that impacts on western pond turtles are less than significant under the California Environmental Quality Act (CEQA). Therefore, compliance

with VHP Conditions, including payment of impact fees, will reduce project impacts on western pond turtles to less than significant levels under CEQA.

Comment A.21: The Biological Resources Report states that there is no suitable nesting or foraging habitat for golden eagles at the Project site and therefore concludes that the species is absent. Mr. Cashen explains that this conclusion is contradicted by evidence from online databases and within the IS/MND Biological Resources Report itself. Specifically, golden eagles have been sighted over Coyote Creek and the Metcalf Energy Center and nest in large trees and occasionally electrical transmission towers. The Biological Resources Report also acknowledges that creatures on which golden eagles prey are known to occur in the grassland habitat along the Project alignment. As such, the IS/MND fails to analyze impacts to golden eagles based on a faulty conclusion that they will not occur there.

The IS/MND also neglects to evaluate the impact of the overhead transmission line on birds through collisions and electrocutions. Overhead power lines are "a major source of bird mortality" with between 12 million and 64 million birds killed annually at power lines in the United States. Electrocution from, and collision with, transmission lines is one of the leading causes of golden eagle mortality. The species is extremely sensitive to these impacts because golden eagles occur at very low densities, a relatively high percentage of young golden eagles do not survive to breeding age, and the population is already declining. Any Project-related take of a golden eagle without a take permit from the U.S. Fish and Wildlife Service would violate the Bald and Golden Eagle Protection Act.

Response A.21: Dr. Steve Rottenborn, Principal at H. T. Harvey & Associates and senior wildlife ecologist for the preparation of the Hummingbird Energy Project biological resources report, has been actively birding in the Coyote Valley area since 1992, during which time he has paid close attention to breeding birds in this area (including participation in the later years of the Santa Clara County Breeding Bird Atlas project and preparation of the Breeding Bird Atlas). Dr. Rottenborn has never observed a golden eagle nest within miles of this site, and no one else (inclusive of records reported to the Breeding Bird Atlas, South-Bay-Birds list-serve, and eBird database) has ever reported a golden eagle nest within miles of this site. Golden eagles do not regularly perch, roost, or forage at this location; when they are observed in the vicinity, they are observed flying over the site (at altitudes much higher than the proposed 120-foot high power lines) when traveling between Coyote Ridge to the east and Tulare Hill and Coyote Valley to the west/southwest.

These observations of high-flying birds in transit are the types of observations that have been reported on the South-Bay-Birds list-serve and eBird. Golden eagles may nest in large trees and on power lines in the region, but they are not expected to nest within line-of-sight of the high levels of human disturbance present near the PG&E Metcalf Substation, inclusive of all areas of the project alignment owing to the lack of nests from these areas over the past 28-plus years. Thus, golden eagles are not expected to occur on the project site or in any areas where they could be impacted by the project, and no measures are necessary to reduce project impacts on this species to less-than-significant levels under CEQA.

The IS/MND does discuss (page 47) the project's potential for bird collisions, and concludes impacts would be less than significant. Furthermore, the statement made by the commenter that the "IS/MND neglects to evaluate the impact of bird collisions with transmission lines" is contradicted in the following Comment A 22 by acknowledgment that the IS/MND addresses bird collisions. For these reasons, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.22: While the IS/MND acknowledges that birds may collide with transmission lines, its analysis of the issue is dismissive of possible significant impacts. It argues that placing the new overhead line at a "similar height" to and "relatively close to the existing lines crossing the creek" will render potential impacts less than significant. However, Mr. Cashen explains that the IS/MND is misleading when it says "relatively close to the existing lines" as the lines will be placed 780 feet apart. Placing another set of transmission lines across Coyote Creek at a similar height 780 away from the first set of transmission lines could actually *heighten* the threat to birds as it would require birds in flight to maneuver *twice* to avoid the lines. The Avian Power Line Interaction Committee ("APLIC") characterizes such a transmission line siting decision as a "risk situation."

Therefore, the IS/MND should commit to APLIC guidelines for bird-friendly design strategies to reduce avian collisions and electrocutions. APLIC strategies include conducting more studies of birds in the area, clustering power lines closer together, and other design strategies such as spacing between phases conductors. The IS/MND does not require the Project to implement any of the strategies outlined by APLIC guidelines.

CEQA establishes a duty for public agencies to adopt feasible mitigation measures that would substantially lessen any significant effects that the project would have on the environment. Failure to incorporate feasible mitigation measures to substantially lessen significant effects from the overhead transmission line to avian species such as the APLIC standards thus amounts to a violation of CEQA. Moreover, given the protected status of golden eagles and their unique biological sensitivity described by Mr. Cashen, there is more than a fair argument of significant impacts that are unmitigated. Therefore, an EIR must be prepared.

Response A.22: Section 4.4 of the IS/MND and Biological Resources Report (Appendix B to the IS/MND) discuss avian collisions. As stated in the IS/MND, many of the birds moving through the project alignment at Coyote Creek during spring and fall are nocturnal migrants, which would be flying at altitudes well above the proposed height of the transmission lines. Coyote Creek provides habitat for numerous birds, many of which make north-south movements along the creek corridor at elevations similar to that of the proposed transmission lines and thus risk encountering the lines.

Existing transmission lines extend across Coyote Creek approximately 780 feet north of the proposed project alignment creek crossing to connect with the PG&E Metcalf Substation. These lines vary in height from approximately 60 to 120 feet as they cross Coyote Creek, and birds moving along

> Existing transmission lines extend across Coyote Creek and birds moving along Coyote Creek likely collide with these lines periodically. Given that the proposed project transmission lines will be installed at a similar height and relatively close to these existing lines (such that they would not have to maneuver twice), the potential impacts of the proposed overhead transmission line due to bird strikes are considered less than significant under CEQA as stated in the IS/MND, and the erroneous comments by Mr. Cashen that birds in flight would have to maneuver twice to avoid the lines do not constitute substantial evidence of a significant project impact. For these reasons, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.23: The IS/MND cites to the City's General Plan and Municipal Code to conclude that even though underground construction noise is calculated to exceed the significance threshold, the impacts are less than significant because the noise impacts will be experienced for less than one year. The IS/MND's Noise Study in Appendix E summarized Significance Criteria for temporary noise impacts as follows: "Hourly average noise levels during construction that would exceed 60 dBA Leq at residential land uses or exceed 70 dBA Leq at commercial land uses and exceed the ambient noise environment by at least 5 dBA Leq for a period of more than one year would constitute a significant temporary noise increase in the project vicinity."

> **Response A.23:** This comment reiterates a section of the IS/MND and does not provide specific issues to respond to. Therefore, no further response is required.

Comment A.24: The Noise Study indicates that during the installation of the underground portion of the transmission line, noise levels associated with the construction along Monterey Road will be 84 to 97 dBA Leq at the nearest residences located 20 feet from the transmission line alignment. Given that the Noise Study reports existing daytime noise levels ranging from 63 to 70 dBA Leq, the average construction noise at the nearest residence will be 14 to 27 dBA above the upper end of the ambient range and 17 to 30 dBA above the middle of the range. Mr. Watry relies on the "commonly-held relationship" cited by the Noise Study that a 10 decibel increase is perceived as approximately doubling of loudness to conclude that the average construction noise levels at the closest residences along Monterey Road will be three to eight times louder than the existing average ambient. Such a "substantial temporary increase" is indicative of significant noise impacts deserving of close analysis and mitigation in an EIR.

Relatedly, the Noise Study states that fluctuating outdoor noises above 60 dBA interfere with speech. Mr. Watry concludes that because calculated levels are 24 to 37 dBA higher than that threshold indicates, "speech in the backyards nearby residences will be difficult, if not impossible, during construction."

Yet the IS/MND concludes these impacts are not significant because the total underground construction period is anticipated to be six months with construction activities gradually traveling down the path of the transmission line. The IS/MND reasons that "any single residence along the corridor would be exposed to noisy construction activities for a period of two months or less."

As Mr. Watry explains, the short-term nature of this noise does not render it insignificant, especially given how loud and disruptive the City's own analysis reveals the construction will be. While Environmental Considerations Policy 1.7 from the City's General Plan is:

> rightfully interpreted to indicate that any heavy construction that lasts more than one year is *a priori* significant, . . . that does not preclude shorter durations from also being significant if the noise levels otherwise warrant. EC 1.7 does not say that noise impacts from short-term construction under 12 months are necessarily insignificant."

In this sense, the IS/MND and Noise Study's apparent conclusion that noise impacts, no matter how loud, cannot be significant if they are only experienced for couple of months suffers from flawed logic and a misunderstanding regarding how significance thresholds operate for purposes of CEQA.

Response A.24: This comment pertains to temporary construction noise. The CEQA guidelines are used in the IS/MND analysis to evaluate the significance of effects of environmental noise attributable to a proposed project. In this case, project construction noise was evaluated against the City's General Plan noise policies, which state that for temporary construction-related noise to be considered significant, construction noise levels would have to exceed ambient noise levels by five dBA Leq or more and exceed the normally acceptable levels of 60 dBA Leq at the nearest noise-sensitive land uses or 70 dBA Leq at office or commercial land uses for a period of more than 12 months.

As discussed in the IS/MND (pages 110 to 112), while construction levels during the proposed project would at times exceed the exterior noise thresholds in the City's General Plan during transmission line and substation construction, the construction noise nuisance resulting from construction activities would be short-term less than 12 months. Further, during the underground work, construction activities would move along the transmission line corridor as work is completed; therefore, residences and commercial uses located along the corridor would only be exposed to limited periods of elevated construction noise levels when activities would occur in close proximity to the land uses. In addition, the temporary noise impact due to project construction would be minimized with the incorporation of the Standard Permit Conditions noted on page 112, which includes restrictions on the days of the week and times of day, as well as requiring the installation of solid plywood fences around construction activity to shield nearby residences and commercial uses. The table values quoted in the comment (Table 4.12-3) are conservative in that they do not account for sound walls located at the property lines for residences along Monterey Road, the setback of non-sound wall shielded residents along Monterey Road, and they do not account for the

shielding provided by the solid plywood fencing noted above. Therefore, it is incorrect to state the average construction noise levels at the closest residences along Monterey Road will be three to eight times louder than the existing average ambient, or that noise levels will be 24 to 37 dBA higher than the 60 dB threshold.

The construction activity at issue in the comment, i.e., the installation of transmission lines within a narrow trench within a public right-of-way, is a common activity occurring throughout the City in many miles of streets as utilities are installed, replaced, or inspected/maintained over time, and the temporary disturbance that adjacent uses experience while temporary construction activity occurs is a commonplace experience. Provided the activity is limited to weekdays and normal day time hours and buffered by solid plywood fencing, the temporary construction noise effects experienced by residents and commercial uses adjacent to the transmission line installation would be considered temporary, routine, and in keeping with what is experienced widely throughout the City and acceptable under the circumstances.

Comment A.25: The absurdity of this rationale is highlighted when compared to the construction noise regulation framework utilized by the City of Oakland. It establishes different maximum allowable construction noise levels depending on whether the construction is for more or less than 10 days. Construction lasting for a period falling under the threshold is short-term and construction lasting for longer than 10 days is long-term. Mr. Watry highlights that asking residents impacted by construction noise to tolerate it for 10 days is a more reasonable expectation than requesting that they tolerate it for up to two months.

Response A.25: This comment does not raise specific environmental issues but rather discusses impact thresholds in Oakland. As noted in the prior response A25, CEQA does not mandate a specific noise threshold of significance, leaving each lead agency to determine what is appropriate, taking into the noise conditions and preferences of that community. Oakland's selection of noise thresholds has no bearing on San Jose's as a practical matter under CEQA. The Checklist question quoted above "(*a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local General Plan or Noise Ordinance*), specifically refers to the standards established in the local General Plan. Therefore, Oakland's framework is irrelevant for analysis of this project that is outside of the Oakland's jurisdiction.

Comment A.26: CEQA case law further supports the view that the IS/MND's interpretation of the City's significance thresholds is unreasonable. In *Keep our Mountains Quiet v. County of Santa Clara*, neighbors of a wedding venue sued over the County of Santa Clara's failure to prepare an EIR for a proposed project to allow use permits for weddings and other party events at a residential property abutting an open space preserve. Neighbors and their noise expert contended that previous events at the facility had caused significant noise impacts that reverberated in neighbors' homes and disrupted the use and enjoyment of their property. The County's MND relied on the noise standards set forth in its local noise ordinance as its thresholds to evaluate significant noise exposure from the

project, deeming any increase to be insignificant so long as the absolute noise level did not exceed those standards.

But the Court of Appeal held that "an EIR is required if substantial evidence supports a fair argument that the Project may have significant unmitigated noise impacts, even if other evidence shows the Project will not generate noise in excess of the County's noise ordinance and general plan." The Court determined that the County erred in only considering the absolute noise level without evaluating the effect of the increase in noise from the ambient level. Even though the County's sound consultant concluded that live band noise would likely comply with County noise standards, the Court decided that the 10 dB increase of a live band above DJ music combined with neighbor testimony of hearing pounding DJ music supported a fair argument that the project may have a significant environmental impact. The Court reached this conclusion despite the fact that the use permit allowed only one live band event in the first year with more in future years only if the noise from the event complied with the noise ordinance because "compliance with the ordinance does not foreclose the possibility of significant noise impacts."

As explained in *Keep Our Mountains Quiet*, compliance with a given noise threshold is not a guarantee the impacts are insignificant and substantial evidence can still be presented to support a fair argument of significance that will require preparation of an EIR. Here, the noise calculations presented in the Noise Study show exceedance of the significance threshold, just not for over a year. Just as the County in *Keep Our Mountains Quiet* was required to consider evidence of significant noise impacts despite its conclusion that the noise level would not violate the ordinance's threshold, the City must contend with Mr. Watry's analysis of the City's evidence that noise impacts will be significant even though it considers two months of loud noise insignificant.

Moreover, as the Court in *Keep Our Mountains Quiet* indicated, the City is required to evaluate the *increase* in noise level from ambient levels, not just the absolute noise level associated with the Project. The IS/MND and Noise Study indicate that construction of the underground transmission line along Monterey Road will "cause noise levels that substantially exceed the existing ambient and local standards and result in difficult outdoor speech for a period up to two months. "This is similar to the evidence in *Keep Our Mountains Quiet* that live music would be 10 dB louder than (or about twice as loud as) already disruptive DJ events. Although the lead agency's noise consultant deemed the live music "likely" to comply with County noise standards and despite the fact that live music could only be used one time in the first year, the Court concluded there was a fair argument of significant impacts based on substantial evidence of disruptive noise increases.

> **Response A.26:** See Response A.25. Further, the *Keep Our Mountains Quiet* case was related to a use permit for large-scale events and live music recurring 28 times per year on an annual basis and not a short-term construction project. The comments did not provide substantial evidence to supports a fair argument that the project may have significant unmitigated noise impacts in light of this case specifically. Further the expert noise opinion cited in the comment offers no additional data or expert noise analysis related to the project. It merely restates the project impacts from the IS/MND noise study, which would not

constitute substantial evidence supporting a fair argument under the *Keep Our Mountains Quiet* case.

The table values quoted in the comment (Table 4.12-3) are conservative in that they do not account for sound walls located at the property lines for residences along Monterey Road, and they do account for the shielding provided by the solid plywood fencing noted above, and the construction activity would be prohibited from occurring nights and weekends when residences are most sensitive to elevated noise levels.

The installation of transmission lines within a narrow trench within a public right of way, is a common activity occurring throughout the City in many miles of streets as utilities are installed, replaced, or inspected/maintained over time, and the temporary disturbance that adjacent uses experience while temporary construction activity occurs is a commonplace experience, and cannot be compared to the noise effects of entertainment and wedding events occurring at night and on weekends when residences are most sensitive to noise disturbance. The comparison of this project's routine, commonplace weekday, daytime temporary construction noise impacts adjacent to homes already protected with soundwalls (and that would be further shielded by solid plywood fencing) is inappropriate with the ongoing operational noise of an event facility operating at nights and weekends without attenuation. According to the rationale of this comment, virtually any construction activity near residences would be subject to a fair argument, which is not the case under CEQA. Similar construction activity (i.e., installation or replacement of utilities) is routinely found exempt by lead agencies under CEQA Guidelines sections 15303(b), 15302, 15303(d) and 15304(d), and such work routinely occurs along streets adjacent to residences. For these reasons, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.27: Mr. Watry's comments that the Project could produce noises three to eight times louder than the ambient with substantial interference on speech constitute substantial evidence supporting a fair argument that construction noise should be deemed a significant and unavoidable impact. As a result, the City must prepare an EIR to disclose, analyze and mitigate these impacts.

Response A.27: See Response A24 and A25. As previously stated, the comment did not account for the soundwalls present along much of Monterey Road, or the fact solid plywood fencing will be installed to further shield construction activity, or that construction would be limited to weekday, daytime hours, and in keeping with common construction occurring throughout the City that is routinely found categorically exempt relying on the several Guidelines sections noted in Response A26. For these reasons, the statement that noise levels would be three to eight times louder is not substantiated. comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.28: In addition to reasoning that the temporary nature of the construction noise limits the significance of the impacts, the IS/MND insists that mitigation measures included as Standard Permit Conditions would reduce noise levels below significant levels. However, as Mr. Watry explains, these conditions "would do little, if anything to actually reduce construction noise levels" for several reasons.

First, the proposed construction of a solid plywood fence to block noise "is not practical for construction along Monterey Road." Second, the conditions include the use of mufflers. But because the noise model uses reference data from projects built from the 1990s to 2007, mufflers are already accounted for in the modeling and any claim that mufflers would further mitigate construction noise impacts "would result from improper double counting of the noise reduction they provide." Third, prohibiting unnecessary idling, while a laudable practice, will not reduce calculated noise levels. Fourth, locating stationary equipment as far as possible from sensitive receptors is infeasible or unlikely to be effective given the "linearity of the transmission line and the small space between that line and the residential property lines." Finally, the conditions include using "quiet compressors". However, compressors are not at all listed in the equipment used for the noise calculation, so using "quiet compressors" would increase the noise levels, if anything.

> **Response A.28:** Noise levels during construction were analyzed and disclosed in the IS/MND and associated Noise and Vibration report (Appendix E of the IS/MND) prepared for the project and, as stated, City conditions of approval would be adequate to reduce noise to a less than significant level. During the underground work, construction activities would move along the transmission line corridor as work is completed; therefore, residences and commercial uses located along the corridor would only be exposed to limited periods of elevated construction noise levels when activities would occur in close proximity to the land uses. Furthermore, the temporary noise impact due to project construction would be minimized to a less than significant level with the incorporation of the City's Standard Permit Conditions, which are incorporated into the project due to their noise-impact-reduction potential.
>
> No reason is provided for the statement that plywood fencing is impractical along Monterey Road. Analysis in the IS/MND shows that placing plywood fencing between the trenching activity and the adjacent housing while that portion of Monterey Road is under construction, is a feasible measure. This shielding will supplement the noise attenuation provided by the soundwalls for homes that back up to Monterey Road. No reason is provided for the statement that prohibiting unnecessary idling will not reduce calculated noise levels. It is feasible to locate stationary equipment as far as possible from sensitive receptors is infeasible or unlikely to be effective due to the linearity of the transmission line. This condition is a best management practice that by its very nature reflects the project doing what is feasible and practical, and increasing the distance to the extent feasible to the adjacent residences will serve to reduce the noise to the extent feasible. This reflects that in situations where the contractor has flexibility in the location of placing stationary equipment, it will always be placed as far away as possible from residences, rather than locations that may be somewhat

closer, and then at that location, a solid barrier would be installed to shield the activity. For these reasons, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.29: The IS/MND's reliance on infeasible and ineffective mitigation measures violates CEQA. As with the EIR in *Kings County Farm Bureau*, the IS/MND here cannot rely on infeasible or ineffective mitigation measures such as building an impractical noise barrier, committing to reduce idling which will not address the root problem of construction noise, or trying to move equipment further away from residences when the equipment necessarily must remain by the roadway to complete the work. The IS/MND violates CEQA when it double counts noise reductions from mufflers already included in modeling to reach the conclusion that noise impacts will be less than significant. It is also improper to attempt to mitigate noise impacts by claiming use of "quiet" compressors when such compressor equipment is not clearly needed for construction and is not even listed as part of the noise analysis. Therefore, an EIR must be prepared to evaluate the significant noise impacts and require feasible, enforceable, and effective mitigation measures.

Response A.29: The City addresses these noise effects by requiring Standard Permit Conditions to reduce noise levels to City thresholds and are fully applied and are part of the project's permit conditions to reduce construction noise and effects under permit authorizations and clearances. Violation of conditions in the permits would result in suspension or revocation of permits. The commenter offers no specific evidence that they are not effective or unenforceable. These Standard Permit Conditions have been required on the projects throughout the City and there is nothing unique about the nature, location, or timing of the proposed construction activity such that the conditions would not be successful here. Therefore, this comment does not result in new CEQA analysis, new significant impacts, or additional mitigation measures than those analyzed and disclosed in the IS/MND and associated appendices.

Comment A.30: The Noise Study references a June 2018 EIR for a "similar facility located in Los Angeles, California" as the basis for its heating, ventilation, and air conditioning (HVAC) noise analysis. However, as Mr. Watry points out, the reference EIR "is not cited, nor is any basis provided that would allow for a comparison of the Los Angeles project to the Hummingbird Energy Storage Project (e.g., required tons of cooling, size of facility, etc.)." The IS/MND and Noise Study further fail to provide any specifics about the size or type of HVAC equipment used in the EIR. Mr. Watry explains that the lack of detail "makes it impossible to determine if the noise levels used for the HVAC analysis are reasonable."

This lack of transparency regarding the basis for the HVAC analysis renders the IS/MND inadequate as an informational document under CEQA. It is well settled that a CEQA document may not rely on hidden studies or documents that are not provided to the public. The City must amend its analysis to fully disclose the sources that form the basis for its conclusion.

Response A.30: See Response A.26 and A.27. The document referenced (DS-86 Battery Energy Storage System Project Negative Declaration prepared by the Los Angeles Department of Water and Power in June 2018) is for s similar, though smaller, 10 MW facility with similar equipment specifications with regard to HVAC equipment. While the HVAC equipment could potentially generate noise levels in excess of the City's Municipal Code standards, it would not be considered a significant impact. Further, measures can be implemented to reduce noise levels emanating from the site, such as locating the HVAC units to less sensitive locations further away from the edge of the building, install a better noise-reducing sound enclosures around the units, select quieter units, etc. A condition of approval will be required by the City (ensuring that a noise study is prepared by an acoustical consultant to show compliance with the Municipal Code). The applicant's interpretation of the IS/MND noise study does not constitute substantial evidence supporting a fair argument that HVAC noise should be deemed a significant and unavoidable impact. Further, the IS/MND did not rely on hidden studies or documents not provided to the public. Submitted materials are available for public review upon request.

Comment A.31: CEQA requires that an EIR be prepared if there is substantial evidence that any aspect of a project, either individually or cumulatively, may cause a significant effect on the environment. As discussed herein, there is substantial evidence supporting a fair argument that the Project would result in significant adverse impacts that were not identified in the IS/MND, and that are not adequately analyzed or mitigated. The IS/MND also fails to contain the basic information and analysis required by CEQA, deficiencies which "cannot be dismissed as harmless or insignificant defects."

We urge the City to fulfill its responsibilities under CEQA by withdrawing the IS/MND and preparing a legally adequate EIR to address the potentially significant impacts described in this comment letter. Only by complying with all applicable laws will the City and the public be able to ensure that the Project's environmental impacts are mitigated to less than significant levels and that the City complies with CEQA.

Response A.31: As explained in detail in the prior Responses A.1 through A.30, the comments have not introduced substantial evidence in support of a fair argument as the commenter include speculations in regards to energy generation sources, accidents or hazardous scenarios beyond the direct or indirect impact of the project, or miscalculation and assumptions of components that are not proposed as part of the project. Based on all of the above responses, the IS/MND is the adequate CEQA document for analysis of the project. The project was reviewed by the City of San Jose to determine whether it could have a significant impact on the environment as a result of project completion. CEQA Guidelines §15382 defines a "Significant effect on the environment" as a substantial or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. Based on the analysis and conclusion of the IS/MND, the project will not have a significant effect on the environment in that the IS/MND identified one or

more potential significant effects on the environment for which the project applicant, before public release of the draft Mitigated Negative Declaration, has made or agrees to make project revisions that clearly mitigate the effects to a less than significant level, as defined in CEQA Guidelines §15369.5. Furthermore, as shown in the Reponses to the comments received on the draft IS/MND, the comment did not raise any new issues about the project's environmental impacts, or provide information indicating the project would result in new environmental impacts as impacts substantially greater in severity than disclosed in the IS/MND [CEQA Guidelines §15074(b)]. or

Comment A.32: The Project Description Is Incomplete. These bits and pieces are grossly incomplete and internally inconsistent, failing to include vendor specifications and other critical information required to estimate impacts. This is like applying for a construction permit for housing and describing the project as consisting of a garage, stove, sink, refrigerator, toilet, bathtub, and electric heating, without bothering to disclose whether the housing will be single family, condo, or an apartment block.

Our review indicates that lithium-ion batteries, inverters, and medium-voltage transformers will be installed within an existing building at 6321 San Ignacio Avenue, San Jose. The batteries will be assembled within racks and cabinets. Metal-clad switchgear, a power transformer, and other unidentified electrical equipment will be installed within a 15,000-foot substation located in the parking area west of the BESS building. This general description is not sufficient to identify the impacts of the Project.

Response A.32: See Response A.1 through A.5 above. The project description and its subsequent component in Section 3.2 of the IS/MND disclosed the proposal of a new battery-based energy storage system including the battery storage facility in square footage, operation specifics of the facility, chemical and materials contained in the main battery cells of the system, construction of a new substation with specific square footage, and associated equipment leading to and from the facility. The commenter did not specify which component of this is not adequate defined or disclosed in the IS/MND and how it does not allow for environmental review and impact analysis.

Responses to Comments in Exhibit A: Comments on the Initial Study and Mitigated Negative Declaration for the Hummingbird Battery Energy Storage Project, April 6, 2020

Phyllis Fox, PhD, PE, Ray Kapahi, Meng, David Marcus, MA

Comment A.33: First, the IS/MND does not disclose the layout of the BESS. Existing fire codes (which are currently being updated to specifically address BESS systems) and fire tests on lithium-ion batteries indicate that the layout of the batteries and ancillary facilities is critical to preventing fires—including separation between batteries, separation between the batteries and other

noncombustible and combustible objects, use of and location of thermal barriers, design of rack enclosures, materials of construction, and design of the sprinkler system. The IS/MND, for example, fails to state how close the batteries will be placed to each other, other Project components, or the building walls, or to disclose the material of construction. In addition, the IS/MND fails to state how much wattage may be contained in a single enclosure. The IS/MND should have included a diagram showing facility layout, including battery spacing, design of the sprinkler system, and location of ancillary facilities. This information is required to determine the risk of explosion and fire associated with the Project.

Second, the IS/MND fails to describe the fire suppression system, critical to control accidents that may occur at the facility, discussed in Comment 7. Rather, it states with no support that "[t]he project would be constructed in conformance with current codes, including features that would reduce potential fire hazards." The Dudek memorandum is similarly incomplete, stating only that the BESS will include "a fire protection system, likely consisting of an upgraded water-based, ceiling-mounted sprinkler system … an in-rack chemical suppression system (or similar technology) may also be installed to supplement the water system." "Likely" and "may" are not commitments.

This is a serious omission because one of the major environmental issues that has been experienced with existing battery storage systems is fire. There is no guarantee that following existing or future fire codes, using an undisclosed fire suppression system, undisclosed battery layout, and following an undeveloped Emergency Response Plan will prevent fire and its consequences, as demonstrated by accidents at similar facilities.

Response A.33: See Response A.1 through A.5 above.

Third, the IS/MND does not explain how the batteries will operate. This is critical information because it determines the emissions and hence air quality impacts of the Project. The IS/MND hints that the BESS will store renewable energy, but does not commit to storing only renewable energy. If it does not store renewable energy, significant emissions will occur, which have not been disclosed in the IS/MND.

Fourth, the IS/MND does not contain a Material Safety Data Sheet (MSDS) for the batteries or otherwise disclose their chemical composition, a sine qua non for assessing the fire, explosion, health, and other risks of the battery storage facility. Rather, it only generally identifies the batteries as lithium-ion batteries11 without disclosing other chemicals that will be present or combustion byproducts generated during accidents. All lithium-ion batteries contain other chemicals required to carry out the function of the batteries, including polyvinylidene fluoride, aluminum foil, and copper foil.

We filed a PRA request to obtain supporting documentation. The response included a lithium-ion battery MSDS. However, the IS/MND itself does not commit to using the batteries covered by this MSDS. Further, the supplied MSDS identifies the manufacturer as Trust Power Group while the

Dudek memorandum states “Powin lithium ion batteries” would be used. We searched for other facilities using Powin14 batteries and found only three very small operating facilities: a 2 MW/8 MWh energy storage system in Irvine, California, developed for SCE as part of the CPUC’s response to the Aliso Canyon natural gas leak, operational since January 2017;15 a 8.8 MW/40.8 MWh energy storage system in Stratford, Ontario, operational since April 2018;16 and a 12 MW/12 MWh energy storage system to support a primary gas generation facility in Mexico, operational since October 2018. Thus, if Powin is the battery supplier, it has no experience with the proposed scale and scope of the Hummingbird Project.

Response A.33: See Response A.1 through A.6 above.

Fifth, the IS/MND is silent on the impacts that could occur in the event of an accident. All lithium-ion batteries contain hazardous chemicals that present health and safety issues in the event of accidents, which have occurred at many BESS facilities. Highly toxic fluoride compounds and hydrogen cyanide, for example, are released in fires and explosions. See Comments 7.2 and 7.3. However, the IS/MND itself failed to disclose the battery composition, failed to disclose the chemicals that could be released in the event of an accident, and failed to acknowledge and evaluate potential impacts that would occur in surrounding commercial and residential areas during accidents. While the Dudek memorandum identifies the batteries as “lithium iron phosphate,” the IS/MND makes no commitment to using batteries of this type. These are serious omissions because accidents have occurred at many BESS facilities.

Sixth, accidents could occur during transport, on-site storage, and disposal. The IS/MND does not disclose where the batteries will be manufactured, how they will be transported to the site (ship, rail, or truck), the transportation routes, details of on-site storage during construction, where the batteries will be recycled, and the routes and means of transport to the recycle center. Accidents can occur during transport, storage, and recycling. The MSDS produced in response to our PRA request (though the IS/MND does not commit to using these batteries) indicates the batteries would be manufactured in China so they would likely arrive by ship and be transported by rail or truck to the site.

Seventh, the IS/MND does not include any vendor specifications for the ancillary equipment required to support the batteries, including the cooling and control systems, inverters, transformers, and heating, ventilation, and air conditioning (HVAC) units. This equipment requires electricity to operate and the generation of this electricity emits criteria and GHG emissions. The CalEEMod model used to estimate emissions does not include emissions from electricity to operate this type of equipment, but rather only lights and water supply.

Eighth, the IS/MND fails to explain the function of the various components of the Project. Some are obvious, like the HVAC units, but others are not generally understood by the reviewing public. Electricity from the batteries is generated as low- voltage direct current (DC). In general, inverters convert the DC current to alternating current (AC). Transformers increase the voltage. This is done

for each subgroup of batteries. The output of the transformers is then combined and run through another transformer to raise it to the 115 kV high-voltage level at which it is delivered to the grid. When charging, the whole thing runs in reverse. The incoming high-voltage AC is run through a transformer and inverters to produce low-voltage DC that is used to charge the batteries. The voltages involved in this process, which are required to estimate electricity demand to operate the equipment and hence emissions from supplying the electricity, are missing from the IS/MND and all documents produced in response to the PRA. For example, the IS/MND indicates there will be a substation associated with the Project, with "transformers located within the substation," but fails to give the most basic information about the substation and transformers. How many transformers will there be in the substation and what voltages will they operate at? This basic information is required to estimate electricity demand to operate the facility and the emissions to generate the electricity. The IS/MND needs to include this basic information.

Response A.33: See Response A.1 through A.6.

Comment A.34: Ninth, the IS/MND contains no information on the gross or net generation of electricity needed to operate the facility, storage capacity, storage efficiency, and expected energy output of the batteries. This information is essential to estimate emissions from operating the facility.

Response A.34: See Response A.6.

Comment A.35: Tenth, the IS/MND indicates that the transmission line will require new 115 kV equipment at the Metcalf substation, implying (but never committing to) that the transmission line will be a 115 kV line. As with the substation, the IS/MND lacks even the most basic information about the proposed transmission line. The IS/MND needs to be amended to: (a) indicate the number of circuits to be installed, (b) describe the type of cable and/or conduit to be used for the 2.5 miles of underground line, (c) indicate the physical space required for the underground transmission line, and (d) analyze the availability of the required underground space, given other underground utilities (electrical, gas, water, sewage, communications, etc.) that may be present.

Eleventh, the IS/MND asserts that a 2-foot by 6-foot trench "would be dug to accommodate the transmission line." The IS/MND needs to provide documentation indicating that a trench of such a size would be adequate to accommodate a 115 kV transmission line. It also needs to quantify the amount of dirt or other materials that would be removed and indicate how it would be disposed. Finally, the IS/MND needs to address the number of street light loop repairs that would be required due to trenching. The environmental impacts of the Project cannot be accurately determined without this and other information that is missing from the IS/MND. Thus, the IS/MND is substantially deficient and does not fulfill its mandate as an informational document under CEQA to inform the public of potential impacts.

Response A.35: See Response A.7.

Comment A.36: The Project Description Is Misleading, the IS/MND and the Dudek memo assert that the Project will be designed to address an electrical capacity deficiency in the South Bay–Moss Landing sub-capacity area. The ISO transmission plan adopted recently (on March 25, 2020) assumes the entire Bay Area has just 80 MW of battery energy storage in 2021 and 109 MW in 2024– 2029. Thus, the ISO is certainly not relying upon this Project. More importantly, the Final 2020 Local Capacity Report evaluates the need for new capacity in the South Bay–Moss Landing subarea of the Greater Bay Area. It finds that under the worst contingency, the South Bay–Moss Landing subarea will need 1,781 MW of generating capacity. However, it already has 2,377 MW of installed capacity in 2020. Thus, existing capacity is already 496 MW more than the maximum needed. Thus, while new capacity from the Project could be used if built, it is not needed to keep the lights on.

The Dudek memo also asserts as follows:

> *The batteries move energy on and off of the transmission power grid based on market and utility demand. In general, California Independent System Operator (CAISO) will dispatch the system to both place energy onto the grid (discharge) during times of high load and to take energy off of the grid (charge) in times of low load relative to generation. PG&E may have different requirements for when to dispatch the system, potentially dictated by the status of critical equipment on their grid. The undergrounding from the substation is only for connecting the batteries to the grid and doesn't have any relevance to system dispatch schedules.*

This is incorrect. It implies that the California Independent System Operator (CAISO), or possibly PG&E, would control the dispatch, i.e., the operation, of the Project. Unless the IS/MND includes an enforceable condition abdicating operational control of the Project to the CAISO, along with documentation that the CAISO would accept such control, then the CAISO will not have dispatch control. The way the CAISO normally operates, generation owners submit prices to the control. Dispatch is based on the projects that have submitted prices at or below the clearing price, as determined by the CAISO. Alternatively, projects can schedule their operation without regard to price, in which case the CAISO has no control whatsoever. Only under unusual conditions does the CAISO override the project-determined or price-determined dispatch and order a project on (for reliability) or off ("curtailment," also done for reliability purposes).

The IS/MND would require an enforceable mitigation measure to limit charging to hours when the marginal resource is renewable—for example, hours when the CAISO clearing price is zero or lower. Therefore, this claim in the Dudek memo provides additional indirect evidence that the Project will be charged during hours when the marginal resource is nonrenewable. Thus, the Project will increase GHG and criteria pollutant emissions.

Response A.36: See Response A.1 and A.8.

Comment A.37: As explained below, the IS/MND fails to describe the Project's impacts from energy use in two major ways. First, the IS/MND claims the Project would "store clean energy (wind

and solar)" and that "The energy storage capacity created as part of the project would assist the City and State of California in meeting their carbon-free electricity goals." However, the IS/MND contains no measures or conditions that will guarantee that the Project will actually store renewable energy. In fact, for several reasons including the Project's location, storage capacity and economic incentives for its operation, it is likely that the Project will incentivize production of more fossil-fuels based energy, by creating more demand in the form of storage capacity.

Response A.37: See Response A.6 and A.8.

Comment A.38: Second, the IS/MND fails to account for all of the Project's energy use. Most notably, the IS/MND does not consider at all the energy used when batteries are being charged and discharged. By failing to account for this energy use, the IS/MND is also failing to account for the full scope of the Project's GHG and air pollution impacts. Emissions from the Project depend on how the BESS is operated. However, the IS/MND fails to explain how the BESS will be operated. Rather, it drops inconsistent hints throughout the IS/MND and its appendices about measures that are not required as mitigation. As currently drafted, the Project will result in a significant increase in greenhouse gas (GHG) emissions and increases in criteria pollutants, which, when combined with increases from other sources, are significant. The IS/MND estimates operational GHG emissions of only 127.6 metric tons of CO_2 equivalents per year (127.6 MT **CO_2e/yr)** based on the CalEEMod model. The majority of this amount, 125 MT **CO_2e/yr**, is due to electricity consumption by supporting equipment (e.g., facility lighting and air conditioning). The CalEEMod model does not include energy consumption due to BESS facilities, but rather only major building envelope systems such as space heating, space cooling, water heating, and ventilation, thereby significantly underestimating GHG and criteria pollutant (e.g., NO_x) emissions. Further, the emissions due to on-site electricity consumption do not occur on site, but rather occur at the power plants where the electricity is generated.

The IS/MND completely ignores GHG and criteria pollutant emissions generated by the on-site consumption of electricity to charge the Project's batteries. It does not explain why emissions resulting from electricity to keep the lights on in the battery building count, but emissions resulting from the electricity used to charge and discharge the batteries themselves do not. Both involve on-site electricity consumption that require electricity generation elsewhere that produces GHG and criteria pollutant emissions. Emissions depend on how the Project will be operated; namely, the specific sources of energy and quantity of electricity that will be stored over the course of a year. The IS/MND is silent on how the BESS will be operated and the specific sources of energy that will be stored. It contains no acknowledgement, let alone discussion or quantification, of the emissions that would result from charging the proposed batteries. Batteries are imperfect instruments: energy is lost every time a battery is charged and discharged. This means that if a battery absorbs 1 MWh of electricity, it will discharge less than 1 MWh back to the grid. The ratio of how much the battery consumes during charging versus its production while discharging is referred to as the energy efficiency of the batteries. The IS/MND fails to disclose the efficiency of the batteries, failing as an informational document under CEQA.

The IS/MND describes on-site electricity use of 0.36 GWh per year for cooling, unspecified equipment, lighting, and water heating, but ignores energy that would be consumed during charging and produced during discharging of the batteries. Because the purpose of a battery storage project is to consume energy, store that consumed energy, and then generate (a smaller amount) of this stored energy, this oversight is inexcusable. The IS/MND needs to be expanded to identify the sources of charging energy, the net energy consumption associated with the Project, and any required mitigation measures.

We (Marcus/Fox) have previously calculated that existing battery energy storage projects on the CAISO system operate at about a 10% capacity factor and have a round- trip efficiency of approximately 80%. For the Hummingbird proposal, those numbers translate to annual generation of 63.7 gigawatt hours (GWh), annual charging energy requirements of 79 GWh, and thus annual net energy consumption of 15.2 GWh. This energy use and its impacts are entirely missing from the IS/MND.

Response A.38: See Response A.8.

Comment A.39: The IS/MND variously asserts that the Project would "store clean energy (wind and solar) so that peak-hour dependence of natural gas or coal-fired electricity could be lessened…" Elsewhere, it asserts the Project will "store excess energy" and "electricity generated within the South Bay-Moss Landing area." There are several problems with these explanations of how the BESS would operate. The Project will result in significant GHG impacts when the errors and omission in the IS/MND are resolved.

First, the IS/MND provides no definition of the term "excess energy." The electrical grid is required to run in balance, with supply and demand balanced at all times. Thus, technically, it never has "excess energy" in the sense of energy that is being generated but not consumed. It appears that the IS/MND is using the term "excess energy" to refer to energy that is capable of being produced but is not actually being produced for lack of a market. However, that definition is circular. The Project can only run using energy that is capable of being produced, and it can only run using energy that does not have any other market (or else such energy would already be getting consumed by that other market).

The IS/MND has failed to clearly explain how the Project will actually operate by failing to explain what "excess energy" refers to, thus failing as an informational document under CEQA. One option is that it refers only to "renewable energy" that is capable of being produced but would otherwise be curtailed and not produced but for the Project. The IS/MND, for example, elsewhere notes that the Project will "store clean energy (wind and solar)." If this is the intent (and the IS/MND fails to require that the batteries only be charged with wind and solar), the IS/MND needs to be amended to require that the batteries only be charged with renewable energy. If not, then the term "excess" is redundant, as there is always "excess" nonrenewable energy that is capable of being produced by increasing the output of gas-fired or coal-fired power plants.

The IS/MND also asserts that the Project "would store excess energy generated by the electrical grid during the day." However, it provides no documentation or other assurance, such as mitigation measures, to ensure that this will occur in practice. Generally, commercial battery storage projects store energy (charge) whenever grid prices are lowest and generate energy (discharge) whenever prices are highest to make a profit. Limiting charging to (a) daytime hours and (b) hours when there is "excess" energy, and (c) only renewable energy will prevent some economical charging. To the extent that the Project batteries are not fully charged because of a lack of "excess energy generated by the grid during the day," this claimed operation mode would also limit the ability of the Project to discharge the full claimed 300 MWh of storage capacity.

The IS/MND needs to be expanded to either (1) incorporate enforceable conditions that will limit charging to daytime periods when there is otherwise-curtailed renewable energy available, or else (2) be amended to clarify that the Project is (a) not limited as claimed in the IS/MND and thus (b) not limited to using renewable energy as the source of charging energy. In the latter case, emissions will increase and an EIR should be prepared to analyze the significant impacts.

Response A.39: See Response A.1 through A.8 and A.16.

Comment A.40: Second, the IS/MND asserts that the Project "would be able to store up to 75 MW/300 (MWh) of electricity…" However, it fails to include any analysis of how often that capability would exist, which determines air quality impacts. To the extent that the Project is dependent on otherwise-curtailed renewable energy for its charging energy, it may be limited in the number of hours during which it can charge and thus may not be able to be fully charged (and thus store 300 MWh of electricity).

For example, during the year starting March 10, 2019, there were 68 days out of 366 (19% of all annual days) in which total renewable energy curtailments on the entire CAISO system were less than 300 MWh. On every one of those days, if the Project had been fully discharged before the day began, it would have been unable to fully recharge and thus would have been limited to less than its 300 MWh discharge capability. Those 68 days included 20 days in August 2019, the month of highest electricity demand in California, suggesting that for most of that month, the Project, had it existed and been limited to using otherwise-curtailed (i.e., excess) renewable energy, would not have been able to fully charge.

Thus, the IS/MND needs to be amended to quantify the extent to which it will actually be able to "store up to 300 MWh of electricity" over the course of a year if it is not using CO2-emitting generation as its source of charging energy. It is likely that it will not be able to fully charge the batteries with renewable energy. Charging with nonrenewable energy will result in air quality impacts which could require the preparation of an EIR.

Response A.40: See Response A.8 and A.16.

Comment A.41: Third, the IS/MND claims that the source of "excess energy" for Project charging will be "electricity generated within the South Bay–Moss Landing area." It provides no evidence for this claim and does not impose any mitigation limiting the Project to charging from this area.

Electricity flows over the Western U.S. grid in response to the laws of physics. Because the grid is interconnected, it is not generally possible to assign a source to any particular kWh of consumption. Moreover, as the great majority of the generation capacity in the South Bay–Moss Landing Area is gas-fired and not renewable, this claim is at odds with the claim elsewhere in the IS/MND that charging energy for the Project would come from renewable resources.

The total South Bay–Moss Landing Subarea generation capacity is 2,377 MW. Five power plants in this subarea totaling 2,292 MW of generation capacity are gas-fired. This is 96% of the total generating capacity in the subarea. The following are the gas-fired sources:

- DVRaST3, DVRaGT1, and DVRaGT2 at busses 36863-36865 (p. 170; "GT" and "ST" indicate gas turbine and steam turbine, respectively), **148 MW**
- Gilroy cogeneration and peaker units at busses 35850-35853 (pp. 170- 171), **248 MW**
- LECEF gas turbine and steam turbine units at busses 35854-35858 (p. 171), **306 MW**
- MEC (Metcalf combined cycle) CTG and STG units at busses 35881-35883 (p. 171; CTG and STG indicate combustion turbine and steam turbine, respectively), **570 MW**
- DUKMOSS (Moss Landing combined cycle) units 1-6 at busses 36221-36226 (p. 172), **1020 MW**

Assuming the assertion that Project charging will be electricity generated within the South Bay–Moss Landing area is valid, it is highly unlikely that the Project can operate without significantly increasing emissions, because of a lack of renewable generation in the South Bay–Moss Landing area that is otherwise curtailed during the day and would thus be available for use by the Project. Thus, the batteries could not be recharged with renewable generation.

However, there is a 1080 MW combined cycle power plant at Moss Landing that generated 4,189 GWh in 2018. This corresponds to a 44% capacity factor. There is also a ~500 MW combined cycle plant adjacent to the Metcalf Substation, 2 miles from the Project. Thus, if the Project is limited to recharging with energy from the South Bay– Moss Landing area and ends up using incremental generation from the Moss Landing or Metcalf power plants as its source of charging energy, charging would increase emissions.

The IS/MND needs to be amended to either (a) strike the claim that the batteries would be charged with renewable generation from the South Bay–Moss Landing area, or (b) explain how it can be true. To the extent that the IS/MND continues to claim charging energy will come from the South

Bay–Moss Landing area, it needs to: (a) include an enforceable operating condition requiring such sourcing and (b) quantify how much, if any, of such South Bay–Moss Landing charging energy will come from otherwise-curtailed renewable resources, and (c) provide mitigation to offset the net charging energy from nonrenewable resources.

Response A.41: See Response A.8 and A.16.

Comment A.42: This is a significant underestimate because the CalEEMod model does not estimate GHG emissions from battery storage facilities, including the electricity required to operate equipment such as the inverters, transformers, switchgear, and other specialized BESS equipment or from recharging the batteries. Further, the IS/MND does not include any of the information required to estimate these emissions, such as vendor specifications for all of the electrical equipment at the facility. Thus, the IS/MND fails as an informational document under CEQA.

The CalEEMod model also does not estimate GHG emissions from charging the batteries. The IS/MND contains no acknowledgement, let alone discussion, of the emissions that would result from charging the proposed batteries. It describes on-site electricity use of 0.36 GWh per year, but ignores the estimated 79.0 GWh per year that would be consumed on site in order to charge the batteries and the estimated 63.7 GWh per year that would be generated on site during discharge of the batteries. Since the whole purpose of a battery storage project is to consume energy and then generate (a smaller amount of) energy, this oversight is inexcusable. A revised CEQA document must be prepared that identifies the sources of charging energy, the net energy consumption associated with the Project, and any required mitigation measures.

As explained in this comment, GHG emissions from battery recharging alone are highly significant. Emissions from generating energy to operate Project equipment, such as the inverters and transformers and to charge the batteries, are indirect emissions. As demonstrated below, these are emissions generated elsewhere to support the Project. These indirect emissions are highly significant and unmitigated, requiring the preparation of an EIR.

GHG emissions generated by the Project, regardless of where they occur, contribute to global climate change and must be included in CEQA analyses. Further, criteria pollutant emissions, regardless of where they occur within California, must be included in CEQA analyses. The IS/MND tacitly admits this by quantifying GHG and criteria pollutant emissions at power plants that supply on-site electricity use for conventional sources, such as facility lighting.[51] There is no basis whatsoever for quantifying emissions from supplying electricity to operate some components of the facility, designated as "energy consumption" in the IS/MND[52] (which are underestimated) while ignoring emissions from facility equipment (transformers, inverters, etc.) and battery charging. The IS/MND fails as an informational document under CEQA for failing to include emissions from facility equipment and battery charging.

The operation of the Project will increase GHG and other emissions elsewhere in California from the generation of electricity to support the on-site facility and to charge the batteries. The IS/MND

does not contain sufficient information to estimate emissions from operating BESS equipment such as transformers and inverters.

Response A.42: See Response A.8 and A.16.

Comment A.43: This comment addresses battery charging emissions. Absent regulatory requirements or enforceable mitigation measures to the contrary, battery storage facilities attempt to store whatever energy is the cheapest and displace whatever is the most expensive, with no concern for emissions that would result from this exchange because there is no price on carbon or any other pollutant.

If the charging energy is from conventional sources, such as gas- or coal-fired generation, charging will generate emissions as those sources would not otherwise operate because there would be no market for them. As explained below, conventional sources of energy generation are likely to provide the great majority of battery charging energy. The fraction of charging energy from renewable generation is likely quite low because only a small fraction of solar generation (and virtually no non-solar renewable generation) is curtailed generation that could have been used for battery charging.

Further, as the IS/MND asserts charging energy will come from the South Bay– Moss Landing area, little renewable generation would recharge the batteries because the majority of the generation capacity in this area is gas-fired and not renewable. Thus, when charging occurs in hours when the marginal fuel in the CAISO-controlled grid or the South Bay–Moss Landing portion of that grid is a fossil fuel, which is most hours, the facility would increase GHG and criteria pollutant emissions. Those emissions would then be partially offset during hours when the battery facility is discharging. But because of the round-trip inefficiency of batteries, which consume more energy than they produce, the result can still easily be an increase in net emissions.

The IS/MND contains no acknowledgement, let alone discussion, of the emissions that would result from charging the proposed batteries. The IS/MND claims that the Project would be charged using generation from power plants in the South Bay–Moss Landing area. Those power plants, unless they are renewable generators, will produce emissions. We have previously calculated that existing battery energy storage projects on the CAISO system operate at about a 9.7% capacity factor and have a round-trip efficiency of approximately 80.7%. For the Project, those numbers translate to annual generation of 63.7 GWh/yr, annual charging energy requirements of 79 GWh/yr, and thus annual net energy consumption of 15.2 GWh/yr.

The largest single generation source in the South Bay–Moss Landing Area is the 1080 MW Moss Landing combined cycle project, which came on line in July of 2002. In 2018, the most recent full year for which data are available, it burned 30.387 trillion Btu of natural gas to generate 4,179 GWh of electricity. The associated emissions included annual emissions of 126 tons of NOx and 1.717 million equivalent tons of GHGe emissions, which include greenhouse gas equivalents (GHGe) of methane and nitrous oxide (N_2O) emissions.

Assuming that the "South Bay–Moss Landing" generation on which the Project intends to rely has the same emission characteristics as the Moss Landing power plant, and further assuming that generation from the Project would displace generation from Moss Landing, the Project would cause incremental emissions of 919 lb/yr of NO_x and 5,682 MT CO_2e/yr.

Alternatively, the IS/MND itself calculates GHG emissions of 125 MT **CO_2e**/yr associated with electricity usage of 0.36359 GWh/yr. For the battery-related net electricity consumption of 15.2 GWh/yr, additional GHG emissions are 5,240MT **CO_2e**/yr. Thus, whether the correct number for battery-related GHG emissions is 5,681 MT **CO_2e**/yr or 5,240 MT **CO_2e** /yr, GHG emissions are significantly greater than the 127 MT **CO_2e**/yr acknowledged in the IS/MND and the 660 MT **CO_2e**/yr significance threshold relied on in the IS/MND.

In sum, because the storage capacity of the Project will incentivize additional fossil-fuel burning activities, GHG emissions from battery recharging alone are significant, requiring mitigation. Total GHG emissions are substantially higher because this estimate excludes GHG emissions from generating electricity to operate Project equipment, including the transformers and inverters. The IS/MND includes a partial estimate of these electricity emissions, 127.6 MT CO_2e/yr, for conventional sources such as lighting. However, total GHG emissions would be significantly higher and are unmitigated.

Response A.43: See Response A.6, A.8, and A.16.

Comment A.44: The IS/MND needs to be significantly expanded to discuss these indirect emissions attributable to the Project, the degree to which they exceed significance thresholds, and include appropriate mitigation measures. The IS/MND sets forth a "GHG Reduction Strategy" based on San Jose's General Plan. None of the cited measures will reduce GHG emissions from the Project, which largely occur off-site.

First, consistency with the Land Use/Transportation Diagram is irrelevant as transportation is a de minimis source of GHG emissions because the BESS is an unmanned facility. Second, implementation of Green Building Measures is irrelevant because the batteries will be installed in an existing building with no modifications to that building. Third, implementation of pedestrian/bicycle site design measures is irrelevant because the facility is unmanned. Fourth, the IS/MND asserts the Project is consistent with the General Plan designation for the site "because … the project is not an energy-intensive use…" This claim is false. The whole purpose of the Project is to use energy, some 75 MW while charging. When charging, the Project would probably be the most intensive energy user in the entire city of San Jose. The fact that roughly 80% of the energy use is then recovered when the batteries discharge does not change the energy-intensive nature of the Project. This sentence, and any conclusions based upon it, needs to be removed from the IS/MND.

One obvious mitigation measure would be to require that the batteries be charged only during hours when the CAISO reports that curtailment of renewable resources is occurring, thus allowing some of the otherwise-curtailed renewable generation to be used for Project charging. With such a condition, it would be reasonable to conclude that no incremental fossil fuels were being burned to generate the electricity used for charging, and thus the Project would not be causing the increase in GHG emissions that would occur without mitigation.

Response A.44: See Response A.8 and A.16.

Comment A.45: Impact EN-2 requires that the Project not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. The IS/MND concludes the Project would have no impact on renewable energy or energy efficiency by asserting that it would facilitate the City's desires and California RPS requirements to meet General Plan policies related to renewable energy and energy efficiency, the CBC, and CalGreen.

This claim is unsupported. To the extent that the Project would rely upon gas- fired generation for its charging energy (Comment 3), it would hamper compliance with RPS goals, not facilitate compliance. If the Project is intended to rely upon renewable generation for its charging energy, the IS/MND has failed to include any enforceable condition or mitigation measures to ensure that this occurs in practice.

One way to ensure that the Project only operates when renewable energy is the marginal source of generation, and thus guarantee that the Project really does facilitate RPS goals, would be to restrict charging only to hours when the CAISO reports that curtailment of renewable resources is occurring, thus allowing some of the otherwise- curtailed renewable generation to be used for Hummingbird charging.

Response A.45: See Response A.1 and A.8.

Comment A.46: The IS/MND concluded that all cumulative impacts were less than significant, without identifying any cumulative projects or conducting any analyses. "Cumulatively considerable" under CEQA means that "the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." When the incremental effect of a project is cumulatively considerable, the lead agency must evaluate cumulative impacts in an EIR.
The IS/MND concluded that all cumulative impacts were less than significant without identifying any cumulative projects or conducting any cumulative impact analyses.
Thus, the IS/MND fails as an informational document under CEQA.

The South Bay Area is undergoing a boom in the construction of data centers to support the internet and other infrastructure to support this growth. We selected data centers for our cumulative impact analysis because we (Fox, Marcus, Kapahi) have worked on many of them and the review period for the Hummingbird IS/MND was not adequate to allow us to identify and

compile emissions for all cumulative projects. Further, it is not the duty of reviewers to perform an analysis that should have been in the IS/MND.

Data centers include diesel-fueled backup generators to supply electricity during power outages. These generators emit the same pollutants associated with the Project— ROG, NOx, PM10, PM2.5, SO_2, and GHG. Diesel generators are stationary sources subject to Bay Area Air Quality Management District (BAAQMD) permitting. They are the major source of emissions from data centers. Other sources include emissions from transportation and generating electricity to support the data centers. The five data centers we selected for our cumulative air quality analysis are in the same BAAQMD air basin as the Project. Thus, direct emissions from these generators plus their transportation emissions will cumulatively affect air quality in this air basin.

The Project's direct emissions will occur in the BAAQMD air basin and its indirect emissions will occur where electricity to support the Project is generated. The IS/MND indicates that the Project's batteries will be charged with electricity from the South Bay–Moss Landing subarea. The South Bay subarea is within the BAAQMD air basin. Thus, when the charging energy comes from a gas-fired power plant in the South Bay subarea (e.g., Metcalf), it will cumulatively contribute criteria pollutant emissions in the BAAQMD air basin, cumulatively impacting air quality in the same air basin as these data centers.

GHG emissions, on the other hand, are a global rather than a regional air quality issue. The air basin they are released in is irrelevant for estimating cumulative impacts. GHG emissions from the Project, the data centers, and other cumulative projects we did not have time to identify, all contribute cumulatively to GHG impacts within California, regardless of where in California they are emitted. We are aware of the following currently proposed data centers in the San José:

- Equinix Data Center
- San Jose City Data Center
- Laurelwood Data Center
- Sequoia Data Center
- Stack Data Center

Further, additional nearby data centers are under development. Microsoft has bought 64.5 acres of land along State Route 237 to build a four-story 49.5 MW data center. Our research also indicates that 63 additional projects are planned in the adjacent City of Santa Clara between 2019 and 2030 and in San Jose, all in the same air basin affected by the Project. In addition to these data centers, significant development is proposed in downtown San Jose to support the anticipated increase in population. The IS/MND contains no analysis of the cumulative impacts of these projects (and many others not mentioned in these comments) and thus fails as an informational document under CEQA.

All of these projects, the data centers and many others that we did not specifically evaluate due to time constraints, will affect ambient air quality, public health risks, noise, the availability of utilities, and other resources in the same general area and air basin as the Project. The emissions from these other cumulative projects would significantly increase our estimate of cumulative impacts in Tables 1–3. These cumulative impacts were not evaluated in the IS/MND, which fails as an informational document under CEQA.

Cumulative impacts can be estimated by summing the emissions from cumulative projects and comparing them to significance thresholds. The annual and daily operational criteria pollutant emissions from data centers, as reported in their CEQA documents, are summarized in Tables 1 and 2. This analysis shows that cumulative mitigated annual ROG emissions (Table 1) and cumulative mitigated daily ROG and NOx emissions (Table 2) are significant. Thus, an EIR is required.

Table 1: Cumulative Mitigated Annual Emissions (ton/yr)

Project	**ROG**	**NOx**	**PM10**	**PM2.5**
Hummingbird	0.46	0.48	0.001	0.001

Project	**ROG**	**NOx**	**PM10**	**PM2.5**
Stack	1.8	9.9	0.2	0.1
Equinix	-1.2	6.6	-0.5	-0.3
San Jose	4.6	-4.71	0.25	0.21
Laurelwood	6.2	-2.3	0.18	0.16
Total	**11.9**	**9.97**	**0.13**	**0.17**
Significance Threshold (ton/yr)	10	10	15	10
Significant?	**Yes**	No	No	No

Table 2: Cumulative Mitigated Daily Emissions (lb/day)

Project	**ROG**	**NOx**	**PM10**	**PM2.5**
Hummingbird	2.5	2.6	0.007	0.007
Stack	8.8	51.9	1.0	0.4
Equinix	4.7	49.1	6.2	2.4
San Jose	25.3	-26.2	1.37	1.17

Laurelwood	33.9	560	1.18	1.07
Sequoia	16.3	23.8	0.23	0.22
Total	**91.5**	**661.2**	**9.99**	**5.27**

Project	ROG	NOx	PM10	PM2.5
Significance Threshold (lb/day)	54	54	82	54
Significant?	**Yes**	**Yes**	No	No

In sum, cumulative annual ROG and cumulative daily ROG and NOx air quality impacts are significant, requiring the preparation of an EIR.

Response A.46: See Response A.16 and A1.7.

Comment A.47: Cumulative GHG impacts can be estimated by summing the emissions from cumulative projects and comparing them to the IS/MND's GHG significance threshold of 660 MT CO2e/yr. The annual GHG emissions from just five additional nearby data centers, as reported in their CEQA documents, are summarized in Table 3. This analysis shows that cumulative GHG emissions are significant. Thus, an EIR is required.

Table 3: Cumulative Greenhouse Gas Emissions: Data Centers (MT CO2e/yr)

Project	GHG
Hummingbird	5,810
Stack	9,489
Equinix	-
San Jose	3,529
Laurelwood	6,142
Sequoia	4,301
Total	**29,271**
Significance Threshold (ton/yr)	660
Project	**GHG**
Significant?	**Yes**

Response A.47: See Response A.16 and A.17.

Comment A.48: The construction of the Project would release PM2.5. The BAAQMD CEQA Guidelines include a significance threshold of 0.3 µg/m^3 for annual average PM2.5 emissions. We (Kapahi/Fox) modeled ambient PM2.5 concentrations using the IS/MND's estimated emissions. This analysis indicates that the annual concentration of PM2.5 will exceed this threshold at several locations. Figure 1. Thus, risks and hazards of construction are significant.

Our analysis underestimates these impacts because the CalEEMod analysis that estimated PM2.5 emissions underestimated PM2.5 and other construction emissions for several reasons. A supporting spreadsheet (Exhibit 19) supplied in response to our PRA discloses significant discrepancies with the CalEEMod analysis in IS/MND Appendix A. First, it indicates that construction would occur between 7 AM and 7 PM while the IS/MND's CalEEMod analysis assumed an 8-hour workday. Second, Exhibit 19 indicates 70,000 ft^2 of pavement would be required during gen-tie installation while the CalEEMod analysis shows zero paving. Third, Exhibit 19 indicates 15,000 ft^2 of paving would be demolished to make room for the substation while the CalEEMod analysis shows zero paving demolition. Fourth, the CalEEMod does not include PM2.5 emissions from windblown dust from graded areas and storage piles and fugitive dust from off-road travel. These emissions must be separately calculated and added to CalEEMod totals, which was not done in the IS/MND's CalEEMod analysis.

Figure 1: Annual PM2.5 Concentrations (µg/m^3) during Construction

Response A.48: See Response A.17.

Comment A.49: The IS/MND did not evaluate construction health impacts. Project construction could result in significant health impacts from two sources: (1) diesel particulate matter (DPM) emitted by construction equipment and (2) HAPs released by battery accidents during battery building setup. First, the Office of Environmental Health Hazard Assessment's (OEHHA's) risk assessment guidelines require a formal health risk assessment for short-term construction exposures lasting longer than 2 months. The OEHHA risk assessment guidelines, which are used throughout California for assessing health risks under CEQA, state:

> Due to the uncertainty in assessing cancer risk from very short-term exposures, we do not recommend assessing cancer risk for projects lasting less than two months at the MEIR. We recommend that exposure from projects longer than 2 months but less than 6 months be assumed to last 6 months (e.g., a 2-month project would be evaluated as if it lasted 6 months). Exposure from projects lasting more than 6 months should be evaluated for the duration of the project. In all cases, for assessing risk to residential receptors, the exposure should be assumed to start in the third trimester to allow for the use of the ASFs (OEHHA, 2009). Thus, for example, if the District is evaluating a proposed 5-year mitigation project at a hazardous waste site, the cancer risks for the residents would be calculated based on exposures starting in the third trimester through the first five years of life.
>
> For the MEIW, we recommend using the same minimum exposure requirements used for the residential receptor (i.e., no evaluation for projects less than 2 months; projects longer than 2 months but less than 6 months are assumed to last 6 months; projects longer than 6 months would be evaluated for the duration of the project). Although the off-site worker scenario assumes that the workers are 16 years of age or older with an Age-Sensitivity Factor of 1, another risk management consideration for short-term project cancer assessment is whether there are women of child bearing age at the worksite and whether the MEIW receptor has a daycare center. In this case, the Districts may wish to treat the off-site MEIW in the same way as the residential scenario to account for the higher susceptibility during the third trimester of pregnancy, and for higher susceptibility of infants and children.
>
> Finally, the risk manager may want to consider a lower cancer risk threshold for risk management for very short-term projects. Typical District guidelines for evaluating risk management of Hot Spots facilities range around a cancer risk of 1 per 100,000 exposed persons as a trigger for risk management. Permitting thresholds also vary for each District. There is valid scientific concern that the rate of exposure may influence the risk – in other words, a higher exposure to a carcinogen over a short period of time may be a greater risk than the same total exposure spread over a much longer time period. In addition, it is inappropriate from a public health perspective to allow a lifetime acceptable risk to accrue in a short period of time (e.g., a very high exposure to a carcinogen over a short period of time resulting in a 1×10^{-5} cancer risk). Thus, consideration should be given for very short term projects to using a lower cancer risk trigger for permitting decisions.

Health risk assessments are routinely performed for construction projects. The proximity of identified sensitive receptors and the duration of construction indicate that a health risk assessment should have been prepared for this Project. Based on our (Fox, Kapahi) experience, we expect that cancer and acute health impacts from diesel particulate matter (DPM), equal to PM2.5, would be significant for on-site construction workers and nearby residents.

Second, an accident could occur, for example, during offloading of the Li-ion batteries, their on-site storage, or setting up the batteries in the storage buildings. These accidents would release toxic compounds that could result in significant health impacts to construction workers, workers in adjacent commercial buildings, residents along the transmission line, or motorists on nearby roadways. The emission of toxic gases can be a larger threat than heat if a battery fire occurred during battery building setup. See discussion of toxic emissions in Comment 7.3.

The construction exhaust PM2.5 emissions estimated in the IS/MND of 0.11 ton/yr were used to estimate cancer risks over the 6-month construction period. The results are summarized in Figure 2. These emissions are underestimated for the reasons explained in Comment 6.1. Cancer risks greater than 10 in one million are significant. This figure shows that construction cancer risks are significant for workers at nearby commercial facilities surrounding the BESS. The cancer risks would be even greater if the errors in the CalEEMod analysis discussed in Comment 6.1 were corrected.

Figure 2: Spatial Distribution of Cancer Risk (cases per million) during Construction

Response A.49: See Response A.17 and A.18 above.

Comment A.50: Fires and explosions have occurred at existing BESS facilities. There are many causes of fires at BESS facilities, including overcharging or short-circuiting due to age, manufacturing defects, battery aging, thermal runaway, malfunction of the cooling or other supporting systems, and charging a severely discharged cell—which can result in internal cell breakdown and damage to neighboring cells. Lithium-ion batteries are sensitive to abusive conditions such as high temperatures, crashing, overcharge, over- discharge, and short circuit. The IS/MND is silent on how these conditions would be prevented during transport, construction, and operation of the facility.

The IS/MND does not even contain the words “fire” or “explosion” and failed totally to evaluate their significant impacts. Thus, the IS/MND fails as an informational document under CEQA for failing to identify BESS failure modes, failing to evaluate their impact on the environment, and failing to identify mitigation measures to protect against them.

The major risk of lithium-ion batteries is thermal runaway, a cycle in which excessive heat keeps creating more heat. Thermal runaway can be caused by a battery having internal cell defects, mechanical failures/damage, or overvoltage. These lead to high temperatures, gas build-up, and potential explosive rupture of the battery cells, resulting in fire and/or explosion. Without disconnection, thermal runaway can also spread from one cell to the next, causing further damage. Lithium-ion batteries are stabilized by an ultrathin protective film that coats both electrodes. Studies have demonstrated that when this film is destroyed, which could happen in a battery large enough to overheat beyond 80°C, such as those proposed for this Project, the reaction of the battery electrolyte with the material of the unprotected positive electrode results in the formation of toxic fluoro-organic compounds.

The negative electrode (anode) in these batteries is usually graphite and the positive electrode (cathode) contains lithium and a transition metal. The cathode of the proposed batteries is lithium iron phosphate (LiFePO4 or LPF). See Comment 7.3. However, with a lead voltage of about 4 volts, no electrolyte is thermodynamically stable, so operation relies on a combination of ethylene carbonate and LiPF6 or other similar compounds producing a continuous film to assure adequate ionic conductivity and electronic insulation. However, above 80°C, thermal runaway can occur spontaneously as a result of the breakup of this protective film. The IS/MND is silent on the design of the batteries—critical information required to evaluate hazards—thus failing as an informational document under CEQA. We obtained an MSDS in a PRA request, but the IS/MND does not cite it or contain any condition requiring the use of this battery. The batteries are not always the cause of BESS accidents. A recent investigation of battery accidents concluded as follows:

> “What we’re learning over time is that it’s not necessarily always a battery problem,” Kaun says. “It’s not necessarily that the failures are occurring within the battery. There are other systems that make up an energy storage system, which can result in failures, and those failures can result in further failures of the battery.”

Another cause of fire is failure of the protection and control system. No matter the design, failure is still possible. For example, a battery management system failure can lead to overcharging and the inability to monitor the operating environment, such as temperature or cell voltage. There are currently no publicly available data that prove any particular type of fire protection can prevent or control thermal runaway in battery storage systems. Lithium-ion batteries are also very sensitive

to mechanical damage and electrical surges. This type of damage can result in internal battery short circuits that lead to internal battery heating, battery explosions, and fires. The loss of a single battery can rapidly cascade to surrounding batteries, resulting in a large fire. Mechanical damage could result from an automobile accident, for example, due to the proximity of the facility to major freeways.

In the event of a fire, which could be triggered by natural conditions, a seismic event, accidents on adjacent freeways (Highways 82, 85, 101), or accidents along the electrical infrastructure in the area, the battery storage facility could be engulfed in flames. A typical trigger accident, for example, could be separation of a power line conductor from a connector, as occurred in the recent "Blue Fire." Of particular concern here is that when lithium-ion batteries are exposed to heat, such as from an external fire, the substances inside the batteries react and explode. Equipment owned by California's three largest utilities ignited more than 2,000 fires in three and a half years. Investigations indicate that electrical lines making contact with vegetation and other line malfunctions sparked most of the fires.
In fact, the risk of fire at a battery storage facility such as the Project is a nonzero risk, regardless of the facility's design and the fire codes that are followed. Due to the potentially significant consequences, including release of toxic gases and damage to adjacent facilities, the risk of fire and its consequences should have been quantitatively evaluated in a risk of upset analysis and mitigation proposed to minimize the risk. The IS/MND does not include or acknowledge the hazards posed by an accident, or any analysis at all, of the likelihood of a fire and its consequences. This is a serious omission due to the Project's proximity to many nearby sensitive receptors.

Response A.50: See Response A.5, A.18 and A.19.

Comment A.51: Fires at existing battery storage facilities demonstrate the severe risk lithium-ion battery fires pose to human health and the environment. Fires have occurred at 23 battery storage facilities in Korea, caused by faulty battery management, system control, or battery protection systems, and faulty installation practices. Fires have also occurred at battery storage facilities in the European Union, including in Belgium, and in a Dreamliner 787 at Heathrow Airport. Several battery fires have occurred in Hawaii and Arizona. These fires can result in significant impacts that are not addressed in the IS/MND, including significant worker and public health impacts from hazardous air pollutants (HAPs) and damage to the commercial buildings. For example, in describing firefighting challenges at a Hawaiian 10-MW battery storage system supporting a 12-turbine, 30-MW wind farm, the Honolulu Fire Department reported:

"The risks from scalding heat, poisonous fumes, a collapsing structure and the potential for battery explosions kept firefighters outside the warehouse." Firefighters at this site faced thick smoke, toxic fumes, and other hazards. "The August … fire, the third since opening in March 2011, was so fierce that firefighters could not enter the building for 7 hours." The typical layout for battery storage facilities is rows of batteries with narrow separating aisles. The IS/MND contains no information on the layout of batteries in the storage facility and thus fails as an informational document under CEQA. The IS/MND should have included a diagram showing facility layout, including battery spacing and the design of the sprinkler system.

The Hawaii fire occurred in August 2012 at a 12-turbine, 30-MW Kahuku wind farm, supported by a 15-MW battery from Xtreme Power. Firefighters did not enter the building until 7 hours after the flames started due to questions about the toxicity of the 12,000 batteries. Two other fires occurred in the battery storage building, attributed to ECI capacitors in inverters from Dynapower. Another major fire in the US recently occurred on April 19, 2019 in Surprise, Arizona, at the APS McMicken Energy Storage Facility, equipped with two 2-MW AES Advancion battery arrays. An explosion in the McMicken battery system led to a fire. The investigation reported the follow sequence of events:

- A single rack of modules was compromised by the initiating thermal event; the fire did not spread to surrounding racks.
- After the initiating event, the fire suppression agent was discharged.
- The compromised modules emitted a mixture of explosive gases, which built up in the container.
- The battery modules did not themselves explode; the gas mixture reached certain concentrations, came in contact with a thus far unidentified ignition source and subsequently exploded.

This event injured eight firefighters, one critically. Four firefighters were hospitalized for chemical inhalation burns. Of the firefighters injured, three required an extended hospital stay. The most serious injuries included a firefighter who had a "nose fracture, skull fracture, collapsed lung, rib fractures, broken tibia and fibula and an artery cut in his left leg." Others sustained multiple fractures, burns, and concussions. Firefighters are a significant at-risk population because batteries may rupture when exposed to extreme heat/fire, leaking corrosive materials, and/or emit toxic

fumes. Burning batteries may emit acrid smoke, irritating fumes, and toxic fumes of fluoride, resulting in acute and chronic health effects in responding firefighters (and any nearby workers and residents). Acute health hazards include chemical inhalation burns and damage to lungs, eyes, and skin.

The McMicken Facility fire was not the first APS battery fire. Another smaller fire has been reported at another APS system. In November 2012, a 1.5-MW system at the APS Elden Substation near Flagstaff, Arizona, also caught fire. The root cause analysis for this fire identified a near miss in May 2012 when a battery cell was severely discharged and the cell was continuously charged against its intended design. Arizona Public Service recently shut down two other battery systems following the explosion.

The Arizona Corporation Commission (ACC) recently reviewed the 2019 APS McMicken Energy Storage Facility and 2012 APS Elden Substation near miss and concluded that "utility scale lithium ion batteries using the chemistries in those types of lithium ion batteries are not prudent and create unacceptable risks, particularly those with chemistries that include compounds that can release hydrogen fluoride in the event of a fire and/or explosion." My (Fox) review of the limited available information cited elsewhere in these comments indicates that the proposed BESS will use batteries with similar chemistries, most notably chemicals that include compounds that can release hydrogen fluoride and hydrogen cyanide.

Polyvinylidene fluoride decomposes into hydrogen fluoride gas in fires. Hydrogen fluoride is an extremely poisonous gas. As there are businesses within 15 feet and residences within 900 feet of the facility, a fire in the BESS would likely result in significant health impacts to nearby residents, as well as workers at the adjacent businesses. Thus, the IS/MND fails as an informational document under CEQA for failing to include an MSDS and other characterization data on the batteries that would be used and for failing to evaluate the health and other impacts of a BESS accident. Further, the cobalt, nickel, copper, aluminum, and manganese in these batteries could be volatilized at the very high temperatures encountered in battery fires and result in significant environmental impacts, including adverse health impacts to firefighters, workers, and residents; and toxicity to vegetation. These potential impacts are not disclosed or analyzed in the IS/MND.

The 2019 Kennedy analysis of the Arizona fires discloses fires with flame lengths of 10 to 15 feet that grew into flame lengths of 50 to 75 feet. The Flagstaff Fire Department Report for the 2012 incident expressed concerns about "a serious risk of a large-scale explosion." The ACC concluded that "a similar fire event at a very large lithium ion battery facility (250 MW+) would have very severe and potentially catastrophic consequences, and that responders would have a very difficult time trying to handle such an incident." The 2019 Kennedy report goes on to conclude:

"To appropriately plan for such a catastrophic event, the large-scale lithium ion battery facility using the same chemistries as the APS Substation (Flagstaff) facility fire and the McMicken facility would need to be built in isolation far from everything else, because an explosion could potentially level buildings at some distance from the battery facility site. The energy stored at a 2 MW battery

facility is equivalent to 1.72 tons of TNT. The energy stored at a 250 MW batter facility is equivalent to 215 tons of TNT. Also, large amounts of hydrogen fluoride could be released and dispersed that would affect and harm the public at a substantial distance downwind. There would be concerns also about lingering hydrogen fluroide contamination in the affected areas."

The Project's BESS facility is not isolated. In fact, it is surrounded by many nearby commercial properties. Based on this analysis, an explosion at the proposed BESS would be equivalent to 65 tons of TNT. This is sufficient to seriously damage the adjacent commercial properties and nearby residential neighborhoods, resulting in mortality of nearby residents and workers from the blast. The IS/MND fails as an informational document under CEQA for failing to disclose and evaluate the risk and consequences of explosions at the proposed BESS. We (Kapahi/Fox) prepared a risk of upset analysis because the Project is close to sensitive receptors and the impacts of an accident are so severe. The BESS is located in a densely occupied commercial district with nearby residential areas. The BAE Systems facility is 15 feet away. Offices are located 85 feet to the east and 130 feet to the north. The nearest residence is 900 feet to the north.

We estimated the health impacts of two operational cases: (1) acute impacts from a fire involving 10% of the battery cells and (2) mortality from worst-case events, a fire involving 50% to 100% of the battery cells. These are documented in Exhibit 4 and summarized in Comments 7.3 to 7.5. The IS/MND did not evaluate health impacts of Project construction, operation, or decommissioning. In the event of a fire, which is possible given the history of similar facilities (Comment 7.2), toxic chemicals will be released. The MSDS supplied in response to a PRA request (but not cited in the IS/MND) indicates that the electrolyte used in the Project's batteries is a solvent mixture of 41% ethyl methyl carbonate (EMC), 39% ethylene carbonate (EC), 14% lithium hexaflurophosphate (LiPF6), 4% propylene carbonate (PC), 2% vinylene carbonate, and 1% 1,3-propane sultone. Other materials include aluminum foil and copper foil. This electrolyte is flammable. In the event of overheating, it will evaporate and eventually be vented out from the battery cells. As discussed below, the release of hydrogen fluoride (HF) and hydrogen cyanide (HCN) during Li-ion battery fires is a well-known health risk.

We (Kapahi/Fox) estimated the acute health impacts for two HAPs that have been identified in emissions from Li ion batteries during fires, hydrogen fluoride (HF) and hydrogen cyanide (HCN). The lithium hexafluorophosphate in the electrolyte is known to decompose to produce hydrofluoric acid (HF) in a fire in the presence of water vapor. HF is generally present in the largest amount in Li-ion battery fire emissions and is the most toxic. Studies covering a broad range of commercial Li-ion battery cells with different chemistry, cell design and size have demonstrated that large amounts of HF may be generated during a battery fire, ranging between 20 and 200 mg/Wh of nominal battery energy capacity. In addition, 15–22 mg/Wh of phosphoryl fluoride (POF3) is generated during fires. These are highly toxic chemicals. We only evaluated HF. An EIR should be prepared to evaluate the cumulative health impacts of all HAPs that would be present in the fumes from a BESS fire.

Response A.51: See Response A..5, A.5, A.18, and A19 above.

Comment A.52: The toxicity of HF is well known. Hydrogen fluoride is one of the substances for which emissions must be quantified under the California Air Toxics Hot Spots Program. The acute reference exposure level that we used in our analyses is 240 µg/m^3. The use of water as an extinguishing agent may promote the formation of additional toxic gases and increase the production of HF. The Dudek memo indicates that the fire suppression system may include water. Comment 2. Experimental studies in which HF was measured indicate that "HF can pose a serious toxic threat, especially for large Li-ion batteries and in confined environments…. The release of hydrogen fluoride from a Li-ion battery fire can therefore be a severe risk and an even greater risk in confined or semi-confined spaces." Another study concluded as follows:

> Reaction of a widely used electrolyte salt – $LiPF_6$ – upon contact with water is known to result in the generation of gaseous HF. This very toxic and corrosive compound poses a serious health risk upon exposure to it. Our assessment shows that at room temperature a release of ca. 20 ml of 1M $LiPF_6$ electrolyte into a room of ca. 62 m^3 may generate sufficient HF to reach an acute exposure concentration limit, such as PAC-2 level, where irreversible and other serious health effects are expected to occur. In

If the toxic chemicals in battery electrolytes are released in an enclosed space during thermal runaway, such as would be encountered during on-site battery storage, transportation and recycling and by maintenance workers or fire fighters at the facility, significant health impacts would result. One recent study, for example, concluded as follows:

> Many of the currently used solvents are (very) volatile. Our calculations show that at room temperature a small solvent release, typically below ca. 250 ml, can evaporate and in a room of ca. 62 m^3 can result in the formation of a toxic atmosphere with concentration of the released compound reaching an acute exposure limit, such as PAC-2 level, where irreversible and other serious health effects are expected to occur.

The IS/MND fails to identify the solvent used in the batteries or to evaluate the health impacts of an accidental release. The available research indicates worker and public health impacts would be significant in the event of a fire or release of electrolytes during thermal runaway. Thus, the IS/MND fails as an informational document under CEQA for failing to identify and analyze health risks of thermal runaways and fires at the BESS. The toxicity of acute exposures to HCN is also well known. The acute reference exposure level (REL) for HCN is 340 µg/m^3. Acute health impacts of HCN include respiratory, central nervous system, and cardiovascular system impacts. The earliest symptoms include numbness, weakness, vertigo, some nausea, and rapid pulse. A few breaths at "high concentrations" may be followed by rapid collapse and cessation of respiration. If exposure continues, unconsciousness is followed by death.

We (Kapahi/Fox) estimated the acute impacts of HF and HCN using emission data based on laboratory measurements for similar Li-ion batteries. The results are presented in Exhibit 4 to these comments and summarized below in Figures 3 and 4. These figures indicate that the acute hazard indices exceed the significance threshold of 1 over the entire 1.5-mile modeling domain. These figures show that many homes and businesses would have hazard indices exceeding 10. Thus, accidents at the BESS involving just 10% of the battery cells would release sufficient HAPs to result in significant acute health impacts at all sensitive receptors in the Project area. These are significant impacts not analyzed or acknowledged in the IS/MND, requiring preparation of an EIR.

Figure 3: Spatial Distribution of Acute Hazard Indices for HCN

Figure 4: Spatial Distribution of Acute Hazard Indices for HF

Response A.52: See Response A.18 and A.19.

Comment A.53: We (Kapahi/Fox) also evaluated a worst-case event, involving 50% to 100% of the battery cells. Such an event could be triggered by an external fire that engulfed the BESS, an earthquake in the area, an airplane impact, a runaway vehicle impact, or a terrorist incident. The California Accidental Release Prevention (CalARP) program, for example, requires modeling a "worst-case release scenario" for all regulated flammable substances above threshold quantities. While the BESS is a not a covered process under CalARP, the methodology incorporated in these regulations offers guidance on how to model the accidental release of toxic compounds, specifically, the need to evaluate impacts under worst case meteorological conditions. Worst case conditions also require that that the maximum quantity of a given toxic compound be evaluated.

We estimated the health impacts for two accident scenarios: (1) a worst-case scenario in which 100% of the battery cells are damaged and (2) a case in which 50% of the battery cells are damaged for a single HAP, hydrogen cyanide (HCN). Exhibit 4. Impacts would be much greater if impacts from all HAPs were included or if HF alone were evaluated. We evaluated the Immediately Dangerous to Life and Health (IDLH) standard for HCN (50 ppm). This is the concentration of HCN that "may be fatal after 0.5 to 1 hour exposure or dangerous to life…" HCN is readily absorbed into the body from the lungs. Symptoms of poisoning begin within seconds to minutes. HCN is highly toxic by all routes of exposure and may cause abrupt onset of profound central nervous system, cardiovascular, and respiratory effects, leading to death within minutes. Exposure to lower concentrations produces eye irritation, headache, confusion, nausea, and vomiting followed in some cases by coma and death. Cellular asphyxia binds to mitochondrial cytochrome oxidase, preventing the use of oxygen in cellular metabolism.

We evaluated three atmospheric conditions for each release scenario: (1) stable atmosphere with light winds (F stability, 1.5 m/sec wind speed); (2) neutral atmosphere (C stability, 2.5 m/sec wind speed); and (3) stable atmosphere (F stability, 1 m/sec wind speed). We estimated the concentration of HCN as a function of distance from the BESS and compared the results to the HCN IDLH (50 ppm) using the SLAB accidental release model. We used laboratory chemical composition data for similar lithium-ion batteries reported in the IS/MND for another similar BESS. The results are summarized in Table 4.

Table 4: Summary of Hazard Analysis

Scenario	Amount of HCN Released (lbs)	Wind Speed	Stability	Distance to IDLH (feet)	Shown in Figure
1 (100%)	593	1.5	F	1,000	5
1 (100%)	593	2.5	C	248	
1(100%)	593	1.0	F	1,195	6
2(50%	296	1.5	F	584	
2(50%)	296	2.5	C	154	
2(50%)	296	1.0	F	720	7

This table shows that mortality and other serious health impacts would occur for all cases. The BAE Systems facility is 15 feet away. Offices are located 85 feet to the east and 130 feet to the north. The

nearest residence is 900 feet to the north. Acute health impacts due to HCN, which occur at much lower concentrations than mortality, would occur throughout the surrounding area.

Response A.53: See Responses A.4, A.5, A.18 and A.19.

Comment A.54: Under this scenario, 593 lb of HCN would be released. The result for meteorological condition 1 is shown in Figure 5 and for condition 3 in Figure 6. The area where the HCN IDLH would be exceeded is shown in red. Mortality would occur for many people within this red area, including workers, other on-site personnel, and motorists on nearby roads and Highways 82, 85, and 101. Meteorological condition 3 indicates that the HCN IDLH would extend into the residential neighborhood north of Highways 82, 85, and 101. The results in these figures are presented relative to the center of the BESS. However, a fire would likely encompass the entire BESS. If the results were presented relative to the edge of the BESS, mortality would reach the residential area north of the freeway for both meteorological conditions 1 and 3 and into commercial areas for meteorological condition 2. See Table 4 for a summary of the significant impact distances associated with each meteorological condition.

Figure 5: HCN Scenario 1: 100% of Cells Release HCN Under Meteorological Condition 1

Figure 6: HCN Scenario 1: 100% of Cells Release HCN Under Meteorological Condition 3

50% Scenario (50% of Cells Damaged): Under this scenario, 293 lb of HCN would be released. The result for meteorological condition 3 is shown in Figure 7. This figure shows that mortality would only occur at nearby commercial properties. However, acute health impacts would occur over a much larger area as show in Figures 3 and 4. The area where the HCN IDLH would be exceeded is shown in red. Mortality would occur for most people within this red area, including workers, other on-site personnel, and motorists on nearby roads and freeways. Mortality would also likely extend into the residential area north of the freeway if measured from the edge of the BESS.

Figure 7: HCN Scenario 2: 50% of Cells Release HCN Under Meteorological Condition 3

Battery Handling and Transportation Accidents Were Not Evaluated: CEQA Guidelines Section 15126.2(d) requires a discussion of any significant irreversible environmental change that would be caused by a project. A project would result in significant irreversible changes if it involves uses in which irreversible damage could result from any potential environmental accidents associated with the project.

The MSDS indicates that the batteries will be manufactured in China. In this case, they would likely be shipped to California on a marine vessel that may dock at Oakland or San Francisco and be transported to the site by truck or rail over undisclosed routes and roadways. Alternatively, the Dudek memorandum indicates that Powin Energy is the battery manufacturer with operations near Portland, Oregon. In this case, the batteries could be transported by either ship, rail, or truck to the Project site. Regardless of the battery source, the route they would likely take to the site passes through densely populated areas in the San Francisco Bay Area. Accidents during handling and transportation could result in injuries to and deaths of workers, motorists, and residents. The IS/MND is silent on how the batteries would be transported to the site and the risks this transportation poses to adjacent populations and facilities.

Lithium-ion batteries are sensitive to damage, especially during handling and transport. They are also sensitive to high ambient temperatures, which occur in the South Bay Area. It is well known that battery accidents occur during handling, loading, and unloading in warehouses and during transportation. The IS/MND fails to discuss the risk of accidents during battery storage, handling, and transportation to the site and thus fails as an informational document under CEQA.

Response A.54: See Responses A.4, A.5, A.18 and A.19.

Comment A.55: Western Pond Turtle - The western pond turtle is a California Species of Special Concern that is known to occur in the Project area. According to the IS/MND:

Western pond turtles occurring along Coyote Creek may nest in adjacent grasslands and riparian habitats in the project area or disperse across these areas. Project activities may disturb upland habitat used for nesting. Individual turtles or their eggs that are present in the work areas may be harmed or killed due to crushing by construction personnel or equipment, or as a result of desiccation or burying (e.g., during grading). Although western pond turtles are widespread in the region, the species is not particularly abundant, and the loss of individuals could reduce the viability of a population to the extent that it would be extirpated. As discussed previously, the project would comply with Habitat Plan Conditions 3, 7, and 11 for impact avoidance and minimization. With implementation of these conditions, impacts to western pond turtles during project construction would be reduced to a less than significant level.

The City's conclusion that impacts to western pond turtles would be reduced to a less than significant level is not justified because Habitat Plan Conditions 3, 7, and 11 do not include measures to prevent turtles (or their nests) from being harmed or killed by construction personnel and equipment:

1. Habitat Plan Condition 3 is limited to measures designed to maintain hydrology and protect water quality.
2. Habitat Plan Condition 7 contains a list of design and construction requirements, none of which would prevent turtles from being harmed or killed by construction personnel and equipment.
3. Habitat Plan Condition 11 prohibits project activities within the stream setback zone. Western pond turtles use terrestrial habitat for refuge, nesting, and resting. Rathbun et al. (2002) reported mean maximum distances of 49.7 meters, 93.7 meters, and 12.0 meters from the nearest water for these three types of terrestrial habitat use, respectively. However, pond turtles may use habitat as far as 500 meters (1,640 feet) from a watercourse. Therefore adherence to Habitat Plan Condition 11 does not prevent impacts to turtles that occur outside of the stream setback zone. Furthermore, the Project involves construction activities within the stream setback zone, thus nullifying the ability of Habitat Plan Condition 11 to prevent impacts to turtles that occur within that zone.

Preventing significant impacts to pond turtles during construction of the Project requires: (a) pre-construction surveys for turtles and turtle nests in the work area; (b) translocation of any turtles that occur in the work area; (c) buffers around any turtle nests that are discovered in the work area; and (d) installation of exclusion fencing to prevent turtles from entering the work area after it has been cleared of turtles. Because the IS/MND does not incorporate these measures as required mitigation, potentially significant impacts on the western pond turtle remain unmitigated.

Response A.55: See Response A.20 above.

Comment A.56: Golden Eagle - The eBird database has numerous records of golden eagles occurring near the Project site. These include records of a golden eagle soaring over Coyote Creek, and of a pair of golden eagles soaring over the Metcalf Energy Center. Nevertheless, the Biological Resources Report ("BRR") concludes that the golden eagle is absent from the Project site because: (a) "[n]o suitable nesting habitat for golden eagles is present along the project alignment," and (b) "[n]o suitable foraging habitat for golden eagles is present in the limited areas of grassland habitat along the project alignment."

The BRR's statement that there is no suitable nesting habitat for golden eagles is inconsistent with evidence. As the BRR acknowledges, golden eagles nest on cliffs, large trees, and occasionally electrical transmission towers. Large trees and electrical transmission towers are present in or near the Project area (figures 1 and 2).The BRR's conclusion that there is no suitable foraging habitat for golden eagles is inconsistent with its statement that: "[t]his species occurs along Coyote Creek in the vicinity of the Metcalf Pond/Parkway Lakes complex and the PG&E Metcalf Substation as an occasional forager." Furthermore, golden eagle prey items are known to occur in the grassland habitat along the Project alignment. These include the striped skunk, raccoon, black-tailed jackrabbit, Virginia opossum, feral cat, and various rodent species.

Response A.56: See Response A.26.

Comment A.57: Collisions and Electrocutions: Overhead power lines are a major source of bird mortality. Loss et al. (2014) estimated that between 12 and 64 million birds are killed each year at U.S. power lines, with between 8 and 57 million birds killed by collision and between 0.9 and 11.6 million birds killed by electrocution. Some of this mortality is preventable through implementation of bird-friendly design strategies, such as those recommended by the Avian Power Line Interaction Committee ("APLIC").

The Project includes the installation of new transmission lines that would span Coyote Creek. Coyote Creek provides habitat for numerous bird species, many of which make north-south movements along the creek corridor at elevations that make them susceptible to collisions with the proposed transmission lines. In addition to the species that use the creek corridor, golden eagles and other raptors are known to forage in the grasslands that occur in and around the Project site. Electrocution from, and collision with, transmission lines is one of the leading causes of golden eagle mortality. The golden eagle population is extremely sensitive to additive mortality because: (a) golden eagles occur at very low densities, (b) a relatively high percentage of juveniles do not survive to breeding age (typically the 4th or 5th year of life), and (c) the population is already declining. As a result, take of even one golden eagle due to the Project would constitute a significant impact under CEQA (i.e., because it would hasten decline of the species). In addition, any Project-related take of a golden eagle would violate the Bald and Golden Eagle Protection Act if the Applicant does not first obtain an eagle take permit from the U.S. Fish and Wildlife Service.

The IS/MND contains no analysis of the potential for the Project's transmission lines to electrocute golden eagles or other birds. In addition, although the IS/MND acknowledges that birds (in general) may collide with the transmission lines, its analysis of the issue is limited to the following statements:

> Existing transmission lines extend across Coyote Creek approximately 780 feet north of the proposed project alignment creek crossing to connect with the PG&E Metcalf Substation. These lines vary in height from approximately 60 to 120 feet as they cross Coyote Creek, and birds moving along Coyote Creek likely collide with these lines periodically. Given that the proposed project transmission lines would be installed at a similar height to these existing lines (up to approximately 120 feet, given anticipated sag of lines attached to 130-foot poles) and relatively close to the existing lines crossing the creek, the construction of the new lines would not be expected to substantially increase bird collisions along Coyote Creek compared to existing conditions. As a result, the potential impacts of the proposed overhead transmission line due to bird strikes would be less than significant.

The IS/MND's rationale is illogical. If existing conditions are a set of transmission lines that cross Coyote Creek, and those transmission lines pose a threat to birds, then installing another set of transmission lines across Coyote Creek would increase the threat by approximately double.

Installing the Project's transmission lines at a similar height to the existing lines does not alleviate the threat. In fact, it may heighten the threat because birds in flight would need to ascend (or descend) to avoid the first set of lines, then quickly have to repeat this maneuver 780 feet later to avoid the second set of lines. APLIC categorizes this as a "risk situation." The APLIC guidelines describe ways to reduce avian collisions and electrocutions through studies (e.g., geospatial analysis), line placement (e.g., clustering lines), and design strategies (e.g., spacing between phases conductors). The IS/MND does not require the Applicant to implement the collision and electrocution strategies outlined in the APLIC guidelines. As a result, Project impacts on birds due to collisions and electrocutions remain potentially significant.

Response A.57: See Response A.22.

Responses to Comments in Exhibit B

Comment A.58: The western pond turtle is a California Species of Special Concern that is known to occur in the Project area. According to the IS/MND: Western pond turtles occurring along Coyote Creek may nest in adjacent grasslands and riparian habitats in the project area or disperse across these areas. Project activities may disturb upland habitat used for nesting. Individual turtles or their eggs that are present in the work areas may be harmed or killed due to crushing by construction personnel or equipment, or as a result of desiccation or burying (e.g., during grading). Although western pond turtles are widespread in the region, the species is not particularly abundant, and the loss of individuals could reduce the viability of a population to the extent that it would be extirpated. As discussed previously, the project would comply with Habitat Plan Conditions 3, 7, and 11 for impact avoidance and minimization. With implementation of these conditions, impacts to western pond turtles during project construction would be reduced to a less than significant level.

The City's conclusion that impacts to western pond turtles would be reduced to a less than significant level is not justified because Habitat Plan Conditions 3, 7, and 11 do not include measures to prevent turtles (or their nests) from being harmed or killed by construction personnel and equipment:

1. Habitat Plan Condition 3 is limited to measures designed to maintain hydrology and protect water quality.
2. Habitat Plan Condition 7 contains a list of design and construction requirements, none of which would prevent turtles from being harmed or killed by construction personnel and equipment.
3. Habitat Plan Condition 11 prohibits project activities within the stream setback zone. Western pond turtles use terrestrial habitat for refuge, nesting, and resting. Rathbun et al. (2002) reported mean maximum distances of 49.7 meters, 93.7 meters, and 12.0 meters from the nearest water for these three types of terrestrial habitat use, respectively.3 However, pond turtles may use habitat as far as 500 meters (1,640 feet) from a watercourse.4 Therefore adherence to Habitat Plan Condition 11 does not prevent impacts to turtles that occur outside of the stream setback zone. Furthermore, the Project

involves construction activities within the stream setback zone, thus nullifying the ability of Habitat Plan Condition 11 to prevent impacts to turtles that occur within that zone.

Preventing significant impacts to pond turtles during construction of the Project requires: (a) pre-construction surveys for turtles and turtle nests in the work area; (b) translocation of any turtles that occur in the work area; (c) buffers around any turtle nests that are discovered in the work area; and (d) installation of exclusion fencing to prevent turtles from entering the work area after it has been cleared of turtles. Because the IS/MND does not incorporate these measures as required mitigation, potentially significant impacts on the western pond turtle remain unmitigated.

Response A.58: See Response A.20.

Comment A.59: Golden Eagle: The eBird database has numerous records of golden eagles occurring near the Project site. These include records of a golden eagle soaring over Coyote Creek, and of a pair of golden eagles soaring over the Metcalf Energy Center.5 Nevertheless, the Biological Resources Report ("BRR") concludes that the golden eagle is absent from the Project site because: (a) "[n]o suitable nesting habitat for golden eagles is present along the project alignment," and (b) "[n]o suitable foraging habitat for golden eagles is present in the limited areas of grassland habitat along the project alignment." The BRR's statement that there is no suitable nesting habitat for golden eagles is inconsistent with evidence. As the BRR acknowledges, golden eagles nest on cliffs, large trees, and occasionally electrical transmission towers.7 Large trees and electrical transmission towers are present in or near the Project area (figures 1 and 2).

The BRR's conclusion that there is no suitable foraging habitat for golden eagles is inconsistent with its statement that: "[t]his species occurs along Coyote Creek in the vicinity of the Metcalf Pond/Parkway Lakes complex and the PG&E Metcalf Substation as an occasional forager." Furthermore, golden eagle prey items are known to occur in the grassland habitat along the Project alignment. These include the striped skunk, raccoon, black-tailed jackrabbit, Virginia opossum, feral cat, and various rodent species.

Response A.59: See Response A.261.

Comment A.60: Avian Collisions and Electrocutions: Overhead power lines are a major source of bird mortality. Loss et al. (2014) estimated that between 12 and 64 million birds are killed each year at U.S. power lines, with between 8 and 57 million birds killed by collision and between 0.9 and 11.6 million birds killed by electrocution. Some of this mortality is preventable through implementation of bird-friendly design strategies, such as those recommended by the Avian Power Line Interaction Committee ("APLIC").

The Project includes the installation of new transmission lines that would span Coyote Creek. Coyote Creek provides habitat for numerous bird species, many of which make north-south movements along the creek corridor at elevations that make them susceptible to collisions with the proposed transmission lines. In addition to the species that use the creek corridor, golden eagles and other

raptors are known to forage in the grasslands that occur in and around the Project site.

Electrocution from, and collision with, transmission lines is one of the leading causes of golden eagle mortality. The golden eagle population is extremely sensitive to additive mortality because: (a) golden eagles occur at very low densities, (b) a relatively high percentage of juveniles do not survive to breeding age (typically the 4th or 5th year of life), and (c) the population is already declining.18 As a result, take of even one golden eagle due to the Project would constitute a significant impact under CEQA (i.e., because it would hasten decline of the species). In addition, any Project-related take of a golden eagle would violate the Bald and Golden Eagle Protection Act if the Applicant does not first obtain an eagle take permit from the U.S. Fish and Wildlife Service.

The IS/MND contains no analysis of the potential for the Project's transmission lines to electrocute golden eagles or other birds. In addition, although the IS/MND acknowledges that birds (in general) may collide with the transmission lines, its analysis of the issue is limited to the following statements: Existing transmission lines extend across Coyote Creek approximately 780 feet north of the proposed project alignment creek crossing to connect with the PG&E Metcalf Substation. These lines vary in height from approximately 60 to 120 feet as they cross Coyote Creek, and birds moving along Coyote Creek likely collide with these lines periodically. Given that the proposed project transmission lines would be installed at a similar height to these existing lines (up to approximately 120 feet, given anticipated sag of lines attached to 130-foot poles) and relatively close to the existing lines crossing the creek, the construction of the new lines would not be expected to substantially increase bird collisions along Coyote Creek compared to existing conditions. As a result, the potential impacts of the proposed overhead transmission line due to bird strikes would be less than significant.

The IS/MND's rationale is illogical. If existing conditions are a set of transmission lines that cross Coyote Creek, and those transmission lines pose a threat to birds, then installing another set of transmission lines across Coyote Creek would increase the threat by approximately double. Installing the Project's transmission lines at a similar height to the existing lines does not alleviate the threat. In fact, it may heighten the threat because birds in flight would need to ascend (or descend) to avoid the first set of lines, then quickly have to repeat this maneuver 780 feet later to avoid the second set of lines. APLIC categorizes this as a "risk situation."

The APLIC guidelines describe ways to reduce avian collisions and electrocutions through studies (e.g., geospatial analysis), line placement (e.g., clustering lines), and design strategies (e.g., spacing between phases conductors). The IS/MND does not require the Applicant to implement the collision and electrocution strategies outlined in the APLIC guidelines. As a result, Project impacts on birds due to collisions and electrocutions remain potentially significant.

Response A.60: See Response A.7.

Responses to Comments in Exhibit C – Hummingbird Energy Storage Project, Review and Comment on CEQA Initial Study Noise Analysis April 6, 2020

Derek L. Watry, Wilson Ihrig

Comment A.61: Calculation results in Table 8 of the Noise Study indicates that noise levels associated with the construction of the underground transmission line along Monterey Road will be 84 to 97 dBA Leq at the nearest residences (East Res.) located 20 ft from the transmission line alignment. [NS at p. 18] The Noise Study states that existing daytime noise levels in the area "typically ranged from 63 to 70 dBA Leq at # feet from the centerline of Monterey Road." [NS at p. 11] 1 Although the distance measurement for the ambient level range is missing and the exact location of the measurement is unknown, the information in Table 8 indicates that average construction noise at the nearest residence will be 14 to 27 dBA above the upper end of the ambient range, and 17 to 30 dBA above the middle of the range. The Noise Study states, "Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities." [NS at p. 2] Using this commonly-held relationship, the average construction noise levels at residences along Monterey Road will be 3 to 8 times louder than the existing average ambient. That is a substantial temporary increase.

In the section Effects of Noise: Sleep and Speech Interference, the Noise Study asserts that the outdoor threshold for speech interference from a fluctuating noise source is about 60 dBA. Given that the calculated levels are 24 to 37 dBA higher than this indicates that speech in the backyards of nearby residences will be difficult, if not impossible, during construction. The Noise Study states as its threshold of significance for construction noise: Hourly average noise levels during construction that would exceed 60 dBA Leq at residential land uses or exceed 70 dBA Leq at commercial land uses and exceed the ambient noise environment by at least 5 dBA Leq for a period of more than one year would constitute a significant temporary noise increase in the project vicinity. [NS at p. 11]

Response A.61: See Response A.25.

Comment A.62: When assessing construction noise at the overhead construction at Coyote Creek, the Initial Study also cites the General Plan noise threshold of 60 dBA for residences. With respect to assessing the noise from construction of the underground transmission line, the Initial Study states: While construction levels during the proposed project would at times exceed the exterior noise thresholds in the City's General Plan during transmission line and substation construction, the construction noise nuisance resulting from construction activities would be short-term. Further, during the underground work, construction activities would move along the transmission line corridor as work is completed; therefore, residences and commercial uses located along the corridor would only be exposed to limited periods of elevated construction noise levels when activities would occur in close proximity to the land uses. In addition, the temporary noise impact due to project

construction would be minimized with the incorporation of the following Standard Permit Conditions. [IS at pp. 111-112.]

The data in the Initial Study (provided by the Noise Study) clearly indicates that construction noise levels at residences along Monterey Road will substantially exceed the existing ambient, the General Plan noise thresholds, and the outdoor speech interference threshold. The Standard Permit Conditions would do little, if anything to actually reduce the construction noise levels [IS at p. 112]:

- Construct a solid plywood fence – This is not practical for construction along Monterey Road.
- Use mufflers – Contemporary construction equipment comes with mufflers from the factory. While requiring mufflers is a good idea, no noise reduction should be claimed for this. The Roadway Construction Noise Model already accounts for mufflers because it primarily uses reference data from a large project built from the 1990s to 2007. So, this condition serves to ensure that the RCNM-calculated noise levels are achieved. Any claim that mufflers would mitigate construction noise impacts would result from improper double counting of the noise reduction they provide.
- Prohibit unnecessary idling – Another good practice, but this will not reduce the calculated noise levels.
- Locate stationary equipment as far as possible from sensitive receptors – Given the linearity of the transmission line and the small space between that line and the residential property lines, this will likely not result in lower noise levels.
- Utilize "quiet" compressors and other such equipment – This is a good idea, but compressors are not listed in the equipment used for the noise calculations, so using these – if they are even necessary – would increase the noise levels, if anything. [NS at p. 16]

Therefore, the sole remaining basis for determining that construction noise will not result in a substantial temporary noise increase is that the duration, "two months or less", is insufficient to be considered significant.

Response A.62: See Response A.26.

The Initial Study relies on Environmental Considerations Policy EC-1.7 of the City of San José's General Plan, the full text of which is: Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would: Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses. [General Plan at Chapter 3, p. 41]

EC 1.7 is rightfully interpreted to indicate that any heavy construction that lasts more than one year is a priori significant, but that does not preclude shorter durations from also being significant if the noise levels otherwise warrant. EC 1.7 does not say that noise impacts from short-term construction under 12 months are necessarily insignificant.

The City of Oakland, another major San Francisco Bay Area city, establishes maximum allowable construction noise levels utilizing two timeframes: less than 10 days and 10 or more days. This framework recognizes a reasonable time period for "short-term" versus "long-term": 10 days. It's one thing to ask people to tolerate construction for 10 days; it's something else to ask them to tolerate it for up to two months.

Because the Initial Study indicates that construction of the underground transmission line along Monterey Road will cause noise levels that substantially exceed the existing ambient and local standards and result in difficult outdoor speech for a period up to two months, the construction noise should be deemed a significant and unavoidable impact.

Response A.62: See Response A.27 and A.28.

Comment A.63: HVAC noise analysis was done using reference levels from an EIR completed for a "similar facility located in Los Angeles, California." [NS at p. 21] The referenced EIR is not cited, nor is any basis provided that would allow for a comparison of the Los Angeles project to the Hummingbird Energy Storage Project (e.g., required tons of cooling, size of facility, etc.). In addition, no specifics are provided regarding the size or type of HVAC equipment used the previous EIR analysis. The lack of detail makes it impossible to determine if the noise levels used for the HVAC analysis are reasonable.

Response A.63: See Response A.26 through A.28.

SECTION 5 PUBLIC COMMENTS ATTACHMENTS

Attachment A

STATE OF CALIFORNIA EDMUND G. BROWN JR., *Governor*

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

November 27, 2018

Advice Letter 5322-E

Erik Jacobson
Director, Regulatory Relations
Pacific Gas and Electric Company
77 Beale Street, Mail Code B10C
P.O. Box 770000
San Francisco, CA 94177

SUBJECT: Energy Storage Contracts Resulting From PG&E's Local Sub-Area Request for Offers Per Resolution E-4909

Dear Mr. Jacobson:

Advice Letter 5322-E is effective as of November 8, 2018 per Resolution E-4949 Ordering Paragraphs.

Sincerely,

Edward Randolph
Director, Energy Division

Pacific Gas and Electric Company

Erik Jacobson
Director
Regulatory Relations

Pacific Gas and Electric Company
77 Beale St., Mail Code B13U
P.O. Box 770000
San Francisco, CA 94177

Fax: 415-973-3582

June 29, 2018

Advice 5322-E
(Pacific Gas and Electric Company ID U 39 E)

Public Utilities Commission of the State of California

Subject: **Energy Storage Contracts Resulting from PG&E's Local Sub-Area Request for Offers Per Resolution E-4909**

I. Purpose

Pursuant to Resolution E-4909 (Resolution), Pacific Gas and Electric Company (PG&E) hereby submits this Advice Letter to seek approval from the California Public Utilities Commission (Commission or CPUC) of four energy storage projects resulting from PG&E's Local Sub-Area Energy Storage Request for Offers (LSA ES RFO):

Counterparty (Project Name)	Storage Technology	On-Line Date	Term (Years)	Discharge Duration (Hours)	Size (MW)	Local Sub-Area
Dynegy Marketing and Trade, LLC (Vistra Moss Landing Energy Storage)	Lithium Ion Batteries	12/01/2020	20	4	300	South Bay – Moss Landing
Hummingbird Energy Storage, LLC (Hummingbird Energy Storage)	Lithium Ion Batteries	12/01/2020	15	4	75	South Bay – Moss Landing
Micronoc Inc. (mNOC AERS Energy Storage)	Lithium Ion Batteries	10/01/2019	10	4	10	South Bay – Moss Landing
Tesla Inc (Moss Landing Energy Storage)[1]	Lithium Ion Batteries	12/31/2020	20	4	182.5	South Bay – Moss Landing

[1] As described more fully below, this is proposed to be a utility-owned project.

II. Background

On March 15, 2017, the California Independent System Operator (CAISO) Board of Governors approved a Reliability Must Run (RMR) designation for Yuba City Energy Center (Yuba City) in the Pease sub-area and Feather River Energy Center (Feather River) in the Bogue sub-area.[2] On November 2, 2017, the CAISO Board of Governors approved a RMR designation for Metcalf Energy Center (Metcalf) for the Moss Landing sub-area.[3] On November 2, 2017, Calpine filed the three RMR agreements with the Federal Energy Regulatory Commission (FERC).[4]

On January 12, 2018, the Commission issued E-4909, which ordered PG&E to hold one or more competitive solicitations for energy storage and/or preferred resources to address the South Bay – Moss Landing and Pease local sub-area capacity deficiencies and to manage voltage issues in the Bogue sub-area.[5] Furthermore, E-4909 outlined requirements for the solicitation, including evaluation criteria and other considerations that should be applied in the selection of projects from the solicitation.

On February 28, 2018, in compliance with the timeline established by E-4909, PG&E issued its LSA ES RFO. PG&E now submits this Tier 3 Advice Letter seeking approval of four cost-effective energy storage contracts resulting from this RFO to address local capacity deficiencies in the South Bay - Moss Landing local sub-area.

III. Introduction

The Resolution provided that:

1. PG&E should hold a solicitation at its earliest opportunity, but should PG&E not commence the solicitation within 90 days of its effective date, PG&E must notify the Commission's Executive Director in writing with justification.[6]

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[2] CAISO Board of Governors Memo, Decision on reliability must-run designations for the Yuba City Energy Center and the Feather River Energy Center, [https://www.caiso.com/Documents/Decision-RequestforReliabilityMust-RunDesignations-Memo-Mar2017.pdf].

[3] CAISO Board of Governors Memo, Decision on reliability must-run designation for Metcalf Energy Center, [http://www.caiso.com/Documents/Decision_ReliabilityMust-RunDesignation_MetcalfEnergyCenter-UpdatedMemo-Nov2017.pdf].

[4] Metcalf Energy Center filing at https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20171102-5246. Gilroy Energy Center filing for Yuba City and Feather River at https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20171102-5142

[5] Resolution at 20 (Ordering Paragraph (OP) 1).

[6] *Id.* at 7.

2. For its Solicitation, PG&E was given parameters for the solicitation, which included that it: (a) take into consideration any new or planned transmission solutions;[7] (b) solicit offers for energy storage and/or preferred resources; (c) consider accelerating projects from the 2016 Energy Storage RFO;[8] and (d) if feasible and at a reasonable cost, resources should be online and operational between 2019 and 2022.[9] All resources procured in the solicitation must be located within the relevant local sub-area(s) and be interconnected at locations that will mitigate local capacity and voltage issues raised in the Resolution.[10]

3. PG&E must coordinate with the CAISO to evaluate the portfolio of resources procured, including consideration of any new or planned transmission solutions, and indicate whether the CAISO agrees they address the deficiencies identified.[11]

4. Resolution E-4909 also addresses several other discrete areas including: (a) that PG&E ensure sellers operate their electrical facilities in accordance with prudent electrical practices;[12] (b) cost recovery, including authorizing PG&E to request recovery for resources procured pursuant to this Resolution through its Cost Allocation Mechanism (CAM);[13] and (c) resources procured pursuant to the Resolution may count toward PG&E's overall storage mandate obligation if the procured resources meet existing eligibility requirements.[14]

IV. <u>Overview of Local Sub-Area Request for Offers (RFO)</u>

PG&E developed and conducted the Local Sub-Area Request for Offers (LSA ES RFO) in accordance with the requirements of the Resolution. PG&E describes the RFO process below and provides additional detail about its Evaluation Methodology in Appendix L.

A. RFO Structure

PG&E issued its LSA ES RFO on February 28, 2018 to solicit offers for energy storage, to address the deficiencies in the affected local sub-areas: Pease; Bogue; and South Bay - Moss Landing. Considering the requirement to launch an RFO within 90-days of the final resolution, PG&E chose to seek only energy storage projects, leveraging its recent 2016 Energy Storage Solicitation as a template.

In its LSA ES RFO materials, PG&E provided detailed guidance on project requirements to prospective participants. The RFO required online dates of 2018, 2019 or 2020 and

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[7] *Id.* at 20 (OP 4).
[8] *Id.* at 20 (OP 11).
[9] *Id.* at 20 (OP 5).
[10] *Id.* (OP 6).
[11] *Id.* (OP 9).
[12] *Id.* at 19 (Finding 14).
[13] *Id.* at 20 (OP 15).
[14] *Id.* at 19 (Finding 12).

called for offers for both third-party and utility-owned resources. Offers for third party-owned projects had a minimum size requirement of 1 MW and had to interconnect to one of the feeders or substations associated with the three local sub-areas. Participants had to demonstrate site control, except for the utility ownership project at Moss Landing (on PG&E-owned land) and the Behind-the-Retail Meter (BTM) projects. Offers had to meet the applicable CPUC requirements for duration and CAISO requirements for deliverability, as well as any other requirements that will enable PG&E to receive all the Resource Adequacy (RA) benefits associated with the project.

Participants that submitted offers for the third-party owned projects could seek to execute an Energy Storage Resource Adequacy Agreement (ESRAA) or a Behind-the-Retail Meter Capacity Storage Agreement (BTM CSA). Participants could also submit offers in the three local sub-areas for projects using a Build-Own-Transfer (BOT) Agreement which would be utility-owned projects. BOT projects would be constructed on a third-party owned site, and then PG&E would take ownership at construction completion. Finally, participants could submit offers to construct storage projects at the Moss Landing substation, to be owned and operated by PG&E, using the Turnkey Engineering, Procurement and Construction (EPC) Agreement.

B. Participant Outreach

PG&E announced the issuance of the LSA ES RFO by email notification and provided three e-mail update notifications to PG&E's mailing list, which included approximately 2,700 recipients. The issuance email gave potential participants information on the location of solicitation documents, participant webinar information, and important action items.

LSA ES RFO documents were finalized for release on February 28, 2018 and remain available on the PG&E website.[15] The documents include the LSA ES RFO solicitation protocol which includes information, requirements, and directions to submit a conforming offer. In addition to the LSA ES RFO dedicated website, PG&E set up a LSA ES RFO mailbox (LocalSubAreaRFO@pge.com) for participants and other interested parties to submit questions. PG&E received over 100 questions, and posted the questions and corresponding answers that might be useful to all participants in a frequently asked questions (FAQ) document on the website.

On February 28, 2018, PG&E also held a site visit for participants who had expressed an interest in providing EPC services as part of the utility-owned Moss Landing project. Two 90-minute sessions were held, providing over 30 participants with an opportunity to familiarize themselves with the site and to ask questions.

On March 7, 2018, PG&E conducted a participants' conference via webinar to explain the LSA ES RFO solicitation protocol, the offer evaluation methodology, and form

[15] www.pge.com/rfo, Local Sub-Area Energy Storage RFO

agreements as well as answer questions from potential participants. About 100 individuals attended the webinar via phone or WebEx. PG&E posted the presentation, an audio file of the presentation, and the list of attendees to the LSA ES RFO website after the webinar.

PG&E requested offers for the LSA ES RFO by March 28, 2018 and notified participants via e-mail of their status regarding the shortlist on April 18, 2018. Shortlisted participants were notified in their email letter of additional requirements to remain on the shortlist and be eligible for negotiations. PG&E conducted calls with participants who were not shortlisted to provide feedback on their offers.

C. Offers Received

In response to the LSA ES RFO, PG&E received 29 offers totaling 100 variations. Several of the offer variations or offers in their entirety were non-conforming for one or more of the following reasons:

1. Exceeded the maximum number of variations allowed for a specific interconnection point.
2. Online date after the required date set forth in the solicitation protocol.
3. The project did not add capacity to an existing interconnection.
4. Ineligible pricing structures

PG&E provided participants with an opportunity to revise offers that were missing information or required clarification by sending deficiency notices requesting further information by a specified date. Some participants were not able to rectify their non-conforming issues. Where an offer was non-conforming and subsequent modification by the participant did not result in a conforming offer, or where PG&E determined that an offer was in violation of the terms of RFO participation, that offer or variation was considered non-conforming and eliminated from further evaluation.

D. Local Sub-Area RFO Evaluation Protocol and Shortlist

PG&E evaluated offers based on Net Market Value (NMV) and Portfolio Adjusted Value (PAV), which is consistent with the methodology used in PG&E's 2014 and 2016 Energy Storage RFOs. PG&E did not receive a high level of diversity, as seen in previous Energy Storage RFOs. Technology, online date, and term were consistent amongst the offers received. The evaluation methodology used to select shortlisted offers is described in Appendix L.

PG&E shortlisted offers based on a combination of NMV, PAV, and other qualitative factors included in the solicitation protocol to achieve a shortlisted portfolio that could contribute to the Local Capacity Requirement (LCR) need of the Local Sub-Areas identified in the Resolution. The shortlisted projects represented three different

agreement types: ESRAA, BTM CSA, and EPC Agreements, for utility ownership. The shortlisted projects also represented each of the three Local Sub-Areas specified in the Resolution: South Bay – Moss Landing; Pease; and Bogue.

Separately, PG&E also evaluated the projects from its 2016 ES RFO.[16] Of the executed agreements, only the Llagas project is located in a relevant local sub-area (South Bay - Moss Landing). Due to additional costs and potential challenges, PG&E did not elect to propose to accelerate this project. However, this project is currently pending before the Commission and, if approved, will provide an additional 20 MW of capacity in the constrained South Bay – Moss Landing local sub-area.

E. Negotiations with Offers for Third-Party Owned Projects and Offers for Utility-Owned Projects

PG&E implemented a code of conduct within the LSA ES RFO to separate offers for both third-party owned and utility-owned energy storage projects. The purpose of the code of conduct was to ensure that offers leading to utility ownership of storage facilities were not favored over third-party owned projects. PG&E employees and consultants working on RFO offers associated with utility-owned energy storage projects were “walled off” from PG&E employees working on RFO offers associated with third-party owned energy storage projects to ensure that those evaluating the utility-owned project offers could not acquire sensitive RFO information that other, non-utility developers did not have.

The code of conduct outlined the restrictions on information sharing between those PG&E employees working on third-party-owned project evaluations, and those PG&E employees working on utility-ownership project evaluations. PG&E implemented the code of conduct by requiring all employees and contractors supporting the LSA ES RFO to review code of conduct training materials and to sign the Local Sub-Area Energy Storage Request for Offers Confidentiality Protocol and Code of Conduct. PG&E also created separate shared drive locations and SharePoint sites, and restricted physical access of employees and consultants engaged in utility-ownership project review to those floors and spaces where PG&E employees and consultants engaged in third-party-owned project receipt and review.

For the third-party ownership offers, PG&E initiated negotiations with each third-party participant whose offer was on the shortlist to review its offer and receive any updates to the project since the offer was submitted. PG&E also confirmed with participants if they would be able to accept the agreement as-is, noting that the per Solicitation Protocol, PG&E did not intend to entertain substantive modifications to the form. All shortlisted participants were told that some negotiations would not necessarily result in an executed agreement.

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[16] *See* Resolution at 21 (OP 11).

For offers for utility-owned projects, PG&E created a shortlist based on the initial submissions from all interested parties and initiated negotiations with the shortlisted counterparties. Shortlisted counterparties were notified of PG&E's intent to select one counterparty to negotiate with and that there was no guarantee that negotiations would result in an executed contract at the conclusion of the RFO process. Initial negotiations with the shortlisted parties focused on gaining clarifications and updates on key items of their offers. PG&E conducted a second site walk for each shortlisted party (which was incremental to the initial site walk that was held on February 28, 2018 for all interested parties). Each shortlisted party was then requested to submit their best and final offer, addressing all technical, commercial and pricing issues. Based on PG&E's review of the best and final offers, in conjunction with considering other qualitative factors, PG&E selected one entity for final negotiations.

F. CAM/Procurement Review Group

PG&E conducted two detailed meetings with its joint CAM/Procurement Review Group (PRG) throughout the LSA ES RFO process. On February 16, 2018, PG&E distributed the LSA ES RFO materials for review at the February 22, 2018 meeting. This timing was to ensure that PG&E could incorporate any CAM/PRG feedback before issuance of the LSA ES RFO.

On April 12, 2018, PG&E distributed materials for its joint CAM/PRG meeting on April 16, 2018. In this meeting, PG&E reviewed the shortlist with the CAM/PRG. PG&E sent an e-mail to the CAM/PRG on May 24, 2018, which reviewed the list of projects with which it would seek to execute agreements.

G. Independent Evaluator

PG&E engaged an Independent Evaluator (IE) from the Commission's approved list of IEs for the LSA ES RFO. The IE for this solicitation was Merrimack Consulting, with Wayne Oliver as the IE representative. The IE was extensively involved in the review of RFO documentation before the RFO was issued. The IE also participated in all the LSA ES RFO-related joint CAM/PRG meetings.

The IE was actively involved in reviewing and evaluating offers received as well as in shortlist development. The IE also participated in shortlist notification, feedback calls with participants, and contract negotiations. The confidential version of the IE Report is provided in Appendix F1, and the public version of the IE Report is provided in Appendix F2.

V. Selected Energy Storage Projects and Planned Transmission Projects

PG&E is requesting approval of four energy storage projects resulting from PG&E's LSA ES RFO as described below. These projects are all interconnected within the South Bay-Moss Landing sub-area identified in the Resolution. The final executed agreements can

be found in Confidential Appendices A-D and additional contract terms can be found in Confidential Appendices G-I.

Additionally, while not requesting approval in this Advice Letter, PG&E also describes the planned transmission projects that reduce the local area needs. Additional details on these transmission projects are available in Appendix K.

A. Dynegy – Vistra Moss Landing Energy Storage Project

PG&E executed an ESRAA for the Vistra Energy Moss Landing Storage project. The project will be owned by Dynegy Marketing and Trade, LLC (Dynegy). Dynegy is a subsidiary of Vistra Energy Corp. Vistra Energy Corp. merged with Dynegy Inc. in April 2018 and the combined entity manages a portfolio of 41 gigawatts (GW) of installed capacity across 12 states.

The project will be a transmission-connected, stand-alone lithium ion battery energy storage resource located in Moss Landing in Monterey County, addressing resource needs in the South Bay – Moss Landing Sub-Area. The project is a 300 MW, four-hour duration project. The project is going through the CAISO Interconnection process. Appendix G provides additional project and ESRAA detail..

Term	Provision
Counterparty and Project	Dynegy Marketing and Trade, LLC, Vistra Energy Moss Landing Storage
Technology	Lithium Ion Battery
Location	Moss Landing, CA
Sub-Area	South Bay – Moss Landing
Type of Interconnection	Transmission
Term	20 years
Initial Delivery Date	December 1, 2020
Capacity (DMax)	300 megawatt (MW)
Discharge Duration	4 hours

B. esVolta – Hummingbird Energy Storage Project

PG&E executed an ESRAA for the Hummingbird Energy Storage Project. It will be owned by Hummingbird Energy Storage, LLC (Hummingbird), which is a subsidiary of esVolta, LP. esVolta, LP is a newly formed company that has partnered with Powin Energy Corp. and Blue Sky Alternative Investments.

The project will be a transmission-connected, stand-alone lithium ion battery energy storage resource located in Morgan Hill in Santa Clara County, addressing resource needs in the South Bay – Moss Landing sub-area. The project is a 75 MW, four-hour

duration project. The Hummingbird Energy Storage project going through the CAISO Interconnection process. Appendix G provides additional project and ESRAA detail.

Term	Provision
Counterparty and Project	Hummingbird, Hummingbird Energy Storage
Technology	Lithium Ion Battery
Location	Morgan Hill, CA
Sub-Area	South Bay – Moss Landing
Type of Interconnection	Transmission
Term	15 years
Initial Delivery Date	December 1, 2020
Capacity (DMax)	75 MW
Discharge Duration	4 hours

C. Micronoc – mNOC AERS Energy Storage Project

PG&E executed a BTM CSA for the mNOC AERS project. It will be owned by mNOC AERS LLC (mNOC), a subsidiary of Micronoc Inc., a company that develops projects in the distributed energy storage market. Micronoc Inc. has installed 6.12 MW / 8.76 megawatt-hour (MWh) of energy battery storage, primarily in South Korea.

The project will be an aggregation of distribution-connected, BTM resources comprised of lithium ion batteries located at customer sites and electrically interconnected to one of the substations or feeders associated with one of the substations in the South Bay – Moss Landing Sub-Area. The project is a 10 MW, four-hour duration project. The mNOC AERS project will go through the appropriate interconnection process for behind-the-retail meter energy storage resources. Appendix G provides additional project and BTM CSA detail.

Term	Provision
Counterparty and Project	mNOC, mNOC AERS Project
Technology	Lithium Ion battery
Location	Aggregated resources in the South Bay – Moss Landing sub-area
Sub-Area	South Bay – Moss Landing
Type of Interconnection	BTM
Term	10 years
Initial Delivery Date	October 1, 2019
Capacity (DMax)	10 MW
Discharge Duration	4 hours

D. Tesla – Moss Landing Energy Storage Project

PG&E executed an EPC agreement and Long-Term Performance and Maintenance Agreement (LTPMA) for the battery energy storage system (BESS) portion of the Moss Landing Battery Energy Storage Project (Moss Landing Project). Under these agreements, the BESS will be designed, constructed, and maintained by Tesla, Inc. (Tesla) and will be owned and operated by PG&E. Tesla has significant experience with the deployment of utility-scale stationary energy storage facilities, including over 700 MWh of energy storage systems installed globally as of December 2017.

The project will be a 182.5 MW, four-hour lithium ion battery energy storage resource located in Moss Landing in Monterey County, California. The land for the project site is currently owned by PG&E within the footprint of the existing Moss Landing Substation. The project will provide capacity to meet the South Bay – Moss Landing local sub-area capacity requirements. Additionally, the Moss Landing Project will participate in the CAISO markets, providing energy, ancillary services, and other services to the CAISO-controlled grid.

The Moss Landing Project will be comprised of Tesla PowerPacks, a modular, fully integrated, pad-mounted energy storage system. The BESS will be connected to a newly constructed PG&E-furnished medium-voltage (MV) switchgear building. PG&E will be responsible for designing, procuring, and installing the MV switchgear and all required equipment through the high-voltage (HV) interconnection point to the CAISO-controlled grid (including scope identified in the project specific CAISO Phase I interconnection study results for reliability network and local delivery network upgrades). PG&E will be responsible for the CAISO remote intelligent gateway (RIG)/meter, telecommunications, and Supervisory Control and Data Acquisition (SCADA) system for the project. Appendix H provides additional details regarding the Moss Landing Project's EPC and LTPMA.

Term	Provision
Counterparty and Project	Tesla, Moss Landing Project
Technology	Lithium Ion battery
Location	Moss Landing Substation in the South Bay – Moss Landing sub-area
Sub-Area	South Bay – Moss Landing
Type of Interconnection	115 kV Transmission
Term	20 years PG&E will own the facility, seller will construct the BESS and provide a 20-year performance guarantee and associated maintenance services on the BESS.
Guaranteed Substantial Completion Date	12/31/2020
Capacity (DMax)	182.5
Discharge Duration	4

E. South Bay-Moss Landing Transmission Projects

PG&E is implementing several transmission projects in the South Bay Moss Landing sub-area, which, when taken together, would reduce the LCR needs by 568 MW for this sub-area; the projects are expected to be completed by February 2019 and include:

1. Monta Vista-Ames 115 kV Path Closing
2. San Jose 'B'-Trimble 115 kV Line Limiting Facility Upgrade
3. San Jose 'B'-Trimble 115 kV Line Series Reactor
4. Moss Landing-Panoche 230 kV Path Upgrade

The collection of the above transmission projects will together address the LCR needs and issues identified by the Resolution and the CAISO that resulted in backstop procurement by the CAISO. Additional details regarding these projects can be found in Appendix K.

F. Pease Sub-Area Transmission Projects

PG&E is implementing two transmission projects in the Pease sub area, which will increase transmission import capacity to the Pease sub-area beginning December 2020. The two projects are:

1. South of Palermo 115 kV Power Line Reinforcement (South of Palermo)
2. Pease 115/60 kV Transformer Addition

Together, these projects will reinforce 115 kV transmission lines between the Palermo, Pease, Bogue, and Rio Oso 115 kV substations as well as add transformer capacity at Pease Substation. Overall, as PG&E completes the reinforcement of each transmission line section and installs the new Pease substation equipment, the added capacity will help improve service reliability and will address the thermal overloads that have been identified in LCR and reliability studies in this sub-area. Additional details regarding these projects can be found in Appendix K.

G. Bogue Sub-Area Transmission Projects

PG&E is implementing two transmission projects in the Bogue sub area, which will provide voltage support equipment to manage 230 and 115 kV system high or low voltage conditions in the Bogue sub-area starting June 2022 when they become operational. The two projects are:

1. Rio Oso 230/115 kV Transformer Upgrades (Banks 1 and 2)
2. Rio Oso Area 230 kV Voltage Support (SVC)

Once these two projects are operational, PG&E expects that system operators will have sufficient voltage control equipment and flexibility in order to minimize reliance on switching actions and market generation to manage high voltages during light loading conditions. Additional details regarding these projects can be found in Appendix K.

VI. Portfolio to Meet Local Sub-Area Need

The CAISO determines the LCR need in each local area through its local capacity Technical Study process. As discussed below, PG&E's proposed portfolio will help meet these local sub-area needs through both transmission projects—which reduce the LCR need—and energy storage—which contributes to the overall capacity and helps meet the LCR need. Together these solutions address the original deficiency identified by the CAISO and reduce the risk of future backstop procurement in the South Bay – Moss Landing and Pease local sub-areas and the voltage deficiency in the Bogue local sub-area.

A. Local Capacity Requirements (LCR) Process[17]

The CAISO identifies specific areas within the CAISO footprint that have limited import capability—i.e., where local load cannot be wholly supplied by the transmission system—and then determines the minimum generation capacity to maintain reliability in these areas. This minimum generation capacity is referred to as the LCR.

Within the CAISO controlled grid, there are 10 Local Capacity Areas, each with its own LCR; the Local Capacity Areas are then further divided into local sub-areas, also with a corresponding LCR.[18] Of these, the Resolution focused on the Bogue and Pease local sub-areas, which are part of the Sierra Local Capacity Area, and the South Bay-Moss Landing local sub-area, which is part of the Greater Bay Area Local Capacity Area.

Through the annual Local Capacity Technical Study process, the CAISO iterates on the LCR need for each Local Capacity Area and the corresponding sub-areas. The annual assessment, among other things, evaluates factors that would tend to increase LCR need, like load growth, and factors that would tend to reduce the LCR need, like increased transmission capacity.[19]

The Local Capacity Technical Study process also aggregates the resource adequacy (RA) supply plans of load serving entities to identify capacity deficiencies and evaluate the need for any backstop procurement. This was not followed in the case of Yuba, Feather River, and Metcalf because the retirement declarations were received after the 2017 process was completed.

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[17] http://www.caiso.com/informed/Pages/StakeholderProcesses/LocalCapacityRequirementsProcess.aspx

[18] Note that the CAISO distinguishes between a Category B (single element or a generator out followed another single contingency) and Category C (double element) contingency.

[19] Note that transmission capacity projects are identified in the CAISO's Transmission Planning Process.

In Sections VI. B to VI. D, PG&E discusses how it plans to eliminate the original deficiencies that led to an RMR designation and reduce the risk of future backstop procurement. However, through Section 41 of its FERC approved tariff, the CAISO retains the exclusive right at any time to designate a resource as an RMR unit based on its own assessment of what it sees as need for system reliability.

B. South Bay - Moss Landing Local Sub-Area

The 2018 Local Capacity Technical Analysis process—the cycle that directly proceeded an RMR designation for the Metcalf Energy Center—showed that the South Bay-Moss Landing was highly constrained from a capacity perspective. Specifically, that the South Bay-Moss Landing sub-area had an LCR need of 2,221 MWs and 2,408 MWs of available generation.[20]

The declared unavailability of Metcalf, (570 MWs) for CAISO dispatch, based on the CAISO's analysis,[21] created a deficiency and resulted in an RMR designation for that unit in 2018. As described in Section V, E. South Bay-Moss Landing Transmission Projects, the transmission solutions CAISO approved as part of the 2017-2018 TPP[22] for the South Bay-Moss Landing sub-area, combined with the most recent load forecast, resulted in the reduction of the LCR need by 568 MWs for 2019, and thus eliminate the specific deficiency that led the CAISO to an RMR designation for Metcalf. This was also confirmed through PG&E's coordination with the CAISO, as required by the Resolution.[23]

Since the 2018 Local Capacity Technical Analysis, the CAISO has completed the 2019 Local Capacity Technical cycle. This reflects the contribution of the approved transmission projects and a reduced LCR need of 1,653 MWs.[24] Additionally, CAISO analyses for 2023 indicate that this sub-area also shows a forecasted increase in the LCR need to 1,977 MW[25] and, thus, is expected to remain constrained during this period of

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[20] CAISO, 2018 Local Capacity Technical Analysis Final Report (the 2018 LCR Report), South Bay-Moss Landing Sub-area section IV, page 42, [http://www.caiso.com/Documents/Final2018LocalCapacityTechnicalReport.pdf].

[21] CAISO Board of Governors Memo, Decision on reliability must-run designation for Metcalf Energy Center, [http://www.caiso.com/Documents/Decision_ReliabilityMust-RunDesignation_MetcalfEnergyCenter-UpdatedMemo-Nov2017.pdf].

[22] California ISO 2017-2018 Transmission Plan, South Bay-Moss Landing Sub-Area Local Capacity Requirements section, Pages 262 and 263, [http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf].

[23] See Attachment J to this Advice Letter (CAISO Letter to PG&E, May 21, 2018).

[24] CAISO, 2019 Local Capacity Technical Analysis Final Report (the 2019 LCR Report), South Bay-Moss Landing Sub-area section IV, page 42, [http://www.caiso.com/Documents/Final2019LocalCapacityTechnicalReport.pdf].

[25] CAISO, 2023 Local Capacity Technical Analysis Final Report (the 2023 LCR Report), South Bay-Moss Landing Sub-area section IV, page 39, [http://www.caiso.com/Documents/Final2023Long-TermLocalCapacityTechnicalReport.pdf]

time, where the notice of a single generator retirement might necessitate backstop procurement.

Therefore, even with a reduced LCR need, there is continued risk of backstop procurement from the CAISO to meet the LCR need due to contracts with existing generators expiring in future years. PG&E's proposed cost-effective energy storage projects from the LSA RFO would add 567.5 MWs of capacity to this constrained area, thereby helping to mitigate the risk of a deficiency by contributing to the available local capacity.

C. Pease Sub-Area

The 2018 Local Capacity Technical Analysis process that directly preceded an RMR designation for Yuba showed that the Pease sub-area was highly constrained from a capacity perspective. Specifically, the study showed that the Pease sub-area had an LCR need of 101 MW,[26] for the most constraining Category B outage, and a total of 104.7 MW of available generation. This same Category B need was updated to 79 MWs in the 2019 Local Capacity Technical Analysis report.[27] The 2019 LCR studies also identify a 92 MW need for the most constraining Category C outage.

The declared retirement of Yuba, based on the CAISO's analysis, created a deficiency of 42.3 MWs and resulted in an RMR designation for that unit in 2018. As described in Section V F. Pease Sub-Area Transmission Projects and Appendix K, PG&E's previously approved South of Palermo project is expected to eliminate the entire LCR need for the most constraining Category B outage (the original deficiency that led to the RMR designation for Yuba).[28]

PG&E received limited offers in the Pease sub-area and has chosen not to execute agreements for energy storage projects because the transmission solutions would eliminate the LCR need completely by December 2020. Should the LCR need profile change, PG&E would consider re-engagement with the participants who proposed projects in the Pease local sub-area.

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[26] CAISO, 2018 Local Capacity Technical Analysis Final Report (the 2018 LCR Report), [http://www.caiso.com/Documents/Final2018LocalCapacityTechnicalReport.pdf]., Pease Sub-area section, page 32.

[27] CAISO, 2019 Local Capacity Technical Analysis Final Report (the 2019 LCR Report), [http://www.caiso.com/Documents/Final2019LocalCapacityTechnicalReport.pdf]. Pease Sub-area section, page 32.

[28] The remaining Category C need identified in the 2019 studies may be addressed with the previously approved Pease 115/60 kV Transformer Addition project along with a low cost-effective transmission solution such as a Remedial Action Scheme (RAS).

D. Bogue Sub Area

In recent years, the Bogue sub-area has experienced high voltage issues and these are typically managed through real-time operations. The declared retirement of Feather River would have worsened the existing high voltage issues in Bogue and, based on the CAISO's analysis, an RMR designation for Feather River was necessary.

As described in Section V.G. Bogue Sub-Area Transmission Projects, these voltage issues will be addressed by the Rio Oso 230/115 kV Transformer Upgrades (Bank 1 and 2) and the Rio Oso Area 230 kV Voltage Support (SVC) by June 2022.

PG&E has chosen to decline executing agreements with projects located in the Bogue local sub-areas in this submittal because the transmission solutions will eliminate the voltage mitigation need and the proposed projects will be ineffective as a single solution to mitigate the high voltages mostly under light load conditions.

VII. Safety

As with previous PG&E Energy Storage RFOs, the LSA ES RFO included safety as a qualitative criterion. As a condition of remaining on PG&E's shortlist for LSA ES RFO negotiations, participants were required to provide information about their storage technology and the safety history of the participant and/or contractors (if known). Shortlisted participants were also required to complete PG&E's safety registration and prequalification process with ISNetworld, PG&E's primary safety management contractor, as a condition of contract execution. PG&E also required shortlisted participants to submit preliminary site safety plans for the development, construction, and operation of their projects, as applicable.

To reduce, manage, and address the potential safety risks with respect to the proposed energy storage projects, PG&E used enhanced safety provisions similar to those previously included in PG&E's 2016 ES RFO agreements. The enhanced safety provisions require sellers to practice responsible safety management through contractual terms and conditions based on standards of Prudent Electrical Practice, applicable laws and regulations, and requirements of the PG&E's Contractor Safety Program (Safety Requirements).

Under each of the agreements with third parties proposed for approval, each seller is required to provide a project safety plan that demonstrates responsible safety management during all phases of the project lifecycle, including project design, construction, operation, and maintenance. Each project safety plan references the applicable safety-related codes and standards and the seller's current safety programs and policies. It includes a summary of the project design and description of key safety-related systems. The seller must also describe potential hazards and include risk mitigations and safeguards, such as operating procedures, incident response and recovery plans, and personal protective equipment and procedures. In addition, the seller

is required to demonstrate and enforce its contractors' and subcontractors' compliance with the Safety Requirements.

Before execution, PG&E used its Contractor Safety Program prequalification standards to assess safety performance and practices of each seller's organization. As additional project details become available during project development, PG&E will continue to monitor and perform additional safety checks of each seller's project safety plans for consistency with the Safety Requirements. Contract terms provide PG&E with the ability to enforce those requirements or, in certain cases, terminate the contracts in the case of non-compliance.

VIII. Permitting Issues Related to PG&E's Utility-Owned Energy Storage Project

The Moss Landing Energy Storage Project involves construction of electrical facilities by an investor-owned utility (IOU) and is thus governed by Commission General Order (G.O.) 131-D as it relates to permitting. GO 131-D sets forth a tiered permitting regime for electric generation facilities, electric transmission and distribution line facilities, substations, and other electrical facilities, and establishes that local discretionary authority over such projects is preempted. Under G.O. 131-D, a certificate of public convenience and necessity (CPCN) is required for generation facilities over 50 megawatts and, unless the project falls within one of numerous exemptions specified in Section III(A), major transmission line facilities over 200 kilovolts (kV). A permit to construct (PTC) is required for power line facilities between 50 and 200 kV, new substations over 50 kV, or "upgraded" substations, as defined, except for projects covered by one of numerous exemptions specified in Section III(B), which are generally required to provide notice of exempt construction (NOC) and submit an advice letter with the Commission. Substation "modification" projects, defined as work at existing substations that do not increase the existing high-side voltage of the substation or go beyond the existing utility-owned parcel, and distribution line projects below 50 kV do not require a CPCN, PTC, or NOC. No requirements are specified for other electrical facilities, including energy storage facilities. Because G.O. 131-D does not require a CPCN, PTC, or NOC for energy storage projects, Commission approval and associated review by the Commission under the California Environmental Quality Act (CEQA) is not required for construction of the Moss Landing Energy Storage Project.[29]

Nonetheless, energy storage projects, including the Moss Landing Project, remain subject to the Commission's jurisdiction, as G.O. 131-D Section XIV makes clear. That section provides that ". . . local jurisdictions acting pursuant to local authority are preempted from

[29] CEQA is triggered by a discretionary agency approval; if an agency is not issuing a discretionary permit or other approval, there is no CEQA obligation. (Pub. Res. Code, § 21080; *see also* 14 Cal. Code Regs. §§ 15002(i), 15040.) As noted below, the Moss Landing Energy Storage Project requires a discretionary coastal development permit from the County of Monterey, which must comply with CEQA in connection with that approval.

regulating electric power line projects, distribution lines, substations, *or electric facilities* constructed by public utilities subject to the Commission's jurisdiction. However, in locating such projects, the public utilities shall consult with local agencies regarding land use matters."[30] Moreover, if the public utility and local agency cannot resolve their differences, either party may notify the Commission, which must set a hearing within 30 days.[31] Consistent with these authorities, PG&E has consulted and will continue to consult with Monterey County, the local agency that would have land use approval authority over the project but for G.O. 131-D Section XIV. While the County has voiced no objection to the proposed project and its location, it would certainly be free to raise any concerns over land use issues to the Commission via the dispute resolution process specified in G.O. 131-D Section XIV(B).

The fact that the Moss Landing Energy Storage Project is proposed to be located within an existing substation parcel, and includes transformers designed to step up and step down power charged or discharged from the BESS, does not transform this *energy storage* project into a *substation* project for purposes of G.O. 131-D compliance. Rather, the inclusion of dedicated transformers as a necessary interconnection-related component of an energy storage facility is no different than the dedicated switchyards that are routinely constructed as part of new electric generation projects -- and the Commission has never found those *generation* projects, or their transformers and related switchyard components, to be subject to the *substation* project permit requirements under G.O. 131-D Section III(B).[32] Similarly, PG&E believes that the better reading of G.O.131-D is that an IOU's energy storage projects, wherever they are proposed to be sited, are among the unspecified other "electric facilities" referenced in G.O.131-D Section XIV. Treating them as such will help streamline utility-owned energy storage project permitting and development while still ensuring, through G.O.131-D's local consultation requirement and backstop dispute resolution process, that IOU energy storage facilities will be appropriately designed and sited.[33]

In addition to G.O.131-D compliance, achieved in this case through consultation with Monterey County over land use issues, PG&E will conduct an environmental assessment of the proposed project and its setting to determine whether any non-CPUC discretionary or ministerial permits are required. While this assessment is ongoing, PG&E has already

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[30] G.O. 131-D, Section XIV(B) (emphasis added).

[31] *Ibid.*

[32] *See, e.g.,* D.06-11-048 (April 11, 2006) (granting CPCN for PG&E's proposed Humboldt Bay Power Plant Project), D.08-06-012 (June 12, 2008) (granting CPCN for PG&E's proposed Colusa Power Project).

[33] Assuming, *arguendo*, that part or all of the Moss Landing Project were properly considered a substation project subject to Section III(B)'s permitting requirements, it still would not require Commission approval under G.O. 131-D. As noted above, the Project would be located entirely within PG&E's existing utility-owned parcel and would not increase the current high-side voltage of PG&E's existing substation. As such, even if the Project were subject to Section III(B), it would be a "substation modification project" for which no permit or notice is required.

determined that the Moss Landing Energy Storage Project will require a discretionary coastal development permit (CDP). Monterey County implements an approved Coastal Program pursuant to state law, which is not preempted by the CPUC's authority over IOU electric construction projects. Therefore, PG&E must obtain a discretionary CDP from the County, which is subject to CEQA. Monterey County, as the CEQA lead agency, will determine the level of environmental review required in compliance with CEQA. At this time PG&E also expects that the Moss Landing Energy Storage Project will require one or more ministerial permits from local agencies. In all events, PG&E will not construct the project until it or its contractor has obtained all required permits.

IX. Cost Recovery

Ordering Paragraph (OP) 15 of the Resolution authorizes PG&E to request Cost Allocation Mechanism (CAM) treatment for resources procured through the solicitation.[34] As noted in the Resolution, CAM treatment for these resources is justified pursuant to Public Utilities Code Sections[35] 365.1(c)(2)(A) and (B). Section 365.1(c)(2)(A) and (B) note that recovery of procurement costs that address and alleviate local reliability issues and are determined by the Commission to benefit all customers may be recovered from all customers. Section 365.1(c)(2)(C) provides that authorized CAM recovery shall be for the terms of the contracts, and the Commission has applied the same principle to utility-owned resources that are authorized for CAM recovery.[36]

The procurement proposed in this advice letter alleviates local reliability issues in specific sub-areas as described in the Resolution. Resources subject to CAM treatment allocate the net costs and benefits to all benefiting customers in PG&E's service territory, which include direct access and community choice aggregation customers for the duration of the contract.[37] As such, PG&E requests CAM treatment for any contracts resulting from this solicitation.

CAM-eligible resources are recorded and recovered through PG&E's New System Generation Balancing Account (NSGBA)[38] and New System Generation Charge (NSGC).

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[34] CAM was originally approved in D.06-07-029 and implemented in D.07-09-044 to allow LSEs in the IOU's service territory rights to the new generation capacity procured by the IOUs that can be applied toward each LSE's resource adequacy ("RA") requirements. Other modifications to D.06-07-029 were approved in D.07-11-051 and D.11-05-005.

[35] All subsequent references to codified sections are to the California Public Utilities Code, unless otherwise specified.

[36] D.11-05-005 at 16 (finding it reasonable to allow CAM recovery of utility-owned generation for as long as it meets CAM statutory requirements).

[37] D.06-07-029, as modified by D.11-05-005, approved CAM treatment for generation resources for the duration of the underlying contract.

[38] Electric Preliminary Statement Part FS.

PG&E will establish separate subaccounts in the NSGBA for each resource approved through this advice letter.[39]

In addition, consistent with D.15-11-041, which adopted a methodology for placing in-front-of-the-meter storage resources into CAM, the "net capacity cost" for each of the proposed energy storage resources would be determined as the costs resulting from charging each battery during the off-peak period netted against the revenues resulting from discharging that battery during peak periods during same 24-hour period to determine the net revenue received from the resource. Additionally, to the degree that the resources receive ancillary service revenues, net of any associated charges, the AS revenues would also be included in the net revenues. Thus, the actual net revenues received in the CAISO market would then be credited to the NSGBA, offsetting the actual resource costs. The net result of the entries in the NSGBA is that the net capacity cost of the resource is recovered through the NSGC.

The net capacity costs associated with these resources will be forecast as part of PG&E's annual Energy Resource Recovery Account (ERRA) Forecast Proceeding and will be included with other CAM-eligible resources. Similar to other resources recovered through the NSGBA, actual costs and market revenues will be recorded in the NSGBA and the balance will be amortized in rates. The final NSGC will be consolidated with other electric rate changes as part of the Annual Electric True-up (AET) process.

A. Cost Recovery Specific to the Utility-Owned Moss Landing Project

PG&E is requesting approval of the Moss Landing Project, its associated capital and operations and maintenance (O&M) costs, and the resulting revenue requirement. As part of this approval, PG&E is seeking approval of the associated costs for the following Moss Landing Project components: (1) the Turnkey Engineering, Procurement and Construction (EPC) Agreement with Tesla for the construction of the battery energy storage system (BESS); (2) PG&E's costs associated with the medium-voltage (MV) to high-voltage (HV) interconnection and related work; (3) PG&E's costs for permitting, engineering, project management, communications/ metering-related activities, and project-related Allowance for Funds Used During Construction (AFUDC); (4) the 20-year LTPMA with Tesla to cover the BESS maintenance and performance guarantees; and (5) PG&E's ongoing maintenance work to support the LTPMA and ensure effective ongoing operations of the Moss Landing Project, including the MV and HV equipment. Forecasts of these costs and a description of each of these cost categories can be found in Appendix I. The proposed battery storage facility life is 20 years, the same as proposed in the Llagas project in A.17-12-003.

[39] PG&E proposes file a Tier 1 advice letter updating the NSGBA to reflect the new subaccounts for the resources approved through this advice letter.

PG&E proposes that beginning with the 2023 General Rate Case (GRC) cycle[40] the revenue requirement associated with the Moss Landing Project will be forecast as part of the GRC but transferred to the NSGBA for recovery through the NSGC. During the interim period, 2021 - 2022, PG&E proposes that the revenue requirement based on actual costs, up to the cost forecast presented in Appendix I, associated with the project be recorded in the NSGBA through the end of 2022. To the extent the actual capital expenditures and expenses are equal to or less than the approved forecast, PG&E requests it be authorized to recover, without further reasonableness review, the actual costs and associated revenue requirement. If the actual costs are less that the authorized costs, any authorized revenue requirement included in rates will be trued-up by recording the actual revenue requirement in the NSGBA

In the case that actual expenditures for the Moss Landing Project exceed the approved cost forecast, PG&E requests it be authorized to seek recovery of the incremental costs above the approved cost forecast in the GRC or other appropriate proceeding, subject to a reasonableness review of those incremental costs. PG&E proposes to track these incremental costs in a memorandum account so that they may be recovered if approved by the Commission following the reasonableness review.

Recovery of the Moss Landing Project in the NSGC would begin once the resource becomes operational.[41] The forecasted revenue requirements for the years 2021 through 2022 are summarized in the following Section B and would be included as CAM-eligible resources as part of PG&E's annual ERRA Forecast proceeding.

B. Revenue Requirement Specific to the Moss Landing Project

The results of operation model computes the annual revenues that are needed ("revenue requirement" or "RRQ") from customers to recover the cost of the Moss Landing Project. The model calculates the revenue requirement based primarily on a forecast of expense and capital costs. The calculations are based on traditional cost-of-service ratemaking methods, which are consistent with the methods that PG&E uses in its GRC applications, including its most recent 2017 GRC Application 15-09-001.

The model computes the revenue requirement by first converting the expense and capital inputs (capital expenditures) into intermediate values: capital additions, expense, depreciation, taxes and rate base. The model computes the RRQ using the following formula:

$$RRQ = Expense + Depreciation + Taxes + Rate\ of\ return * (Rate\ Base)$$

[40] Although the Moss Landing Project is planned to go on-line on December 31, 2020, the revenue requirements associated with this project will not be included in PG&E's 2020 GRC request, which is expected to be filed September of 2018. PG&E therefore anticipates rolling the project into its 2023 GRC.

[41] Although the expected completion date is December 31, 2020, PG&E is assuming for purposes of cost recovery that the project goes online in 2021.

The final RRQ numbers include a small adjustment to include revenue fees and uncollectibles. Input parameters used for calculating taxes and rate of return are based on the most recent authorized amounts. The rate of return is based on the 2018 Cost of Capital approved in D.17-07-005. The federal income tax rate of 21% was used in accordance with the "Tax Cuts and Jobs Act" enacted on December 22, 2017. Depreciation input parameters are consistent with the 20-year depreciable life and the 5% depreciation rate proposed for the Llagas Project in PG&E's 2016 Energy Storage Solicitation, A.17-12-003. The recorded revenue requirement will utilize updated parameters, as appropriate.

PG&E's forecast of the 2021 and 2022 revenue requirements to support the Moss Landing Project is based on the information presented in this Advice Letter. For the purposes of the revenue requirement calculation, the operative date is assumed to be 1/1/2021. Based on these assumptions, PG&E shows the revenue requirements in the following table.

2021-2022 REVENUE REQUIREMENT FORECAST
(THOUSANDS OF DOLLARS)

Line No.	Project Description	2021	2022	Total
1	Moss Landing Project	$ 41,204	$ 39,044	$ 80,248

X. Compliance with the Resolution

PG&E's LSA RFO and its resulting energy storage solutions meet the requirements and goals set forth in the Resolution as follows:[42]

1. Pacific Gas and Electric Company is authorized to hold one or more competitive solicitation to address two local sub-area capacity deficiencies in the Pease and South Bay-Moss Landing subarea and manage a high voltage in the Bogue subarea.

PG&E issued the Local Sub-Area RFO on February 28, 2018, to address the two local sub-area capacity deficiencies in the Pease and South Bay – Moss Landing sub-areas and the high voltage issue in the Bogue sub-area.

2. If PG&E does not commence the solicitation authorized by this Resolution within 90 days of its effective date, PG&E is required to notify the Commission's Executive Director in writing and include the justification.

[42] Resolution at 20-21 (OP 1-15).

PG&E issued its solicitation on February 28, 2018, less than 90 days from the Resolution's January 12, 2018 date of issuance.

3. PG&E may solicit bids for energy storage and/or preferred resources, either individually or in an aggregation.

PG&E's solicited offers specifically for energy storage in the Local Sub-Area RFO because of the requirement to issue a RFO in less than 90 days from the Resolutions date of issuance. PG&E will continue to engage with stakeholders to see if an additional solicitation is warranted that could include energy storage and preferred resources.

4. PG&E is required to take into account the known cost and on-line dates of any new or planned transmission solutions that reduce or eliminate the need for RMR contracts or their extension, when it selects resources for procurement in this solicitation.

As detailed more fully above and in Appendix K, PG&E has taken into account the planned transmission solutions. It found planned transmission solutions for the South Bay - Moss Landing local sub-area will eliminate the original local capacity area deficiency by the expected completion date of February 2019. Planned transmission solutions for the Pease and Bogue sub areas will reduce the local capacity needs by December 2020 and June 2022, respectively.

Given that additional gas-fired generation in these three local sub-areas are also expected to have difficulty making sufficient market revenue to support profitable operations, there is risk of additional retirements in the future, which would reduce available capacity to meet LCR need. The storage contracts presented in this AL will help mitigate the impacts of future retirements by adding capacity to the respective local sub-area.

5. Resources procured pursuant to this solicitation must be on-line and operational on or before a date sufficient to ensure that one or more of the RMR contracts for the three plants – Metcalf Energy Center, Feather River Energy Center, and Yuba City Energy Center – will not be renewed for any year from 2019 through 2022, if feasible and represent a reasonable cost savings to ratepayers.

PG&E executed contracts for four storage projects, having expected on-line dates of 10/1/19, 12/1/20, 12/1/20 and 12/31/20. Based on PG&E's evaluation methodology the contracts executed in the LSA ES RFO represent a positive market value to PG&E's portfolio.

6. Resources procured pursuant to this solicitation must be located within the relevant sub-area(s) and be interconnected at location(s) that will mitigate local capacity and voltage issues sufficient to reduce or eliminate the need for RMR contracts for the aforementioned plants.

All storage projects procured in this RFO are located in, and will be interconnected within, the South Bay-Moss Landing sub area. Resources were not procured for the Pease and Bogue sub areas because transmission solutions are expected to alleviate the LCR need.

7. Resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts, with adjustments for contract terms such as contract length and expedited delivery date.

As seen in Appendix G and H, the market valuations of the four storage projects are all positive.

8. Any portfolio of resources selected and contracted with, including consideration of any new or planned transmission solutions that will reduce or eliminate the sub-area deficiencies, must be of sufficient capacity and attributes to alleviate the deficiencies identified.

The approved transmission solutions eliminate the original deficiencies identified by the CAISO in each of the local sub-areas. The energy storage resources selected and contracted with add capacity to the constrained South Bay – Moss Landing local sub-area. Together they may alleviate the need for backstop procurement by the CAISO.

9. PG&E is required to coordinate with the CAISO to ensure that the resources procured in this solicitation partially or wholly obviate the need for, or extension of, RMR contracts at question in this Resolution.

The CAISO has provided a letter of support (see Appendix J) for the benefits of providing storage capacity in the South Bay – Moss Landing subarea.

10. PG&E is required to indicate when seeking approval of the contracts whether the CAISO agrees that the resources procured in this solicitation partially or wholly eliminate the need for, or extension of, one or more of the RMR contracts at question in this Resolution.

The CAISO indicates that the planned transmission upgrades alleviate the immediate need that led to the RMR designations, however supports PG&E's procurement of energy storage resources and acknowledges the contribution that energy storage would provide to reduce the risk of future CAISO-forecasted deficiencies.

11. PG&E may consider accelerating projects from its 2016 storage RFO, should those projects meet all other criteria of the solicitation ordered by this Resolution.

As discussed in Section IV.D. above, only one project from the 2016 Energy Storage RFO is in a subarea applicable to the current RFO. PG&E decided it would not be cost effective to accelerate the schedule for the Llagas project.

12. PG&E is required to hold at least one bidders' conference in advance of issuance of the request for offer (RFO).

In line with PG&E's normal solicitation process, PG&E held a participant's webinar shortly after the RFO was launched on March 7, 2018.

13. Pacific Gas and Electric Company may contract with any resource at reasonable cost, and file Tier 3 Advice Letters for approval of contracts resulting from this solicitation.

PG&E is hereby submitting a Tier 3 Advice Letter for approval of contracts resulting from this solicitation.

14. Pacific Gas and Electric Company shall take all reasonable steps to expedite the interconnection processes to allow the storage resource to connect to the grid.

PG&E's RFO team members engaged in discussions with PG&E's interconnection group and with the CAISO regarding ways to expedite the interconnection process for all projects that succeed in the solicitation. PG&E will continue these discussions and take any appropriate measures to reasonably expedite the interconnection process subject to applicable CAISO tariffs.[43]

15. Pacific Gas and Electric Company may request authorization to record procurement costs for procurement in the solicitation authorized by this Resolution in its Cost Allocation Mechanism account.

PG&E is hereby requesting authorization to record procurement costs for procurement in the solicitation authorized by this Resolution in its CAM account.

XI. Request for Commission Approval

PG&E requests that the Commission issue a Resolution no later than 90 days from the submittal of this Advice Letter that contains the following findings, conclusions, and orders:

1. Approves the four storage projects and associated contracts resulting from its Local Sub Area RFO: Vistra Moss Landing (300 MW) ESRAA; esVolta – Hummingbird (75 MW) ESRAA; Micronoc – mNOC AERS (10 MW) BTM CSA; and the Moss Landing Project (182.5 MW).

[43] CAISO Tariff Appendix DD 8.6

2. Finds that all procurement costs associated with the Vistra Moss Landing ESRAA, esVolta ESRAA, and Micronoc BTM CSA shall be recovered in rates via the Cost Allocation Mechanism (CAM) for the full term of the respective agreement and using the net cost calculation described in this Advice Letter.

3. Finds that the revenue requirement for the Moss Landing Project shall be recovered in rates via the CAM for the full useful life of the project using the net capacity cost calculation described in this Advice Letter.

4. Authorizes PG&E to record the revenue requirement based on actual costs up to the adopted cost forecast associated with the Moss Landing Project once the project achieves commercial operation to the NSGBA. Once included in the GRC, the revenue requirement associated with the Moss Landing Project will be forecast as part of the GRC but transferred to the NSGBA for recovery through the NSGC.

5. Authorizes PG&E to seek recovery of the Moss Landing Project's capital expenditures and expenses in excess of the authorized cost cap in PG&E's GRC or any other appropriate proceeding, subject to reasonableness review of the incremental costs.

6. Concludes that no certificate of public convenience and necessity, permit to construct, or notice of exempt construction, or associated CEQA analysis by the Commission, is required in connection with PG&E's Moss Landing Project pursuant to General Order 131-D.

7. Concludes that pursuant to General Order 131-D Section XIV(B), local jurisdictions acting pursuant to local authority are preempted from regulating the Moss Landing Project.

8. Finds that the Vistra Moss Landing ESRAA, esVolta ESRAA, Micronoc BTM CSA, and Moss Landing Project are eligible to meet the outstanding portion of PG&E's storage mandate obligation established by Assembly Bill 2514 as implemented by CPUC D.13-10-040 and qualify for LCR credits pursuant to D.13-02-015 and D.14-03-004.

9. Adopts the finding of fact and conclusion of law that PG&E complied with the Resolution in all other respects in carrying out its solicitation and executing the respective agreements.

XII. Confidentiality Treatment

In support of this Advice Letter, PG&E has provided the confidential information listed below. This information is being submitted in the manner directed by Commission Decision (D.) 08-04-023 and the August 22, 2006, Administrative Law Judge's Ruling Clarifying Interim Procedures for Complying with D.06-06-066 to demonstrate the confidentiality of the material and to invoke the protection of confidential utility information provided under Public Utilities Code section 454.5(g) or the Investor Owned Utility Matrix,

Appendix 1 of D.06-06-066 and Appendix C of D.08-04-023. A separate Declaration Seeking Confidential Treatment is being submitted concurrently with this Advice Letter.

Confidential Appendices

Appendix A: Dynegy – Vistra Energy Storage Resource Adequacy Agreement (ESRAA)
Appendix B: esVolta – Hummingbird Energy Storage Resource Adequacy Agreement (ESRAA)
Appendix C: Micronoc – mNOC AERS Behind the Retail Meter Capacity Storage Agreement
Appendix D: Tesla – Moss Landing Engineering Procurement Construction (EPC) Agreement
Appendix E: Tesla – Moss Landing Long-Term Performance and Maintenance Agreement (LTPMA)
Appendix F1: Independent Evaluator (IE) Report (Confidential)
Appendix G: Summary of Key 3rd-Party Owned Contract Terms
Appendix H: Summary of Key EPC and LTPMA Contract Terms
Appendix I: Utility Ownership Costs for Moss Landing Project

Public Appendices

Appendix F2: Independent Evaluator Report (Public)
Appendix J: CAISO Letter to PG&E Regarding Energy Storage Projects from LSA RFO
Appendix K: Planned Transmission Projects
Appendix L: Evaluation Methodology

XIII. Protests

Anyone wishing to protest this submittal may do so by letter sent via U.S. mail, facsimile or E-mail, no later than July 19, 2018, which is 20 days after the date of this submittal. Protests must be submitted to:

CPUC Energy Division
ED Tariff Unit
505 Van Ness Avenue, 4th Floor
San Francisco, California 94102

Facsimile: (415) 703-2200
E-mail: EDTariffUnit@cpuc.ca.gov

Copies of protests also should be mailed to the attention of the Director, Energy Division, Room 4004, at the address shown above.

The protest shall also be sent to PG&E either via E-mail or U.S. mail (and by facsimile, if possible) at the address shown below on the same date it is mailed or delivered to the Commission:

Erik Jacobson
Director, Regulatory Relations
c/o Megan Lawson
Pacific Gas and Electric Company
77 Beale Street, Mail Code B13U
P.O. Box 770000
San Francisco, California 94177

Facsimile: (415) 973-3582
E-mail: PGETariffs@pge.com

Any person (including individuals, groups, or organizations) may protest or respond to an advice letter (General Order 96-B, Section 7.4). The protest shall contain the following information: specification of the advice letter protested; grounds for the protest; supporting factual information or legal argument; name, telephone number, postal address, and (where appropriate) e-mail address of the protestant; and statement that the protest was sent to the utility no later than the day on which the protest was submitted to the reviewing Industry Division (General Order 96-B, Section 3.11).

XIV. Effective Date

PG&E requests that this Tier 3 advice submittal become effective upon Commission approval.

XV. Notice

In accordance with General Order 96-B, Section IV, a copy of this advice letter is being sent electronically and via U.S. mail to parties shown on the attached list and the parties on the service list for Service List: R.15-03-011, and R.17-09-020. Address changes to the General Order 96-B service list should be directed to PG&E at email address PGETariffs@pge.com. For changes to any other service list, please contact the Commission's Process Office at (415) 703-2021 or at Process_Office@cpuc.ca.gov. Send all electronic approvals to PGETariffs@pge.com. Advice letter submittals can also be accessed electronically at: http://www.pge.com/tariffs/.

/S/
Erik Jacobson
Director, Regulatory Relations

cc: Service Lists R.15-03-011, and R.17-09-020

CALIFORNIA PUBLIC UTILITIES COMMISSION

ADVICE LETTER SUBMITTAL SUMMARY
ENERGY UTILITY

MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No. **Pacific Gas and Electric Company (ID U39 E)**

Utility type:	Contact Person: Kingsley Cheng
☑ ELC ☐ GAS	Phone #: (415) 973-5265
☐ PLC ☐ HEAT ☐ WATER	E-mail: k2c0@pge.com and PGETariffs@pge.com

EXPLANATION OF UTILITY TYPE

ELC = Electric GAS = Gas
PLC = Pipeline HEAT = Heat WATER = Water

(Date Submitted/ Received Stamp by CPUC)

Advice Letter (AL) #: **5322-E** **Tier: 3**

Subject of AL: **Energy Storage Contracts Resulting from PG&E's Local Sub-Area Request for Offers Per Resolution E-4909**

Keywords (choose from CPUC listing): Compliance, Agreements

AL submittal type: ☐ Monthly ☐ Quarterly ☐ Annual ☑ One-Time ☐ Other _____

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #: E-4909

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL: No

Summarize differences between the AL and the prior withdrawn or rejected AL: _____

Is AL requesting confidential treatment? If so, what information is the utility seeking confidential treatment for: Yes. See the attached matrix that identifies all of the confidential information.

Confidential information will be made available to those who have executed a nondisclosure agreement: ☑ Yes ☐ No

Name(s) and contact information of the person(s) who will provide the nondisclosure agreement and access to the confidential information: Marino Monardi, (415) 973-8573

Resolution Required? ☑Yes ☐No

Requested effective date: **Upon Commission Approval** No. of tariff sheets: N/A

Estimated system annual revenue effect (%): N/A

Estimated system average rate effect (%): N/A

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected: N/A

Service affected and changes proposed: N/A

Pending advice letters that revise the same tariff sheets: N/A

Protests, dispositions, and all other correspondence regarding this AL are due no later than 20 days after the date of this submittal, unless otherwise authorized by the Commission, and shall be sent to:

California Public Utilities Commission
Energy Division
EDTariffUnit
505 Van Ness Ave., 4th Flr.
San Francisco, CA 94102
E-mail: EDTariffUnit@cpuc.ca.gov

Pacific Gas and Electric Company
Attn: Erik Jacobson
Director, Regulatory Relations
c/o Megan Lawson
77 Beale Street, Mail Code B13U
P.O. Box 770000
San Francisco, CA 94177
E-mail: PGETariffs@pge.com

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

PACIFIC GAS AND ELECTRIC COMPANY
ADVICE LETTER FOR APPROVAL OF CONTRACTS
RESULTING FROM ITS LOCAL SUB-AREA REQUEST
FOR OFFERS PURSUANT TO RESOLUTION E-4909

DECLARATION OF MARINO MONARDI
SEEKING CONFIDENTIAL TREATMENT
FOR CERTAIN DATA AND INFORMATION
CONTAINED IN PG&E'S ADVICE LETTER

I, Marino Monardi, declare:

1. I am a Director in the Energy Procurement and Policy Organization at Pacific Gas and Electric Company (PG&E). In this position, I am responsible for procurement of various electric resources and products including energy storage and renewable energy. This declaration is based on my personal knowledge of PG&E's practices and my understanding of the Commission's decisions protecting the confidentiality of market-sensitive information.

2. Based on my knowledge and experience, and in accordance with the Decisions 06-06-066, 08-04-023, and relevant Commission rules, I make this declaration seeking confidential treatment for certain data and information contained in PG&E's Advice Letter pursuant to Resolution E-4909.

3. Attached to this declaration is a matrix identifying the data and information for which PG&E is seeking confidential treatment. The matrix specifies that the material PG&E is seeking to protect constitutes confidential market sensitive data and information covered by D.06-06-066, Appendix 1, and Public Utilities Code §454.5(G). The matrix also specifies why confidential protection is justified. Further, the data and information: (1) is not already public; and (2) cannot be aggregated, redacted, summarized or otherwise protected in a way that allows partial disclosure. By this reference, I am incorporating into this declaration all of the explanatory text that is pertinent to my testimony in the attached matrix.

I declare under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct. Executed on June 29, 2018 at San Francisco, California.

/s/

Marino Monardi

PACIFIC GAS AND ELECTRIC COMPANY (U 39 E)

ADVICE LETTER FOR APPROVAL OF CONTRACTS RESULTING FROM ITS LOCAL SUB-AREA REQUEST FOR OFFERS PURSUANT TO RESOLUTION E-4909

JUNE 29, 2018

IDENTIFICATION OF CONFIDENTIAL INFORMATION

Redaction Reference	Category from D.06-06-066, Appendix 1, or Separate Confidentiality Order That Data Corresponds To	PG&E's Justification for Confidential Treatment	Length of Time
Confidential Appendices			
Appendix A: Dynegy – Vistra ESRAA	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	The terms of the Energy Storage Resource Adequacy Agreement (ESRAA) Agreement presented in this appendix are generally confidential. The terms of this contract that are public pursuant to Item VII. B. are publicly disclosed in section V. Selected Energy Storage Projects and Planned Transmission Projects.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.
Appendix B: esVolta – Hummingbird ESRAA	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	The terms of the Energy Storage Resource Adequacy Agreement (ESRAA) Agreement presented in this appendix are generally confidential. The terms of this contract that are public pursuant to Item VII. B. are publicly disclosed in section V. Selected Energy Storage Projects and Planned Transmission Projects.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.
Appendix C: Micronoc – mNOC AERS BTM CSA	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	The terms of the Behind-the-Retail Meter Capacity Storage Agreement (BTM CSA) Agreement presented in this appendix are general confidential. The terms of this contract that are public pursuant to Item VII. B. are publicly disclosed in section V. Selected Energy Storage Projects and Planned Transmission Projects.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.

PACIFIC GAS AND ELECTRIC COMPANY (U 39 E)

ADVICE LETTER FOR APPROVAL OF CONTRACTS RESULTING FROM ITS LOCAL SUB-AREA REQUEST FOR OFFERS PURSUANT TO RESOLUTION E-4909

JUNE 29, 2018

IDENTIFICATION OF CONFIDENTIAL INFORMATION

Redaction Reference	Category from D.06-06-066, Appendix 1, or Separate Confidentiality Order That Data Corresponds To	PG&E's Justification for Confidential Treatment	Length of Time
Appendix D: Tesla – Moss Landing EPC	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	The terms of the Turnkey Engineering, Procurement and Construction (EPC) Agreement presented in this appendix are generally confidential. The terms of this contract that are public pursuant to Item VII. B. are publicly disclosed in section V. Selected Energy Storage Projects and Planned Transmission Projects.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.
Appendix E: Tesla – Moss Landing LTPMA	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	The terms of the Long-Term Performance and Maintenance Agreement (LTPMA) presented in this appendix are generally confidential. The terms of this contract that are public pursuant to Item VII. B. are publicly disclosed in section V. Selected Energy Storage Projects and Planned Transmission Projects.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.

PACIFIC GAS AND ELECTRIC COMPANY (U 39 E)

ADVICE LETTER FOR APPROVAL OF CONTRACTS RESULTING FROM ITS LOCAL SUB-AREA REQUEST FOR OFFERS PURSUANT TO RESOLUTION E-4909

JUNE 29, 2018

IDENTIFICATION OF CONFIDENTIAL INFORMATION

Redaction Reference	Category from D.06-06-066, Appendix 1, or Separate Confidentiality Order That Data Corresponds To	PG&E's Justification for Confidential Treatment	Length of Time
Appendix F1: Independent Evaluator (IE) Report (Confidential)	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)); Item VIII. B) Specific quantitative analysis involved in scoring and evaluation of participating bids.	The IE Report contains extensive discussion of the specific terms of the ES Contracts. All contract terms, except for the 8 contract characteristics noted as public in Matrix VII.B, are confidential. The IE Report also contains information on the shortlist, which constitutes the confidential results of bid scoring and evaluation.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first. Information under Item VIII. B is confidential for three years from the date winning contracts are submitted for CPUC approval..
Appendix G: Summary of Key 3rd-Party Owned Contract Terms	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	Contract specific terms between PG&E and the counterparty and between the counterparty and suppliers are confidential terms as they are not identified as public by Matrix term VII.B.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.

PACIFIC GAS AND ELECTRIC COMPANY (U 39 E)

ADVICE LETTER FOR APPROVAL OF CONTRACTS RESULTING FROM ITS LOCAL SUB-AREA REQUEST FOR OFFERS PURSUANT TO RESOLUTION E-4909

JUNE 29, 2018

IDENTIFICATION OF CONFIDENTIAL INFORMATION

Redaction Reference	Category from D.06-06-066, Appendix 1, or Separate Confidentiality Order That Data Corresponds To	PG&E's Justification for Confidential Treatment	Length of Time
Appendix H: Summary of Key EPC and LTPMA Contract Terms	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	Contract specific terms between PG&E and the counterparty and between the counterparty and suppliers are confidential terms as they are not identified as public by Matrix term VII.B.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.
Appendix I: Utility Ownership Costs for Moss Landing Project	Item II.B.1 (Utility-Retained Generation Cost Forecast); Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)); California Public Utilities Code Section 454.5(g); and/or California Government Code Section 6255(a).	This appendix provides detailed cost estimates for the proposed utility-owned Moss Landing Project, which include the costs of underlying contracts between PG&E and third-party contractors. Disclosure of these detailed costs could enable market participants to manipulate future solicitations for similar products and services, to the detriment of PG&E's customers. The public interest in maintaining the confidentiality of this data outweighs the benefit from general public disclosure since interested parties can gain access to the confidential data through standard Commission-approved processes.	Item II.B.1: Confidential for three years; Public by resource category (e.g. fossil, wind, solar, hydro-electric, etc.) after three years. Item VII.B: Confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first. Section 454.5(g): Indefinite. Section 6255(a): Indefinite.

PACIFIC GAS AND ELECTRIC COMPANY

APPENDIX A

DYNEGY – VISTRA ENERGY STORAGE RESOURCE ADEQUACY AGREEMENT (ESRAA)

(CONFIDENTIAL IN ITS ENTIRETY)

PACIFIC GAS AND ELECTRIC COMPANY

APPENDIX B

ESVOLTA – HUMMINGBIRD ENERGY STORAGE RESOURCE ADEQUACY AGREEMENT (ESRAA)

(CONFIDENTIAL IN ITS ENTIRETY)

PACIFIC GAS AND ELECTRIC COMPANY

APPENDIX C

MICRONOC – MNOC AERS BEHIND THE RETAIL METER

(BTM CSA)

(CONFIDENTIAL IN ITS ENTIRETY)

PACIFIC GAS AND ELECTRIC COMPANY

APPENDIX D

TESLA – MOSS LANDING ENGINEERING, PROCUREMENT AND CONSTRUCTION (EPC) AGREEMENT

(CONFIDENTIAL IN ITS ENTIRETY)

PACIFIC GAS AND ELECTRIC COMPANY

APPENDIX E

TESLA – MOSS LANDING LONG-TERM PERFORMANCE AND MAINTENANCE AGREEMENT (LTPMA)

(CONFIDENTIAL IN ITS ENTIRETY)

PACIFIC GAS AND ELECTRIC COMPANY

APPENDIX F2

INDEPENDENT EVALUATOR REPORT

(PUBLIC)

Pacific Gas and Electric Company

Energy Storage Request for Offers

Confidential Version

Independent Evaluator Report on

PG&E's Local Sub-Area Energy Storage Request for Offers Process

June 28, 2018

Prepared by
Merrimack Energy Group, Inc.
26 Shipway Place
Charlestown, Mass. 02129

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Appendix A: Summary Information for Third-Party Offers Received

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Attachments

Attachment A: mNOC AERS, LLC Behind the Meter Capacity Storage Agreement

Attachment B: Hummingbird Energy Storage, LLC Energy Storage Resource Adequacy Agreement

Attachment C: Dynegy Marketing and Trade, LLC Energy Storage Resource Adequacy Agreement

Attachment D: Tesla Inc. EPC Agreement for Moss Landing Energy Storage Project

I. Introduction

A. Overview of the 2018 Local Sub-Area Energy Storage Request for Offers

On February 28, 2018, Pacific Gas & Electric Company ("PG&E" or "Company") issued its 2018 Local Sub-Area Energy Storage Request for Offers ("LSA ES RFO" or "Solicitation Protocol") to procure energy storage resources to meet local sub area reliability needs as required by California Public Utilities Commission ("CPUC") Resolution E-4909 (the "Resolution").[1] The Resolution ordered PG&E to hold a competitive solicitation within 90 days for energy storage and/or preferred resources to meet capacity and reliability needs in three local areas: Bogue, Pease and South Bay – Moss Landing (the "Local Areas"). Issuance of the 2018 Local Sub-Area Energy Storage RFO for energy storage only and for project online dates in 2018, 2019 and 2020 is designed to address the CPUC's resolution.

As noted on the CPUC News Blog, any battery storage projects selected through this RFO would replace three Calpine fossil fuel plants (Feather River, Yuba, and Metcalf) that do not have long-term contracts with utilities but that have been identified by the CAISO as needed to serve local reliability needs. Calpine and the CAISO have requested that the Federal Energy Regulatory Commission approve the CAISO designation of the three plants as "must run" for reliability purposes ("RMR" or "Reliability Must-Run"), which would mean that the plants would get paid to operate on an expensive cost of service contract. The CPUC and PG&E have opposed this, in part because a lack of competition can lead to market distortions and unjust rates for power. The CPUC believes there are better alternatives, including battery storage. The CPUC proposal does not require PG&E to sign contracts; it requires the utility to ascertain whether there are competitive offers for battery storage, and if there are PG&E will execute contracts.

According to the Resolution, the Commission stated it was concerned about impacts to ratepayers if the RMR contracts are executed and if they are extended:

> As discussed earlier in this Resolution, these contracts were developed outside of the normal resource adequacy process and the CAISO's Capacity Procurement Mechanism ("CPM") was not initiated. Lack of competition, with in this instance these RMR contracts, can lead to market distortions and unjust rates for power. It is because of this concern that the Commission is exercising its procurement authority with this Resolution to authorize PG&E to conduct a limited solicitation for resources that can effectively fill the local deficiencies and address issues identified by the CAISO. If contracted for, alternative resources could potentially be brought on line. These new resources could eliminate the need for the RMR contracts for the plants described in this Resolution, or renewal in subsequent years. In addition, these new resources would be subject to must offer obligations ("MOO") in the wholesale energy markets. In contrast, RMR contracts cover the full cost of keeping the facility available, but the facility is only called upon to

[1] Resolution E-4909 Authorizing PG&E to Procure Energy Storage or Preferred Resources to Address Local Deficiencies and Ensure Local Reliability (January 11, 2018).

serve load if the specific contingency occurs and is not subject to a MOO. In all other time periods, RMR designation can cause ongoing market distortions because it may serve as a disincentive to a plant from regular participation in the energy market (page 4-5).

According to the Resolution, PG&E is authorized to conduct one or more solicitations at its earliest opportunity. PG&E must coordinate with the CAISO in an effort to ensure that its proposed portfolio will contribute to reducing or eliminating the local sub-area deficiencies in the Pease and South Bay-Moss Landing sub-areas and high voltage in the Bogue sub-area. In any advice letter submission for approval of the solicitation results, PG&E must indicate whether the CAISO agrees that the proposed portfolio will reduce, or eliminate, the local sub-area deficiencies. PG&E is not required to execute any contracts if the solicitation does not yield resources at a reasonable cost and value as detailed below.

The important parameters for procurement of the resources as contained in the Resolution include:

1. PG&E is required to take into consideration any new or planned transmission solutions that reduce or eliminate the need for RMR contracts or their extension, when it selects resources for procurement in this solicitation;

2. PG&E may solicit bids for energy storage and/or preferred resources, either individually or in an aggregation;

3. PG&E may consider accelerating projects from its 2016 storage RFO, should those projects meet all other criteria of the solicitation ordered by this Resolution;

4. Resources procured pursuant to this solicitation must be both:
    a. On-line and operational on or before a date sufficient to ensure that the RMR contracts for the three plants – Metcalf Energy Center, Feather River Energy Center, and Yuba City Energy Center – will not be renewed in any year from 2019 through 2022;
    b. Located within the relevant sub-area(s) and be interconnected at locations that will mitigate local capacity and voltage issues sufficient to obviate the need for RMR contracts for the aforementioned plants;

5. Resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions;

6. Any portfolio of resources selected and contracted with, including consideration of any new or planned transmission solutions that will reduce or eliminate the sub-area deficiencies, must be of sufficient capacity and attributes to alleviate the deficiencies identified;

7. PG&E is required to coordinate with the CAISO to ensure that the resources procured in this solicitation partially or wholly obviate the need for, or extension of, RMR contracts at question in this Resolution;

8. PG&E is required to indicate when seeking approval of the contracts whether the CAISO agrees that the resources procured in this solicitation partially or wholly eliminate the need for, or extension of, one or more of the RMR contracts at questions in this Resolution;

9. PG&E is required to hold a bidder's conference in advance of the RFO.

In the Resolution, the Commission also clarified that the value of any negotiated RMR contract should be used as a metric to value other alternatives and if the RMR contracts offer the best ratepayer value, PG&E is not required to pursue other alternatives.

Pursuant to regulatory requirements of the CPUC, PG&E retained Merrimack Energy Group, Inc. ("Merrimack Energy") as the Independent Evaluator ("IE") for the 2018 LSA ES RFO procurement process.

This IE report is submitted in conformance with the requirements of the CPUC and is designed to be consistent with the requirements outlined in the CPUC's IE Report Template (Long Form), subject to adjustments in requirements to reflect the unique nature of this solicitation.

B. 2018 Local Sub-Area Energy Storage RFO Procurement Protocol

On February 28, 2018 PG&E launched the 2018 Local Sub-Area Energy Storage Request for Offers and posted the Solicitation Protocol document on its website. In the 2018 Local Sub-Area ES RFO Protocol document, PG&E listed a number of requirements and preferences to inform prospective Participants of the requirements for competing in the procurement process. A summary of the key provisions of the Solicitation Protocol is provided in Table 1.

Table 1: Provisions of the 2018 Local Sub-Area Energy Storage RFO Solicitation Protocol

2018 ES RFO Requirements or Characteristics	Description of Key Provisions
Resource Needs	PG&E seeks new energy storage resources connected at the transmission, distribution or customer level within the local sub-

	areas of Bogue, Pease and South Bay – Moss Landing to meet real power capacity and reactive power needs in Bogue and Pease and real power needs in the South Bay – Moss Landing area. Storage project online dates should be 2018, 2019 and 2020
Objectives of RFO	PG&E is issuing this LSA ES RFO to procure energy storage resources to meet local capacity and local sub area reliability needs as required by CPUC Resolution E-4909. PG&E's objective is to execute agreements substantially the same as the form agreements provided in this Solicitation.
Proposed Schedule	The Schedule contained in the 2018 LSA ES RFO Protocol document included the following key dates for the RFO: • February 28, 2018 – PG&E issues the RFO; • March 7, 2018 - Participants Webinar; • March 28, 2018 – Deadline for PG&E to receive offers by 1:00 PM PPT; • April 18, 2018 – PG&E notifies Participants that their Offers will be included on a list of Offers for which PG&E may seek to enter into or negotiate an Agreement related to the Offer ("Shortlist"); • April 20, 2018 – Participants notify PG&E whether they accept Shortlist status and acknowledge acceptance of the Confidentiality Agreement; • June 28, 2018 – PG&E submits Agreements for CPUC Approval.
Agreement Types	PG&E is seeking both third-party owned and utility-owned projects. The Agreements for third-party owned projects are listed below as Nos. 1 and 2 and the Agreements for utility-owned projects are listed as Nos. 3 and 4. 1. Energy Storage Resource Adequacy Agreement (ES RA Agreement); 2. Behind-the-Retail Meter Capacity Storage Agreement (BTM CSA); 3. Engineering, Procurement and Construction (EPC) Agreement for Moss Landing 4. Build Own Transfer (BOT) Agreement For both utility-owned agreements (EPC and BOT), PG&E requires entering into long-term agreements to support the ongoing maintenance and performance of the energy storage system.
Eligibility Requirements	This solicitation is for energy storage only, and for project online dates in 2018, 2019, and 2020. Offers must meet the applicable specifications noted below: ***<u>Project Size Requirements</u>*** • Third Party-owned Offers at all connection levels

	must be at least 1 MW in size;
	• Offers at Moss Landing must be per the specifications below and BOT offers must be a minimum of 10 MW in size;
	• PG&E will consider offers where multiple ES resources are aggregated to meet the minimum size;
	• For utility-owned options, project size requirements vary:
	  o For BOT options, the minimum project size is 10 MW;
	  o For EPC options at Moss Landing, all Participants must propose a minimum size of a 195 MW BESS system.[2] Participants may also propose a 100 MW BESS system.
	
	<u>Site Control:</u>
	• Participants must demonstrate site control for the Project referenced in their Offer at the time of Offer submission, except for Offers for the PG&E ownership project at Moss Landing and BTM customer-connected projects.
	
	<u>Performance and Operational Requirements:</u>
	• Third Party-owned Offers must have a four (4) hour minimum discharge duration;
	• For PG&E ownership projects, offers at the Moss Landing site must have a 4-hour discharge duration while a generic BOT option can offer any duration;
	• Offers including RA must meet the applicable CPUC requirements for duration and CAISO requirements for deliverability, as well as any other requirements that will enable PG&E to receive all of the RA benefits associated with the Project;
	• All Offers must identify the amount of reactive power a project will be capable of providing if requested by the CAISO within the Voltage Services section of the Offer Form's operating characteristics tab.
	
	<u>Electrical Interconnection Status:</u>

[2] The original Protocol was posted on February 28, 2018. However, PG&E updated the Protocol and posted an updated version on March 9, 2018. One of the changes to the updated version was that PG&E revised the minimum size of the BESS system required for the EPC option from 205 MW to 195 MW. The 4-hour duration requirements remained the same.

	• All Offers must be connected to one of the feeders or substations associated with the three local sub areas. Absent a Phase 1 (or equivalent) or later interconnection study or interconnection agreement, Participants will be asked to provide a not-to-exceed estimate of refundable Delivery Network Upgrade and Reliability Network Upgrade costs in the Offer Form. Sellers should be aware that PG&E has the right to terminate the Agreement if such costs as demonstrated in any interconnection study or interconnection agreement exceed such estimate.
	  • Third Party Agreements for Transmission or Distribution-Connected Projects:
	  o At the time of Offer submittal, Participants must have Full Capacity Deliverability Status (FCDS) or have documentation showing that the Project is on track to receive FCDS by the committed online date. Participants must remain active in the applicable interconnection queue until the project's required network upgrades have been completed. At a minimum, projects, except BTM, must have an interconnection request that has been deemed complete and requested FCDS for the cluster window that closes on April 30, 2018.
	  • EPC at Moss Landing
	  o Participants submitting Offers for Moss Landing EPC project do not need to establish a valid and active interconnection application by the time of Offer submittal;
	  • BOT Energy Storage at any location in local sub-areas
	  o Participants submitting Offers for stand-alone utility-owned BOT Energy Storage projects will be responsible for all activities and costs associated with obtaining interconnection, including interconnection study costs, network upgrades, and interconnection facilities as determined via the relevant interconnection process. Participants must have completed a Phase 1 interconnection study (or equivalent – i.e.

	a system impact study) or have documentation showing that the project passed the Distribution Provider or CAISO Fast Track screens at the time of Offer submittal. Participants must remain active in the applicable interconnection queue until the Project's required network upgrades have been completed.
Pricing	Participants are required to provide a complete Offer package, and include pricing in their Offer Form depending on the Agreement type as described below: (1) BTM CSA: RA price in $/kW-month and Variable O&M (VOM) Price in $/MWh; (2) ES RA: RA price in $/kW-month; (3) Utility-Ownership: Purchase Price in total dollars and operations and maintenance ("O&M") costs in $/year.
Evaluation Process/Evaluation of Offers Received	PG&E will evaluate Offers using quantitative and qualitative criteria. PG&E's evaluation will apply "least-cost, best fit" principles, using quantitative and qualitative criteria to evaluate the submitted Offers. The RFO Protocol identifies and describes in detail the procedures for evaluation of offers, including a description of the Net Market Value and Portfolio Adjusted Value components. To evaluate Offers from a quantitative perspective, PG&E indicates that the quantitative criteria will include Net Market Value (NMV) and Portfolio Adjusted Value ("PAV") components. NMV benefits include net energy, capacity and ancillary services value. NMV costs include the offered fixed and variable pricing under the applicable Agreement. PAV may include adjustments that are relevant to PG&E's total energy portfolio, specifically for, but not limited to: (1) Transmission Network Upgrade Cost; (2) Increased System Efficiency; (3) Avoided Renewable Curtailment; (4) Delivery Period Adjustment. The final PAV value is equal to the Net Market Value (NMV) plus the four PAV components stated above. Shortlisting will be based on the final total PAV value. In addition, PG&E will consider the following qualitative attributes: • Project Viability • Supply Chain Responsibility • Credit • Safety

Offer Submittal Process	All Offers must be received by March 28, 2018 at 1:00 P.M. (PPT). All Offers must be submitted electronically through the PowerAdvocate Platform.
Allowable Offers	Participants may submit up to five (5) Offers per interconnection point. Participants may vary any attributes of the offer provided the total Offers submitted at a single interconnection point does not exceed this limit. Participants submitting Offers for third-party owned BTM Projects may submit up to 20 Offers per local sub-area. All BTM projects must be located within the Bogue, Pease and South Bay-Moss Landing local sub-areas.
Offer Package	Offers must contain all required information and must be organized in accordance with the instructions listed in the RFO Protocol. Information required includes: 1. Introductory Letter 2. Offer Form – Appendix A 3. Project Description – Appendix B1 4. Site Control – Appendix B2 5. Project Milestone Schedule – Appendix B3 6. Experience Qualifications – Appendix B4 7. Electric Interconnection – Appendix B5 8. Organizational and Finance Information – Appendix B6 9. Utility-Ownership Additional Information – Appendix B7 10. FERC 717 Waiver – Appendix C 11. Confidentiality Agreement – Appendix D 12. Utility-Owned Moss Landing Substation EPC Project - Appendix E 13. Energy Storage Resource Adequacy Agreement – Appendix F1 14. Behind-the-Retail Meter Capacity Storage Agreement – Appendix F2 15. Term Sheet for Utility Owned Engineering Procurement Construction Agreement – Appendix F3 16. Term Sheet for Utility Owned Build Own Transfer Agreement – Appendix F4 17. Term Sheet for Long-Term Performance and Maintenance Agreement – F5
Credit	Upon execution of an Agreement with PG&E, the Participant must post collateral to PG&E. Each of the Agreements requires that the Participant post collateral with PG&E prior to and following commercial operation of the facility in varying amounts and form, as provided in the applicable Agreement. • For ES RA/BTM agreements, Project Development security is $15/kW within 5 days of execution, and an additional $45/kW within 5 days of CPUC Approval for a total of

	$60/kW. Delivery term security is $125/kW or 10% of the highest estimated capacity payments for any 36-month period, whichever is higher. • For offers for utility ownership (EPC and BOT), Project Development security is $15/kW at execution, and 15% of the purchase price within 10 days after CPUC approval. The Post Closing Collateral for Performance and Warranty Periods is an acceptable warranty by an issuer acceptable to PG&E plus 10% of the purchase price for the duration of the warranty period.
Shortlist Offer Deposit	If a Participant is notified that it is eligible for PG&E's Shortlist and accepts the Shortlist position, then the Participant must post a deposit ("Shortlist Offer Deposit") in the amount of $3/kW of Payment Quantity (as the term is defined in the form Agreements) or Guaranteed Dmax for each offer on the Shortlist on the 3rd business day after receiving such notice.
CPUC Approval	Whether an Agreement goes into effect or not is expressly conditioned on PG&E's receipt of CPUC Approval, which is more specifically defined in each of the Agreements or Term Sheets. At a minimum, PG&E will require a finding from the CPUC that PG&E's entry into the Agreement satisfies PG&E's Energy Storage compliance with the Resolution, that the terms are reasonable, and that PG&E will recover the costs incurred under the Agreement in its rates. Additionally, most Agreements will be subject to a no-fault termination if CPUC Approval does not occur within a specified period, as set forth in each of the applicable Agreements. CPUC Approval typically requires the approval of the Agreement by the CPUC to be final and non-appealable without any modifications that are unacceptable to either of the parties.

C. Issues Addressed in This Report

This report addresses Merrimack Energy's assessment and conclusions regarding the following issues identified in the CPUC's IE Report Template:

1. Describe the role of the IE throughout the solicitation process;

2. How did the IOU conduct outreach to bidders? Was the solicitation robust?

3. Evaluate the administration of the solicitation process including the fairness of the investor-owned utility's ("IOU's") bid evaluation and selection process (i.e. quantitative and qualitative methodology used to evaluate and select offers, and consistency of evaluation and selection methods with criteria specified in bid documents, etc.);

4. Describe PG&E's Least Cost Best Fit ("LCBF") methodology for evaluating offers. Was the LCBF process fairly administered? Evaluate the strengths and weaknesses of the IOU's methodology;

5. Describe the applicable project specific negotiations. Highlight any areas of concern including unique terms and conditions;

6. If applicable, describe safeguards, code of conduct and methodologies employed by the IOU to compare affiliate bids or utility-owned generation ownership offers. If a utility selected an offer from an affiliate or an offer that would result in utility asset ownership, explain whether the IOU's selection of such offer was appropriate;

7. Do the contract(s) merit CPUC approval? Is the contract reasonably priced and does it reflect a functioning market?

8. Based on the complete bid process, was the RFO acceptable?

Given the number of contracts executed, PG&E and the IE held discussions with respect to the best approach for presenting the IE's findings regarding the overall 2018 LSA ES RFO solicitation process and assessment of contract negotiations and final contract execution. Similar to the approach used for 2016 ES RFO, it was agreed that organizationally it would be preferable to include the issues listed in point 5 above regarding the description of contract negotiations and point 7 regarding CPUC approval of the contract in a separate Attachment to this report on the 2018 LSA ES RFO solicitation process. Attachments A through D include a description and assessment of each of the four Energy Storage Agreement executed by PG&E through this 2018 LSA ES RFO.

II. Description of the Role of the IE

A. Regulatory Requirements For the IE

The requirements for participation by an IE in utility solicitations are outlined in CPUC Decisions ("D").04-12-048 (Findings of Fact 94-95, Ordering Paragraph 28), D.06-05-039 (Finding of Fact 20, Conclusion of Law 3, Ordering Paragraph 8) of the CPUC, D.09-06-050 and D.10-07-042.

The role of IEs in California IOU procurement processes has evolved over the past ten to twelve years. In D.04-12-048 (December 16, 2004), the CPUC required the use of an IE by investor-owned utilities (IOUs) in resource solicitations where there is an affiliated bidder or bidders, or where the utility proposed to build a project or where a bidder proposed to sell a project or build a project under a turnkey contract that would ultimately be owned by a utility. The CPUC generally endorsed the guidelines issued by the Federal

Energy Regulatory Commission ("FERC") for independent evaluation where an affiliate of the purchaser is a bidder in a competitive solicitation, but stated that the role of the IE would not be to make binding decisions on behalf of the utilities or administer the entire process.[3] Instead, the IE would be consulted by the IOU, along with the Procurement Review Group ("PRG") on the design, administration, and evaluation aspects of the Request for Proposals ("RFP"). The Decision identifies the technical expertise and experience of the IE with regard to industry contracts, quantitative evaluation methodologies, power market derivatives, and other aspects of power project development. From a process standpoint, the IOU could contract directly with the IE, in consultation with its PRG, but the IE would coordinate with the Energy Division.

In D.06-05-039 (May 25, 2006), the CPUC required each IOU to employ an IE regarding all RFPs issued pursuant to the RPS, regardless of whether there are any utility-owned or affiliate-owned projects under consideration. This was extended to any long-term contract for new generation in D.06-07-029 (July 21, 2006). In addition, the CPUC directed the IE for each RFP to provide separate reports (a preliminary report with the shortlist and final reports with IOU advice letters to approve contracts) on the entire bid, solicitation, evaluation and selection process, with the reports submitted to the utility, PRG, and CPUC and made available to the public (subject to confidential treatment of protected information). The IE would also make periodic presentations regarding its findings to the utility and the utility's PRG consistent with preserving the independence of the IE by ensuring free and unfettered communication between the IE and the CPUC's Energy Division, and an open, fair, and transparent process that the PRG could confirm.

In 2007, the use of an IE was required for any competitive solicitation seeking products for a term of more than three months in D.07-12-052 (December 21, 2007). Also, the process for retaining IEs was modified substantially, with IOUs developing a pool of qualified IEs, subject to feedback and any recommendations from the IOU's PRG and the Energy Division, an internal review process for IE candidates, and final approval of IEs by the Energy Division.

In 2008, in D.08-11-008, the CPUC changed the minimum term requirement from three months to two years and reiterated that an IE must be utilized whenever an affiliate or utility bidder participates in the RFO, regardless of contract duration.

In D.09-06-050 issued on June 18, 2009 in Rulemaking 08-08-009, Order Instituting Rulemaking to Continue Implementation and Administration of California Renewable Portfolio Standard Program, the CPUC required that bilateral contracts should be reviewed according to the same processes and standards as contracts that come through a solicitation. This includes review by the utility's PRG and its IE, including a report filed by the IE.

In D.10-07-042 issued on July 29, 2010, the Commission reaffirmed the role of the IE and required the Energy Division to revise the IE Template to ensure that the IEs focus

[3] Decision 04-12-048 at 129-37. The FERC guidelines are set forth in Ameren Energy Generating Company, 108 FERC ¶ 61,081 (June 29, 2004).

on their core responsibility of evaluating whether an IOU conducted a well-designed, fair, and transparent RFO for the purpose of obtaining the lowest market prices for ratepayers, taking into account many factors (e.g. project viability, transmission access, etc.).

This IE report is submitted in conformance with the above requirements.

B. Description of Key IE Roles

In compliance with the above requirements, PG&E selected Merrimack Energy to serve as IE for the 2018 LSA ES RFO in January 2018. The overall objective of the role of the IE is to ensure that the solicitation process is undertaken in a fair, consistent, unbiased, and objective manner and that the best resources are selected and acquired for the benefit of customers consistent with the solicitation requirements. This role generally involves a detailed review and assessment of the evaluation process and the results of the quantitative and qualitative analysis.

In addition to the requirements identified in CPUC Orders, the Scope of Work included in the Contract Work Authorization ("CWA") between Merrimack Energy and PG&E clearly identifies the tasks to be performed by the IE. These include the following tasks:

- Advise on the consistency of solicitation activities with the CPUC's procurement-related rules and procedures and PG&E's Commission-approved procurement authority;
- Assist in the development, design, and review of the Request for Offers. Promptly submit any recommendations to PG&E and/or CPUC, consistent with the objective of ensuring a competitive, open and transparent process, and to ensure that the overall scope of the solicitation process is not unnecessarily broad or too narrow;
- Monitor all communications and/or negotiations between PG&E and counterparties, as required by the solicitation's objectives as outlined in the solicitation Protocol and approved by the CPUC;
- Provide recommendations and reports, if required by PG&E and/or the CPUC, concerning the definition of products sought and price and non-price evaluation criteria; so that all aspects of the products are clearly understood, and all bidders may effectively respond to the solicitation, as applicable;
- Review the comprehensive quantitative and qualitative bid evaluation criteria and methodologies applied to any Local Sub-Area Energy Storage RFO Solicitation and assess whether these are applied to all bids in a fair and non-discriminatory manner. The Consultant will be provided access to PG&E's personnel, modeling tools, and meeting documentation in order to credibly evaluate the bid evaluation and selection processes;
- Report on the outcome of a solicitation using the appropriate CPUC-approved Independent Evaluator Report Template, which may be amended from time to time, for inclusion in any Advice Letter, Application, and/or Quarterly Compliance Report filings;

- Monitor the solicitation, bilateral negotiation and/or contract amendment processes and promptly submit recommendations to PG&E's management to ensure that no bidder has an information advantage and that all bidders or counterparties, if applicable, receive access to relevant communications in a non-discriminatory manner. This task may include monitoring contract negotiations and/or keeping appraised of negotiation status and major issues;
- Provide presentations to PG&E's management, the Procurement Review Group (PRG), and the CPUC Energy Division (ED), if requested, regarding the Consultant's findings or status. Communicate periodically with the Energy Division ("ED") as a check on the Request for Offer (RFO) process;
- Provide a written assessment as to whether the solicitation, bilateral negotiation and/or contract amendment processes were open, transparent and fair, and whether any bidder received material information that gave them a competitive advantage or disadvantage relative to other bidders;
- Provide a final written assessment as to whether or not PG&E's evaluation criteria and methodologies were reasonable and appropriate and were applied in a fair and non-discriminatory manner for all offers received;
- Prepare or assist in the preparation of direct and/or rebuttal testimony, and participate as a witness or in an advisory capacity during administrative hearings, as required, before the CPUC and/or FERC in any associated proceedings;
- Perform other duties as may be further defined in subsequent relevant regulatory proceedings or required by PG&E's senior management.

C. Description of IE Oversight Activities

As noted, Merrimack Energy was retained as the IE by PG&E in January 2018, prior to the development of the RFO documents and therefore, Merrimack Energy has had the opportunity to participate in and assess the development and implementation of the entire process from start to completion. In performing its oversight and evaluation role, the IE participated in and undertook a number of activities in connection with the solicitation process including providing comments on the protocol documents, monitoring communications between PG&E and the Participants, reviewing and commenting on internal RFO Evaluation Protocol documents, organizing and summarizing the offers received, reviewing the evaluation and selection process and results at each stage in the process, monitoring the status of short-listed offers, participating in calls with Participants after receipt of offers, communicating with PG&E's Project Manager, project team, and transactors on a regular basis to discuss RFO issues, participating in meetings with the PRG, PG&E's Evaluation Committee and PG&E's Advisory Committee, and monitoring the contract negotiation process with short-listed Participants.

For the 2018 LSA ES RFO, the role of the IE was complex since PG&E was seeking offers for third-party storage projects as well as an EPC contract for a project at a PG&E site in which PG&E would own the project. Because of the sensitivity associated with third-party and utility-owned options, PG&E established separate teams to review and evaluate the different types of offers, with one team focused on utility-owned options exclusively. While members of each team did not communicate on the evaluation of

offers for the RFO during the solicitation process, the IE was required to coordinate review and evaluation with both teams. In particular, the dual roles of the IE in coordinating with both groups were focused primarily on the review of the evaluation results and the contract negotiation process after shortlist selection.[4] The IE monitored contract negotiations associated with each type of contract/product. But given the nature of this solicitation was required to focus its efforts on monitoring negotiations of the EPC contract given the short timeframe for negotiations, the intensity of negotiations, the complexity of the process, and PG&E's intent to minimize negotiations of third-party offers.

This report provides an assessment and review of PG&E's 2018 LSA ES RFO procurement process from development of the RFO through execution of the final Agreements. The role of the IE is also discussed as it pertains to specific activities in Section IV of this report.

III. Did PG&E Do Adequate Outreach to Bidders and Was the Solicitation Robust?

This section of the Report focuses on the adequacy of outreach activities of PG&E and the robustness of the response of bidders with regard to the solicitation process.

A. Describe the IOU outreach to potential bidders (e.g., sufficient publicity, emails to expected interested firms)

Outreach activities are important to the success of a competitive solicitation process. PG&E's outreach efforts targeted a large number of potential Participants based on PG&E's contact lists of energy companies and individuals. These efforts likely played a role in the robust response to the RFO in terms of number of Participants and specific offers or projects.

PG&E maintains a detailed list of potential Participants with nearly 2,800 contacts that serves as the database for Seller contact and outreach.[5] PG&E sent emails to all potential Participants on this list informing them of the 2018 LSA ES RFO process and the issuance of the 2018 LSA ES RFO. The list includes Diverse Suppliers that were also informed via email of the 2018 LSA ES RFO. PG&E notified contacts on the mailing list of the issuance of the 2018 LSA ES RFO and also provided several email notifications and updates to the email list during the solicitation process. In addition, the issuance of

[4] The IE monitored contract negotiations for all shortlisted projects including third-party and utility-owned options. For offer evaluation purposes, the IE coordinated its efforts only with the offer evaluation team or "Solicitation team" since the Solicitation team conducted the evaluation of all offers submitted. The utility-ownership team was not involved in the quantitative evaluation of the offers submitted but did conduct a due diligence review including the project viability assessment.

[5] PG&E informed the IE that PG&E sent notification emails associated with issuance of the LSA ES RFO to 2,732 contacts.

the 2018 LSA ES RFO was highly publicized in the trade press based on the CPUC Resolution.

PG&E initiated a comprehensive process for communicating with bidders for the 2018 LSA ES RFO. PG&E again utilized the PowerAdvocate Platform as the means for Participants to submit their offers. Similar to the 2016 ES RFO, PG&E established two separate events on the PowerAdvocate Platform – one for Utility-Owned options and one for third-party options. In addition to establishing a mechanism for Participants to submit their offers to PG&E in a confidential manner, PG&E also used the Utility-Owned event to provide a significant number of technical and commercial/administrative files regarding the Moss Landing site and project that Participants could access. PG&E also established a section on its public website for distribution of information to prospective Participants and other interested parties. The public website also included contact information for PG&E should prospective Participants wish to ask any questions or request follow-up information.

The PG&E internal website contained all the pertinent solicitation documents, presentations for prospective bidders, schedule for the solicitation, CPUC Resolution and a list of questions and answers related to the solicitation. The following documents and information were included on the public website for Participant review and utilization:

- CPUC Resolution E-4909;
- Solicitation Schedule for the 2018 LSA ES RFO
- RFO Documents including the ES RFO Protocol and associated Appendices[6]
- Participants Webinar Presentation and attendees list.
- Power Advocate instructions
- Contact Information for PG&E and the IE
- Frequently Asked Questions
- Confidentiality Agreement
- Site visit information for the Moss Landing

A total of 17 questions and answers were posted on the website, including questions from the Participants Webinar and Frequently Asked Questions. The IE found the website easy to access and navigate. All documents associated with the 2018 ES RFO were included on the website and were easy to identify, access, and download.

B. Identify Principles Used to Determine Adequate Robustness of a Solicitation (e.g. number of proposals submitted, number of MWhs associated with submitted proposals).

[6] The Appendices posted included the documents Participants must submit with their offers (i.e. Offer Form, Project Description, Site Control document, Project Milestone Schedule, Experience Qualification statement, Electric Interconnection documents, Organizational and Financial information and Confidentiality Agreement). Other Appendices included the various contracts for the products solicited, utility-ownership term sheets for the EPC contract agreement, Build, Own, Transfer agreement, and Long-Term Performance and Maintenance Agreement. Other documents such as Sample introductory letter, Letter of Credit, and list of eligible substations for interconnection location were also included.

With regard to assessing whether the response to the solicitation was adequately robust, there are several criteria to consider:

- Was the response to the solicitation commensurate with the level of outreach?
- Did the solicitation encourage a diverse response from Participants in terms of products requested, project structure, pricing options, etc?
- Was the response large with respect to the number of proposals and megawatts ("MW") offered relative to the amount requested?
- Was the process a competitive process based on the amount of MW submitted by Bidders relative to the number of MW requested?
- Were the Solicitation Documents clear and concise such that Participants could clearly assess how to structure a competitive offer?

C. Did the IOU Do Adequate Outreach? If Not, Explain in What Ways it Was Deficient

There are several criteria generally applied for assessing the performance of the utility in its outreach and marketing activities:

- Did the utility contact a large number of prospective Participants?
- Were the utility's outreach efforts active or passive?
- Did the utility adequately market the solicitation?
- Could prospective bidders easily access information about the RFP?
- Did any prospective bidders complain about the process or access to information?

As noted above, PG&E contacted a large number of prospective Participants to inform them of the issuance of the RFO. In addition, the RFO was highly publicized in the trade press based on the CPUC Resolution requirements. The outreach activities of PG&E can be classified as "active" given that emails about the solicitation process were directly sent to prospective Participants. In addition, PG&E held a Participants webinar to provide information on the solicitation process, and to allow the Participants to ask questions and seek information about the solicitation process.

D. Was the Solicitation Adequately Robust

The overall result of this outreach activity was a robust response from Participants. Offers were also received from a range of eligible Sellers who offered proposals for all products/contract structures requested at all desired locations.

A total of approximately 100 offer variations were received, which represented 29 projects from [redacted] counterparties. [redacted] Appendices A and B of this Report contain a list and summary of the Offers submitted. The IE found the response from the market to be robust and competitive for each product category, particularly given the short lead time allotted to submit offers.

In conclusion, the response of the market to PG&E's 2018 LSA ES RFO provides evidence that the outreach and Participant engagement activities of PG&E were effective, and Participants felt they had an adequate opportunity to receive a contract from the process.

E. Did the IOUs Seek Adequate Feedback About the Bidding/Bid Evaluation Process From All Bidders After the Solicitation Was Complete?

PG&E's project team members were involved in regular communications with prospective Participants, primarily after submission of the offers. Also, PG&E agreed to debrief Participants who submitted offers that were not selected about the general reasons for non-selection. The IE participated in calls with a number of Participants.

F. Was the Outreach Sufficient and Materials Clear Such That the Bids Received Meet the Needs the Solicitation Was Intending to Fill?

PG&E spent considerable time and effort in developing the Protocol Document and Offer Forms to ensure the documents were clear and concise. PG&E did update the 2018 LSA ES RFO Protocol prior to submission of Offers on March 28, 2018. With the exception of revising the minimum size for the Moss Landing EPC option from 205 MW to 195 MW, the updates were minor and should not have created any issues with regard to affecting the timing of offer submission by Participants to reflect any new information in their Offers. The IE had the opportunity to review of the 2018 LSA ES RFO Protocol document and Offer Forms, during the development of the Protocols and provided comments on the documents. The IE's comments were designed to ensure the information was consistent and clear to Participants.

Overall, the IE was of the opinion that the documents and follow-up information presented by PG&E were clear and concise and provided all Participants the opportunity to develop a complete and conforming Offer. The IE also felt that the documents and follow-up webinar provided detailed information for Participants to decide if they wanted to participate and to understand the requirements for competing. Prospective Participants

had multiple opportunities to ask questions and participate in interactive discussions with PG&E staff regarding the Offer Forms, Attachments and contracts.

The IE also found that PG&E's project team was particularly responsive to the needs of prospective Participants and also responded to questions in a timely and thorough manner.

G. Any Other Relevant Information or Observations

Most of the Participants provided reasonably complete proposals with a moderate amount of clarification questions or information requirements after submission. After submission of the Offers, PG&E's project team also worked diligently to ensure that the Participant Offer's conformed to the requirements of the RFO. Team members were in contact with the Participants after submission of the Offers. The IE participated in a number of calls with Participants after Offer submission for the purpose to either ensure the Offers were conforming, if possible. PG&E's project team made every attempt to allow Participants to cure any deficiencies and conform their offers to RFO requirements within reason and subject to RFO requirements. As a result, a number of Participants posted revised Offer Forms and Offer Structure letters to the PowerAdvocate Platform.

IV. Administration of the LSA ES RFO Solicitation Process

In performing its oversight role, the IE participated in and undertook a number of activities in connection with the 2018 LSA ES RFO including providing comments on the RFO documents, participating in regularly scheduled conference calls with the PG&E project teams given the expedited nature of the solicitation, participating in discussions on the offer evaluation methodology and selection process, organizing and summarizing the offers received, reviewing and commenting on the evaluation and selection process and results at each step of the process, and participating in meetings with the CAM group and PRG

A list of the key milestone events which occurred during the solicitation process as well as the activities of the IE during the procurement process consistent with the important activities and milestones for the process are described below.

Project Kick-off Meeting

The PG&E and Merrimack Energy project teams held a kick-off meeting via conference call in early February 2018 to discuss the schedule for the RFO, evaluation methodology, and overall solicitation process. PG&E provided an overview of the expedited schedule for the project and provided a high-level discussion regarding the similarities and differences between this RFO and the 2016 Energy Storage RFO, for which Merrimack Energy served as IE. Merrimack Energy inquired about the contract structures that would be used and products solicited and also asked questions about the evaluation methodology and evaluation parameters based on the CPUC Resolution. PG&E also

asked the IE if the IE could identify any "lessons learned" from the implementation of other expedited Energy Storage RFOs for which Merrimack Energy served as IE.

PG&E suggested the Company and IE set up weekly conference calls to discuss any issues that may arise during the solicitation process, similar to the process adopted for the 2016 ES RFO that proved to be valuable for ensuring everyone was up-to-date with the process. After the call, PG&E also provided a draft copy of the LSA ES RFO Protocol for review and comment. The IE provided comments back shortly after receiving the document.

Based on the questions from the IE, PG&E noted that the contracts for third-party RA and BTM Agreements will be very similar to the agreements executed from the 2016 ES RFO. Given the timeframe allotted, PG&E's objective was to allow no changes or minimum changes to the contracts given the recent Energy Storage Agreements executed.

After the meeting, Merrimack Energy prepared a list of follow-up questions and sent the questions to PG&E for comments. The parties subsequently held a call to discuss the questions and determine if the IE had any additional questions.

CAM/PRG Meeting

PG&E provided a presentation to the joint Cost Allocation Mechanism (CAM)/Procurement Review Group (PRG) on February 22, 2018 on the Local Sub-Area Request for Offers (RFO). PG&E provided an overview of CPUC Resolution E-4909, a description of the local sub-area needs for the Pease, Bogue, and South Bay-Moss Landing areas, an overview of the RFO and the RFO schedule. PG&E noted that the Resolution provided that PG&E may solicit offers for energy storage and/or preferred resources. PG&E informed the groups that it plans to launch two solicitations for resources in the sub-areas. Track 1, which is for energy storage resources will be launched on February 28, 2018. Track 2 would be for preferred resources (including energy storage) and would be launched later in 2018. PG&E indicated that consistent with the requirements of the Resolution it will continue to coordinate with CAISO to identify any transmission solutions or other options that may help mitigate the local sub-area deficiencies.

PG&E provided an assessment of the sub-area capacity deficiencies based on netting out resources that currently have RMR or CPM status. This would result in a deficiency of 29 MW in the Pease area and 893 MW in the South Bay – Moss Landing area. Resources required in the Bogue area would help solve the voltage problem in this area.

PG&E also identified that the allowable contract structures for this RFO would include third-party owned resources similar to PG&E's 2016 ES RFO including Energy Storage RA Agreements for front-of-the-meter projects and BTM Capacity Storage Agreement for behind-the-meter projects. Utility-owned resources will also be eligible. PG&E is seeking offers for Engineering, Procurement, and Construction Agreement ("EPC") for

its utility-provided site at Moss Landing and a Build-Own-Transfer ("BOT") Agreement for projects at any site within the sub-areas.

Issuance of the LSA ES RFO

PG&E launched its Local Sub-Area Energy Storage RFO on February 28, 2018 as identified. The RFO Protocol was subsequently revised and an updated version was posted on March 9, 2018.

Separate RFO Requirements/Webpages

Similar to the 2016 Energy Storage RFO, PG&E is seeking both third-party options as well as utility-ownership options. PG&E has taken a similar approach in this RFO with regard to the establishment of separate teams for implementing the solicitation and separate bid events within the PowerAdvocate Platform. PG&E has established a specific team within its utility generation group to manage the interaction with bidders for the utility-owned component of the RFO. The team is responsible for conducting due diligence on the offers, managing the communications with bidders, and conducting the negotiations. Participants for utility-ownership options can access the specific event or webpage on PowerAdvocate associated with this product and can access documents and submit their offers via the specific event established for utility-ownership options. In addition, third-party bidders can access a separate event or webpage for their offers and will be able to access documents and submit their offers to the specific event. PG&E's lead team for the solicitation will have access to both events. However, members of the utility-ownership team will have access only to the webpage established within PowerAdvocate for utility-ownership options. This separation is designed to maintain confidentiality of the bidder information by limiting access in PowerAdvocate and also serves to ensure that bidders for each event only have the information they require to complete their offers.

Participants and Offer Form Webinar

PG&E held its Participants and Offer Form Webinar on March 7, 2018. The IE provided comments on the presentation slides and monitored the Webinar. Topics addressed at the Webinar included:

- Overview of Resolution E-4909 as the impetus for undertaking the RFO;
- Solicitation Overview including the products sought, Agreement options, and project schedule;
- Safety requirements;
- Interconnection information to be provided with the Offer (Appendix B5);
- Overview of the Energy Storage RA Agreement and BTM Capacity Storage Agreement;
- Overview of the Utility-Owned EPC project at Moss Landing substation;
- Utility-owned Build, Own, Transfer option;
- Description of the Evaluation Methodology;
- Offer submittal process and information requirements;

- Keys to a successful Offer;
- Description of the Offer Form; Offer Form Instructions; Offer Form validation; Participants project information.

For the previous two Energy Storage solicitations, PG&E held a separate Webinar devoted totally to review of the Offer Form. Given the timeframe for the solicitation, PG&E included a discussion regarding completion of the Offer Form as part of the Participants Webinar. However, PG&E did devote a considerable amount of time describing the Offer Form requirements

A total of 100 individuals attended the Participants Webinar, representing an estimated 62 companies.

Questions and Answers

PG&E received a total of 17 questions and provided responses on its website for the RFO. The responses to the questions were grouped into the following categories:

- General (4 Q&As)
- Site Control (1)
- Interconnection (5)
- Evaluation (2)
- Utility-Owned projects (2)
- Offer Form (3)

Reviewed and Commented on Internal Evaluation Protocols and Evaluation Methodology

The IE conducted reviews of drafts of the internal evaluation protocols and criteria to be used in the evaluation of offers once received. The IE discussed his comments with the Quantitative Evaluation ("Quant") team at PG&E regarding the protocols. The internal evaluation protocols were completed in final form and sent to the IE prior to receipt of the offers.

The IE also coordinated with the Quant team to review the integration model, which was originally developed for the 2014 Energy Storage RFO but has now been used for three storage related solicitations. The integration model is a tool developed by PG&E which allows the IE to quickly review and evaluate the outputs and inputs for each offer by keying in the offer number. The integration model essentially pulls in and organizes all the input and output information for each offer and presents the output data in several forms, including total cost and benefits by year as well as the complete information and backup for each metric compiled. This tool greatly facilitated the IE review and assessment of the offers received.

Receipt of Offers – March 28, 2018

The deadline for PG&E to receive offers was March 28, 2018 at 1:00 pm PPT. Participants were required to submit all required forms and documents to the PowerAdvocate Platform. Upon receipt of offers on PowerAdvocate, the IE reviewed the offers and prepared a summary table which contained pricing, operational information, commercial and other pertinent information associated with each offer. As noted below, PG&E received a total of 100 offers including [redacted] offers from [redacted] Suppliers for the utility-ownership EPC option at the Moss Landing site, [redacted] offers from [redacted] Suppliers for a BOT option and [redacted] offers from [redacted] projects provided by [redacted] Suppliers for third-party RA and BTM offers.

Table 2 provides a list of all offers originally submitted by Participants for third-party offers. Table 3 provides a list of all offers originally submitted for utility-owned offers. The Comments column attempts to generally explain the characteristics of the offer variations in cases where a Participant proposes multiple offer variations.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

The IE and PG&E team also reviewed the offers for conformance with eligibility requirements and completeness of the offers. After review and discussions, it was determined that [redacted] of the third-party offers were conforming and [redacted] non-conforming. [redacted]

[redacted]

For the utility-ownership options, [redacted]

Evaluation of the Offers Submitted

After submission and initial review of the offers, PG&E's evaluation team members reviewed the offers and organized the input data into a file to allow for review and evaluation of the offers received. The initial task involved review of the offers to ensure all the information required for the evaluation was provided and was consistent with the inputs necessary for bid evaluation. PG&E submitted emails for bidders with regard to clarifications or inconsistencies about their offers. PG&E identified the issue and allowed bidders the opportunity to cure and resubmit completed offers via the PowerAdvocate website when warranted. PG&E also held phone conversations with a few Participants who either provided inconsistent information or required clarification of their offers. The IE attended the majority of the calls with Participants.

Subsequent to this review, PG&E began to evaluate the offers and prepare evaluation sheets with the offer evaluation results. PG&E submitted initial evaluation output files to the IE at the project team meeting on April 9, 2018 as identified below. At the meeting, the PG&E project team walked through the preliminary results.

As evaluation results were updated, PG&E submitted additional output runs to the IE. The IE reviewed each successive output file submitted by PG&E and raised questions as required regarding the evaluation results.

Also, PG&E at the IE's request prepared an integration model for the IE which compiled the input and output data for each offer to allow the IE to review the results in detail. The IE utilized the integration model to assess the evaluation results for the higher ranked offers in each category.

Meeting with PG&E Project Team

The IE and PG&E project team met at PG&E's offices on April 9, 2018 to review the initial bid evaluation results to inform shortlist selection and to review the classification of offers as conforming and non-conforming. In addition, given the expedited schedule, the IE proposed several additional topics for discussion including the schedule going forward, IE review of the revenue requirements model and assumptions, review of evaluation results using the integration model, contract negotiation teams, timing for shortlist selection, and status of meetings/coordination with the CAISO.

CAM/PRG Meeting – April 16, 2018

A joint CAM/PRG meeting was held on April 16, 2018 at which PG&E provided the results of its evaluation of energy storage offers for the 2018 LSA ES RFO and recommended a shortlist of offers. PG&E provided an overview of the schedule of the solicitation going forward as well as an overview of CPUC Resolution E-4909.

[redacted][7] [redacted][8] [redacted]

[redacted]

[redacted]

[7] [redacted]

[8] [redacted]

[redacted]

Shortlist Notification to Bidders

Shortly after the PRG meeting, on April 18, 2018, PG&E notified the Participants that had projects selected for the shortlist as well as those who were not selected. PG&E identified any offers selected for the shortlist as well as those offers not selected. PG&E informed the selected shortlisted Participants that if they wished to continue to participate in the solicitation process they would have to respond via email to PG&E's notification

letter by April 20, 2018. For third-party options, PG&E's notification letter also identified the following requirements for continued participation:

- Submission of a Shortlist Offer Deposit in the amount of $3/kW of the Payment Quantity by April 23, 2018;
- [redacted];
- Note that the Expected Initial Delivery Date must be no later than 2020 and the first day of the first showing month for which product is delivered;
- Acknowledge and accept PG&E's Confidentiality Agreement;
- Inform PG&E if the project has been or will be submitted in another solicitation with PG&E or another entity.

PG&E also informed shortlisted bidders via the Notification Letter that all shortlisted RFO participants are required to complete PG&E's safety registration and prequalification process with ISNetworld, PG&E's primary contractor safety management system, in order to be eligible for execution of an Agreement in the Local Sub-Area RFO. PG&E noted that all storage Sellers would be required to maintain an active ISNetworld subscription in compliance with PG&E's Contractor Safety Program during the Term of the Agreement. PG&E provided a phone number and email address for ISN to guide the participants.

[redacted]

PG&E also notified shortlisted Participants that if they decide to withdraw from the Solicitation they must provide PG&E five business days' notice that the Participants wishes to withdraw.

PG&E also submitted letter notifications to Participants who were not shortlisted and offered the opportunity for a de-briefing call with the counterparty.

PG&E followed up with shortlisted Participants the same day that notifications were issued to ensure the Participants had received their shortlist notifications, to inform Participants of the next steps in the process and to answer any questions from the shortlisted Participants. PG&E identified the PG&E primary contacts for the Participant and reminded the Participant that PG&E [redacted]. PG&E also provided the shortlisted Participants a clean version of the form agreement and requested the Participant to populate all fields necessary to incorporate all project specific information as specified in the shortlisted offer and return the Agreement as soon as

possible. PG&E also requested via the email available time slots from the Participant to set up an initial meeting with the Participant the following week.

Due Diligence Process and Best and Final Offers for EPC Bidders

The process followed with the [redacted] shortlisted Participants[9] for the EPC option proceeded on a different path given the time required to complete a very complex EPC contract negotiation process. PG&E set up face-to-face meetings with each project team at its offices for April 23-24th. Each meeting was scheduled for 6 hours. Agenda items included:

[redacted]

The IE and the PG&E utility-ownership team held a conference call on April 30, 2018 to discuss [redacted]

[9] At the time of shortlist selection, PG&E's utility-ownership team convened a conference call with the IE to discuss the basis for shortlist selection and to address any questions the IE had about the selection. [redacted]

[redacted]

Communications with Shortlisted Third-Party Participants

Shortly after the selection of the shortlist on April 18, 2018, PG&E initiated communications with the shortlisted third-party counterparties as previously noted. After PG&E submitted the notification letters to Participants, PG&E set up calls or meetings with each shortlisted Participant to discuss the offers. PG&E asked the Participants to populate the ESRAA or BTM agreement with their project specific information. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Table 5 provides a summary of the original and best and final pricing for each shortlisted project.

[redacted]

[redacted]

[redacted]

Project Team Meetings

During the solicitations process the IE held weekly meetings with PG&E's transaction team to discuss the contract negotiation process and any issues which emerged during the solicitation process. The group also discussed any outstanding or emerging issues associated with the overall implementation of the evaluation and selection process. The meeting also identified any potential issues, possible revisions to the standard form agreements, and any revisions in pricing and value calculations.

Advisory Committee Meeting

On May 16, 2018, the PG&E Solicitation team provided a presentation to its internal Advisory Committee to discuss the status of the solicitation and potential project selection. The team presented background information on the CPUC Resolution E-4909, its current perspective on the applicable local sub-area requirements, summary of PG&E's discussions with CAISO, feedback received from the CPUC, and the status of projects on the shortlist for each sub-area. The team also provided a list of the next steps and key dates.

[redacted]

[redacted]

[redacted]

[10] [redacted]

[redacted]

Revisions to the Shortlist

During the shortlist evaluation and negotiation process, activities associated with a [redacted]

[redacted]

[redacted]

PRG Notification

On May 24, 2018 PG&E notified the Cost Allocation Mechanism/Procurement Review Group of the Offers for potential transactions from the 2018 Local Sub-Area Energy Storage Request for Offers. [redacted]

[redacted]

[redacted]

[redacted]

V. Appropriateness of the Local Sub-Area Energy Storage RFO Bid Evaluation and Selection Methodology and Design

A. Identification of Principles for Evaluating PG&E's Bid Evaluation Methodology

This section of the report addresses the principles and framework underlying the IE's review of PG&E's evaluation and selection methodology for the 2018 Local Sub-Area ES RFO solicitation process. One of the important questions in this regard is whether the bid evaluation and selection methodology was fair and appropriate for this type of solicitation. Key areas of inquiry by the IE and the underlying principles used by the IE to evaluate the methodology include the following:

- Were the procurement targets, products solicited, principles and objectives clearly defined in PG&E's 2018 Local Sub-Area ES RFO and other materials?

- Is the IOU bid evaluation based on those criteria specified in the bid documents? In cases where bid evaluation goes beyond the criteria specified in the bid documents, the IE should note the criteria and comment on the evaluation process.

- Do the IOU bid documents clearly define the type and characteristics of products desired and what information the bidder should provide to ensure that the utility can conduct its evaluation?

- Does the methodology identify how qualitative and quantitative measures were considered and were consistent with an overall metric?

- Are there differences in the evaluation method for different technologies that cannot be explained in a technology-neutral manner?

- Was the bid evaluation and selection process and criteria reasonably transparent such that Participants would have a reasonable indication as to how they would be evaluated and selected?

- Was the bid evaluation methodology consistent with CPUC direction?

- Was PG&E's bid evaluation based on and consistent with the information requested in the RFO to be submitted by Participants in their proposal documents?

- Were the bid evaluation criteria consistently applied to all offers?

- Does the quantitative evaluation methodology allow for consistent evaluation of bids of different sizes and in-service dates? Are there differences in the evaluation method for different technologies that cannot be explained in a technology-neutral manner?

- Did the bid evaluation criteria and evaluation process contain any undue or unreasonable bias that might influence project ranking and selection results or in any way favor affiliate bids?

- Was the 2018 Local Sub-Area ES RFO clear and concise to ensure that the information required by PG&E to conduct its evaluation was provided by project sponsors?

- Did the IOU bid evaluation criteria change after the bids were received? Explain the rationale for the changes.

In the view of the IE, the 2018 LSA ES RFO Solicitation Protocol Document and related Appendices provide a significant amount of information on which Participants can base their offers. The documents contain detailed information on the products sought, the information required of Participants for offer submission, contract provisions, evaluation criteria and a description of the evaluation methodology. In addition, PG&E held a Participants Webinar to further describe the evaluation methodology, evaluation criteria, information required of Participants, and guidance on how to complete the offer forms. Overall, the IE concludes that the products solicited, procurement targets, protocol information and quantitative and qualitative evaluation criteria were generally clearly defined and applied. PG&E generally followed its evaluation criteria and methodology in undertaking the evaluation of the offers. Furthermore, the methodologies applied to the different types of products were fair and reasonable and did not unduly bias any technologies or products. While PG&E did apply different evaluation methodologies and models (e.g. Revenue Requirements model for EPC options) to the various proposals or project structures sought, the methodologies applied were consistent with the project structure evaluated.

The IE found that the evaluation methodology and criteria were consistently applied to different products, technologies, different terms and start dates. The methodology had to address not only third-party energy storage agreements (i.e. Energy Storage Resource Adequacy and Behind-the-Retail Meter Capacity Storage Agreements) but utility ownership offers whereby PG&E would own and operate the project (i.e. EPC Agreement for Moss Landing and BOT Agreement for utility ownership). In such cases, PG&E clearly described the methodologies to be applied to each type of product in its evaluation protocols submitted to the IE and included all reasonable costs consistently in the evaluation. In addition, PG&E generally followed its evaluation criteria in undertaking the evaluation process.

To address the other issues identified, the IE will first present a detailed description of the bid evaluation methodology and process implemented by PG&E to undertake the evaluation. This includes both the quantitative and qualitative criteria used in the evaluation. Subsequently, the IE then discusses the strengths and weaknesses of the methodology relative to the issues identified above.

B. Overview Description of PG&E's Least Cost Best Fit ("LCBF") Evaluation Methodology Adjusted to Obtain a Mix of Attributes

This section of the report provides an overall description of PG&E's LCBF bid evaluation methodology, procedures, and criteria applicable to the 2018 LSA ES RFO. The methodology selected is designed to generally conform to the Least Cost Best Fit ("LCBF") procedures applied in other solicitations. However, the methodology also needs to address the unique nature of Energy Storage resources and the eligible products/contract structures allowed. In particular, given the number of products/contract structures allowed and the technology options eligible, PG&E's evaluation protocols, methodology and criteria are very detailed and complex and are designed to address the nuances associated with the evaluation of each eligible contract type. For this report, the IE is providing a general summary of the overall methodology and criteria used in the evaluation in this section of the report. In addition to the general summary of the overall methodology, the IE report also describes the process used to evaluate the energy storage options for the Utility-Owned EPC Project option at the PG&E owned Moss Landing substation site, based on the different methodology and assumptions utilized.

The 2018 LSA ES RFO bid evaluation procedure and methodology was designed to include evaluation of both quantitative and qualitative attributes of each offer to assess its value to PG&E's customers and relative value in comparison to other proposals. This includes but is not limited to: Net Market Value (NMV), Portfolio-Adjusted Value (PAV), Project Viability, Supply Chain Responsibility, Credit, and Safety. Each of the above criteria has a corresponding internal protocol.[11] The evaluation procedure discussed below describes how to combine the criteria to determine the ranking and inform shortlist selection.

A Net Market Value assessment will be performed on all offers by first calculating each project's Net Market Value (NMV) and then making adjustments to account for their impact on PG&E's portfolio, yielding a list of offers ranked by Portfolio Adjusted Value (PAV). NMV and PAV will be measured in Present Value [redacted] and ranked from highest to lowest.

The following describes the general evaluation process flow envisioned by PG&E for undertaking the evaluation process once the Evaluation Team commenced formal reviews[12]:

---

[11] PG&E has developed Internal Evaluation Protocols for each of the evaluation criteria listed in this section for the 2018 Local Sub-Area ES RFO. The Evaluation Protocols have been approved by PG&E's Steering Committee and are used as the basis for the evaluation process. The information contained in the Evaluation Protocols and described in general in the Local Sub-Area Energy Storage Solicitation Protocol document are summarized in the write-up in this section of the report.

[12] PG&E's Evaluation Teams reviewed the offers when received to ensure the Participants provided the requested information and to identify any inconsistencies in the offer forms and other offer information. In addition, the Evaluation Team also identified cases where the data appeared inconsistent or where further clarification of the information was required. In such cases, PG&E contacted the Participants to seek to clarify or correct the data prior to conducting the offer evaluation process.

1. All offers will be reviewed to determine whether or not they meet the applicable eligibility requirements for consideration in the RFO

2. All eligible offers will be run through the NMV and PAV valuation and adjustment models for an initial evaluation;[13]
   - Valuations will be updated when new information is received from Participants (i.e. updated pricing because of delayed interconnection studies, updated pricing offers based on a continuously competitive process, best and final pricing for the EPC shortlisted options).

3. Complete utility-ownership offers will be sent to the Utility Ownership Evaluation Team for an assessment of Project Viability;

4. Offers will be organized in groups by agreement type;

5. Offers will be ranked by PAV within the groups;

6. For Utility Ownership Offers, Project Viability scores will be applied and [redacted]

7. To develop the shortlist, PG&E will consider the following qualitative factors:
   - Contract term and Commercial Operation Date
   - Supply Chain Management (only Small Business Enterprise component)[14]

   Based on these qualitative factors projects that may have a lower PAV result could be added to the shortlist to ensure there are a diverse number of technology types, counterparties, contract terms, and commercial operation dates to manage the risk of not having a diverse portfolio of projects to negotiate with, if applicable for this solicitation.

8. After shortlisting, the following additional criteria will be considered before executing an agreement:
   - NMV/PAV (to account for changes in value which might occur during negotiations);
   - Project Viability;
   - Credit;

[13] PG&E's Storage Valuation Model was the primary tool used for undertaking the evaluation. The Storage Valuation model calculates the energy value, capacity value, ancillary service value, and the fixed and variable cost and PAV adjustments. For utility ownership options, PG&E uses an internal Revenue Requirements model to calculate annual revenue requirements to provide fixed cost inputs to the Storage Valuation Model. PG&E provided detailed documentation for the Storage Valuation Model to the IE along with the Revenue Requirements model used to calculate the annual revenue requirements for utility-owned offers.

[14] Based on these qualitative factors, projects that may have a lower PAV result could be added to the shortlist to ensure there are a diverse number of technology types, counterparties, contract terms, and commercial operation dates to manage the risks of not having a diverse portfolio of projects to negotiate with.

- Contract Modifications;
- Safety;
- Contract term and Commercial Operation Date[15]

C. Detailed Description of the Evaluation Process

The following section of the report provides a more in-depth discussion of the components of the evaluation methodology and process and describes in general how the various storage offers would be evaluated. In addition, this section includes a description of the input assumptions utilized for evaluation purposes.

PG&E Energy Storage Evaluation Methodology

This section of the Report will present an overview of PG&E's energy storage evaluation methodology, including a review and assessment of both the Net Market Value ("NMV") and Portfolio Adjusted Value ("PAV") metrics to be used to value and rank energy storage offers from a quantitative perspective. PG&E has developed energy storage evaluation models and methodologies that allow for the evaluation of the contract/product options solicited.

This section of the report will provide a high-level overview of the quantitative methodology used by PG&E to value storage options.

Market Valuation Assessment

PG&E's evaluation methodology applies "Least-Cost, Best-Fit" principles, using quantitative and qualitative criteria to evaluate the submitted offers. From a quantitative perspective, PG&E considers both Net Market Value (NMV) and Portfolio Adjusted Value (PAV) criteria. The evaluation methodology applied by PG&E starts with the calculation of the Net Market Value for each storage offer submitted. NMV is used to value offers according to their "stand-alone" economic merits regardless of their use in any portfolio.

In the solicitation process, a Participant submits a storage offer for the particular contract or product type which details the costs and operational characteristics[16] of the energy storage facility. This information is provided on the Bid Forms included in the RFO package. These offers have to be evaluated and compared to one another. Market Valuation considers how a particular Offer's costs compare to the market value of its

[15] Another factor not listed above but which became an important criterion for shortlist selection was project location with specific sub-areas or interconnection location. [redacted]

[16] The operational characteristics requested from the bidders include: Design Dmax (MW), Design Dmin (MW), Design Discharge Duration, Design storage energy, Design Cmax (MW), Design Cmin (MW), Design charge duration (hours), Guaranteed efficiency, Ramp rates, Start-up times, and transition times from charge to discharge and vice versa, ancillary service capability, run time limitations, and daily constraints.

benefits. For each Offer, Net Market Value is calculated as the starting point of the evaluation. NMV is calculated based on several components as follows:

Net Market Value: NMV = E + A + C + (V + F) where

E = Energy Value
A = Ancillary Service (A/S) Value
C = Capacity Value
V = Variable Cost (negative)
F = Fixed Cost (negative)

The cost and market benefits associated with a particular Offer are to be included in Market Valuation. These costs and benefits in Market Valuation do not include portfolio costs, portfolio benefits, or desirability associated with a particular Offer's impact on PG&E's Service Area aggregate portfolio positions.

[redacted]

The [redacted] were used for evaluating and shortlisting the Offers received. The curves may be updated on a monthly basis post-shortlisting.

Offers are classified into four contract/product types:

- Energy Storage Resource Adequacy (ES RA) Agreement;
- Behind-the-Retail Meter Capacity Storage Agreement (BTM CSA);
- Engineering, Procurement, and Construction (EPC) Agreement for Moss Landing Ownership, and
- Build, Own, Transfer (BOT) Agreement for Utility Ownership.

While PG&E applies similar NMV calculations for all the contract and product types listed above, there are several nuances for each agreement option that affects the application of the NMV methodology.[17]

[17] For example, for ES RA offers, Energy Value, A/S Value and Variable Cost will all be zero. Only Capacity Value is calculated in the same way as for other third-party offers. BTM offers, on the other hand, include Energy Value, Variable Cost and Fixed Cost. Under the BTM offer, PG&E does not settle energy from the project with CAISO but receives the Energy Settlement value from the Seller. For BTM offers, Energy Value is the part of the Energy Settlement that is attributable to the largest energy price spreads corresponding with the ES duration multiplied with Payment Quantity.

Valuation Components

An overall description of the methodology applied for calculating each component of NMV as described in the Protocol document is provided below. As a note, for the Energy Storage Resource Adequacy Agreement (ES RA), PG&E only purchases the capacity product from the Seller. [redacted]

Under the Behind-the-Retail Meter Capacity Storage Agreement (BTM CSA), PG&E receives (1) the Energy Settlement and (2) the RA capacity from the Seller. [redacted]

Under the EPC Agreement for Moss Landing, the Energy Storage project is to be built to meet PG&E specifications, on PG&E-owned land within the Moss Landing substation. Since PG&E will own and operate the Energy Storage project participating in the CAISO markets, EPC Agreement Offers provide energy, A/S Value and Capacity Value.

Under a Build, Own and Transfer (BOT) Agreement for Utility Ownership, the project is constructed on a third-party-owned site and PG&E takes ownership of the Project once it has been constructed to the specifications in the BOT, is operational, and has satisfied certain tests.

The following sections describe in more detail how the costs and benefit values of each component are included for each Agreement type.

Energy Value

Energy value captures the value associated with the electric energy price in the CAISO markets for each Offer over its delivery term. The payoff of energy storage is the spread between the revenue from discharge energy and cost of charge energy. For offers that provide energy value, the market value of energy will be computed from the appropriate price curves for the corresponding Trading Hub (NP15) adjusted for congestion and losses specific for the project location to account for the Location Marginal Price ("LMP") at the specific project location.

[redacted]

[redacted]

[redacted]

[redacted]

Ancillary Service (A/S) Value

For Offers that provide PG&E the ability to schedule and receive CAISO market revenues for Ancillary Services in accordance with CAISO Tariff requirements, the incremental benefit of having Ancillary Service capability will be captured. [redacted]

[redacted]

[redacted]

Capacity Value

Capacity value is the net present value of monthly capacity values across all months during the delivery period. [redacted]

[redacted]

The amount of NQC and EFC are determined by the particular asset operating characteristics as specified in its Offer. NQC for ES offers is, in general, based on the maximum discharge power that ES can continuously sustain for 4 hours in 3 consecutive days. EFC for Dispatchable ES offers will be determined based on the Appendix B of CPUC Decision 14-06-050 dated June 26, 2014. The calculations are implemented in the Offer Form.

Fixed Cost

Fixed costs are determined by the net present value of monthly Contract Payments for Third-Party Owned projects or annual Revenue Requirements for Utility-Owned projects, and Administrative Costs, which accounts for PG&E's cost of contract management and resource scheduling if applicable. [redacted]

Fixed costs for a BTM CSA and ES RA Offers are calculated as the sum of Contract Payments and Administrative Costs. Monthly Contract Payments are equal to the product of monthly Payment Quantity times the monthly Contract Price. [redacted]

[redacted]

For BOT and EPC Offers, which will be owned by PG&E, annual fixed costs will be the annual revenue requirement (RRQ) as determined by the Revenue Requirements ("RRQ") model assuming standard cost-of-service ratemaking. The annual revenue requirements are thus calculated based on the formula:

$$R = E + D + T + kB$$

Where:

R = Revenue Requirements in a specific year
E = Expenses in a specific year D = Book Depreciation in a specific year
T = Taxes paid in a specific year
k = Rate of Return
B = Rate base in a specific year

The revenue requirement in each year is the amount that the utility must collect from customers to recover its expenditures and earn its allowed rate of return.

Expenses

Expenses are assumed to be recovered directly from customers in the year in which they occur. [redacted]

[redacted]

[redacted]

Portfolio Adjusted Value

Portfolio Adjusted Value ("PAV") is intended to represent the value of a resource or Offer in the context of PG&E's bundled portfolio of resources. The calculation of PAV for PG&E's 2018 Local Sub-Area Energy Storage RFO will use Portfolio Adjusted Value ("PAV"), which is NMV with four additional valuation components. The calculation of PG&E's PAV for 2018 LSA RFO thereby makes explicit and systematic bundled-portfolio adjustments for: (1) Transmission Network Upgrade Costs; (2) Increased system efficiency; (3) Avoided Renewable Curtailments; (4) Delivery Period adjustments

Specifically, PAV = Net Market Value plus

- PAV Transmission Network Upgrade Costs plus
- PAV Adjustment for Increased System Efficiency plus
- PAV Adjustment for Avoided Renewable Curtailment plus
- PAV Adjustment for Delivery Period

As previously noted, the starting point for calculating the value of each offer is the calculation of Net Market Value of each offer. Net Market Value components include the following: Cost, Energy, Ancillary Service (A/S) and Capacity. Each of these

components is measured in [redacted]

[redacted]

Each of the PAV adjustments is described below.

Transmission Network Upgrade Cost Adders

Transmission Network Upgrade ("TNU") cost adders are calculated as the Present Value of the Revenue Requirement ("PVRR") of the refundable TNUs for each offered project. TNU cost adders include, as applicable, Reliability Network Upgrade ("RNU") costs and either Deliverability Network Upgrade ("DNU") or Local Deliverability Network Upgrade ("LDNU") costs. TNU cost adders do not include Area Deliverability Network Upgrade costs because these are either (a) associated with satisfying a bulk need identified in the Transmission Planning Process (TPP) for a particular area, or (b) not refundable to the interconnection customer. The TNU cost adders for Behind-the-Retail-Meter projects are assumed to be zero because these projects are considered to not directly trigger TNUs.

Only the refundable portion of TNU costs are included in the adders because these costs are ultimately paid for by transmission rate-payers (after initially being funded by the interconnection customer). The non-refundable portion of the RNU cost is not included in the transmission adder because this portion is borne by the Seller (as the Interconnection Customer) and thus assumed to be reflected in the bid price for a project. [redacted]

The revenue requirements associated with the TNUs are [redacted] For PG&E's 2018 LSA RFO, only projects offering full capacity deliverability are eligible.

PAV Adjustment for Increased System Efficiency

PAV Adjustment for Increased System Efficiency is intended to capture PG&E's Service Area's share of operational and economic efficiency in meeting loads gained through energy storage. Energy storage resources can provide flexibility to the system so that the rest of the generation can be run at less cost by helping to reduce the magnitude of evening ramp (by increasing generation whenever needed in high net load hours and increasing load during surplus generation or negative prices in low net load hours) so that other resources run more efficiently and at less cost. This results in reduced system costs (such as cost of a startup/shutdown, fuel, variable O&M and emissions).

There are differences in the system impacts depending on the operating parameters of Energy Storage (such as VOM, efficiency, operating constraints, etc). [redacted]

PAV Adjustment for Avoided RPS Curtailment

The operation of the storage resource can reduce the frequency and magnitude of renewable energy curtailments. The avoided curtailment of RPS energy will allow LSEs in PG&E's service area to avoid procuring additional RECs to replace the curtailed energy. PAV Adjustment for Avoided RPS Curtailment is intended to capture the differences in the value in avoiding RPS curtailments by different hours of duration.

[redacted]

[redacted]

PAV Adjustment for Delivery Period

The Delivery Period PAV adjustment is a way to standardize the valuation period for offers with different delivery terms and start date. The standardization will ensure a fair comparison of the full costs and benefits among all offers regardless of different delivery periods. [redacted]

[redacted]

Final Portfolio-Adjusted Value

The calculation for Portfolio-Adjusted value is summarized below:

Intermediate PAV [redacted] = Net Market Value [redacted]

+ PAV Transmission Network Upgrade Cost [redacted]
+ PAV Adjustment for Increased System Efficiency [redacted]
+ PAV Adjustment for Avoided Renewable Curtailment [redacted]

Intermediate PAV [redacted] and then added to PAV Delivery Period Adjustment [redacted] to obtain the PAV [redacted]

Final PAV [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Input Assumptions

An important aspect of the offer evaluation process is the development of input assumptions to use in the evaluation of the Participant's pricing formulas and other evaluation parameters. PG&E's quantitative evaluation team prepared a presentation for the IE regarding a review of market prices for Storage RFO evaluations. The key input prices for the evaluation include the following components:

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Qualitative Factors

In addition to the quantitative factors previously discussed, PG&E proposed to evaluate each offer using qualitative criteria as well. For assessment of the qualitative criteria, PG&E proposed to use subject matter experts to review and evaluate the offers relative to their criteria of expertise. A brief description of the qualitative factors to be considered includes:

Project Viability

Separate and distinct Project Viability criteria were developed by the evaluation team as well as the Utility-Owned team. The Utility-Owned team generally developed more detailed criteria and applied the +/0/- scoring mechanism for each individual criterion. Project viability means the likelihood that the project can be successfully developed and then provide the product and services required for the period stated in the Offer.

For the Utility-Ownership assessment, project viability means the likelihood that the development, construction and operation of the Project associated with an offer can satisfy the requirements of the Agreement. This assessment is based on a review of the history of the technology, constructability, Participant and contractors experience, operational history, portability, modularity, operation and maintenance complexity, and assessment of project schedule. The third-party resource team bases its assessment on a review of the status and plans for key project activities such as financing plan and experience, site access, permitting, engineering, procurement, construction, interconnection, environmental impact, participants experience and track record, project schedule/critical path, O&M plan, track record of technology and reliability and availability of equipment.

PG&E's intended objective was to develop a single composite score for Project Viability based on the status and plans for key project activities.

Overall, the evaluation was intended to rely on information provided in each Offer (i.e. Appendix A, Offer Form; Appendix B1, Project Description; Appendix B2, Site Control; Appendix B3, Project Milestone Schedule; Appendix B4, Experience Qualifications; Appendix B5, Electric Interconnection and Appendix B6, Organizational and Finance information. Additional information would be used as applicable.

Each Offer would receive a rating on a three-point scale of plus, zero, or minus (+/0/-). [redacted]

[redacted]

The application of these criteria will generally be determined on a relative basis, with the value attributed to each project based on how it scores relative to other projects.

A sub-committee oversees the implementation of each respective protocol.

Credit

PG&E may consider the Participant's capability to perform all of its financial and financing obligations under the Agreements. From a credit standpoint, PG&E may consider the Participant's ability and willingness to meet the credit requirements under the Agreements and PG&E's overall counterparty credit concentration with a Participant or its banks including any Participant affiliates.

[redacted]

In assessing the type and amount of security, PG&E is using the same three-point rating system as per other criteria of plus, zero and minus. [redacted]

Supply Chain Responsibility

PG&E is committed to supply chain responsibility which includes supplier diversity, sustainability, and ethnical supply chain practices. PG&E may determine how an offer will assist PG&E in reaching enterprise-wide supply chain responsibility goals. The evaluation methodology will require review and analysis of the Participant's response to the Supply Chain Responsibility questions provided. Based on the results of the analysis, an Offer will receive a numerical score and converted to a (+), (0), or (-) rating.

Safety

PG&E will seek information from Participants regarding the safety history and practices of the entities that will construct, operate, or maintain projects and safety information related to the technology for the project and project development.

D. Revisions to Bid Evaluation Criteria

The CPUC IE Report Template requests the IE to address whether the bid evaluation criteria changed after the bids were received and to explain the rationale for the changes. In general, PG&E maintained the same proposed methodology as described in the ES RFO. The description of the evaluation criteria and methodology were fairly general in the ES RFO.

E. Evaluation of the Strengths and Weaknesses of PG&E's Methodology in This Solicitation

PG&E has implemented a methodology for evaluating Energy Storage Offers received in response to the 2018 LSA ES RFO that includes a combination of existing methodologies used in previous solicitations as well as revisions to traditional methodologies to address the requirements of CPUC Resolution E-4909.[18] There have been several lessons learned from the implementation of the 2014 and 2016 ES RFO processes which highlight the strengths and weaknesses of the evaluation and ranking methodology.

<u>Strengths of Evaluation and Ranking Methodology</u>

The following represents the IEs perspective regarding the strengths associated with the evaluation and ranking methodology implemented by PG&E for assessing energy storage Offers submitted into the ES RFO processes. These include:

- The methodology used by PG&E takes into consideration all reasonable costs and benefits associated with the various types of offers, project structures, and contract structures for the energy storage offers submitted;

- The overall evaluation methodology is capable of effectively and consistently evaluating a range of different types of resources, project structures with different terms, product sizes, and start dates, different generation profiles and operating parameters. The IE does not view the methodology as having a direct bias toward any product solicited in this RFO with respect to technology, operating characteristics, ownership structure, etc.;

[18] Resolution E-4909 requires that resources procured in this solicitation (2018 LSA ES RFO) should be a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

- The models used by PG&E for undertaking the evaluation of the Energy Storage offers have been developed and utilized for two major energy storage solicitations. The models have been enhanced and improved based on lessons learned from recent solicitations. In addition, the models were validated internally by the Risk Group prior to evaluation of the offers for the 2014 and 2016 ES RFOs;

- PG&E has developed and maintains detailed documentation for each of the models used to evaluate Energy Storage projects. PG&E provided the documentation to the IE;

- To address the requirements included in the CPUC Resolution to compare Offer costs to the costs of the specific RMR contracts, [redacted]

- PG&E uses consistent input assumptions for undertaking the evaluation of all offers;

- At the request of Merrimack Energy during the development of PG&E's 2014 Energy Storage RFO, PG&E developed an internal integration model to compile all input and output data for each of the Offers and provides a detailed summary of the components of the costs and benefits for each Offer, on an annual basis including nominal and discounted dollars, and provides other pertinent data for each offer to allow the IE to undertake a detailed review of the evaluation results for each offer. This is a very valuable tool to allow the IE to easily and quickly assess the reasonableness of PG&E's evaluation results;

- The use of Portfolio Adjusted Value (PAV) as the basis for undertaking this evaluation represents a reasonable step in the evolution of PG&E's evaluation methodology since the methodology is intended to represent the value of a resource or Offer in the context of PG&E's portfolio. The PAV adjustments for several of the PAV factors are based on detailed evaluation results using sophisticated production cost modeling to generate estimates and research into factors that influence assessment of the PAV components;

- PG&E's proposed methodology is generally consistent with Least Cost Best Fit principles by incorporating quantitative and qualitative factors to determine a shortlist of projects;

- PG&E prepared detailed internal evaluation protocol documents that clearly described the evaluation methodologies and criteria, which facilitated review by the IE;

- The key inputs and assumptions (i.e. capacity price forward curve, discount rate, and forward curves for gas and power prices) were locked down prior to receipt of offers, which serves to minimize any potential evaluation bias;

- There was no evidence of any bias in the evaluation or favoritism in the treatment of any offer that would be owned by PG&E through an EPC or BOT;

- One of the weaknesses associated with the Least Cost Best Fit methodology has been the bias associated with [redacted] This approach is similar to approaches used by other utilities who use their Integrated Resource Planning methodologies in conjunction with an RFP process to evaluate and select resources;

- The results of the evaluation illustrated that [redacted] were selected based on economic rank illustrates that the evaluation methodology is generally fair and unbiased as well as being a very comprehensive evaluation process.

<u>Weaknesses of the Evaluation and Ranking Methodology</u>

Since the initiation of the Energy Storage RFOs beginning with the 2014 ES RFO, PG&E has made continual strides toward improving its evaluation methodology and address weaknesses in the process. Any remaining weaknesses are associated with research and development of necessary information to continue to develop the necessary PAV adjustments and other information to provide for a more thorough evaluation process. The IE also believes that a more detailed qualitative evaluation process should take place for both utility-owned and third-party offers. The IE has observed that the utility-ownership team applies detailed quantitative and qualitative criteria in a more balanced approach to undertake evaluation of utility-owned offers, including conducting a detailed project viability assessment. We would suggest a similar approach be undertaken for both types of products.

G. Future LCBF Improvements

There are several issues that should be considered as potential future improvements in the evaluation and ranking process. These include:

- The adjustment factors used in the Portfolio Adjusted Value methodology should be continually subject to review and possible revision and enhancement based on experience and judgment of PG&E Quantitative Analysis Group team members. These adjustors need to be reassessed over time as new information becomes available or as different Energy Storage solicitation processes are implemented, such as the 2018 LSA ES RFO, which may have unique requirements and timeframes that lead to different processes;

- [redacted] More detailed scoring factors and scoring systems, such as scoring relative to the highest and lowest performance on a given factor, can be developed and fully disclosed in the RFP documentation. In this way, bidders' pre-bid efforts could be concentrated on qualitative factors important to PG&E. Furthermore, shortlisted bidders would be forewarned that they would be scored adversely if their contractual modifications stressed the time and resources of PG&E unnecessarily. Alternatively, PG&E could establish thresholds that all offers would have to meet. The IE would expect that as more new projects are proposed, qualitative criteria will be more important for screening out non-viable or risky projects;

- While it is challenging to undertake a reasonable project viability assessment for all offers submitted outside the general approach undertaken by PG&E to identify any potential fatal flaws, it may be worthwhile to include a more formal and detailed project viability assessment prior to shortlisting, particularly if a number of the projects selected through this solicitation fail to go forward;

H. Additional Information or Observations Regarding PG&E's Evaluation Methodology

No additional information or observations are provided.

VI. Did PG&E Fairly Administer the Evaluation Process?

A. Principles and Guidelines Used to Determine Fairness of Process

In evaluating PG&E's performance in implementing the 2018 LSA ES RFO solicitation process, the IE has applied a number of principles and factors, which incorporate those suggested by the Commission's Energy Division in previous Templates as well as

additional principles that the IE has used in its oversight of other competitive bidding processes. These include:

- What qualitative and quantitative factors were used to evaluate offers?
- If applicable, were affiliate offers treated the same as non-affiliate offers?
- Were economic evaluations consistent across offers?
- Was there a reasonable justification for any fixed parameters that enter into the methodology?
- Were all Participants treated the same regardless of the identity of the Participants?
- Were Participants questions answered fairly and consistently and the answers made available to all?
- Did the utility ask for "clarifications" from Participants, and what was the effect, if any, of these clarifications?

As described in detail in the previous sections of this report, PG&E evaluated the offers received based on both quantitative and qualitative factors. However, while all offers were evaluated relative to the qualitative factors identified, [redacted]

The IE concluded that affiliate or utility ownership options were treated no differently than other offers by PG&E. In the opinion of the IE, PG&E assessed all offers in a similar manner although the components of the evaluation methodology and elements of the contract negotiation process varied appropriately by resource type and ownership structure. As previously noted, PG&E used reasonable methodologies for assessing each type of offer. In addition, PG&E created two separate transaction teams to lead the negotiation of third-party and utility-owned contracts, with both teams subject to Internal Confidentiality Protocol requirements. There were differences associated with contract negotiation in this 2018 LSA ES RFO attributed to the timing and resources sought. [redacted]

The IE felt that the economic evaluations were consistent across all types of offers, with the objective of the evaluation to assess the benefits and costs of each offer based on Net

Market Value and PAV metrics. [redacted]

PG&E's project team was very actively engaged in the process from the very beginning. This included responding to bidder questions and seeking clarification from Participants when required. With regard to Bidder questions, PG&E both responded to questions from Participants about the solicitation process and posted the appropriate responses for all Participants to review on its website. The IE was copied on all Questions and Responses to Participants. We found no cases where PG&E favored a specific Participant over another. PG&E responded consistently to all Participants throughout the process.

B. Description of IE Methodology Used to Evaluate Administration of PG&E's Solicitation Process, Notably the LCBF Process

As previously discussed, the IE was actively involved in all phases of the process. The IE was copied on all emails exchanged between PG&E and Participants. The IE was also invited and attended many of the calls with Participants wherein PG&E sought to clarify any uncertainties about the offers or inconsistencies associated with submission of offer information.

The IE also compiled summaries of all offers and the results of the bid evaluation and was fully engaged in the process throughout the solicitation. In addition, the IE and PG&E evaluation and transaction teams held regular weekly conference calls to discuss the progress of the solicitation and any issues that arose during the process.

With regard to the quantitative evaluation, the IE held discussions with the quantitative evaluation team to discuss the bid evaluation methodology prior to submission of bids to ensure the IE had an understanding of the evaluation methodology and presentation of evaluation results. PG&E provided copies of the evaluation results generated by the quantitative evaluation team to the IE on multiple occasions during the evaluation process.

PG&E's approach, as noted previously, was to use different models to evaluate different types of products based on the same set of assumptions. PG&E provided the write-ups of the models and model documentation to the IE along with the internal evaluation protocols and criteria for quantitative and qualitative factors.

At the request of the IE, PG&E prepared an integration model for use by the IE to review and validate the results of PG&E's LCBF evaluation process.[19] The Integration Model provided input and output results for each offer by integrating several models and

[19] PG&E had previously developed such a methodology for the CHP 2 and CHP 3 processes to allow Merrimack Energy to access all inputs and output results for each offer in an organized fashion to be able to verify the reasonableness of the offer evaluation results. Merrimack Energy requested expansion of the integration model for the first two Energy Storage solicitations. The model again used for this solicitation.

spreadsheets to organize all relevant data on a specific project/offer. The model allows the IE to enter the number of a specific offer in a specific cell in the workbook. Once the project number was entered, the integration model provided an array of information about each offer including the following data:

[redacted]

The integration model results allowed the IE to conduct a thorough review and assessment of the valuation results for each offer or a sample of offers. In addition, IE was able to use the integration model results to create portfolios of offers and assess the total notional value of the portfolio as well as NPV values other relevant information included in the model.

For evaluating the LCBF process, the IE initially reviewed the evaluation results included in the spreadsheets submitted by PG&E to the IE to assess whether there appeared to be any inconsistencies or unexplained outliers in the results. The spreadsheets prepared by PG&E included both an input file and an output file. The output file included Net Market Value by component as well as PAV value for all cost and benefit components.

After review of the bid evaluation methodology and testing of the results of the evaluation provided by PG&E, the IE concluded that the evaluation methodology was reasonable for this type of analysis and effectively evaluated offers with different products, terms, and contract structures. The IE found no evidence of undue bias in the evaluation methodology that favored affiliate or utility-owned offers relative to third-party offers as a result of review of the model operation and results.

Based on the IE's active involvement throughout the solicitation process, the IE concluded that PG&E reasonably followed the criteria outlined in the 2018 LSA ES RFO.

C. Identification of Non-Conforming Bids

After the offers were received, the initial task undertaken by PG&E's project team was to review the offers to assess if the offers conformed to the eligibility provisions listed in the Protocol. Although PG&E's objective was to be more inclusive, PG&E did follow its eligibility and threshold requirements when classifying offers as non-conforming. As noted on page 24 of this report, ■ of the ■ third-party offers were non-conforming, while ■ of the ■ utility-owned offers were conforming.

D. Utility Evaluation and Outsourced Evaluation

This section of the IE Template asks the IE to identify those parts of the process conducted by the utility, and to opine on how the parameters and inputs were used and whether they were reasonable. In addition, the Template asks the IE to identify any parts of the process that were outsourced to either the IE or a third party, what information did the utility communicate to that party and what controls did the utility exercise over the quality or specifics of the outsourced analysis.

In short, PG&E was primarily responsible for all aspects of the solicitation process, including all the evaluations of the offers received. The IE did not have any direct requirement to lead or conduct any specific aspect of the evaluation. Instead, the IE's role was to primarily review and assess whether the results of the analysis undertaken by PG&E were accurate and whether the process was fair and consistent for all Participants. The IE also provided his input to the various management committees at PG&E regarding his observations from the process.

The IE is not aware of PG&E outsourcing any aspects of the evaluation process to a third-party, although PG&E retained services of a third-party firm to assist it with the evaluation and negotiations of the EPC offers and contract.

E. Transmission Analysis Procedures

One of the major revisions to the 2016 ES RFO was the requirement that Participants must complete a Phase I interconnection study or equivalent or have documentation showing that the project passed the Distribution provider or CAISO Fast Track screens at the time of Offer submittal. The initial interconnection cost information included in the Phase I study or better was used for purposes of assessing the transmission costs included in the evaluation results.[20]

[20] The interconnection study generally includes cost for the interconnection facilities and Network upgrades (Reliability Network Upgrades, Local Delivery Network Upgrades and Area Delivery Network Upgrades).

PG&E eased the interconnection requirements for the 2018 LSA ES RFO. All offers were required to be connected to one of the feeders or substations associated with the three local sub areas. Absent a Phase 1 (or equivalent) or later interconnection study or interconnection agreement, Participants will be asked to provide a not-to exceed estimate of refundable Delivery Network Upgrade and Reliability Network Upgrade costs in the Offer Form. Sellers should be aware that PG&E has the right to terminate the Agreement if such costs as demonstrated in any interconnection study or interconnection agreement exceed such estimate. PG&E noted that all Sellers are required to be extremely proactive to complete the interconnection process with sufficient time to meet their committed online date.

PG&E did include Appendix B5 Project Interconnection and Transmission which requires the Participant to provide project information associated with their interconnection status, expected cost, ability to complete interconnection and achieve full deliverability status by COD and requests supplemental documents to support interconnection status and plans to expedite the interconnection process.

F. Criteria or Analysis Used to Create the Short-List

PG&E included a description of its offer evaluation methodology and approach in both the 2018 LSA ES RFO Protocol and the Participants Webinar presentation. PG&E noted its evaluation methodology will apply "least-cost, best-fit" principles, using quantitative and qualitative criteria to evaluate the submitted Offers. PG&E stated that the final PAV value is equal to the Net Market Value plus the four PAV components. [redacted]

G. Offer Evaluation Results and Shortlist Assessment

The offers received were evaluated based on the methodology described in the previous section of this report. [redacted][21]

The bid evaluation output results prepared by PG&E included an evaluation of all eligible offers and alternatives ranked by PAV [redacted]

Once the rankings were completed, PG&E then went about selecting the shortlist of offers. The shortlisted categories or agreement types considered included the following:

[redacted]

[21] [redacted]

[redacted]

Projects were considered and selected based on a combination of value and PG&E's objective of procuring resources in the various sub-areas identified. For shortlist selection, [redacted]

[redacted]

H. Conclusions Regarding Administration of the Bid Evaluation Process

The IE has concluded that the bid evaluation process was fairly administered with respect to all Offers. The IE felt that PG&E's project team performed their function in communicating with Participants throughout the process in an exemplary manner, including responses to Participants questions prior to offer submission to assist Participants with questions about submission requirements, follow-up communications with Participants to clarify offer forms and information about each specific offer after submission and prior to evaluation, and with regard to follow-up conference calls with Participants that were not selected for a contract. PG&E generally provided thorough and informative responses to Participant questions and did so in a timely manner. In addition, the IE found PG&E to be very inclusive of all potential Participants.

The IE felt that PG&E's evaluation methodology was effective in evaluating a range of potential energy storage products and agreement structures in a consistent and fair manner. The fact that the evaluation results illustrated a mix of products in the rank order shows that the methodology is fair and unbiased. In addition, the quantitative evaluation methodology allowed for consistent evaluation of bids of different sizes and in-service dates and was designed to be technology neutral. The overall methodology had to address not only third-party energy storage options but also utility-owned options and did so in a consistent and comprehensive manner. The IE found that PG&E included all reasonable costs consistently in its evaluation and evaluated all the offers using a consistent set of inputs and assumptions.

I. Any Other Relevant Information

None at this time.

VII. Code of Conduct/Internal Confidentiality Protocol

For the 2018 Local Sub-Area Energy Storage RFO, PG&E made slight modifications to its existing Code of Conduct that was implemented in the two previous Energy Storage

RFOs. PG&E's objective was to update the Code of Conduct to make it more concise and understandable. The new document is now called an Internal Confidentiality Protocol. While the Local Sub-Area Energy Storage RFO seeks both offers by third-parties to provide energy storage projects and offers from EPC contractors for utility-owned energy storage facilities, PG&E is not submitting or reserving the right to submit its own bid into this RFO. Therefore, there are no PG&E employees involved in preparing bids for projects that would be owned by the utility. Instead, PG&E is seeking offers for either EPC or BOT options for projects that would be constructed by a third-party and owned by the utility. The utility-ownership team is responsible for developing the project specifications and contracts, conducting evaluation of the offers received, and negotiating the contracts with the selected Participant. The Internal Confidentiality Protocol is designed to ensure that an appropriate internal level of confidentiality of confidential RFO information is maintained. With this Confidentiality Protocol, PG&E is focusing on the type of information that PG&E employees must keep confidential in order to avoid external perceptions of unfair advantage to Utility-Owned Offers.[22] This Confidentiality Protocol shall be in place from March 28, 2018 until the date executed contracts are filed with the CPUC for approval.

This Section of the Report addresses the Internal Confidentiality Protocol implemented by PG&E to undertake the 2018 LSA ES RFO. The preparation of a Code of Conduct document is required by the CPUC for investor-owned utility ("IOU") participation in the IOU's own competitive procurement of electric energy resources. The CPUC's 2008 LTPP Decision (D.07-12-052) included several references with regard to the requirements for utilities to develop a Code of Conduct for solicitations seeking utility ownership options.[23] PG&E developed an Internal Confidentiality Protocol for this solicitation to ensure appropriate safeguards are in place to define the roles and responsibilities of the project teams and protect the confidentiality of sensitive confidential information. PG&E required all employees supporting the 2018 LSA ES RFO that requires use of Confidential RFO information to acknowledge the Confidentiality Protocol. According to the IE Report Template, two issues are to be addressed in this Section of the Report:

[22] Examples of the type of information considered confidential RFO information includes: (1) Participant's confidential information as described in the RFO Protocol; (2) Internal Evaluation Protocols including quantitative models, scoring and selection criteria, actual input assumptions such as price curves; (3) Evaluation results and selection of Offers for the shortlist and execution, including deliberations and reasons for selections; and (4) Status of PG&E's negotiations with shortlisted Participants.

[23] On page 206 of D.07-12-052, the CPUC stated "As a precondition for conducting an RFO seeking utility ownership options, the IOU shall develop a strict code of conduct to be signed by any and all IOU personnel involved in the RFO process to prevent sharing of sensitive information between staff involved in developing utility bids and staff who create the bid evaluation criteria and select winning bids". On page 236 the CPUC stated "If a utility were soliciting turnkey bids or EPC contracts as well as PPAs in a given solicitation, the individuals performing the bid evaluation would have to be functionally separated from the individuals preparing the bids (or the cost estimates) for projects that would ultimately be utility-owned. Under this restriction, the employees developing the utility-owned project would be barred from access to any evaluation protocols, input assumptions, or bid information not made generally available to outside bidders."

Describe the design and implementation of the required Code of Conduct used by the IOU to prevent sharing of sensitive information between staff working with developers who submitted UOG bids and staff who create the bid evaluation criteria and select winning bids.

Describe any violation(s) of that code

As a precondition of holding a competitive solicitation in which offers resulting in partially or wholly utility-owned energy storage projects compete against third-party offers, a utility (in conjunction with the IE, PRG, and Energy Division Staff) must develop and adopt a strict Code of Conduct, to be signed by any and all IOU personnel in the RFO process, to prevent the sharing of sensitive information between staff involved in developing offers for utility-owned projects ("Ownership Employees") and staff who evaluate and select the winning offers ("Solicitation Employees").[24] PG&E's Internal Confidentiality Protocol also includes a third category of employees referred to as Decision-Makers. These are employees who approve the selection of the offers submitted in response to PG&E's ES RFO for PG&E's shortlist of projects and/or final execution list. Only Decision-Makers and Solicitation Employees have full access to all confidential RFO information. However, all Utility Ownership employees, Decision-Makers, and Solicitation employees must keep confidential RFO information confidential.

As noted, the Internal Confidentiality Protocol was designed to maintain an appropriate internal level of confidentiality of Confidential RFO Information and to avoid external perceptions of unfair advantage of utility ownership offers. The Confidentiality Protocol is being adopted because PG&E is evaluating Utility-Owned and third-party off-take Offers in this LSA ES RFO, with both types of offers ultimately competing for selection by PG&E and CPUC approval. Some of the key elements of the Confidentiality Protocol include:

A. Teams

- Utility-Owned (UO) – Employees evaluating, selecting and negotiating Utility-Owned offers;
- Solicitation Employees – Employees (a) evaluating, selecting, and negotiating third-party offers, and (b) preparing information for Decision Makers, including evaluation and selection of offers;
- Decision Makers – Employees approving the selection of offers for shortlisting and/or final execution.[25]

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[24] For the Energy Storage Solicitation, the utility personnel involved in the evaluation and selection of offers submitted in response to PG&E's Energy Storage RFO in order to enable PG&E to develop a shortlist of projects and/or its final execution list for the ES RFO shall be referred to as Energy Storage Solicitation Employees and the utility employees who establish the non-public requirements for, and evaluate the viability and cost of development, construction, and on-going operations associated with third party offers submitted in response to the Energy Storage RFO leading to utility ownership shall be referred to "Utility Ownership Employees".

[25] In addition to the above teams, to evaluate offers teams may engage Subject Matter Experts ("SME") from within PG&E to assist with the evaluation of Offers. Such SME's are subject to this Confidentiality Protocol and shall review and evaluate Offers using and accessing the Confidential RFO information only

B. Confidential RFO Information includes:

- Participants confidential information;
- Internal Evaluation Protocols
- Evaluation results and selection of offers for shortlisting and execution; deliberations and reasons for selections;
- Status of PG&E's negotiations with shortlisted participants

C. Teams' Obligations to Confidential RFO Information

- Solicitation and Decision Maker team members shall not disclose or share Confidential RFO information; provided that,
- Utility-Ownership offer team members may use, have access to or knowledge of Confidential RFO information with respect to the Utility-owned offers only.

D. Functional Separation of Information and Teams:

- Confidential RFO information – to be kept functionally separate per team type such as locating the information electronically on separate shared drives or internal sites that can only be accessed by the respective team members. Confidential RFO information should not be emailed even internally;
- Employees – Physical separation of teams is not required. To evaluate offers teams may engage SMEs from other LOBs to assist with the evaluation of offers. Such SMEs are subject to this Protocol and shall review and evaluate offers using and accessing the Confidential RFO information only to the extent necessary to perform their review and evaluation.

E. Acknowledgement of Protocol – By employees actively participating in offer evaluation and/or selection process of offers in the RFO process through:

- Attendance at in-person training or meetings; or
- Written acknowledgement of training materials.

VIII. Treatment of Affiliate Bids and UOG Ownership Proposals

The 2018 LSA ES RFO included several eligible options in which PG&E would own the project, including (1) EPC Agreement for Moss Landing and (2) Build, Own, Transfer Agreement. As a result, the IE Report Template requires the IE to address the following issues:

1. Describe other safeguards and methodologies implemented by the IOU including those stipulated in Commission decisions (e.g. D.04-12-048 and D.07-12-052) for head-to-head competition between utility ownership and independent ownership bids, to ensure that affiliate and UOG bids were analyzed and considered on as comparable a basis as possible to other bids,

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to the extent necessary to perform their review and evaluation for the respective team. Such SME's should not be conduits for Confidential RFO information.

that any negotiations with such bids' proponents were conducted as comparably as possible to negotiations with other proponents, and that the utility's final selections in such cases did not favor an affiliate or UOG bid.

2. Describe compliance with the safeguards
3. If a utility selected a bid from an affiliate or a bid that would result in utility asset ownerships, explain and analyze whether the IOU's selection of such bid(s) was appropriate.

In terms of the safeguards implemented, as noted in the previous section of the report, PG&E implemented an Internal Confidentiality Protocol which included detailed information regarding the roles and responsibilities of the various teams involved in the solicitation and the type of information considered confidential. As noted, PG&E formed two separate teams for the process. Employees who establish the requirements for, and evaluated the viability and costs of development, construction, and on-going operations associated with third-party offers leading to utility ownership are referred to Ownership Employees while Employees who evaluate and select the shortlist and final offers for third-party owned projects are referred to as Solicitation employees.

In its Internal Confidentiality Protocol, PG&E also identified how during each step in the Energy Storage RFO process, Ownership Employees should perform different functions and be separated from Solicitation Employees involved in the evaluation of offers to avoid the sharing of sensitive information.

The roles of the above teams supporting the ownership options include the following:

- Prior to issuance of the RFO, the Ownership Employees at PG&E jointly developed the offer criteria for evaluation of these offers including product attributes, physical requirements, and security requirements for each utility-owned storage product;
- This team also maintained and implemented the utilities Revenue Requirements model used to undertake a portion of the cost assessment for the evaluation of utility-ownership options;
- The Utility-Ownership team reviewed the ownership offers received, identified any missing or incomplete information and conducted due diligence on the offers;
- The Utility-Ownership team also selected its own transactors for the utility-owned options that were shortlisted. During contract negotiations, the teams dealing with the Utility-Ownership and Third-Party RA or BTM offers were separate entities. The IE monitored negotiations undertaken by both groups. Essentially, the negotiations proceeded along different paths, albeit within the same or similar schedule for completion.

In summary, each team conducted its review, evaluation, and negotiation of contracts for shortlisted suppliers along separate tracks with different departments and employees undertaking the aspects of the evaluation and negotiations. From an evaluation perspective, the Utility Ownership team conducted its evaluation of the revenue requirements implications for each ownership option and provided the results to the

Quantitative Evaluation team who was responsible for incorporating this data in its overall evaluation of the offers which included other aspects of the quantitative evaluation including dispatching implications, operational impacts and PAV adjustments. Once the assessment was completed and offers were selected for the shortlist, contract negotiations proceeded down separate paths. The negotiation teams were diligent about ensuring that the process remained independent and the IE found no indication that the Utility Ownership negotiation team was aware of the activities of the other team. The view of the IE is that adequate safeguards were put in place to ensure that evaluation and negotiations of the different options were undertaken in a fair and comparable manner and were effectively maintained. We found no cases in which a utility-owned generation option was favored over a third-party RA or BTM Offer

As we have previously noted, Merrimack Energy as IE was sensitive to comparability issues regarding the treatment of utility-owned and third-party offers from the beginning of the process since we view fairness and comparability of treatment of these different resource options to be one of the more challenging issues associated with undertaking a fair and equitable evaluation and selection process. We have had meetings and discussions with PG&E prior to release of the past few Energy Storage RFOs to discuss comparability associated with both the evaluation methodology and contract provisions. We were satisfied that the evaluation methodology and contract provisions should ensure a fair and equitable process without the presence of bias for one type of resource over another.

[redacted]

IX. Was the RFO Acceptable

1. Overall was the RFO conducted in a fair and competitive process, free of real or perceived conflict of interest?
2. Based on the complete bid process, should some component(s) be changed to ensure future RFOs are fairer or provide a more efficient, lower cost option?
3. Any other relevant information

The IE concludes that PG&E has implemented the 2018 LSA ES RFO in a fair and consistent manner, marked by an overall objective to maintain a reasonably transparent and competitive solicitation process designed to be inclusive for all Participants. PG&E worked closely with the Participants to ensure they fully understood the requirements of the process and were able to submit all the necessary information to allow for a thorough and consistent evaluation process. In addition, PG&E took important steps to ensure that no potential biases existed in the process associated with the ability of utility-owned options to compete with third-party RA and BTM options. PG&E implemented safeguards in the process designed to ensure that fairness in the process was maintained, such as development of an effective Internal Confidentiality Protocol, separation of the

Solicitation evaluation team and Utility-Ownership team, and the use of different transactors for each type of transaction with no knowledge of the other competitors.

As noted in this report, PG&E's outreach activities were designed to encourage a wide range of participants. PG&E's interaction with Participants before and following submission of offers to clarify offers submitted facilitated participation by a broader supplier base.

The IE was in general agreement with PG&E's overall shortlist selection. The IE generally agreed with PG&E's approach to select the shortlist given the nature of the solicitation. [redacted]

X. Conclusions and Recommendations

A. Conclusions and Observations

Merrimack Energy has the following conclusions and observations regarding the 2018 LSA ES RFO solicitation process based on its role of IE in this process:

1. PG&E generally implemented the 2018 ES RFO solicitation process consistent with CPUC Resolution E-4909. PG&E solicitated Energy Storage offers for the three local areas in questions and sought to meet a near term need to ensure that RMR contracts in these sub-areas will not be renewed. [redacted] The IE understands that PG&E has attempted to coordinate its solicitation results with the CAISO in an attempt to ensure that its proposed portfolio will contribute to reducing or eliminating the local sub-area deficiencies in the Pease and South Bay – Moss Landing sub-areas and high voltage in the Bogue sub-area;

2. PG&E's 2018 LSA ES RFO resulted in a robust response from the market, particularly given the relatively short lead-time. PG&E received 100 offer variations, which represented [redacted] projects from [redacted] counterparties. There were [redacted] third-party offers for Energy Storage RA Agreements and Behind-the-Retail Meter Agreements as well as [redacted] offers for the EPC option at the Moss Landing site or BOT offers;

3. PG&E's outreach activities and interaction with Participants prior to and after submission of offers was designed to provide a significant base of information for Participants. This included holding a Participants and Offer Form Webinar for potential Participants as required by the Resolution, and direct interaction with Participants either through Q&As via the 2018 LSA Energy Storage website or direct contact via conference calls at the request of Participants. The IE participated in these communications and felt that all Participants were treated

fairly and equitably. In addition, PG&E sent emails to all contacts on its email list for solicitations, which totals nearly 2,800 contacts. Overall, PG&E's outreach activities were extensive;

4. PG&E developed the evaluation methodologies and process to reflect the products being solicited, similar to the "Least Cost Best Fit" methodology used for other recent Energy Storage RFOs. In addition, at the IE's request, PG&E prepared an integration model for use by the IE to review the results of the evaluation process. PG&E also has developed documentation for the models used in the solicitation process which helps an outsider better understand the operations and functions of the models;

5. Merrimack Energy, as Independent Evaluator in the process, was retained in the very early stages of the development of the solicitation documents and processes and had the opportunity to provide input into all aspects of the solicitation development and implementation process. The IE provided comments on the ES RFO Protocol documents, offer forms, and evaluation protocols and methodology;

6. The IE found the solicitation documents to be reasonably transparent and well-structured to allow potential Participants to effectively decide whether and how they wished to compete. The 2018 LSA ES RFO Solicitation documents clearly defined the procurement targets, products solicited, eligibility requirements, evaluation process and criteria, information required of Participants and company objectives;

7. PG&E undertook both a quantitative and qualitative evaluation of the offers submitted generally consistent with the evaluation process identified in the 2018 LSA ES RFO Solicitation Protocol and Bidders Conference presentation. The quantitative evaluation provided a rank order of offers based on the evaluation metric PAV [redacted] The final PAV costs reflect Net Market Value plus PAV adjustments as identified in the LSA ES RFO Solicitation Protocol;

8. Based on the evaluation process, PG&E selected an initial shortlist comprised of [redacted]. There were no exceptions to the shortlist identified by the CAM/PRG;

9. The evaluation methodology allowed for a consistent evaluation of offers of different sizes, operating characteristics, in-service dates and terms. The methodology was also technology and contract structure neutral. PG&E made a revision to the evaluation methodology for this RFO which attempted to consistently evaluate shorter-term and longer-term options by adding a PAV

component called Delivery Period Adjustment. The Delivery Period PAV adjustment is a way to standardize the valuation period for offers with different delivery terms and start dates;

10. PG&E's final selection and negotiation of offers consisted of four projects totaling 567.5 MW. The selected offers included one EPC option for 182.5 MW at PG&E's Moss Landing site, two RA ES Agreements for a total of 375 MW, and one BTM option for 10 MW. Two of the projects selected are expected to be among the largest energy storage projects proposed to date for construction. [redacted]

11. The IE found no evidence of any preference toward any bidder or type of project, such as EPC option to be owned by PG&E. PG&E maintained the separation of teams associated with the utility-owned options.

12. The evaluation methodology resulted in the evaluation and selection of different types of project/contract structures with offers selected in [redacted]. The IE believes this demonstrates that the evaluation methodology is fair and unbiased and allows for a consistent evaluation of a range of product and contract types;

13. The IE concludes that the process was undertaken in a fair and equitable manner and all Participants were treated equally. The IE received no complaints or criticisms about the process;

Appendix A: PG&E Third-Party Proposals - Local Sub-Area Energy Storage RFO

Bidder No.	Bidder Name	Project Name	Offer Type	Technology	Start Date	Location	Contract Term (Years)	Storage Capacity (MW)	Discharge Duration hours	Flexible Capacity MW	Monthly Capacity Price ($/kW-mon)	Escalation Rate %	Interconnection Cost

Appendix A: PG&E Third-Party Proposals - Local Sub-Area Energy Storage RFO

Bidder No.	Bidder Name	Project Name	Offer Type	Technology	Start Date	Location	Contract Term (Years)	Storage Capacity (MW)	Discharge Duration hours	Flexible Capacity MW	Monthly Capacity Capacity Price ($/kW-mon)	Escalation Rate %	Interconnection Cost

Appendix B: PG&E EPC Offers - Local Sub-Area Energy Storage RFO

	Bidder	Project	Offer	Technology	Start Date	Location	Contract	Storage	Discharge	Flexible	Total	Cost/kW
	Name	Name	Type				Term	Capacity	Duration	Capacity	Capital Cost	Installed
							(Years)	(MW)	hours	MW		

Pacific Gas and Electric Company

2018 Local Sub-Area Energy Storage Request for Offers

Independent Evaluator Report

Confidential Version

Attachment A

Review of Behind the Retail Meter Capacity Storage Agreement with mNOC AERS, LLC Energy Storage Project

June, 2018

Prepared by
Merrimack Energy Group, Inc.
26 Shipway Place
Charlestown, Mass. 02129

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I. Introduction

A. Overview

Pacific Gas and Electric Company ("PG&E) is seeking approval of a Behind the Retail Meter Capacity Storage Agreement ("BTM CSA") with mNOC AERS, LLC ("mNOC AERS"), that will deploy a portfolio of "behind the meter" energy storage units at Customer sites located in the PG&E distribution areas identified in Appendix II-C of this BTM CSA. [redacted]. The project has a Design Dmax of 10 MW, with Storage Energy of 40 MWh and Discharge Duration of 4.0 hours. The project will be developed and owned by mNOC AERS, LLC.[1] The term of the BTM CSA will be 10 years commencing on the Initial Delivery Date ("IDD"), which is expected to be October 1, 2019.

MicroNOC is the project development, management, and operational entity that will secure contracts with BTM customers to deploy energy storage technologies and provide associated software and controls. MicroNOC, Inc. [redacted] to offer PG&E an aggregate Behind-the-Meter Battery ("BTM") Energy Storage System ("ESS") to be located in PG&E's Sub-Area Moss Landing – South Bay ("MLSB") or CAISO SubLaps PGSB. The BTM ESS project is designed and configured [redacted] with 4 hours duration offering total aggregated resources of 10 MW/40 MWh to meet resource adequacy requirements. [redacted]

The BTM CSA was executed by PG&E pursuant to the Company's 2018 Local Sub-Area Energy Storage Request for Offers ("2018 LSA ES RFO" or "2018 Energy Storage RFO"). Through this RFO, PG&E is seeking to procure energy storage resources to meet local sub-area reliability needs as required by California Public Utilities Commission ("CPUC") Resolution E-4909 (the "Resolution"). The CPUC issued Resolution E-4909 in response to the CAISO's award of RMR contracts to three generators. The Resolution instructed PG&E to issue a Request for Offers ("RFO") within 90 days for the procurement of energy storage and/or preferred resources, to address the deficiencies in the affected local sub-areas. PG&E could also explore potential transmission solutions. The Resolution also instructed PG&E to coordinate with the CAISO on whether PG&E's proposed procurement and/or transmission solutions partially or wholly eliminate the need for, or extension of, one or more of the RMR contracts in the identified local sub-areas.

In addition, the Resolution also established parameters to guide the procurement process and decisions regarding resource selection, including the following:

- Resources procured pursuant to this solicitation must be both:

[1] [redacted]

- On-line and operational on or before a date sufficient to ensure that the RMR contracts for the three plants – Metcalf Energy Center, Feather River Energy Center, and Yuba City Energy Center – will not be renewed in any year from 2019 through 2022;
- Located within the relevant sub-area(s) and be interconnected at locations that will mitigate local capacity and voltage issues sufficient to obviate the need for RMR contracts for the aforementioned plants;

- Resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

PG&E launched the 2018 LSA ES RFO on February 28, 2018 and received offers on March 28, 2018. PG&E executed four Agreements for energy storage products as a result of the solicitation, representing a total of 567.5 MW, including 10 MW of energy storage capacity services under the BTM CSA with mNOC AERS, LLC.

This Attachment A to the Independent Evaluator Report on PG&E's 2018 LSA ES RFO process ("IE Report on 2018 LSA ES RFO") focuses on the two sections of the CPUC IE Report Template associated with discussions of project-specific negotiations (Section E of the Report Template) and of the approval issue (Section H of the Report Template) – does the contract merit CPUC approval? Is the contract reasonably priced and does it reflect a functioning market? A separate Attachment is provided for each Contract executed by PG&E with the energy storage providers. Accordingly, the IE Report on PG&E's LSA ES RFO will contain Attachment A through Attachment D, which addresses each contract executed through this solicitation.

II. Project Specific Contract Negotiations

For reviewing and evaluating the performance of the utility with regard to specific contract negotiations, the IE has addressed the issues raised in the CPUC Independent Evaluator Report Template. These include:

1. Identify the principles the IE used to evaluate negotiations;

2. Using the above principles, evaluate the project specific negotiations. Highlight any issues of interest/concern including unique terms and conditions;

3. Was similar information/options made available to other bidders when appropriate (i.e. if a bidder was told to reduce its price, was the same information made available to others?);

4. Describe and explain any differences of opinion between the IE and utility. If resolved, describe the reasonableness of the outcome;

5. Any other information relevant to negotiations not asked above but important to understanding the IOU's process.

Principles Used to Evaluate Negotiations

The general principles followed by the IE in evaluating contract negotiations include assurance that the risk allocation provisions in the contract are reasonably balanced between the counterparties and that the utility customers are not placed at undue risk as a result of the contracting process. The IE generally "monitors" but does not actively participate in the contract negotiation process but will identify issues to the utility transactors if negotiations are moving off track or there are potential biases or inconsistencies in the process. It has been the IE's experience in monitoring a number of negotiation processes that contract negotiations can divert off course but eventually return to a balance after contested provisions are resolved. We also attempt to ensure that similarly situated counterparties are treated the same or similarly and that all counterparties are provided with the same message. For example, PG&E has generally provided a clear message to counterparties to other solicitations (in addition to the ES RFO) that the process is a very competitive process with more projects shortlisted than PG&E intends to execute contracts for. As a result, counterparties should sharpen their pencils and price as competitively as possible.

However, given the lead times associated with completion of this RFO and the recently negotiated agreements resulting from the 2016 ES RFO process, PG&E essentially used the "standard" contracts[2] executed via the 2016 ES RFO as the starting point for this solicitation. [redacted]

Revisions to the Pro Forma Energy Storage Agreement

Prior to issuing the 2018 LSA ES RFO, PG&E made several revisions to the pro forma BTM CSA to reflect updates since completion of the BTM CSA contract with Calstor LLC from the 2016 ES RFO. This section of the report provides the following Exhibit A-1, describing the important contract revisions incorporated into the pro forma BTM CSA relative to the Agreement executed between PG&E and Calstor LLC from the 2016 ES RFO, which was executed in November 2017. Exhibit A-1 addresses the changes to the BTM CSA. Many of the revisions reflect the CPUC Multiple-Use Application Decision.

[2] [redacted]

Exhibit A-1: Important Contract Revisions From 2016 BTM CSA Agreement

Provision/Purpose	Revisions
[redacted]	

[redacted]

Negotiation of the BTM CSA Contract with mNOC AERS, LLC

The BTM CSA with mNOC AERS, LLC is for a collection of behind the meter storage units at retail Customers' sites in the South Bay-Moss Landing sub-area. Each unit will be a stand-alone lithium ion battery energy storage resource, comprised of complete balance of system devices containing DC battery packs, power electronics, thermal management and controls. The energy stored in the module(s) will then supply power to the inverter in a manner that optimizes equipment efficiency for the desired output. The system consists of total aggregate nameplate capacity of 10 MW and 40 MWh of stored energy with four hours duration.

The Delivery Term under this BTM CSA is for 10 years after the Initial Delivery Date (IDD). The Expected Initial Delivery Date is October 1, 2019.

[redacted]

[redacted][3]

Exhibit A-2: Pricing Provisions in Original Offer

Proposed Pricing	Summary of Offer of mNOC AERS, LLC
[redacted]	

On April 16, 2018, PG&E held a CAM/PRG meeting to provide an update on the LSA Energy Storage RFO process and to present its proposed shortlisted projects. [redacted]

[redacted]

[redacted]

[3] [redacted]

[redacted]

Shortly after the CAM/PRG meeting, PG&E notified MicroNOC that its [redacted] offer had been selected for the shortlist and asked for the company to notify PG&E if they would accept their shortlist position. PG&E also provided the shortlisted Participants with a clean version of the form agreement and asked the Participants to populate all fields in the contract necessary to incorporate all project specific information. [redacted]

On April 19, 2018 MicroNOC sent a letter to PG&E [redacted]

On May 8, 2018 PG&E [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

The key provisions of the final executed mNOC AERS LLC BTM CSA are summarized in Exhibit A-5.

Exhibit A-5: Final Contract Key Provisions

Contract Provisions	Inclusion in Final mNOC AERS Contract
Form of Agreement	Behind the Retail Meter Capacity Storage Agreement

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

In addition to the contract provisions described above, the BTM CSA also includes Appendix II, including II-C (a form which mNOC AERS shall complete when its Portfolio of Customers are known) and Appendix III which provide the Operational Characteristics of the BTM units mNOC AERS will supply to its retail customers. The information from Appendix II and III is summarized in Exhibit A-6 below

Exhibit A-6: Summary of BTM CSA Appendix II and III for mNOC AERS, LLC

Project Name	**Micronoc 10 MW BTM Aggregate Energy Storage System**
[redacted]	
Technology Type	Lithium-Ion Batteries
Point of Interconnection	Aggregation of substations in South Bay – Moss Landing local sub-area as listed in Appendix XIII.
Electric Delivery Point	Sub-LAP(s) will be set forth in Appendix II-C as of the IDD
Existing Zone	NP-15
Design Capacity (Design Dmax)	10 MW
[redacted]	
Discharge Duration	4.0 hours
Storage Energy (MWh)	40 MWh
[redacted]	

III. Does the Contract Merit CPUC Approval

A. Introduction

This section of the Report addresses the issue "Does the Contract merit CPUC approval and is the contract reasonably priced and does it reflect a functioning market? To address these questions the IE Report Template requires that the following issues be addressed.

1. Provide a discussion and observation for each category and describe the project's ranking relative to other bids from the solicitation; and from an overall market perspective;
    a. Contract price, including cost adders (transmission, credit, etc.)
    b. Portfolio fit
    c. Project viability
        i. Technology
        ii. Bidder experience (financing, construction, operation)
        iii. Credit and collateral
        iv. Permitting, site control and other site-related matters
        v. Fuel status
        vi. Transmission upgrades
    d. Any other relevant factors
2. Based on the complete bid process:
    a. Does the IOU contract reflect a functioning market?
    b. Is the IOU contract the best overall offer received by the IOU?
3. Is the contract a reasonable method of achieving the need identified in the RFO?
4. If the contract does not directly reflect a product solicited and bid in an RFO, is the contract superior to the bids received or the products solicited in the RFO?
5. Based on your analysis of the RFO bids and the bid process, does the contract merit Commission approval? Explain

B. Need for Procurement

Through the 2018 LSA ES RFO, PG&E is seeking new energy storage resources connected at the transmission, distribution or customer level within the local sub-areas of Bogue, Pease and South Bay – Moss Landing to meet real power capacity needs in the South Bay – Moss Landing area and reactive power needs in Bogue and Pease. PG&E is issuing this RFO to procure energy storage resources to meet local capacity and local sub area reliability needs as required by CPUC Resolution E-4909. Any battery storage projects selected through this RFO could be used to replace three Calpine fossil fuel plants (Feather River, Yuba City, and Metcalf) that do not have long term contracts with utilities but that have been identified by the CAISO as needed to serve local reliability needs.

CPUC Resolution E-4909 also states that resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E,

previous solicitations in which PG&E has awarded contracts to similar resources, the cost of specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

Through this LSA ES RFO process, PG&E is proposing to procure 567.5 MW of energy storage capacity. The execution of this agreement with mNOC AERS LLC for 10 MW will provide approximately 1.76% of this total.

Chapter III Section (D) of the IE's Report on the 2018 LSA ES RFO process, provides ample evidence of the robustness of the response to this RFO, even in light of the short turnaround time for Participants to prepare their offers. As illustrated in this section of the report, PG&E received 100 offer variations from 29 projects and [redacted] counterparties. Appendix A and B of the IE Report on the 2018 LSA ES RFO provides a summary of the 100 offer variations received, including both offers for third-party owned Resource Adequacy ("RA") and Behind-the-Retail-Meter ("BTM") options, Utility-owned projects at the Moss Landing site, and [redacted] BOT options. The detailed evaluation conducted by PG&E is described primarily in Chapters IV and V of the 2018 IE LSA ES RFO Report, and that description confirms that the mNOC AERS LLC BTM storage project submitted by MicroNOC was selected for execution based on its competitiveness, and on the applicable evaluation criteria, compared to other competitive options. The mNOC AERS, LLC BTM CSA offer was [redacted]. The reasonableness of the mNOC AERS LLC BTM CSA from a viewpoint of its cost competitiveness, as well as the other evaluation criteria, is set forth in the next section of this Report.

C. Contract Pricing and Portfolio Fit

[redacted]

[redacted]

The final BTM CSA is for a 10 MW, four-hour duration project. [redacted] The initial valuation results by cost and value component that corresponds to the shortlist results are listed in Exhibit A-8.

Exhibit A-8: Valuation Results for Short Listed Offer

Valuation Components	Levelized PAV [redacted] [4]
[redacted]	

[4] These results are presented in levelized [redacted] because this data was the starting point for the calculation of the selection metrics used by PG&E for shortlist rank and selection and represents consistent valuation results for net market value calculations and PAV adjustments.

[5] [redacted]

[redacted]

In response to a request by PG&E to shortlisted Participants for best and final pricing, [redacted]

Exhibit A-9 includes the final evaluation results for MicroNOC's shortlisted offer by component.

Exhibit A-9: Final Valuation Results for MicroNOC Best and Final Offer

Valuation Components	Levelized PAV [redacted]
[redacted]	

[6] [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

D. Project Viability

Project Scrutiny

The LSA ES RFO requires the completion of detailed forms soliciting comprehensive information about the many project development and operational aspects of the projects offered. The responses by Participants with regard to the forms and the follow-up communications between the Participants and PG&E prior to and during negotiations cover topics ranging from manufacturing queues, to procurement experience, to permit requirements and lead times, to all aspects of the interconnection process. As a result, the

[7] [redacted]

level of information about each project provided at the time of offer submittal as well as during the negotiation process provides a solid base of information for both the PG&E team and IE to assess project viability for each of the contracts executed.

Technology and Procurement Issues

For the most popular and most commonly used commercially available technologies, such as lithium-ion batteries, with its current sub-chemistries, procurement skill and experience has become increasingly more important under current market conditions. As a result, the formal inquiries and follow-up questioning include attention on procurement track records and relationships, tender plans, if any, and the strength of the anticipated vendor teams.

A fundamental part of the LSA ES RFO inquiry is the collection of information on safety monitoring equipment, safety processes and safety protocols, including training and lessons learned. The review of technology also extends to the required licenses and patents, if any, and the plans to support operations and the associated performance guarantees with monitoring equipment and maintenance and operating contracts with original equipment manufacturing or other reputable vendors.

mNOC AERS will install lithium-ion battery solutions that are interconnected behind the customer meter at retail customer locations in the PG&E service territory. [redacted] While the individual energy storage systems will be sized to meet site specific requirements, a portfolio of different size units will be aggregated within the PG&E DLAP to meet CAISO and PG&E requirements. Projects could be managed from a Network Operations Center which provides real time remote monitoring, diagnostics, and troubleshooting capabilities. [redacted]

Each unit will be a stand-alone, lithium-ion battery-based energy storage system comprised of a complete balance of system devices containing DC battery packs, power electronics, thermal management and controls. The Lithium Ion battery technology has experienced rapid growth and improvement and is generally considered to be more advanced and mature than other storage technologies. The BTM installations contemplated here by mNOC AERS include [redacted]

[redacted]

[redacted]

mNOC AERS, LLC, a special purpose entity affiliated with MicroNOC, Inc. MicroNOC has installed a range of project sizes from 30kW to 1MW, totaling 6.12MW/8.76MWh of storage capacity.

Experience (Financing, construction, operation)

The organization and expertise of the developer of the storage project are thoroughly vetted in the ES RFO process. Past projects of team members, the track record of the team obtaining financing or the presence of self-financing resources, the experience in developing and permitting sites to completion and the presence of, or ability to contract for, qualified suppliers, constructors and operators are all scrutinized.

MicroNOC Inc. will be the lead to develop, construct, operate and maintain the Energy Storage System ("ESS") with [redacted] MicroNOC will procure the equipment and use its own Aggregated Energy Resources (AERS) intelligent control NOC software technology. [redacted] will provide the full wrap of bringing the project on line by the Guaranteed Initial Delivery Date as well as ensuring that the ESS provides the operational characteristics stated in the Agreement.

MicroNOC provided a list of projects it has installed of similar capacity and configuration as this proposal. MicroNOC identified 6.12 MW of installation at a number of facilities in the US and Korea.

MicroNOC states in the proposal that it has financed many of its projects over the last 10 years. MicroNOC has pre-arranged and secured funding for this project and does not need any government assistance or programs for the project to continue development.

Site Control and Other Site Issues, Permitting

Given the nature of this product, site control is not relevant to the success of the solution. PG&E recognized the difference between product options in the questions related to BTM projects in Appendix B2, the Project Description document. PG&E asked BTM projects [redacted]

The project sites for this product are controlled by the retail customers that mNOC AERS plans to solicit. [redacted]

[redacted]. The IE finds no cause to question this assessment of the permits required and in general, the low risk of not obtaining them. In specific cases, it is conceivable that abutters could vigorously oppose the installation of batteries in the sizes needed and mNOC AERS could presumably manage that risk by finding a replacement customer.

Interconnection

The review of interconnection starts with the Point of Interconnection and covers the full range of applications and studies required for the storage project to safely participate in the regional or local grid system. The status of the necessary CAISO processes is disclosed and information is obtained on the cluster analysis being done, where applicable, the Phase I and Phase II studies, the network and local upgrades and upgrade costs allocated to the storage project, the deliverability analysis and allocation and if available, chargeability studies which the storage project has obtained. [redacted]

Schedule

Many, if not all, of the essential facts regarding the storage project, from the technology to the financing strength to the suitability of the site, determine whether the development team has a realistic chance of meeting the Expected Initial Delivery Date ("EIDD") for the project. Whether the project can be relied upon to contribute to the storage objective will depend on an overall assessment of these essential project facts, not the least of which is the decision of the development team, curated by the PG&E staff, to pick an EIDD with sufficient lead time.

In this case, the EIDD is October 1, 2019. In light of the advanced factors supporting the project, including the resources, the "behind the meter" experience of MicroNOC, and [redacted], the mNOC AERS project is can reasonably be expected to meet its EIDD.

Conclusion

Based on the foregoing, it appears to the IE that the mNOC AERS BTM Project should have a high probability of success for completing the project as required by the BTM CSA.

The project is being developed by an affiliate of an experienced project developer with a successful track record of bringing distributed projects to fruition. [redacted] The IE therefore recommends approval of the BTM CSA with mNOC AERS, LLC.

Pacific Gas and Electric Company

2018 Local Sub-Area Energy Storage Request for Offers

Independent Evaluator Report

Confidential Version

Attachment B

Energy Storage Resource Adequacy Agreement with Hummingbird Energy Storage, LLC

June, 2018

Prepared by
Merrimack Energy Group, Inc.
26 Shipway Place
Charlestown, Mass. 02129

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I. Introduction

A. Overview

Pacific Gas and Electric Company ("PG&E) is seeking approval of an Energy Storage Resource Adequacy Agreement ("ESRAA") from the Hummingbird Energy Storage, LLC facility located in Morgan Hill, California. [redacted] The facility has a Design Dmax of 75 MW, with Storage Energy of 300 MWh and Discharge of 4.0 hours. Hummingbird Energy Storage is a transmission-connected project.

Hummingbird Energy Storage is a stand-alone lithium-ion battery-based energy storage system. The project will feature Powin Energy's patented Battery Pack Operating System (bp-OS) that manages battery charge balancing in a manner tailored to utility-scale stationary assets. The project will be built and owned by Hummingbird Energy Storage, LLC.[1] The term of the ESRAA will be 15 years commencing on the Initial Delivery Date ("IDD"), which is expected to be December 1, 2020. The Delivery Point for the project is the Metcalf 115 kV substation, which is the physical point of interconnection to the CAISO grid.

The ESRAA was executed by PG&E pursuant to the Company's 2018 Local Sub-Area Energy Storage Request for Offers ("2018 LSA ES RFO" or "2018 Energy Storage RFO"). Through this RFO, PG&E is seeking to procure energy storage resources to meet local sub-area reliability needs as required by California Public Utilities Commission ("CPUC") Resolution E-4909 (the "Resolution"). The CPUC issued Resolution E-4909 in response to the CAISO's award of RMR contracts to three generators. The Resolution instructed PG&E to issue a Request for Offers ("RFO") within 90 days for the procurement of energy storage and/or preferred resources, to address the deficiencies in the affected local sub-areas. PG&E could also explore potential transmission solutions. The Resolution also instructed PG&E to coordinate with the CAISO on whether PG&E's proposed procurement and/or transmission solutions partially or wholly eliminate the need for, or extension of, one or more of the RMR contracts in the identified local sub-areas.

In addition, the Resolution also established parameters to guide the procurement process and decisions regarding resource selection, including the following:

- Resources procured pursuant to this solicitation must be both:
    - On-line and operational on or before a date sufficient to ensure that the RMR contracts for the three plants – Metcalf Energy Center, Feather River Energy Center, and Yuba City Energy Center – will not be renewed in any year from 2019 through 2022;
    - Located within the relevant sub-area(s) and be interconnected at locations that will mitigate local capacity and voltage issues sufficient to obviate the need for RMR contracts for the aforementioned plants;

[1] [redacted]

- Resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

PG&E launched the 2018 LSA ES RFO on February 28, 2018 and received offers on March 28, 2018. PG&E executed four Agreements for energy storage products as a result of the solicitation, representing a total of 567.5 MW, including 75 MW of energy storage capacity services under the ESRAA with Hummingbird Energy Storage, LLC.

This Attachment B to the Independent Evaluator Report on PG&E's 2018 LSA ES RFO process ("IE Report on 2018 LSA ES RFO") focuses on the two sections of the CPUC IE Report Template associated with discussions of project-specific negotiations (Section E of the Report Template) and of the approval issue (Section H of the Report Template) – does the contract merit CPUC approval? Is the contract reasonably priced and does it reflect a functioning market? A separate Attachment is provided for each Agreement executed by PG&E with the energy storage providers. Accordingly, the IE Report on PG&E's LSA ES RFO will contain Attachment A through Attachment D, which address each contract executed through this solicitation.

II. Project Specific Contract Negotiations

For reviewing and evaluating the performance of the utility with regard to specific contract negotiations, the IE has addressed the issues raised in the CPUC Independent Evaluator Report Template. These include:

1. Identify the principles the IE used to evaluate negotiations;

2. Using the above principles, evaluate the project specific negotiations. Highlight any issues of interest/concern including unique terms and conditions;

3. Was similar information/options made available to other bidders when appropriate (i.e. if a bidder was told to reduce its price, was the same information made available to others?);

4. Describe and explain any differences of opinion between the IE and utility. If resolved, describe the reasonableness of the outcome;

5. Any other information relevant to negotiations not asked above but important to understanding the IOU's process.

Principles Used to Evaluate Negotiations

The general principles followed by the IE in evaluating contract negotiations include assurance that the risk allocation provisions in the contract are reasonably balanced between the counterparties and that the utility customers are not placed at undue risk as a result of the contracting process. The IE generally "monitors" but does not actively participate in the contract negotiation process but will identify issues to the utility transactors if negotiations are moving off track or there are potential biases or inconsistencies in the process. It has been the IE's experience in monitoring a number of negotiation processes that contract negotiations can divert off course but eventually return to a balance after contested provisions are resolved. The IE also attempts to ensure that similarly situated counterparties are treated the same or similarly and that all counterparties are provided with the same message. For example, PG&E has generally provided a clear message to counterparties to other solicitations (in addition to the Energy Storage RFOs) that the process is a very competitive process with more projects shortlisted than PG&E intends to execute contracts for. As a result, counterparties should sharpen their pencils and price as competitively as possible.

However, given the lead times associated with completion of this RFO and the recently negotiated agreements resulting from the 2016 ES RFO process, PG&E essentially used the "standard" contracts[2] executed via the 2016 ES RFO as the starting point for this solicitation. [redacted]

Revisions to the Pro Forma Energy Storage Agreement

Prior to issuing the 2018 LSA ES RFO, PG&E made several revisions to the pro forma ESRAA agreement to reflect updates since completion of the contracts from the 2016 ES RFO. This section of the report provides the following Exhibit B-1, describing the important contract revisions incorporated into the pro forma ESRAA relative to the Agreements executed between PG&E and counterparties from the 2016 ES RFO, which were executed in November, 2017. Exhibit B-1 addresses the changes to the ESRAA that applies to all ESRAA agreements.

[2] [redacted]

Exhibit B-1: Important Contract Revisions From 2016 ES RFO Agreements

Provision/Purpose	Revisions
[redacted]	

[redacted]

Project Specific Negotiations of Contract with Hummingbird Energy Storage

[redacted]

[redacted]

[redacted] A list of the initial shortlisted offers is provided in Exhibit B-2.

[3] [redacted]

[redacted]

[redacted]

Shortly after the CAM/PRG meeting, PG&E notified esVolta that its offer had been selected for the shortlist and asked for the company to notify PG&E if they would accept their shortlist position. PG&E also provided the shortlisted Participants with a clean version of the form agreement and asked the Participants to populate all fields in the contract necessary to incorporate all project specific information. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

The key provisions of the final executed Hummingbird Energy Storage, LLC ESRAA are summarized in Exhibit B-4.

Exhibit B-4: Final Contract Key Provisions

Contract Provisions	Inclusion in Final Contract
Form of Agreement	Energy Storage Resource Adequacy Agreement
[redacted]	

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

In addition to the contract provisions described above, the ESRAA also includes Appendix II and III which provide a description of the facility, unit, performance characteristics and operational limitations. The information from Appendix II is summarized in Exhibit B-5 below.

Exhibit B-5: Summary of ESRAA Appendix II and III for Hummingbird Energy Storage, LLC

[redacted]

[redacted]

III. Does the Contract Merit CPUC Approval

A. Introduction

This section of the Report addresses the issue "Does the Contract merit CPUC approval and is the contract reasonably priced and does it reflect a functioning market? To address these questions the IE Report Template requires that the following issues be addressed.

1. Provide a discussion and observation for each category and describe the project's ranking relative to other bids from the solicitation; and from an overall market perspective;
    a. Contract price, including cost adders (transmission, credit, etc.)
    b. Portfolio fit
    c. Project viability
        i. Technology
        ii. Bidder experience (financing, construction, operation)
        iii. Credit and collateral
        iv. Permitting, site control and other site-related matters
        v. Fuel status
        vi. Transmission upgrades
    d. Any other relevant factors
2. Based on the complete bid process:
    a. Does the IOU contract reflect a functioning market?
    b. Is the IOU contract the best overall offer received by the IOU?
3. Is the contract a reasonable method of achieving the need identified in the RFO?
4. If the contract does not directly reflect a product solicited and bid in an RFO, is the contract superior to the bids received or the products solicited in the RFO?
5. Based on your analysis of the RFO bids and the bid process, does the contract merit Commission approval? Explain

B. Need for Procurement

Through the 2018 LSA ES RFO, PG&E seeks new energy storage resources connected at the transmission, distribution or customer level within the local sub-areas of Bogue, Pease and South Bay – Moss Landing to meet real power capacity needs in the South Bay – Moss Landing area and reactive power needs in Bogue and Pease. PG&E is issuing this RFO to procure energy storage resources to meet local capacity and local sub area reliability needs as required by CPUC Resolution E-4909. Any battery storage projects selected through this RFO could be used to replace three Calpine fossil fuel plants (Feather River, Yuba City, and Metcalf) that do not have long term contracts with utilities but that have been identified by the CAISO as need to serve local reliability needs.

CPUC Resolution E-4909 also states that resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

Through this LSA ES RFO process, PG&E is proposing to procure 567.5 MW of energy storage capacity. The execution of this agreement with Hummingbird Energy Storage for 75 MW will provide approximately 13.2% of this total.

Chapter III Section (D) of the IE's Report on the 2018 LSA ES RFO process, provides ample evidence of the robustness of the response to this RFO, even in light of the short turnaround time for Participants to prepare their offers. As illustrated in this section of the report, PG&E received 100 offer variations from 29 projects and [redacted] counterparties. Appendix A and B of the IE Report on the 2018 LSA ES RFO provides a summary of the 100 offer variations received, including both offers for third-party owned Resource Adequacy ("RA") and Behind-the-Retail-Meter ("BTM") options and Utility-owned projects at the Moss Landing site. The detailed evaluation conducted by PG&E is described primarily in Chapters IV and V of the 2018 IE LSA ES RFO Report, and that description confirms that the Hummingbird Energy Storage Resource Adequacy Agreement submitted by esVolta was selected for execution based on its competitiveness, and on the applicable evaluation criteria, compared to the large number of similar lithium-ion battery ESRAA agreement options. The reasonableness of the Hummingbird Energy Storage ESRAA from a viewpoint of its cost competitiveness, as well as the other evaluation criteria, is set forth in the next section of this Report.

C. Contract Pricing and Portfolio Fit

[redacted]

[redacted]

[redacted]

Exhibit B-6: Valuation Results for the Short-Listed Hummingbird Energy Storage, LLC Project

Valuation Components	Levelized PAV
[redacted][4] [redacted][5] [redacted]	[redacted]

[4] [redacted]

[5] [redacted]

Exhibit B-7 includes the final evaluation results for the Hummingbird Energy Storage, LLC project by component.

Exhibit B-7: Final Valuation Results for Hummingbird Energy Storage Project

Valuation Components	Levelized PAV
[redacted]	[redacted]

[redacted]

[redacted]

[redacted][8]

[6] [redacted]

[7] [redacted]

[8] [redacted]

[redacted]

[redacted]

D. Project Viability

Project Scrutiny

The LSA ES RFO Protocol Offer Package requires Participants to complete and submit a number of documents pertaining to aspects of project development for their energy storage offers.[9] The Offer Package includes detailed forms soliciting comprehensive information about the many project development and operational aspects of the projects offered. PG&E relies on this information to conduct its own qualitative evaluation of the offers. In addition, for the Offer Package and related information, follow-up questioning during meetings and discussions with the Bidders covered topics ranging from project updates to manufacturing queues, procurement experience, permitting requirements and lead times, to all aspects of the interconnection process. As a result, the level of information about each project provided at the time of offer submittal as well as during follow-up discussions provide a solid base of information for both the PG&E team and IE to assess project viability for each of the contracts executed.

Technology and Procurement Issues

For the most popular and most commonly used commercially available technologies, such as lithium-ion batteries, with its current sub-chemistries, procurement skill and experience has become increasingly more important under current market conditions. As a result, the formal inquiries and follow-up questioning include attention on procurement track records and relationships, tender plans, if any, and the strength of the anticipated vendor teams.

A fundamental part of the ES RFO inquiry is the collection of information on safety monitoring equipment, safety processes and safety protocols, including training and lessons learned. The review of technology also extends to the required licenses and patents, if any, and the plans to support operations and the associated performance guarantees with

[9] Documents which Participants are required to provide with their offer include: (1) Appendix B1 – Project Description; (2) B2 – Site Control; (3) Project Milestone Schedule; (4) Experience Qualifications; (5) Electric Interconnection; and (6) Organization and Finance information.

monitoring equipment and maintenance and operating contracts with original equipment manufacturing or other reputable vendors.

The Hummingbird Storage project will be a stand-alone 75 MW, 300 MWh lithium-ion battery project to be located in Morgan Hill California, approximately 10 miles south of San Jose. [redacted]

[redacted]

[redacted]

Experience (Financing, construction, operation)

The organization and expertise of the developer of the storage project are thoroughly vetted in the LSA ES RFO process. Past projects of team members, the track record of the team obtaining financing or the presence of self-financing resources, the experience in developing and permitting sites to completion and the presence of, or ability to contract for, qualified suppliers, constructors and operators are all scrutinized.

The Hummingbird Energy Storage project is owned by Hummingbird Energy Storage, LLC, a special purpose entity. This limited liability company will own 100% of the

proposed project and the project assets throughout the term of the ESRAA with PG&E. The project is being developed and managed by esVolta, LP. esVolta claims it is among the largest developers/owners/operators of utility-scale energy storage projects in North America, with a battery storage asset portfolio totaling 116 MWh including projects in operations and utility-contracted backlog. esVolta is sponsored by Powin Energy Corporation, a leading US manufacturer and integrator of energy storage systems, and Blue Sky Alternative Investments, a major international energy and infrastructure investor. Powin Energy is a publicly traded US based designer and manufacturer of lithium-ion storage solutions. Blue Sky is a private equity firm with $3 billion of assets under management.[10]

According to the information provided by the Participant, the project team has two projects in operations: a 2 MW project (Millikan) that is providing services to SCE. The project was selected through the 2016 Aliso Canyon energy storage solicitation. A second project is for 8.8 MWs with IESO Ontario. [redacted] compared to the 75 MW facility it proposes to contract under the LSA ES RFO.

Site Control and Other Site Issues, Permitting,

Starting with site control status, the site-related information collected during the RFO process includes the full spectrum of possible federal, state and local permits, the bidder's experience in applying for and obtaining permits with sufficient lead time, and the range of impact analyses, such as hazardous waste and sensitive resource investigations, needed to assess the suitability of the site for energy storage use.

[redacted]

In terms of permitting, the Respondent states it [redacted]

[10] A news release is included on Powin Energy's website that describes its relationship with the above parties. According to the press release, in December, 2017, Powin Energy sold its 110 MWh of storage assets and contracted pipeline to esVolta. esVolta recently received a large financial commitment from Blue Sky Alternative Investments LLC to accelerate its growth in the North American utility-scale energy storage market. Powin Energy will be esVolta's exclusive provider of energy storage systems through 2022. Powin Energy's business plan has long had the vision of transitioning the company out of the project development business and into being a fully dedicated energy storage systems and services provider.

[redacted]

Interconnection

The review of interconnection starts with the Point of Interconnection and covers the full range of applications and studies required for the storage project to safely participate in the regional or local grid system. The status of the necessary CAISO processes are disclosed and information is obtained on the cluster analysis being done, where applicable, the Phase I and Phase II studies, the network and local upgrades and upgrade costs allocated to the storage project, the deliverability analysis and allocation and if available, chargeability studies which the storage project has obtained.

[redacted]

[redacted]

Schedule

Many, if not all, of the essential facts regarding the storage project, from the technology to the financing strength to the suitability of the site, determine whether the development team has a realistic chance of meeting the Expected Initial Delivery Date ("EIDD") for the project.

In this case, the EIDD is December 1, 2020. [redacted]

Conclusion

Based on the foregoing, it appears to the IE that the Hummingbird Energy Storage Project should have a reasonable probability of success for completing the project as required by the ESRAA. [redacted] However, with these risks in mind, given the unique requirements of this solicitation, the IE does recommend approval of the ESRAA with Hummingbird Energy Storage given the need to move forward with new resources in the South Bay – Moss Landing area. [redacted]

Pacific Gas and Electric Company

2018 Local Sub-Area Energy Storage Request for Offers

Independent Evaluator Report

Confidential Version

Attachment C

Energy Storage Resource Adequacy Agreement with Dynegy Marketing and Trade, LLC

June, 2018

Prepared by
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26 Shipway Place
Charlestown, Mass. 02129

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I. Introduction

A. Overview

Pacific Gas and Electric Company ("PG&E) is seeking approval of an Energy Storage Resource Adequacy Agreement ("ESRAA") from the Moss Landing Energy Storage facility located in Moss Landing, California. [redacted][1] The facility has a Design Dmax of 300 MW, with Storage Energy of 1,200 MWh and Discharge of 4.0 hours.[2] The Moss Landing Energy Storage project is a transmission-connected project.

The Moss Landing Energy Storage project is a stand-alone lithium-ion battery-based energy storage system. The project will utilize Tier 1 batteries. The project will be built at a brownfield existing power plant site located in Moss Landing, California. Vistra plans to interconnect using the recently retired Unit 6 interconnect location at the 500 kV substation adjacent to the facility.

[redacted]

[redacted]

The term of the ESRAA with Dynegy Marketing and Trade, LLC is for 20 years commencing on the Initial Delivery Date ("IDD"), which is expected to be December 1, 2020.

The ESRAA was executed by PG&E pursuant to the Company's 2018 Local Sub-Area Energy Storage Request for Offers ("2018 LSA ES RFO" or "2018 Energy Storage RFO"). Through this RFO, PG&E is seeking to procure energy storage resources to meet local sub-

[1] [redacted]

[2] This project will be one of the largest BESS systems in the world, if not the largest. Two projects, the Fluence 100 MW/400 MWh BESS project in Long Beach California along with the Tesla 100 MW BESS Hornsdale Power Reserve project in Australia claim to be the largest BESS projects. The largest BESS project under construction is a 200 MW/800 MWh project in China.

area reliability needs as required by California Public Utilities Commission ("CPUC") Resolution E-4909 (the "Resolution"). The CPUC issued Resolution E-4909 in response to the CAISO's award of RMR contracts to three generators. The Resolution instructed PG&E to issue a Request for Offers ("RFO") within 90 days for the procurement of energy storage and/or preferred resources, to address the deficiencies in the affected local sub-areas. PG&E could also explore potential transmission solutions. The Resolution also instructed PG&E to coordinate with the CAISO on whether PG&E's proposed procurement and/or transmission solutions partially or wholly eliminate the need for, or extension of, one or more of the RMR contracts in the identified local sub-areas.

In addition, the Resolution also established parameters to guide the procurement process and decisions regarding resource selection, including the following:

- Resources procured pursuant to this solicitation must be both:
    - On-line and operational on or before a date sufficient to ensure that the RMR contracts for the three plants – Metcalf Energy Center, Feather River Energy Center, and Yuba City Energy Center – will not be renewed in any year from 2019 through 2022;
    - Located within the relevant sub-area(s) and be interconnected at locations that will mitigate local capacity and voltage issues sufficient to obviate the need for RMR contracts for the aforementioned plants;
- Resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

PG&E launched the 2018 LSA ES RFO on February 28, 2018 and received offers on March 28, 2018. PG&E executed four Agreements for energy storage products as a result of the solicitation, representing a total of 567.5 MW, including 300 MW of energy storage capacity services under the ESRAA with Dynegy Marketing and Trade, LLC.

This Attachment C to the Independent Evaluator Report on PG&E's 2018 LSA ES RFO process ("IE Report on 2018 LSA ES RFO") focuses on the two sections of the CPUC IE Report Template associated with discussions of project-specific negotiations (Section E of the Report Template) and of the contract approval issue (Section H of the Report Template) – does the contract merit CPUC approval? Is the contract reasonably priced and does it reflect a functioning market? A separate Attachment is provided for each Agreement executed by PG&E with the energy storage providers. Accordingly, the IE Report on PG&E's LSA ES RFO will contain Attachment A through Attachment D, which address each contract executed through this solicitation.

II. Project Specific Contract Negotiations

For reviewing and evaluating the performance of the utility with regard to specific contract negotiations, the IE has addressed the issues raised in the CPUC Independent Evaluator Report Template. These include:

1. Identify the principles the IE used to evaluate negotiations;

2. Using the above principles, evaluate the project specific negotiations. Highlight any issues of interest/concern including unique terms and conditions;

3. Was similar information/options made available to other bidders when appropriate (i.e. if a bidder was told to reduce its price, was the same information made available to others?);

4. Describe and explain any differences of opinion between the IE and utility. If resolved, describe the reasonableness of the outcome;

5. Any other information relevant to negotiations not asked above but important to understanding the IOU's process.

Principles Used to Evaluate Negotiations

The general principles followed by the IE in evaluating contract negotiations include assurance that the risk allocation provisions in the contract are reasonably balanced between the counterparties and that the utility customers are not placed at undue risk as a result of the contracting process. The IE generally "monitors" but does not actively participate in the contract negotiation process but will identify issues to the utility transactors if negotiations are moving off track or there are potential biases or inconsistencies in the process. It has been the IE's experience in monitoring a number of negotiation processes that contract negotiations can divert off course but eventually return to a balance after contested provisions are resolved. The IE also attempts to ensure that similarly situated counterparties are treated the same or similarly and that all counterparties are provided with the same message. For example, PG&E has generally provided a clear message to counterparties in other solicitations (in addition to the Energy Storage RFOs) that the process is a very competitive process with more projects shortlisted than PG&E intends to execute contracts for. As a result, counterparties should sharpen their pencils and price as competitively as possible.

However, given the lead times associated with completion of this RFO and the recently negotiated agreements resulting from the 2016 ES RFO process, PG&E essentially used the "standard" contracts[3] executed via the 2016 ES RFO as the starting point for this

[3] [redacted]

solicitation. [redacted]

Revisions to the Pro Forma Energy Storage Agreement

Prior to issuing the 2018 LSA ES RFO, PG&E made several revisions to the pro forma ESRAA agreement to reflect updates since completion of the contracts from the 2016 ES RFO. This section of the report provides the following Exhibit B-1, describing the important contract revisions incorporated into the pro forma ESRAA relative to the Agreements executed between PG&E and counterparties from the 2016 ES RFO, which were executed in November, 2017. Exhibit C-1 addresses the changes to the ESRAA that applies to all ESRAA agreements.

Exhibit C-1: Important Contract Revisions From 2016 ES RFO Agreements

Provision/Purpose	Revisions
[redacted]	

[redacted]

Project Specific Negotiations of Contract with Vistra Energy Storage

[redacted]

[redacted]

[redacted]

[redacted] A list of the initial shortlisted offers is provided in Exhibit C-2.

[redacted]

[redacted]

Shortly after the CAM/PRG meeting, PG&E notified Vistra Energy that its offer had been selected for the shortlist and asked for the company to notify PG&E if they would accept their shortlist position. PG&E also provided the shortlisted Participants with a clean version of the form agreement and asked the Participants to populate all fields in the contract necessary to incorporate all project specific information. [redacted]

On May 8, 2018 PG&E [redacted]

The key provisions of the final executed Dynegy Marketing and Trade, LLC ESRAA are summarized in Exhibit C-4.

Exhibit C-4: Final Contract Key Provisions

Contract Provisions	Inclusion in Final Contract
Form of Agreement	Energy Storage Resource Adequacy Agreement
[redacted]	

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

In addition to the contract provisions described above, the ESRAA also includes Appendix II and III which provide a description of the facility, unit, performance characteristics and operational limitations. The information from Appendix II and III is summarized in Exhibit C-5 below.

Exhibit C-5: Summary of ESRAA Appendix II and III for Dynegy Marketing and Trade, LLC

Project Name	Moss Landing Storage project
[redacted]	

[redacted]

Technology Type	Lithium-Ion Batteries
Physical Point of Interconnection to the CAISO Grid	Moss Landing 500 kV Substation
Existing Zone	NP-15
Design Capacity (Design Dmax)	300 MW
[redacted]	
Discharge Duration	4.0 hours
Storage Energy (MWh)	1200 MWh

[redacted]

III. Does the Contract Merit CPUC Approval

A. Introduction

This section of the Report addresses the issue "Does the Contract merit CPUC approval and is the contract reasonably priced and does it reflect a functioning market? To address these questions the IE Report Template requires that the following issues be addressed.

1. Provide a discussion and observation for each category and describe the project's ranking relative to other bids from the solicitation; and from an overall market perspective;
    a. Contract price, including cost adders (transmission, credit, etc.)
    b. Portfolio fit

c. Project viability
    i. Technology
    ii. Bidder experience (financing, construction, operation)
    iii. Credit and collateral
    iv. Permitting, site control and other site-related matters
    v. Fuel status
    vi. Transmission upgrades
d. Any other relevant factors

2. Based on the complete bid process:
    a. Does the IOU contract reflect a functioning market?
    b. Is the IOU contract the best overall offer received by the IOU?
3. Is the contract a reasonable method of achieving the need identified in the RFO?
4. If the contract does not directly reflect a product solicited and bid in an RFO, is the contract superior to the bids received or the products solicited in the RFO?
5. Based on your analysis of the RFO bids and the bid process, does the contract merit Commission approval? Explain

B. Need for Procurement

Through the 2018 LSA ES RFO, PG&E is seeking new energy storage resources connected at the transmission, distribution or customer level within the local sub-areas of Bogue, Pease and South Bay – Moss Landing to meet real power capacity needs in the South Bay – Moss Landing area and reactive power needs in Bogue and Pease. PG&E is issuing this RFO to procure energy storage resources to meet local capacity and local sub area reliability needs as required by CPUC Resolution E-4909. Any battery storage projects selected through this RFO could be used to replace three Calpine fossil fuel plants (Feather River, Yuba City, and Metcalf) that do not have long term contracts with utilities but that have been identified by the CAISO as needed to serve local reliability needs.

CPUC Resolution E-4909 also states that resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

Through this LSA ES RFO process, PG&E is proposing to procure 567.5 MW of energy storage capacity. The execution of this agreement with Dynegy Marketing and Trade, LLC for 300 MW will provide approximately 53% of this total.

Chapter III Section (D) of the IE's Report on the 2018 LSA ES RFO process, provides ample evidence of the robustness of the response to this RFO, even in light of the short turnaround time for Participants to prepare their offers. As illustrated in this section of the report, PG&E received 100 offer variations from 29 projects and [redacted] counterparties. Appendix A and B of the IE Report on the 2018 LSA ES RFO provides a summary of the 100 offer variations received, including both offers for third-party owned Resource

Adequacy ("RA") and Behind-the-Retail-Meter ("BTM") options, Utility-owned projects at the Moss Landing site, and [redacted] BOT options. The detailed evaluation conducted by PG&E is described primarily in Chapters IV and V of the 2018 IE LSA ES RFO Report, and that description confirms that the Dynegy Marketing and Trade, LLC Energy Storage Resource Adequacy Agreement submitted by Vistra for the Moss Landing Storage project was selected for execution based on its competitiveness, and on the applicable evaluation criteria, compared to the large number of similar lithium-ion battery ESRAA agreement options. The reasonableness of the Dynegy Marketing and Trade, LLC ESRAA from a viewpoint of its cost competitiveness, as well as the other evaluation criteria, is set forth in the next section of this Report.

C. Contract Pricing and Portfolio Fit

[redacted]

[redacted]

[redacted]

Exhibit C-6: Valuation Results for the Short-Listed Moss Landing Storage Project

Valuation Components	Levelized PAV
[redacted]	

[redacted][4] [redacted][5] [redacted]

Exhibit C-7 includes the final evaluation results for the Moss Landing Storage project by component.

Exhibit C-7: Final Valuation Results for Moss Landing Storage Project

Valuation Components	Levelized PAV
[redacted][6] [redacted]	[redacted]

[4] [redacted]

[5] [redacted]

[6] [redacted]

[redacted][7] [redacted]

[redacted]

[redacted][8] [redacted]

[redacted]

D. Project Viability

Project Scrutiny

The LSA ES RFO Protocol Offer Package requires Participants to complete and submit a number of documents pertaining to aspects of project development for their energy storage offers.[9] The Offer Package includes detailed forms soliciting comprehensive information about the many project development and operational aspects of the projects offered. PG&E relies on this information to conduct its own qualitative evaluation of the offers. In addition, for the Offer Package and related information, follow-up questioning during meetings and discussions with the Bidders covered topics ranging from project updates to manufacturing queues, procurement experience, permitting requirements and lead times, to all aspects of the interconnection process. As a result, the level of information about each project

[7] [redacted]

[8] [redacted]

[9] Documents which Participants are required to provide with their offer include: (1) Appendix B1 – Project Description; (2) B2 – Site Control; (3) Project Milestone Schedule; (4) Experience Qualifications; (5) Electric Interconnection; and (6) Organization and Finance information.

provided at the time of offer submittal as well as during follow-up discussions provides a solid base of information for both the PG&E team and IE to assess project viability for each of the contracts executed.

Technology and Procurement Issues

For the most popular and most commonly used commercially available technologies, such as lithium-ion batteries, with its current sub-chemistries, procurement skill and experience has become increasingly more important under current market conditions. As a result, the formal inquiries and follow-up questioning include attention on procurement track records and relationships, tender plans, if any, and the strength of the anticipated vendor teams.

A fundamental part of the LSA ES RFO inquiry is the collection of information on safety monitoring equipment, safety processes and safety protocols, including training and lessons learned. The review of technology also extends to the required licenses and patents, if any, and the plans to support operations and the associated performance guarantees with monitoring equipment and maintenance and operating contracts with original equipment manufacturing or other reputable vendors.

The Moss Landing Storage project will be a stand-alone 300 MW, 1,200 MWh lithium-ion battery project to be located in Moss Landing California. [redacted]

Experience (Financing, construction, operation)

The organization and expertise of the developer of the storage project are thoroughly vetted in the LSA ES RFO process. Past projects of team members, the track record of the team obtaining financing or the presence of self-financing resources, the experience in developing and permitting sites to completion and the presence of, or ability to contract for, qualified suppliers, constructors and operators are all scrutinized.

In terms of overall power project experience, Vistra touts its experience in its offer to PG&E. Vistra Energy states that it is a premier Texas-based energy company focused on the competitive energy and power generation markets through operation as the largest retailer and generator of electricity in the Texas market. Vistra's integrated portfolio of competitive business consists primarily of TXU Energy and Luminant. TXU Energy sells retail electricity and value-added services to approximately 1.7 million residential and business customers in Texas. Luminant generates and sells electricity and related products from a diverse fleet of generation facilities totaling approximately 13,600 MW of conventional generation in Texas and is a large purchaser of renewable power. In the past 10 years, Vistra has constructed 2,500 MW of power generation including 180 MW of solar energy scheduled to be completed in May 2018.

As noted, Vistra is currently in the process of merging with Dynegy to become the largest independent power producer in the US. Dynegy generates energy primarily in the Northeast, Mid-Atlantic, Midwest, Texas and California markets. Dynegy operates in 12 states and generates approximately 28,000 MW across 43 power plants. When the merger is complete, Vistra will operate over 42,000 MW of generation across the country.

In terms of experience with energy storage projects, it appears from the materials provided by Vistra, [redacted]

In terms of financing, Vistra stated in its offer that Vistra will be providing balance sheet financing for the Moss Landing Storage project. No external financial conditions or debt is required. Vistra has a corporate credit rating of Ba2/BB with a positive/stable outlook. Also, Vistra's senior debt was recently rated by S&P as BBB- (investment grade).

Site Control and Other Site Issues, Permitting,

Starting with site control status, the site-related information collected during the RFO process includes the full spectrum of possible federal, state and local permits, the bidder's experience in applying for and obtaining permits with sufficient lead time, and the range of impact analyses, such as hazardous waste and sensitive resource investigations, needed to assess the suitability of the site for energy storage use.

As noted, Vistra and Dynegy are in the process of merging. Vistra will then have full ownership of the Moss Landing site. [redacted]

In terms of permitting, the Respondent states that since all batteries will be [redacted]

Interconnection

[redacted]

Schedule

Many, if not all, of the essential facts regarding the storage project, from the technology to the financing strength to the suitability of the site, determine whether the development team has a realistic chance of meeting the Expected Initial Delivery Date ("EIDD") for the project.

Although the EIDD is December 1, 2020, [redacted]

Conclusion

Based on the foregoing, it appears to the IE that the Moss Landing Storage project should have a reasonable probability of success for completing the project as required by the ESRAA. [redacted] From a project development perspective, the Respondent indicated that it is prepared to construct the project using balance sheet financing. It is not certain how the impact of the acquisition of Dynegy, which was approved by FERC in April 2018, will impact the financial integrity of Vistra. Given the unique requirements of this solicitation, the IE does recommend

approval of the ESRAA with Dynegy Marketing and Trade, LLC given the need to move forward with new resources in the South Bay – Moss Landing area. [redacted]

Pacific Gas and Electric Company

Local Sub Area Energy Storage Request for Offers

Confidential Version

Independent Evaluator Report

On PG&E's 2018 Local Sub Area Energy Storage RFO

Attachment D

Review of Turnkey Engineering, Procurement and Construction Agreement for Moss Landing Energy Storage Project with associated Long-Term Performance and Maintenance Agreement by and between Tesla, Inc., as Contractor, and PG&E, as Owner

June 29, 2018

Prepared by
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Charlestown, Mass. 02129

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I. Introduction

Overview

Pacific Gas and Electric Company ("PG&E") is seeking approval of an Engineering, Procurement and Construction Agreement ("EPC") for a Local Sub-Area Energy Storage Project with Tesla, Inc. ("Tesla") providing for, on a lump-sum, fixed price, turnkey basis, a new, fully operational, fully-permitted 182.5 MW[1] battery energy storage system to be engineered, procured, constructed, commissioned and successfully tested by Tesla, and interconnected at 115 kV by PG&E, on a portion of the PG&E-owned site where its 500/230/115 kV Moss Landing Substation is located. The substation site is at Highway 1 and Dolan Road, Moss Landing, Monterey County, California 95039.

The energy storage system will interconnect, as indicated, with PG&E's 115 kV system at the Moss Landing substation[2]. In addition, upon the completion of the Project, by virtue of its ownership, the Moss Landing Energy Storage Project ("Tesla Moss Landing ES Project") will provide Local Resource Adequacy credit to PG&E and will participate in the CAISO NP-15 markets[3]. Most significantly, pursuant to Resolution E-4909 of the California Public Utility Commission ("CPUC") issued January 12, 2018, "Authorizing PG&E to Procure Energy Storage or Preferred Resources to Address Local Deficiencies and Ensure Local Reliability", the Moss Landing Energy Storage Project will provide Local RA resources in the South Bay-Moss Landing sub-area and in so doing, contribute to mitigating the local capacity deficiency that exists in the subject sub-area when RMR and CPM resources are netted out. In short, the Moss Landing Energy Storage Project will contribute to the effort directed by the CPUC in Resolution E-4909 to eliminate or reduce reliance on such RMR resources in any year between 2019 and 2022.

The Tesla Moss Landing ES Project will have a Project Dmax of 184.3 MW in the PG&E-supplied medium voltage Switchgear and Discharge Duration of 4.0 hours, resulting in 737.2 MWh of Guaranteed Discharge Energy[4].

---

[1] The battery energy storage project will record different capacities at the meters located at different voltages. At the 115 kV high voltage interconnection, where the CAISO meter is located, the capacity will be 182.5 MW. At 21 kV, where the Tesla equipment will interconnect with the PG&E supplied switchgear, the capacity will register 184.3 MW. For EPC options at Moss Landing, all Participants had to propose a minimum size of a 195 MW BESS system. Participants could also propose a 100 MW BESS system. The 195 MW size was based on an estimate of the CAISO interconnection and no longer is an operative number.

[2] Moss Landing Battery Energy Storage System (BESS) is designed to be connected at the 115 kV level. The interconnection facility is designed as a single-bus-single-breaker (SBSB) and includes one (1) main line and three (3) transformer 115 kV circuit breakers, one (1) 115 kV Bus, three (3) 45/60/75MVA 115/21 kV Power Transformers each protected by a circuit breaker. Each Transformer will feed a 21 kV bus section. The three (3) 21 kV Bus sections will be connected via two (2) tie breakers. Each of the 21 kV bus sections will be designed as outdoor metalclad switchgears each with one (1) transformer LV breaker, one (1) collector bus and four (4) 21 kV breaker collector lines (Transformer/Inverter feeds).

[3] Market participation may vary from four-second frequency regulation to daily energy market bidding.

[4] See: Attachment 8 to the EPC. At 115 kV, the 182.5 MW Project will produce 730 MWh over its four-hour duration.

The Tesla Moss Landing ES Project will be built by Tesla and owned by PG&E pursuant the terms of the EPC. The delivery point for the Project is on the Project Site where the new associated gen tie-line extending from the 115 kV Substation terminates at the new PG&E-furnished 115 kV bus which will be connected through three (3) new 115/21 kV transformers supplied by PG&E to three (3) new 21 kV buses each housed in a new switchgear building where medium voltage switchgear installed by PG&E connect to twelve (12) 21 kV collection circuits installed by Tesla. The facilities on the battery side of the medium voltage switchgear will be supplied and installed by Tesla.

The EPC and associated Long-Term Performance and Maintenance Agreement ("LTMPA") [redacted] with Tesla. The EPC was executed by PG&E pursuant to the Company's 2018 Local Sub-Area Energy Storage Request for Offers ("2018 LSA ES RFO" or "Solicitation Protocol"). Through this RFO, PG&E is seeking to procure energy storage resources to meet local sub-area reliability needs as required by California Public Utilities Commission ("CPUC") Resolution E-4909 (the "Resolution"). The CPUC issued Resolution E-4909 in response to the CAISO's award of RMR contracts to three generators. The Resolution instructed PG&E to issue a Request for Offers ("RFO") within 90 days for the procurement of energy storage and/or preferred resources, to address the deficiencies in the affected local sub-areas. PG&E could also explore potential transmission solutions. The Resolution also instructed PG&E to coordinate with the CAISO on whether PG&E's proposed procurement and/or transmission solutions partially or wholly eliminate the need for, or extension of, one or more of the RMR contracts in the identified local sub-areas.

In addition, the Resolution also established parameters to guide the procurement process and decisions regarding resource selection, including the following:

- Resources procured pursuant to this solicitation must be both:
    - On-line and operational on or before a date sufficient to ensure that the RMR contracts for the three plants – Metcalf Energy Center, Feather River Energy Center, and Yuba City Energy Center – will not be renewed in any year from 2019 through 2022;
    - Located within the relevant sub-area(s) and be interconnected at locations that will mitigate local capacity and voltage issues sufficient to obviate the need for RMR contracts for the aforementioned plants;
- Resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

PG&E launched the 2018 LSA ES RFO on February 28, 2018 and received offers on March 28, 2018. On April 16, 2018, PG&E presented its Shortlist for the review at a joint CAM/PRG meeting. PG&E has now executed four contracts for energy storage products

as a result of the solicitation, representing a total of 567.5 MW, including the 182.5[5] MW energy storage asset represented by the Tesla Moss Landing BESS Project.

This Attachment D to the Independent Evaluator Report on PG&E's 2018 Local Sub Area Energy Storage Request for Offers Process ("IE Report 2018 LSA ES RFO") focuses on the two sections of the CPUC IE Report Template associated with discussion of project-specific negotiations (Section E of the Report Template) and of the approval issue (Section H of the Report Template) – does the contract merit CPUC approval? Is the contract reasonably priced and does it reflect a functioning market? A separate Attachment is provided for each Contract executed by PG&E with the energy storage providers. Accordingly, the IE Report on PG&E's Local Sub Area ES RFO will contain Attachment A through Attachment D, which address each contract executed through this solicitation.

II. Project Specific Contract Negotiations

For reviewing and evaluating the performance of the utility with regard to specific contract negotiations, the IE has addressed the issues raised in the CPUC Independent Evaluator Report Template[6]. These include:

1. Identify the principles the IE used to evaluate negotiations;

2. Using the above principles, evaluate the project specific negotiations. Highlight any issues of interest/concern including unique terms and conditions;

3. Was similar information/options made available to other bidders when appropriate (i.e. if a bidder was told to reduce its price, was the same information made available to others?);

4. Describe and explain any differences of opinion between the IE and utility. If resolved, describe the reasonableness of the outcome;

5. Any other information relevant to negotiations not asked above but important to understanding the IOU's process.

[5] Measured at 115 kV.

[6] The requirements for participation by an IE in utility solicitations are outlined in CPUC Decisions ("D").04-12-048 (Findings of Fact 94-95, Ordering Paragraph 28), D.06-05-039 (Finding of Fact 20, Conclusion of Law 3, Ordering Paragraph 8) of the CPUC, D.09-06-050 and D.10-07-042. The role of IEs in California IOU procurement processes has evolved over the past ten to twelve years. In D.04-12-048 (December 16, 2004), the CPUC required the use of an IE by investor-owned utilities (IOUs) in resource solicitations where there is an affiliated bidder or bidders, or where the utility proposed to build a project or where a bidder proposed to sell a project or build a project under a turnkey contract that would ultimately be owned by a utility. The latter circumstance is the case with the Moss Landing BESS.

Principles Used to Evaluate Negotiations

The general principles followed by the IE in evaluating contract negotiations include assurance that the risk allocation provisions in the contract are reasonably balanced between the counterparties and that the utility customers are not placed at undue risk as a result of the contracting process. The IE generally "monitors" but does not actively participate in the contract negotiation process. The IE will identify issues to the utility transaction teams if negotiations are moving off track or there are potential biases or inconsistencies in the process. It has been the IE's experience in monitoring a number of negotiation processes that contract negotiations can divert off course but eventually return to a balance after contested provisions are resolved. We also attempt to ensure that similarly situated counterparties are treated the same or similarly and that all counterparties are provided with the same message[7]. For example, PG&E has generally provided a clear message to counterparties to other solicitations (in addition to the Local Sub Area ES RFO) that the process is a very competitive process with more projects shortlisted than PG&E intends to execute contracts for resources. As a result, counterparties should sharpen their pencils and price as competitively as possible. This message was clearly sent to all shortlisted Participants.

Key Negotiating Developments and Key Contractual Provisions of the Tesla – PG&E EPC for Local Sub Area Energy Storage at the Moss Landing Substation

[redacted]

As a matter of overview, the IE sees the level of effort negotiating the final documentation as impressive, particularly considering the short amount of time available for the negotiations. This significant effort appropriately revealed the deep experience of the

[7] Among the fairness precautions employed by PG&E is the separation of teams - - between those teams negotiating ES RA agreements, Behind-the-Meter (BTM) CSA contracts and other third-party ownership contracts and a single, separate team negotiating with EPC Participants and potentially with PSA Participants. In addition, within both the third-party ownership group and the utility ownership group, PG&E appeared to "script" its important messages to assure that all Participants were treated similarly and that issues common to all teams were treated the same. As indicated, the EPC negotiations were conducted by a single team which consistently stayed "on script" in delivering its near-uniform messages to the two shortlisted EPC Participants.

negotiating teams on both sides. The summary assessment of the end result of these efforts is that the resulting EPC and LTPMA contracts are good contracts, balanced, technically competent and suitable for use for constructing a utility project with guaranteed performance standards backed up by a long-term commitment from the original equipment supplier. Accordingly, these documents will likely serve as a basis for negotiating the terms for constructing and operating future utility-owned battery projects of this significant scale.

Summary of the Tesla Negotiating Process (following April 16, 2018 Shortlisting):

The 2018 LSA ES RFO received a robust response from Participants. Offers were also received from a range of eligible Participants. A total of approximately 100 offer variations were received, which represented 29 projects from [redacted] counterparties. There were [redacted] offers for the EPC option at the Moss Landing, [redacted] BOT offers and [redacted] third-party offers that included Energy Storage RA agreements and Behind-the-retail meter CSA. Appendices A and B of the IE 2018 LSA ES RFO Report contain a list and summary of the Offers submitted. The IE found the response from the market to be robust and competitive for each product category.

[redacted][8]

[8] [redacted]

[redacted][9]

[redacted]

[redacted]

[redacted]

[redacted]

[9] Exhibit D-1 is the same as Table 4 in the IE 2018 LSA ES RFO Report.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted][10]

[redacted]

[redacted]

[redacted]

---

[10] [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

PG&E Notifications of Shortlist Development

On May 16, 2018, the PG&E Solicitation team provided a presentation to its internal Advisory Committee to discuss the status of the solicitation and potential project selection. PG&E's team provided an update to the group after the prior April 16, 2018 Shortlist review and presented a preferred portfolio of projects selected by the PG&E Energy Storage Advisory Committee.

The presentation summarized each selected project. The facts regarding the Tesla Moss Landing ES Project, as summarized on May 16, 2016, follow:

Counterparty Name	**Tesla, Inc.**
Project Name	Moss Landing Energy Storage
Technology	Lithium-Ion Technology
Zone/Delivery Point	South Bay – Moss Landing
Design Capacity	182.5 MW
Design Discharge Energy	730 MWh
Discharge Time	4.0 hours
Start Date/Term	Guaranteed Substantial Completion Date 12/31/2020, 20 years

[redacted]

The Solicitation team presentation also provided updated PAV values for the shortlisted projects based on the most recent offer pricing. Exhibit D-2, below, contains updated information on the valuation results for each of the shortlisted offers based on best and final pricing submitted by Participants.

[11] [redacted]

[redacted][12]

[redacted]

PRG May 24, 2018 Notification

On May 24, 2018 PG&E notified the Cost Allocation Mechanism/Procurement Review Group of the Offers for potential transactions from the 2018 Local Sub-Area Storage Request for Offers. [redacted]

[12] Exhibit D-2 is the same as Table 6 in the IE 2018 LSA ES RFO Report.

[13] [redacted]

[redacted]

[redacted][14]

[redacted]

Exhibit D-4: Contract Price in Tesla Moss Landing BESS EPC

EPC Contract Price	Potential Adjustments
[redacted]	

[14] Those results shown in Exhibit D-3, above, are the same as Table 7 in the IE 2018 LSA ES Report to which this report is Attachment D.

Key Contractual Provisions of the Tesla – PG&E Engineering, Procurement and Construction Agreement (EPC)

The next section of this IE Report provides the following Exhibit D-5 which describes the key contract provisions contained in the Tesla Moss Landing BESS EPC. Exhibit D-5 is specific to the Tesla negotiations and presents or summarizes the issues considered to be key. Exhibit D-5 is appropriately detailed to demonstrate the complexity of the documentation and the extent of the negotiations which occurred between the end of April and the June execution date.

Exhibit D-5: Tesla EPC - - Key Contract Provisions, as Revised

Contract Provisions	Inclusion in Final Contract
Form of Agreement	Engineering, Procurement and Construction Agreement for the Moss Landing Energy Storage Project
[redacted]	

[redacted]

[redacted][15]

[15] Owner shares responsibility for certain aspects of site preparation and investigation.

[redacted]

The IE and PG&E's negotiation team did not have any differences of opinion or issues associated with the negotiations. The IE felt both Tesla and PG&E were dedicated to the same end and both pursued the negotiations in a professional and responsive manner.

III. Does the Contract Merit CPUC Approval

A. Introduction

This section of this Attachment F addresses the issue "Does the Contract merit CPUC approval and is the contract reasonably priced and does it reflect a functioning market? To address these questions the IE Report Template requires that the following issues be addressed.

1. Provide a discussion and observation for each category and describe the project's ranking relative to other bids from the solicitation; and from an overall market perspective;
    a. Contract price, including cost adders (transmission, credit, etc.)
    b. Portfolio fit
    c. Project viability
        i. Technology
        ii. Bidder experience (financing, construction, operation)
        iii. Credit and collateral
        iv. Permitting, site control and other site-related matters
        v. Fuel status
        vi. Transmission upgrades
    d. Any other relevant factors
2. Based on the complete bid process:
    a. Does the IOU contract reflect a functioning market?
    b. Is the IOU contract the best overall offer received by the IOU?
3. Is the contract a reasonable method of achieving the need identified in the RFO?
4. If the contract does not directly reflect a product solicited and bid in an RFO, is the contract superior to the bids received or the products solicited in the RFO?
5. Based on your analysis of the RFO bids and the bid process, does the contract merit Commission approval? Explain

B. Need for Procurement

Through the 2018 LSA ES RFO, PG&E is seeking new energy storage resources connected at the transmission, distribution or customer level within the local sub-areas of Bogue, Pease and South Bay – Moss Landing to meet real power capacity needs in the South Bay – Moss Landing area and reactive power needs in Bogue and Pease. PG&E is issuing this RFO to procure energy storage resources to meet local capacity and local sub area reliability needs as required by CPUC Resolution E-4909. Any battery storage projects selected through this RFO could be used to replace three Calpine fossil fuel plants (Feather River, Yuba City, and Metcalf) that do not have long term contracts with utilities but that have been identified by the CAISO as needed to serve local reliability needs. Chapter I of the Independent Evaluator Report on PG&E's 2018 Local Sub Area Energy Storage Request for Offers Process ("IE Report on the 2018 LSA ES RFO") provides a summary of the requirements listed in CPUC Resolution E-4909.

CPUC Resolution E-4909 also states that resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

Through this LSA ES RFO process, PG&E is proposing to procure 567.5 MW of energy storage capacity. The execution of this agreement with Tesla, Inc. for 182.5 MW will provide approximately 32% of this total.

Chapter III Section (D) of the IE's Report on the 2018 LSA ES RFO process, provides ample evidence of the robustness of the response to this RFO, even in light of the short turnaround time for Participants to prepare their offers. As illustrated in this section of the report, PG&E received 100 offer variations from 29 projects and [redacted] counterparties. Appendix A and B of the IE Report on the 2018 LSA ES RFO provides a summary of the 100 offer variations received, including both offers for third-party owned Resource Adequacy ("RA") and Behind-the-Retail-Meter ("BTM") options, Utility-owned projects at the Moss Landing site, and [redacted] BOT options. The detailed evaluation conducted by PG&E is described primarily in Chapters IV and V of the 2018 IE LSA ES RFO Report, and that description confirms that the Tesla, Inc. EPC Agreement for the Moss Landing Storage project was selected for execution based on its competitiveness, and on the applicable evaluation criteria, compared to the large number of similar lithium-ion battery EPC agreement options. The reasonableness of the Tesla, Inc. EPC Agreement from a viewpoint of its cost competitiveness, as well as the other evaluation criteria, is set forth in the next section of this Report.

C. Contract Pricing and Portfolio Fit

[redacted]

[redacted]

[redacted]

[redacted]

Exhibit D-6: Offer Valuation Results for the April 16, 2018 Short-listed Tesla Moss Landing Battery Energy Storage Project

Valuation Components	Levelized PAV
[redacted]	

The final valuation results as provided to the CAM/PRG on May 24, 2018 are listed in Exhibit D-7.

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16 [redacted]

17 [redacted]

Exhibit D-7: Final Valuation Results May 24, 2018 as provided to CAM/PRG for Tesla Moss Landing Battery Energy Storage Project

Valuation Components	Levelized PAV
[redacted][18]	[redacted]
[redacted][19]	[redacted]

[redacted]

[redacted]

[18] [redacted]

[19] [redacted]

[redacted]

[redacted]

D. Project Viability

Experience

Founded in 2003, Tesla currently has roughly 40,000 full time employees[20] engaged in manufacturing, engineering and other business functions. As its best-known business, Tesla has delivered over 300,000 Model S, Model X and Model 3 electric vehicles into world-wide markets[21]. Each vehicle is powered by a remotely managed and monitored mobile battery.[22] Since its founding, Tesla has also installed approximately 470 MWh of stationary energy storage systems around the world, supporting a wide range of applications including peak shaving, demand response, renewable-tied microgrids, and load management. Through its subsidiary, SolarCity, Tesla also installs solar panels in the residential market.

Planned for use in 2021 in the Moss Landing Energy Storage Project, the Tesla Powerpack Energy Storage System is currently produced at Tesla's well-publicized Gigafactory 1 in Sparks, Nevada. When fully completed, Tesla claims that Gigafactory 1 will be the largest and most advanced battery manufacturing facility in the world. The Gigafactory offers

[20] Tesla announced on June 12, 2018 that it was cutting its workforce by 9% in order to restructure and improve profitability.

[21] Tesla delivered 101,312 Model S and Model X cars in 2017, a 33 percent rise over its 2016 figures. For the fourth quarter, Tesla reported 29,870 cars delivered. The Model S led with 15,200 customers, followed by the Model X at 13,120. The Model 3 tallied 1,550 deliveries in the fourth quarter of 2017. In April, 2018, Tesla announced its first quarter 2018 production and delivery numbers – confirming a record production of 34,494 vehicles, including an increase in Model 3 production, which accounted for about 10,000 of those vehicles in the first quarter of 2018.

[22] For charging its electric vehicles on the road, Tesla offers Supercharger stations in numerous U.S. locations.

Tesla the opportunity to achieve savings from scale in the material cost of energy storage systems.[23]

Tesla claims that it has deployed the more than 470 MWh energy storage systems across 19 countries which include the following similar projects to the Tesla Moss Landing BESS Project:

- South Australia- - this Australian Energy Storage is presently the world's largest lithium-ion battery project with 100MW/109MWh of capacity and energy constructed in less than 100 days in 2017;

- Southern California Edison - - The Aliso Canyon Energy Storage project is comprised of a 20MW/80MWh project. There are two physical connections to the SCE distribution network located near Mira Loma substation. SCE can control the battery as one 20 MW asset to participate into the day-ahead and real-time energy markets on CAISO;

- Kaua'i Island Utility Cooperative (KIUC) - - KIUC has signed a power purchase agreement (PPA) with Tesla (dba SolarCity) for electricity from the first utility-scale solar array and battery storage system designed to supply power to the grid in the evening, when demand is highest. Tesla believes the solar/battery project to be the first utility-scale system in the U.S. to provide dispatchable solar energy up to 52 MWh from its 13 MW capacity during four hours each day;

- Pacific Gas & Electric (PG&E) - - The Browns Valley Energy Storage is a 500kW/2MWh project that deploys Tesla's Powerpack units at an existing PG&E distribution substation to demonstrate the ability of a utility-operated energy storage asset to address capacity overloads on the distribution system and improve reliability;

- Pacific Gas & Electric (PG&E) - - The Llagas Energy Storage Project, expected by the end of 2021, will be a 20MW/80MWh project that deploys Tesla's Powerpack units at an existing PG&E-owned site adjacent to the PG&E Llagas substation to demonstrate the ability of a utility-operated energy storage asset to address capacity overloads on the distribution system and improve reliability by deferring the upgrade of transformers at the Llagas distribution substation;

- North Carolina Electric Cooperative (NCEMC) -- NCEMC is using a 1MWh Powerpack system to provide backup services as part of a microgrid on a remote North Carolina community called Ocracoke Island, served by Tideland EMC.

[redacted] This is largely driven by the short construction period of the Project as well as the fact that Tesla

[23] By 2020, Tesla says that the Gigafactory will output 50 GWh of battery packs annually (35 GWh of lithium ion cells), enough for 500,000 electric vehicles per year and large-scale deployment of grid-connected energy storage.

is also the manufacturer of the energy storage system and is entering into an EPC agreement [redacted]. Moreover, Tesla points out that it recently acquired SolarCity, an industry leader in raising funds for solar projects. Tesla claims that SolarCity's financial team has raised more than $1.5 billion in project financing to date. The IE has no reason to doubt Tesla's past experience in financing projects supported by [redacted].

[redacted]

While a relatively new company among large scale manufacturers, Tesla has acquired substantial experience in a short period in the market for utility scale bulk battery projects. Modular open-air construction, of the type for which well-designed battery projects are suited, adds to Tesla's ability to scale its utility projects up to larger and larger sizes. The commitment to a massive manufacturing facility in nearby (tariff-free) Nevada adds further credibility to Tesla's skills in developing very large projects.

In the IE's view, based on its demonstrated experience and leadership skills, Tesla is likely to perform on the Moss Landing BESS Project. On the other side of the ledger, however, may lay Tesla's aggressive ambitions in all of its business initiatives. Accordingly, the balance Tesla management strikes between rapid market expansion - - particularly in the electric vehicle market - - and the timely acquisition of strategic resources may deserve monitoring by PG&E management.

Schedule

The Tesla Moss Landing BESS EPC Project will be connected at 21 kV to the PG&E supplied switchgear on the site. [redacted][24]

Tesla does not need to acquire a project site since the Project is being built under the EPC on PG&E's land which is a part of the Moss Landing Substation. [redacted]

[redacted]

[24] See: Footnote 2, above, for more details on the scope of PG&E's interconnection work.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Technology

As set forth in the EPC, this stand-alone lithium-ion battery project is presently planned to be comprised of the following major battery related components[25]:

- DC Battery Pack "Powerpack Units", comprised of:

[25] [redacted]

[redacted]

- DC cable harnesses between battery packs (to be installed at site)
- Communication cable harnesses between battery packs (to be installed at site)
- Bi-directional inverter
- Site Master Controller (SMC)
- Tesla Control and monitoring software

The Tesla Energy Powerpack System is a modular, fully integrated AC-coupled energy storage system. The system includes the rechargeable lithium-ion battery packs, Battery Management Systems (BMS), thermal management system, DC-DC converter, DC-AC grid-tied bidirectional inverter, Powerpack Controller, and firmware, which all work together as a single system. This single-source system, designed and manufactured by Tesla, allows for seamless power electronics integration and eliminates third-party component integration risk. Tesla's thermal management system uses liquid cooling at a pack level that touches each individual cell. This system enables an even temperature distribution across all cells within a given Powerpack. The Powerpack is designed with an enhanced safety architecture including electrical and mechanical protection measures at the cell, pod, and pack level. The Tesla inverter is capable of scaling from 50kVA to 650kVA with the use of self-contained inverter modules (called Powerstages).

In general, the Lithium Ion battery technology has experienced rapid growth and improvement and is generally considered to be more advanced and mature than other storage technologies. Tesla has shown that it has benefited from this maturity and that future improvements are likely to occur before equipment is manufactured for the 2020 Tesla Moss Landing BESS Project.

Site Control, Permits and Environmental Impacts

Site Control:

Site control will not be an issue for Tesla since the site is owned by PG&E and use of the site is provided under, and subject to, the EPC.

Permits

[redacted] The Project Site is adjacent to the Moss Landing Substation in an area of Moss Landing zoned heavy industrial (coastal zone) where mixed commercial and industrial uses are prevalent. [redacted]

[redacted] That Attachment is replicated herein as Exhibit D-8.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

In assessing the impacts that must be mitigated before permits can be issued, the particular site circumstances and the site history should be taken into account. It is not possible for even an expert in licensing to know with precision the outcome of any permit or license proceeding, however, in the IE's view, similar proceedings in the same setting with roughly similar impacts are likely to result in similar licensing outcomes. Therefore, it is important here to acknowledge that the Moss Landing BESS Project Site is a part of a heavily disturbed cluster of industrial properties with a long history of similar uses at or adjacent to the present Moss Landing Substation Site.

Starting in 1949, PG&E used the original land parcels for the construction of five generating units totaling 560 MW and remaining in operation from 1950 until 1995. In 1964, PG&E added units 6 and 7, each with 750 MW and a 500-foot stack. Selective catalytic reduction units were added to these 750 MW units in 1998 and the units remained in operation at lower and lower levels of use, consistent with the use of a summer season peaking facility, until the end of 2016. As of August 1 1998, when Duke Energy purchased the portion of the overall original site used for generation, the 239-acre purchase contained the five 1950 units, the two 1964 units, eight 225-foot exhaust stacks, nineteen fuel storage tanks and two seawater inlet and outfall structures. At the time of the Duke Energy purchase, PG&E retained the adjacent 500/230/115 kV Moss Landing Substation.

In 1999, Duke Energy commenced the permitting of a new Moss Landing Power Plant Project, replacing the existing units 1 through 5 (along with their associated eight stacks) with two new gas-fired combined cycle (GFCC) 530 MW units. Duke added SCR to units 6 and 7 in 1998 and demolished and removed the fuel storage tanks on the site. Both Monterrey County and the California Energy Commission reviewed and approved the Duke Project. Construction was completed in 2002[26].

This history is testimony not only to the heavy industrial use of the Moss Landing Power Plant Site but also to the extensive review that has been the precondition to allowing that heavy industrial use at the site to occur. Most recently, on two occasions in the last ten years, PG&E has developed and permitted improvements to the Moss Landing Substation. In 2011, as indicated above, an Amendment of the Moss Landing Power Plant Master Plan was needed. A Coastal Development Permit was required to allow expansion of the existing 115/230 kV system transformer banks, to permit the upgrade of certain lattice towers and to relocate certain telecommunications towers and test facilities. Also, a Coastal Development Permit was needed since the site had a positive archaeological report. Unlike 2011, when both a Combined Development Permit and a Coastal Development Permit were both needed, at the present time only a Coastal Development Permit is needed[27] since the footprint at the Project Site is not being expanded. An expansion would trigger an Amendment to the Moss Landing Power Plant Master Plan and call for a Combined Development Permit. Nonetheless, it is possible for the current application(s) that an Applicant Prepared Environmental Assessment (APEA) might comprehensively review the potential impacts and set forth Applicant Proposed Measures (APM) which will be incorporated into the project design to mitigate impacts.

This relevant recent experience, as indicated, included obtaining a Combined Development Permit (CDP), and a Coastal Development Permit, from the County of Monterey Zoning Administrator and the County of Monterery Planning Commission, respectively, for its 2011 and 2016 substation improvements[28]. The Moss Landing Substation Site, as

[26] The Moss Landing Power Plant was transferred from Duke to LS Power Equity Partners in 2006 and was sold by LS Power to Dynegy in April, 2007.
[27] See: Attachment 19 to the EPC, reproduced above.
[28] In 2016, only a Coastal Development Permit was needed from the Zoning Administrator for the installation of security fencing and a concrete wall on a site with a positive archaeological report. PLN

indicated, has a zoning and land use designation of Heavy Industrial (Coastal Zone) and the existing substation use is consistent with that designation.

From that recent experience, PG&E has data on the geotechnical and environmental, biological and cultural resource conditions at the Moss Landing Substation Site. PG&E has knowledge of the resource areas expected to be impacted by the Tesla BESS Project[29]. PG&E is already working on any updated analyses[30]. PG&E has familiarity with the impact concerns of the permit officials reviewing the local permit applications as well as with the conditions and constraints that are likely to attach to the applicable permit(s). PG&E can be expected, as needed, to prepare studies and propose measures consistent with its prior experiences with the Moss Landing Substation Site.

With regard to those local officials, it is of equal significance that County of Monterey permit officials and consultants have the same recent experience as PG&E. In fact, it is by virtue of both the nature of their function and the prior development history of this cluster of parcels, including the development by Duke Energy on its parcels, that such officials know the impacts of, and the necessary conditions on, development at least as well as PG&E.

150699, Resolution No. 16-014 (April 20, 2016) (adopting a Mitigated Negative Declaration that no substantial evidence existed that the project would have a significant effect on the environment and approving the Coastal Development Permit for security fencing being installed in the Coastal Zone.). In 2011, a Combined Development Permit was required due to the much more significant project undertaken at that time which expanded the footprint of the site. PLN 090274, Resolution No. 11-029, August 31, 2011. An Amendment of the Moss Landing Power Plant Master Plan was needed due to the expanded footprint. A Coastal Development Permit was required to allow expansion of the existing 115 kV system and the 230 kV system transformer banks and the upgrade of certain lattice towers and the relocation of certain telecommunications towers and test facilities. Also, a Coastal Development Permit was again needed since the site had a positive archaeological report. In 2011. An Applicant Prepared Environmental Assessment (APEA) comprehensively reviewed the potential impacts and set forth Applicant Proposed Measures (APM) incorporated into the project design to mitigate impacts.

[29] The Tesla BESS Project may be expected to demonstrate consistency with various applicable plans and policies, including the North County Land Use Plan (LUP) and the Monterey County Coastal Implementation Plan (CIP), in addition to consistency with the Zoning Ordinance (Title 20). The substation site is zoned HI (CZ) [heavy Industrial (Coastal Zone)]. The Tesla BESS Project is expected to be consistent, in these regards, with applicable LUP policies which require expansion within the existing bounds of a coastally dependent industrial facility before expansion outside the bounds may be considered. No expansion of the existing "facility" will be needed for the Tesla BESS Project.

[30] Pursuant to a Contract Work Authorization dated May 21, 2018, Kleinfelder Inc. delivered to PG&E the following report on the Moss Landing BESS Project Site, "GEOTECHNICAL INVESTIGATION REPORT, PG&E MOSS LANDING SUBSTATION BATTERY ENERGY STORAGE PROJECT, MOSS LANDING, CALIFORNIA" , PROJECT NO. 20190603.001A, dated June 1, 2018. As stated in its transmittal letter, Kleinfelder opines, "It is Kleinfelder's professional opinion that the proposed site is geotechnically suitable for construction of the proposed project using conventional grading and shallow and deep foundation systems. The primary geotechnical design and construction issues associated with the project is the presence of cohesionless soils that may present caving concerns and difficult drilling conditions for drilled pier construction. Recommendations for design of foundations, site grading, and other geotechnical considerations are presented in this report. The recommendations presented in this report should be incorporated into project design and construction." **See**: Attachment 14 to the EPC for the full Kleinfelder June 1, 2018 report.

[redacted]

Impacts

As indicated above, the parties expect that resource impacts at this site in the coastal zone will be significant enough to call for at least one discretionary permit. The mixed industrial and commercial character of the surrounding area, however, and the long history up to the present time of obtaining the necessary permits to authorize those historical industrial uses, provide a reasonable basis for expecting that any significant impacts to sensitive resources will be mitigated through well-crafted permit conditions and will not create a barrier to obtaining the necessary permits[31].

Conclusion on Viability

Based on all of the foregoing factors, it appears to the IE that Tesla, in coordination with the Owner, PG&E, should have a high prospect for success in completing the Moss Landing BESS Project in general accordance with its EPC.

E. Project Contract Approval

Selecting the Tesla Moss Landing BESS Project for the preferred portfolio added a utility-ownership option to the response of PG&E to the mandate of Resolution 4909. Through its ownership of the Moss Landing Project Site, its relative ease of the interconnection and the control it will have under the EPC agreement, PG&E should have a high degree of confidence that selection of this option will contribute to the effort to avoid future RMR contracts for the Calpine plants in question. [redacted] For these and the other reasons set forth in this Attachment D, the IE recommends Commission approval of the Moss Landing BESS EPC with Tesla.

[31] How the conditions affect the actual timing of the construction and its overall duration are questions that cannot be known with precision. As a result, not only the counterparties but their regulators should be prepared to judge what timely performance is in a practical fashion.

[redacted]

[redacted]

[redacted]

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[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

PACIFIC GAS AND ELECTRIC COMPANY

APPENDIX G

SUMMARY OF KEY 3RD-PARTY OWNED CONTRACT TERMS

(CONFIDENTIAL IN ITS ENTIRETY)

PACIFIC GAS AND ELECTRIC COMPANY

APPENDIX H

SUMMARY OF KEY EPC AND LTPMA CONTRACT TERMS

(CONFIDENTIAL IN ITS ENTIRETY)

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APPENDIX I

UTILITY OWNERSHIP COSTS FOR MOSS LANDING PROJECT

(CONFIDENTIAL IN ITS ENTIRETY)

PACIFIC GAS AND ELECTRIC COMPANY

APPENDIX J

CAISO LETTER TO PG&E REGARDING ENERGY STORAGE PROJECTS FROM LSA RFO

California ISO

California Independent System Operator

Keith E. Casey, Ph.D.
Vice President, Market & Infrastructure Development

May 21, 2018

Mr. Fong Wan
SVP, Energy Policy & Procurement
Pacific Gas & Electric Company
77 Beale Street B32
San Francisco, CA 94105

Dear ~~Mr. Wan~~ Fong:

Through Resolution E-4909 (Resolution) issued on January 12, 2018, the California Public Utilities Commission (CPUC) ordered Pacific Gas and Electric Company (PG&E) to hold a competitive solicitation for energy storage and preferred resources to address two local sub-area deficiencies and to manage voltage issues in another sub-area.

The Resolution was largely in response to the ISO designating the Metcalf Energy Center, the Yuba City Energy Center and the Feather River Energy Center as reliability must-run resources, addressing the South Bay-Moss Landing sub-area deficiencies, the Pease sub-area deficiencies, and the Bogue area voltage control issues, respectively. The Resolution directed PG&E to "coordinate with the CAISO in an effort to ensure that its proposed portfolio will contribute to reducing or eliminating the local sub-area deficiencies in the Pease and South Bay-Moss Landing subareas and high voltage in the Bogue subarea."

Since the CPUC issued the Resolution, the ISO finalized its 2017-2018 Transmission Plan, which identified mitigations either already underway or approved in the plan to address the specific needs that led to the reliability must-run designations. These mitigations consist of transmission upgrades which are expected to be in place for 2019 in the South Bay-Moss Landing area, but are still several years away from completion in the case of Pease and Bogue sub-areas.

The ISO supports the procurement of storage as a general matter and recognizes that energy storage can reduce the risk of future local capacity deficiencies in the event of generation retirement, especially in the South Bay-Moss landing sub-area. Beyond the local area needs, increasing storage capacity on the grid will provide flexible resources that can contribute to meeting the ever-growing ramping requirements on the ISO system, triggered by the growing fleet of grid-connected and behind-the-meter solar PV generation.

The ISO further notes that the Resolution anticipates that storage procured by PG&E in response to the Resolution will contribute to PG&E's overall storage mandate.

We look forward to working with PG&E in the future to validate the effectiveness of the resources ultimately procured, taking into account the location and volume of the resources given the characteristics necessary to meet local capacity needs and the changes to those characteristics as more preferred resources are relied upon.

Sincerely,

Keith E. Casey, Ph.D.
Vice President
Market & Infrastructure Development

KEC/ds

PACIFIC GAS AND ELECTRIC COMPANY

APPENDIX K

PLANNED TRANSMISSION PROJECTS

Appendix K: Planned Transmission Projects

South Bay-Moss Landing Sub-Area

PG&E is implementing the following transmission projects in the South Bay Moss Landing sub area:

1. Monta Vista-Ames 115 kV Path Closing
2. San Jose 'B'-Trimble 115 kV Line Limiting Facility Upgrade
3. San Jose 'B'-Trimble 115 kV Line Series Reactor
4. Moss Landing-Panoche 230 kV Path Upgrade

The Monta Vista-Ames 115 kilovolt (kV) Path project will reconnect the 115 kV lines from Mountain View and Whisman Substations into the 115 kV bus at Ames Substation. This project in effect will create another path for electric power to support the local sub-area particularly during emergency conditions. This project is part of the revised scope of the South of San Mateo Capacity Increase which was re-assessed by the CAISO as part of the 2017-2018 Transmission Planning Process (TPP) [1]. Design for this project is currently underway and the project is expected to be placed into service by February 2019.

The San Jose 'B'-Trimble 115 kV Line Limiting Facility Upgrade project will re-rate the San Jose 'B'-Trimble 115 kV Line to 4 ft/sec wind speed assumptions as well as upgrade any limiting substation equipment to achieve a summer emergency rating of 189 mega-volt ampere (MVA) in order to increase the load serving capability of the circuit. This project was identified and approved by the CAISO as part of the 2017-2018 TPP as a reliability upgrade[2].

The San Jose 'B'-Trimble 115 kV Line Series Reactor project will install a 4-ohm series reactor at Trimble Substation on the termination of the Trimble – San Jose B 115 kV Line and upgrade line termination equipment and protection equipment at both Trimble and San Jose B Substations. Installation of the series reactor reduces the potential overload on this line during the identified emergency conditions. This project was approved by the CAISO as part of the 2017-2018 TPP as an economically driven upgrade[3].

Design and procurement of material for the two above projects on the San Jose 'B'-Trimble 115 kV Line and associated substations is currently underway and the projects are expected to be placed into service by February 2019.

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[1] California ISO 2017-2018 Transmission Plan, Reliability Assessment section, Page 126, [http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf].
[2] California ISO 2017-2018 Transmission Plan, Transmission Project List section, Table 7.2-1, item 5, Page 334, [http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf].
[3] California ISO 2017-2018 Transmission Plan, Transmission Project List section, Table 7.2-3, item 1, Page 335, [http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf].

The Moss Landing-Panoche 230 kV Path Upgrade project will upgrade limiting substation equipment at Panoche and Coburn Substations and re-rate the five 230 kV lines from Moss Landing to Panoche to have a 4 ft/sec wind speed emergency rating of at least 400 MVA rating. These upgrades and re-rates mitigate the constraint identified by the CAISO on the Moss Landing-Las Aguilas 230 kV line and enables further import capability on this path during emergency conditions[4]. This project was identified and approved by the CAISO as part of the 2017-2018 TPP as an economically driven upgrade[5]. Design for this project is currently underway and the project is expected to be placed into service by December 2018.

The CAISO as part of its 2019 LCR analysis[6] shows that as PG&E completes the projects, the LCR need in the sub-area will be reduced by 568 MW.

Pease Sub-Area

PG&E is implementing two transmission projects in the Pease sub area:

1. South of Palermo 115 kV Power Line Reinforcement (South of Palermo)
2. Pease 115/60 kV Transformer Addition

The South of Palermo project is a multi-segment effort to replace or upgrade conductor and structures along approximately 59.5 miles of line in Butte, Yuba, and Sutter counties. It was identified in the 2010-11 CAISO transmission plan and confirmed, after re-study, in the 2015 CAISO transmission plan as necessary for increased service reliability[7]. The Commission granted a permit to construct the South of Palermo Project8 and construction is expected to begin in July 2018.

The Pease 115/60 kV Transformer Addition project will install a new 115/60 kV transformer rated at 200 MVA at Pease Substation and will also reconfigure the Pease 115 kV Bus to breaker and a half (BAAH) configuration. The project need for reliability and operational flexibility was reconfirmed in the CAISO 2017-2018 TPP[9].

Bogue Sub-Area

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[4] California ISO 2017-2018 Transmission Plan, Economic Planning Study section 4.9.4 South Bay-Moss Landing Sub-area Local Capacity Requirements, Summary of Results discussion, Page 262, [http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf].
[5] California ISO 2017-2018 Transmission Plan, Transmission Project List section, Table 7.2-3, item 2, Page 335, [http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf].
[6]CAISO, 2019 Local Capacity Technical Analysis Final Report (the 2019 LCR Report), South Bay-Moss Landing Sub-area section IV, page 42, [http://www.caiso.com/Documents/Final2019LocalCapacityTechnicalReport.pdf].
[7] California ISO 2017-2018 Transmission Plan, Reliability Assessment section, Page 83 and Transmission Project List section, Table 7.2-1, item 14, Page 332, [http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf].
[8] *See* D.18-05-014.
[9] California ISO 2017-2018 Transmission Plan, Reliability Assessment section, Page 117, [http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf].

PG&E is implementing two transmission projects in the Bogue sub area:

The Rio Oso 230/115 kV Transformer Upgrade project will replace the existing 230/115 kV Transformer Nos. 1 and 2 with two new 420 MVA, 230/115 kV three-phase, load-tap-changer (LTC) transformers at Rio Oso Substation. The project need was reconfirmed in the CAISO 2017-2018 TPP[10].

The Rio Oso Area 230 kV Voltage Support involves installing a +200/-260 MVA Static Var Compensator (SVC) at Rio Oso 230 kV bus. As with the transformer project, the need for this project was validated by the CAISO as part of the 2017-2018 TPP[11]. Construction of both of these projects will be coordinated with other work at Rio Oso Substation and are expected to be put in-service by June 2022.

[10] California ISO 2017-2018 Transmission Plan, Transmission Project List section, Table 7.1-1, item 58, Page 328, [http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf].
[11] California ISO 2017-2018 Transmission Plan, Reliability Assessment section, Page 118, and Transmission Project List section, Table 7.1-1, item 59, Page 328 [http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf].

PACIFIC GAS AND ELECTRIC COMPANY

APPENDIX L

EVALUATION METHODOLOGY

Appendix L: Evaluation Methodology

PG&E's quantitative evaluation criteria included Net Market Value (NMV) and Portfolio Adjusted Value (PAV)[1]. PG&E's evaluation also included qualitative criteria. These criteria are listed below:

Quantitative Criteria

1. NMV
   a. Benefits (Energy, Ancillary Services, Capacity)
   b. Fixed and Variable Costs
2. PAV
   a. Transmission Network Upgrade Cost
   b. Increased System Efficiency for Fossil Generation
   c. Avoided Renewable Curtailment
   d. Delivery Period

Qualitative Criteria

1. Project Viability
2. Supply Chain Responsibility
3. Credit
4. Safety

Evaluation of the offers included the above criteria. For each of the criteria, a team of subject matter experts was formed to perform the evaluation. The evaluation teams consisted of PG&E employees. The teams met periodically to review progress and exchange information.

PG&E applied the quantitative and qualitative criteria to each conforming offer or offer variation as follows:

TABLE L-1
EVALUATION CRITERIA, SCORING UNIT, AND APPLICATION

Line No.	Evaluation Criteria	Scoring Unit	Application
1	Net Market Value	$/kW	Shortlist Development
2	Portfolio Adjusted Value	$/kW	Shortlist Development
3	Project Viability	+, 0, -	Post Shortlist Development
4	Supply Chain Responsibility	Required[(a)]	Informational Only
5	Credit	+, 0, -	Post Shortlist Development
9	Safety	Required[(a)]	Post Shortlist Development

(a) Additional requirements were imposed on participants to be added to the shortlist, or will be required during performance of the contract.

1 NMV and PAV used to establish the shortlist, reflect PG&E's estimates of market forward prices as of March 2018. However, market conditions continue to evolve.

1. Net Market Value

NMV compares an offer's market value—energy, ancillary services (A/S) and capacity—to its costs. NMV was calculated for each offer as follows:

NMV = (E + A + C) – (V + F)
Where:
E = Energy Value
A = Ancillary Services Value
C = Capacity Value
V = Variable Cost
F = Fixed Cost

PG&E solicited the four agreement types below:

- Energy Storage Resource Adequacy Agreement (ES RAA);
- Behind-the-Retail Meter Capacity Storage Agreement (BTM CSA);
- Engineering, Procurement, and Construction (EPC) Agreement for Moss Landing Ownership, and
- Build, Own, Transfer (BOT) Agreement for Utility Ownership.

For both utility-owned agreements (EPC and BOT), PG&E required entering into the Long-Term Performance and Maintenance Agreement (LTPMA) to support the ongoing maintenance and performance of the energy storage system.

The NMV calculations were applied consistently for all the agreement types listed above, with variations depending on agreement option. Sections 1.a to 1.e below describe the NMV calculations component by component, detailing the variations by agreement type.

a. Energy Value (E)

Energy value captures the value associated with the electric energy price in the CAISO markets for each offer over its delivery term. For utility-owned projects, PG&E assessed the market value of the energy deliveries for each offer using a charging and discharging time series based on operational limitations specified in the offer over its delivery term, assuming no provision of A/S[2]. PG&E included the cost of charging energy (grid energy used to charge energy storage) in the energy value.

[2] A/S provision is the amount of AS provided. In this instance itis zero.

For third-party-owned ESRAAs, energy value is not relevant and is zeroed out. For third-party-owned BTM CSAs, the energy value is the energy settlement, net of variable operations and maintenance (VOM) cost, as those terms are defined in the BTM CSAs, which PG&E received from the third party.

The market value of the energy is computed from the appropriate price curves for the North of Path 15 (NP15) trading hub — adjusted for the congestion and losses at the offered project's specific location. To this end, Locational Marginal Price (LMP) multipliers are used to incorporate congestion and losses specific for the location, and thereby value the project's contribution to transmission congestion relief.

b. Ancillary Services Value (A)

For utility-ownership offers, PG&E will have the ability to schedule and receive CAISO market revenues for A/S, as defined under and in accordance with CAISO tariff requirements, and the incremental benefit of having A/S capability was captured based on a time series of charging, discharging and A/S provision obtained for the offer over its delivery term. Regarding A/S provision, PG&E took into account the impact of the shallowness of the A/S market on the A/S awards.

The A/S value for ESRAAs and BTM CSAs are zeroed because PG&E does not settle A/S awards from the project with CAISO, nor receive any A/S settlements from the Seller.

c. Capacity Value (C)

The value of Resource Adequacy (RA) capacity associated with each offer (utility-ownership, or third-party ES-RAA or BTM CSA) was calculated as the sum of the value of Local Sub-Area (LSA) capacity and the value of Flexible RA capacity provided by (a) the offered monthly quantity of Net Qualifying Capacity (NQC) and (b) the Effective Flexible Capacity (EFC) of the ES resource, respectively.

Resources that were expected to be found fully deliverable by the CAISO were attributed the full Local Sub-Area capacity values for their projected NQCs. To the extent that an offer could provide flexible RA, the EFC that was expected to count towards the must-offer obligation for flexible RA was valued at the projected monthly price for flexible RA, and added to the capacity value.

d. Variable Cost (V)

When applicable, variable cost for an offer was calculated as the sum of hourly variable payments. For utility-ownership offers, hourly variable payments were based on the VOM price multiplied by the discharge time series obtained in the offer. Variable cost did not include the market costs for charging energy because this value was included in the energy value (See Section a). For ESRAAs, the variable cost is zero. For BTM CSAs, the hourly variable cost was calculated as the projected VOM in the energy settlement when applicable.

e. Fixed Cost (F)

Fixed cost for a utility-ownership offer was calculated as the sum of administrative cost and present value of annual revenue requirements (PVRR) calculated by PG&E's RRQ model using the offer's price and PG&E's cost under the EPC and LPTMA. The main components of the revenue requirements are depreciation, return on rate base, taxes, and expenses.

Fixed cost for a third-party-owned ESRAA or BTM CSA was calculated as the sum of administrative cost and projected monthly fixed payments. Monthly fixed payments were based on the Payment Quantity Price ($/kilowatt-month) and the monthly Payment Quantity specified in the offer.

The administrative cost is an annual fixed overhead cost (independent of the size of the project, but dependent on the use case of the project) representing the cost of managing the contract plus the cost of scheduling into CAISO markets.

2. Portfolio Adjusted Value

After determining the NMV for an offer, PG&E calculated the PAV to derive the value of that offer from the perspective of PG&E's portfolio, not just from the market perspective. PAV included adjustments to the NMV based on: (1) transmission network upgrade costs, (2) increased system efficiency for fossil generation, (3) avoided renewable curtailment, and (4) delivery period.

a. Transmission Network Upgrade Cost

Transmission availability and transmission-related costs are part of an offer's PAV. For all offers that submit a Phase I interconnection study to CAISO, PG&E used the latest CAISO tariff rules and independent study results conducted as part of the feasibility study to determine the transmission network upgrade cost adder. For all offers that do not submit a Phase I interconnection study, PG&E used the total cost provided by the participant in the offer form. Network upgrades include all facilities

necessary to: (i) reinforce the transmission system after the point where a project's electricity first interconnects with and enters the utility's transmission grid; and (ii) transmit or deliver the full amount of generation to or from the project. Transmission cost adders reflect the reimbursed portion of the cost of potential network upgrades borne by customers.

b. Increased Efficiency for Fossil Generation

Energy storage has the potential for allowing fossil generation to run with fewer start-ups and to operate more efficiently. Such increased efficiency could reduce the overall generation cost of the resources in PG&E's service area in such components as start-up, fuel, greenhouse gas and VOM costs. PG&E estimated the avoided generation costs to the resource portfolio of PG&E's service area. Such avoided costs differed among offers due to the variation in characteristics of the offers.

c. Avoided Renewable Curtailment

Higher penetration of renewable energy increases the likelihood of curtailment. Storage can help reduce the curtailment of intermittent generation, benefiting customers by increasing total generation from the renewable portfolio that contributes to meeting Renewables Portfolio Standard (RPS) requirements and thus reducing RPS procurement costs. PG&E estimated this reduction in RPS procurement costs by multiplying an estimated future value of Renewable Energy Credits (RECs) by a reduction in RPS curtailment obtained using the same methodology as applied above to increased efficiency.

d. Delivery Period

Offers can have different delivery periods due to differences in term and start dates that affect the comparability of offers. PG&E adopts a standardized delivery period to analyze all offers. PG&E estimates the cost and benefits of each offer over the standardized delivery period based on each offer's characteristics, PG&E's projected portfolio need, and expected market conditions.

3. Project Viability

Project viability means the likelihood that the project under an offer can be successfully developed and then provides the product and services for the period stated in the offer.

As indicated in Table L-1 above, PG&E assessed each project's viability and assigned a score of +, 0, or -. This assessment was based on a review of the status and plans for key project activities (e.g., financing, site access,

permitting, engineering, procurement, construction, interconnection, start-up and testing, operations, fuel supply, charging capability, etc.). While not required, PG&E considered any independent engineer's report that evaluated a project's charging capability.

4. Supply Chain Responsibility

PG&E may consider participant's status as a Small Business Administration self-certified small business. PG&E is committed to supply chain responsibility which includes supplier diversity, sustainability and ethical supply chain practices. The Supplier Diversity Program, launched in 1981, aims to provide diverse suppliers with economic opportunities to supply products and services. The Supplier Sustainability Program, launched in 2007, encourages supplier responsibility, excellence and innovation.

Promoting an ethical supply chain means that health and safety, labor issues and human rights, ethical business conduct and conflicts of interest are important considerations in supplier selection. Additional information on PG&E's Supply Chain Responsibility and Diversity Program can be found at www.pge.com/supplychainresponsibility.

5. Credit

PG&E considered the participant's capability to perform all its financial and financing obligations under the agreements and PG&E's overall credit concentration with the participant or its banks, including any of participant's affiliates. Offers were assigned a score of +, 0 or - based on creditworthiness and overall credit concentration.

6. Safety

For each offer, PG&E required information from the offering party regarding the safety history and practices of the entities that would construct, operate, own or maintain the projects, and safety information related to the technology for the project.

PG&E Gas and Electric
Advice Filing List
General Order 96-B, Section IV

AT&T
Albion Power Company
Alcantar & Kahl LLP
Anderson & Poole
Atlas ReFuel
BART
Barkovich & Yap, Inc.
Braun Blaising Smith Wynne P.C.
CalCom Solar
California Cotton Ginners & Growers Assn
California Energy Commission
California Public Utilities Commission
California State Association of Counties
Calpine
Casner, Steve
Cenergy Power
Center for Biological Diversity
City of Palo Alto
City of San Jose
Clean Power Research
Coast Economic Consulting
Commercial Energy
County of Tehama - Department of Public Works
Crossborder Energy
Crown Road Energy, LLC
Davis Wright Tremaine LLP
Day Carter Murphy
Dept of General Services
Don Pickett & Associates, Inc.
Douglass & Liddell
Downey & Brand
Ellison Schneider & Harris LLP
Energy Management Service
Evaluation + Strategy for Social Innovation
GenOn Energy, Inc.
Goodin, MacBride, Squeri, Schlotz & Ritchie
Green Charge Networks
Green Power Institute
Hanna & Morton
ICF
International Power Technology
Intestate Gas Services, Inc.
Kelly Group
Ken Bohn Consulting
Keyes & Fox LLP
Leviton Manufacturing Co., Inc.
Linde
Los Angeles County Integrated Waste Management Task Force
Los Angeles Dept of Water & Power
MRW & Associates
Manatt Phelps Phillips
Marin Energy Authority
McKenzie & Associates
Modesto Irrigation District
Morgan Stanley
NLine Energy, Inc.
NRG Solar
Office of Ratepayer Advocates
OnGrid Solar
Pacific Gas and Electric Company
Pioneer Community Energy
Praxair
Regulatory & Cogeneration Service, Inc.
SCD Energy Solutions
SCE
SDG&E and SoCalGas
SPURR
San Francisco Water Power and Sewer
Seattle City Light
Sempra Utilities
Southern California Edison Company
Southern California Gas Company
Spark Energy
Sun Light & Power
Sunshine Design
Tecogen, Inc.
TerraVerde Renewable Partners
Tiger Natural Gas, Inc.
TransCanada
Troutman Sanders LLP
Utility Cost Management
Utility Power Solutions
Utility Specialists
Verizon
Water and Energy Consulting
Wellhead Electric Company
Western Manufactured Housing Communities Association (WMA)
Yep Energy

Attachment B

A Planning Application For:

DUDEX

6321 San Ignacio Avenue San Jose, CA 95119

PROJECT DESCRIPTION

THIS IS A REQUEST FOR A CONDITIONAL USE PERMIT. A NEW UN-MANNED ENERGY STORAGE FACILITY IS PLANNED TO BE LOCATED WITHIN AN EXISTING 102,642 S.F. 1-STORY WAREHOUSE BUILDING. THERE ARE NO IMPROVEMENTS TO THE EXTERIOR OF THE BUILDING SHELL. A NEW FENCED ELECTRICAL SUB-STATION IS PROPOSED IN THE NE CORNER OF THE SITE. NO NEW LANDSCAPING OR EXTERIOR LIGHTING IS PROPOSED.

THERE ARE FIVE EXISTING BUILDINGS ON THE SITE. THE PERMIT REQUEST IS FOR THE OCCUPANCY OF ONE OF THE BUILDINGS (6321) AND ASSOCIATED SITE WORK.

THE PROPERTY HAS RECENTLY GONE THROUGH EXTENSIVE SITE MODIFICATIONS WHICH INCLUDED INSTALLATION OF AN ACCESSIBLE PATH OF TRAVEL FROM THE EXISTING BUILDING TO THE STREET AND FROM ACCESSIBLE PARKING STALLS TO THE BUILDING. THERE WILL BE AMPLE PARKING ON THE SITE AS THE FIVE BUILDINGS SHARE A PARKING POOL OF 1,476 STALLS. THE PROPOSED USE OF THE ENERGY STORAGE FACILITY REQUIRES NINE PARKING STALLS WHILE 405 STALLS ARE ASSIGNED TO THE BUILDING THROUGH THE TENANT LEASE. THERE IS AMPLE ACCESSIBLE PARKING ON SITE (22 STALLS), AND NO NEW PARKING, BICYCLE, MOTORCYCLE, OR CAR SHARE STALLS ARE PROPOSED. 60 PARKING STALLS WILL BE REMOVED FOR THE INSTALLATION OF THE SUBSTATION, HOWEVER THERE WILL STILL BE 345 PARKING STALLS ASSIGNED TO THE BUILDING.

PROJECT DATA

PROJECT FILE NUMBER: CP19-020
PROJECT ADDRESS: 6321 IGNACIO AVENUE, CA 95119

ASSESSOR'S PARCEL NO.:	APN 706-09-094
ZONING:	I-P INDUSTRIAL PARK
SITE AREA:	±1,103,462 S.F. / 25.33 ACRES
ALLOWABLE BUILDING HEIGHT	45'
EXISTING BUILDING HEIGHT - ONE STORY	18'

EXISTING FLOOR AREA FOR ENTIRE SITE:	GROSS	NET (85% GROSS)
6341-71:	91,279 S.F.	77,588 S.F.
6331:	123,309 S.F.	104,813 S.F.
6321:	102,642 S.F.	87,246 S.F.
6311:	29,956 S.F.	25,463 S.F.
TOTAL BUILDING AREA:	353,186 S.F.	295,110 S.F.

EXISTING F.A.R. (353,186 S.F. / ±1,103,462 S.F.) .32

PARKING, EXISTING FOR ENTIRE SITE:
1,476 PARKING STALLS FOR 353,186 S.F.
EXISTING PARKING RATIO; 4.1 / 1,000 S.F.

PER THE TENANT LEASE,
6321 IGNACIO HAS 3.9 STALLS / 1,000 S.F. = 405 PARKING STALLS ASSIGNED TO BUILDING

PROPOSED PROJECT PARKING RATIO (TABLE 20-190):
PRIVATE POWER GENERATION 1/ EMPLOYEE & 1 PER COMPANY VEHICLE.
THE PROJECT WILL HAVE A MAXIMUM OF NINE ON-SITE EMPLOYEES; AND NO COMPANY VEHICLES.

REQUIRED PARKING FOR BUILDING: NINE SPACES

PROVIDED - (PROJECT WILL REMOVE 60 SPACES FOR SUBSTATION INSTALLATION) LEAVING 345 STALLS

PROJECT WILL NOT PROVIDE NEW PARKING STALLS AS THERE WILL BE A SURPLUS ON THE SITE.

BICYCLE PARKING REQUIRED: (TABLE 20-190)
REQUIRED: 1 LONG TERM SPACE PER 10 FULL TIME EMPLOYEES
PROVIDED: 1 LONG TERM PARKING SPACE WILL BE PROVIDED WITHIN THE BUILDING

NO NEW LANDSCAPE AREAS PROPOSED

ALLOWABLE AREA AND HEIGHT CALCULATION

TYPE OF CONSTRUCTION	III-B
AUTOMATIC SPRINKLER CONFIGURATION:	SM
OCCUPANCY:	S-2
FROM CBC TABLES 504.3, 504.4 AND 506.2	
MAXIMUM HEIGHT (TABLE 504.3)	75'-0"
MAXIMUM NUMBER OF STORIES (TABLE 504.4)	4
ALLOWABLE AREA FACTOR - ONE STORY BUILDING (TABLE 506.2)	104,000 S.F.

PROJECT TEAM

OWNER: DUDEK
1630 San Pablo Avenue, Suite 300
Oakland, CA 94612

ARCHITECT: ARC TEC INC.
1731 Technology Drive, Suite 750
San Jose, CA 95110
PHONE: 408.496.0676
CONTACT: Douglas Oliver
EMAIL: DOliver@arctecinc.com

CIVIL ENGINEER: KIER & WRIGHT
2850 Collier Canyon Road
Livermore, CA 94551
PHONE: 408.727.6665
CONTACT: Ryan Amaya
EMAIL: ramaya@kierwright.com

DRAWING INDEX AND ISSUE DATES

○ PRELIMINARY OR PRICING PLANS
● FIRST FORMAL SUBMITTAL OR NO CHANGES SINCE PREVIOUS ISSUE
✚ MODIFICATIONS SINCE PREVIOUS ISSUE

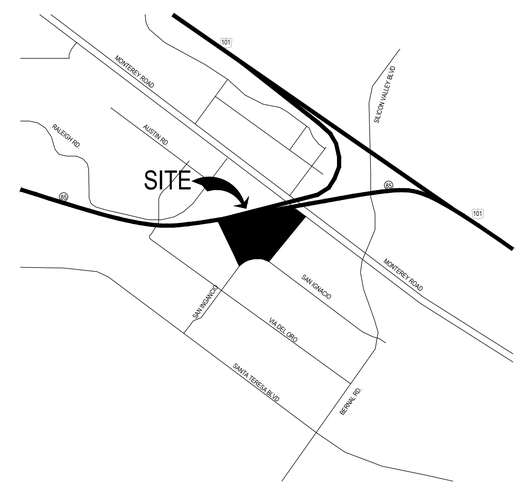
		06.14.2019 PRELIM PLANNING APPLICATION
		ISSUE DATES AND DESCRIPTIONS
COVER SHEET		●
ARCHITECTURAL		
A0.11	NEIGHBORHOOD CONTEXT	●
A1.01	PARCEL PLAN	●
A1.02	ENLARGED SITE PLAN	●
A2.11	FIRST FLOOR PLAN	●
A3.01	EXISTING EXTERIOR ELEVATIONS	●
C1	EXISTING CONDITIONS	●
C2	PRELIMINARY DEMOLITION PLAN	●
C3	PRELIMINARY GRADING AND DRAINAGE PLAN	●
E1-01	GENERAL ARRANGEMENT	●
E2-01	SUBSTATION, SECTION A	●
G2-01	SUBSTATION, ONE-LINE DIAGRAM	●
SHT 1	PRELIMINARY UNDERGROUND 115-kV TRANSMISSION LINE CONCEPT	●

APPLICABLE CODES

2016 CALIFORNIA BUILDING CODE (CCR TITLE 24, PART 2)
2016 CALIFORNIA ELECTRIC CODE (CCR TITLE 24, PART 3)
2016 CALIFORNIA MECHANICAL CODE (CCR TITLE 24, PART 4)
2016 CALIFORNIA PLUMBING CODE (CCR TITLE 24, PART 5)
2016 CALIFORNIA ENERGY CODE (CCR TITLE 24, PART 6)
2016 CALIFORNIA FIRE CODE (CCR TITLE 24, PART 9)
2016 CALIFORNIA GREEN BUILDING STANDARDS CODE (CCR TITLE 24, PART 11)

ALL CODES ARE SUBJECT TO LOCAL GOVERNMENT AMENDMENTS PER CALIFORNIA BUILDING STANDARDS COMMISSION BULLETIN 10-03.

VICINITY MAP



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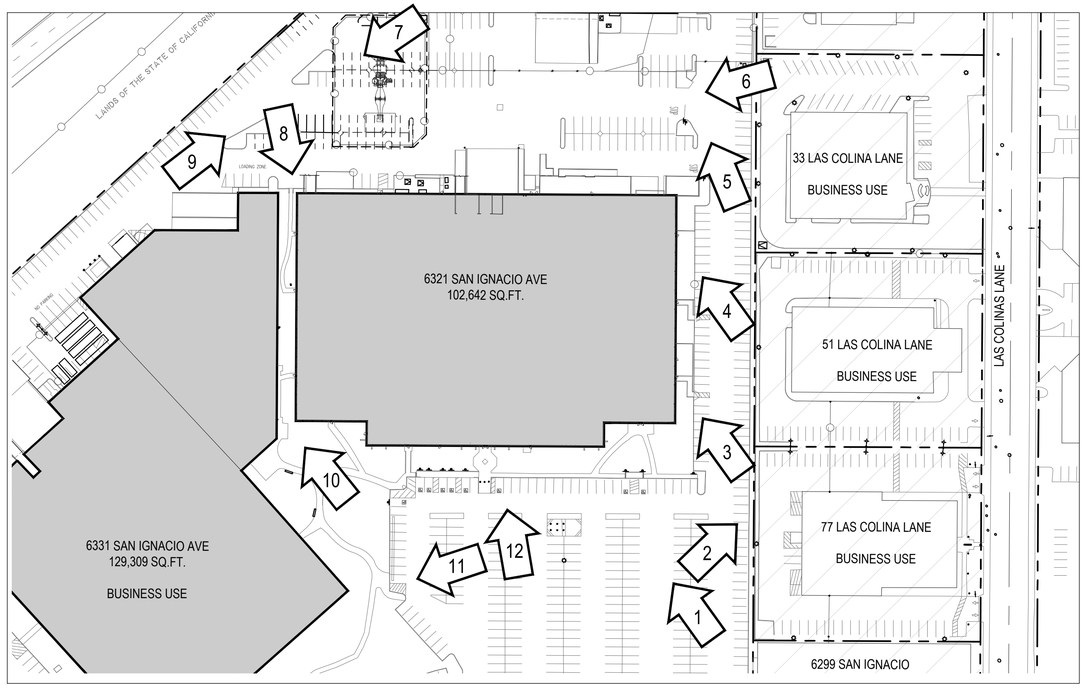
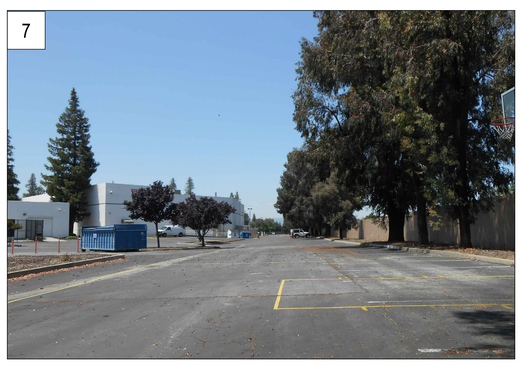
PROJECT: 194852



REFERENCE SITE PLAN

SCALE: NTS



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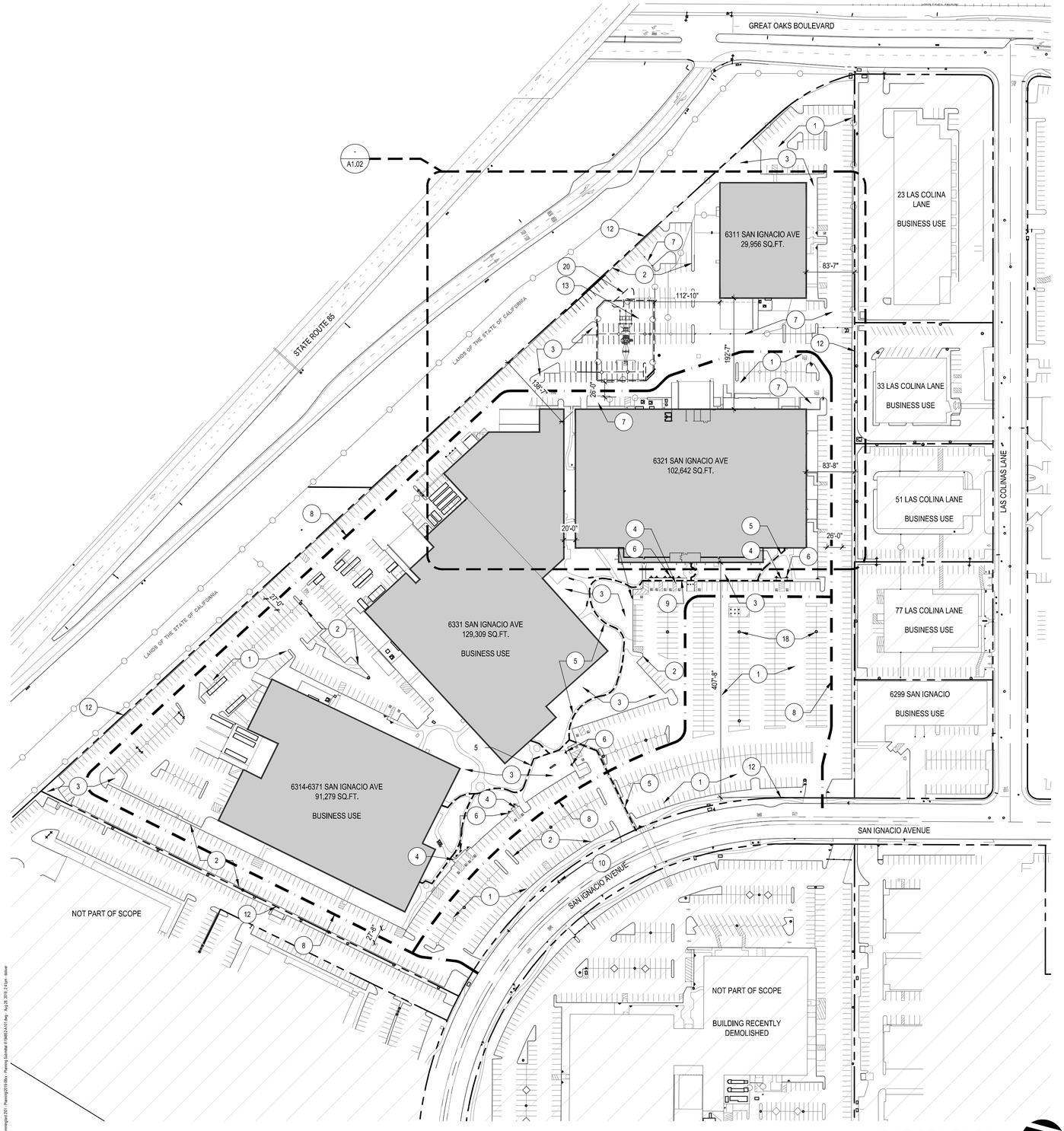
NEIGHBORHOOD CONTEXT

A0.11

PROJECT NO: 194852



PARCEL PLAN

SCALE: 1" = 100'-0"

0 5 10 20 30 50 70

NO CITY REQUIREMENTS FOR BICYCLE OR MOTORCYCLE PARKING

KEYNOTES

1. EXISTING PAVED PARKING AND DRIVES.
2. EXISTING CURB.
3. EXISTING LANDSCAPE AREA.
4. EXISTING ACCESSIBLE RAMP (MAXIMUM SLOPE 1 : 12).
5. EXISTING WALKWAY / ACCESSIBLE PATH OF TRAVEL TO STREET.
6. EXISTING ACCESSIBLE PARKING VIOLATION SIGN; SEE DETAIL 16C/-
7. EXISTING SECURITY CHAIN-LINK FENCE AROUND EQUIPMENT AND YARDS.
8. PATH OF FIRE TRUCKS.
9. EXISTING ACCESSIBLE PARKING STALLS.
10. EXISTING MONUMENT SIGN.
11. EXISTING TRUNCATED DOME; SEE DETAIL 20D/- FOR REFERENCE.
12. EXISTING PROPERTY LINE.
13. LOCATION OF NEW SUBSTATION. REMOVE (E) ASPHALT, PROVIDE GRAVEL SURFACE, AND CHAIN-LINK FENCE AROUND AREA. RELOCATE (E) LIGHT POLE 15' NORTH. SEE SUBSTATION DRAWINGS.
14. PROJECT ENTRY.
15. EXISTING LOADING RAMP AREA.
16. REMOVE EXISTING PARKING STRIPPING.
17. ADD PARKING STRIPPING.
18. EXISTING LIGHT POLES.
19. DEMO CONCRETE CURB.
20. RELOCATE EXISTING LIGHT POLE.

GENERAL NOTES

A. ALL ROADS, WALLS AND PARKING ARE EXISTING, VERIFY IN FIELD

B. VERIFY EXISTING CONDITIONS IN THE FIELD. REPORT ANY DISCREPANCIES TO THE ARCHITECT

C. REFER TO DRAWINGS A0.03 THROUGH A0.05 AND DETAILS ON THIS SHEET FOR SITE ACCESSIBILITY PATH OF TRAVEL REQUIREMENTS AND ACCESSIBLE PARKING REQUIREMENTS.

D. AT LEAST ONE ACCESSIBLE ROUTE SHALL BE PROVIDED WITHIN THE SITE FROM ACCESSIBLE PARKING SPACES AND ACCESSIBLE PASSENGER LOADING ZONES; PUBLIC STREETS AND SIDEWALKS; AND PUBLIC TRANSPORTATION STOPS TO THE ACCESSIBLE BUILDING OR FACILITY ENTRANCE THEY SERVE. WHERE MORE THAN ONE ROUTE IS PROVIDE ALL ROUTES MUST BE ACCESSIBLE. EXCEPTION: AN ACCESSIBLE ROUTE SHALL NOT BE REQUIRED BETWEEN SITE ARRIVAL POINTS AND THE BUILDING OR FACILITY ENTRANCE IF THE ONLY MEANS OF ACCESS BETWEEN THEM IS A VEHICULAR WAY NOT PROVIDING PEDESTRIAN ACCESS.

E. DIMENSIONS ARE TO THE FACE OF BUILDING, CURBS OR SPACES UNLESS NOTED OTHERWISE

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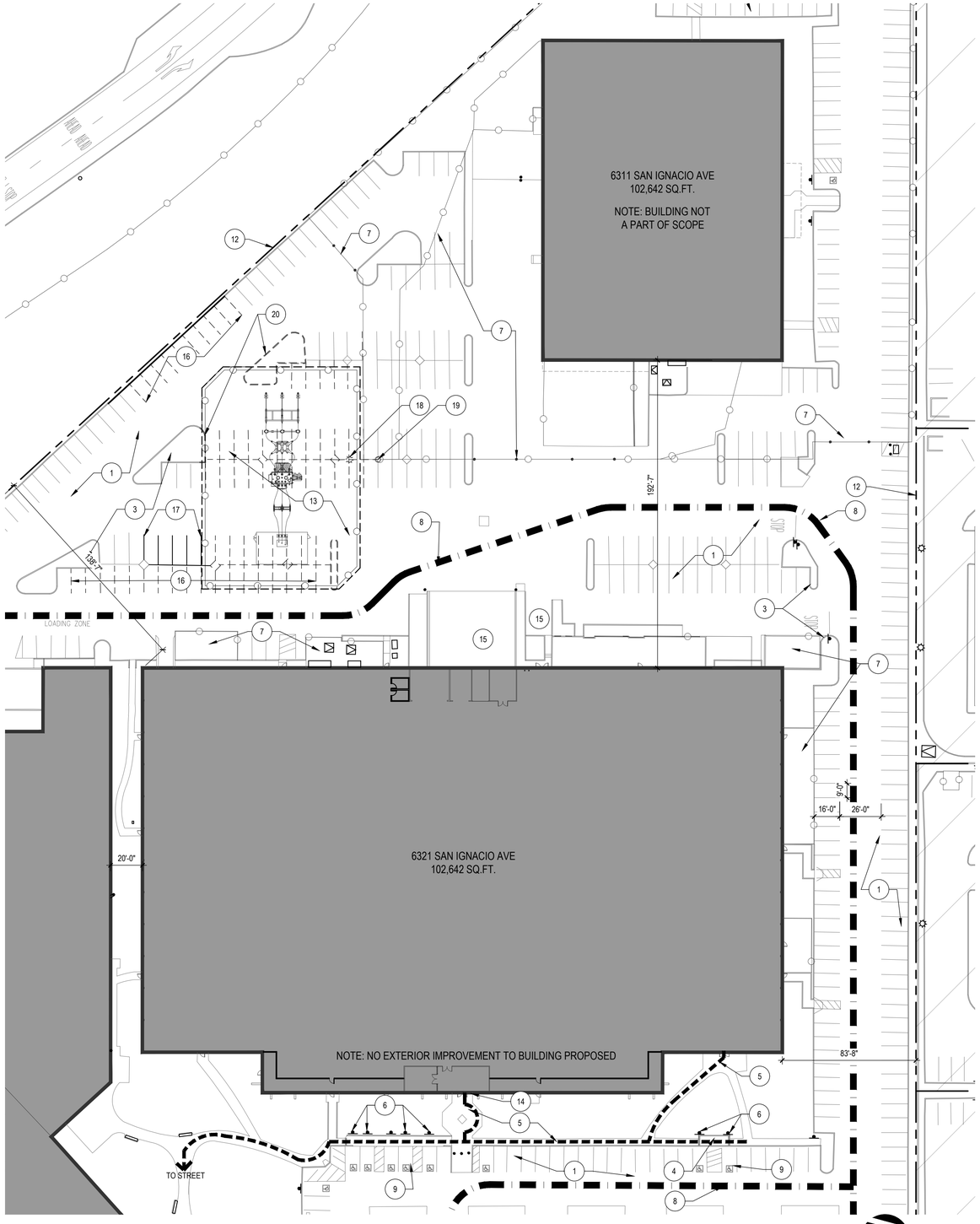
PARCEL PLAN

A1.01

PROJECT NO: 194852



ENLARGED SITE PLAN

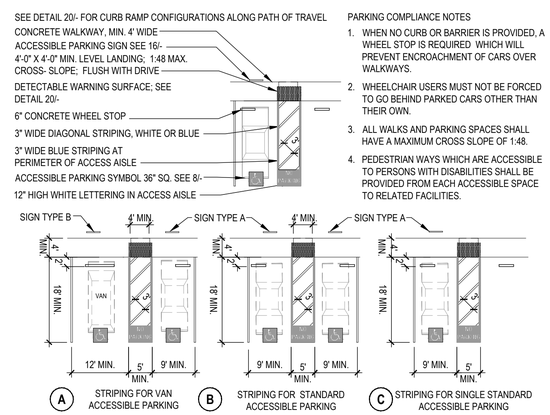
SCALE: 1" = 40'-0"

0 20 40 80 120 200

NO CITY REQUIREMENTS FOR BICYCLE OR MOTORCYCLE PARKING

KEYNOTES

1. EXISTING PAVED PARKING AND DRIVES.
2. EXISTING CURB.
3. EXISTING LANDSCAPE AREA.
4. EXISTING ACCESSIBLE RAMP (MAXIMUM SLOPE 1 : 12).
5. EXISTING WALKWAY / ACCESSIBLE PATH OF TRAVEL TO STREET.
6. EXISTING ACCESSIBLE PARKING VIOLATION SIGN; SEE DETAIL 16C/-
7. EXISTING SECURITY CHAIN-LINK FENCE AROUND EQUIPMENT AND YARDS.
8. PATH OF FIRE TRUCKS.
9. EXISTING ACCESSIBLE PARKING STALLS.
10. EXISTING MONUMENT SIGN.
11. EXISTING TRUNCATED DOME; SEE DETAIL 20D/- FOR REFERENCE.
12. EXISTING PROPERTY LINE.
13. LOCATION OF NEW SUBSTATION. REMOVE (E) ASPHALT, PROVIDE GRAVEL SURFACE, AND CHAIN-LINK FENCE AROUND AREA. RELOCATE (E) LIGHT POLE 15' NORTH. SEE SUBSTATION DRAWINGS.
14. PROJECT ENTRY.
15. EXISTING LOADING RAMP AREA.
16. REMOVE EXISTING PARKING STRIPPING.
17. ADD PARKING STRIPPING.
18. EXISTING LIGHT POLES.
19. DEMO CONCRETE CURB.
20. RELOCATE EXISTING LIGHT POLE.



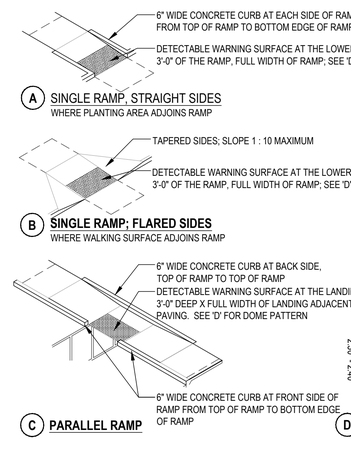
VAN PARKING SPACES SHALL BE PERMITTED TO BE 108 INCHES (9'-0") WIDE MINIMUM WHERE THE ACCESS AISLE IS 96" (8'-0") WIDE MINIMUM
ACCESS AISLE FOR VAN ACCESSIBLE PARKING SHALL BE ON PASSENGER SIDE.

PARKING COMPLIANCE NOTES

1. WHEN NO CURB OR BARRIER IS PROVIDED, A WHEEL STOP IS REQUIRED WHICH WILL PREVENT ENCROACHMENT OF CARS OVER WALKWAYS.
2. WHEELCHAIR USERS MUST NOT BE FORCED TO GO BEHIND PARKED CARS OTHER THAN THEIR OWN.
3. ALL WALKS AND PARKING SPACES SHALL HAVE A MAXIMUM CROSS SLOPE OF 1:48.
4. PEDESTRIAN WAYS WHICH ARE ACCESSIBLE TO PERSONS WITH DISABILITIES SHALL BE PROVIDED FROM EACH ACCESSIBLE SPACE TO RELATED FACILITIES.

2 ACCESSIBLE PARKING SPACES

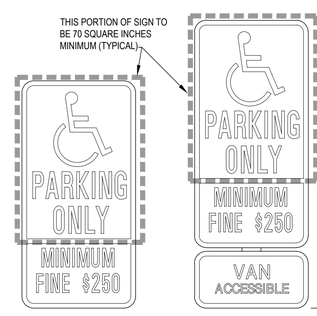
SCALE: 1/16"=1'-0"



1. CONCRETE WALK AND RAMP SHALL BE MIN. 4" DEEP WITH 6X6X WWM CENTERED IN SLAB OVER CONCRETE FILL, WITH 8" TURN DOWN AT SIDES AND ADJACENT TO PAVEMENT..
2. RAMPS SHALL HAVE A MAXIMUM RUNNING SLOPE OF 1 : 12 IN THE DIRECTION OF TRAVEL OF THE SIDEWALK AND MAXIMUM CROSS SLOPE OF 1 : 48.
3. CURB RAMPS SHALL HAVE A LEVEL LANDING AND BLENDED TRANSITION AT THE TOP AND AND BASE OF THE RAMP 4'-0" MINIMUM IN THE DIRECTION OF TRAVEL AND THE WIDTH OF THE CURB RAMP.
4. BLENDED TRANSITIONS SHALL HAVE A RUNNING SLOPE NOT STEEPER THAN 1 : 20.
5. DETECTABLE WARNING SURFACES SHALL BE INTEGRALLY COLORED. ON RAMP SURFACE, THE COLOR SHALL PROVIDE A 70% VISUAL CONTRAST TO ADJACENT WALKING SURFACES. DETECTABLE WARNING SURFACE AT LANDINGS SHALL BE OSHA YELLOW. WARNING SURFACE SHALL DIFFER FROM ADJOINING SURFACES IN RESILIENCY OR SOUND-ON-CANE CONTACT.

1 CURB RAMP CONFIGURATION

SCALE: N.T.S



SIGN TYPE A:
ACCESSIBLE CAR PARKING SPACE IDENTIFICATION

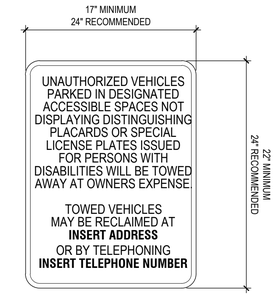
SIGN TYPE B:
ACCESSIBLE VAN PARKING SPACE IDENTIFICATION

ACCESSIBLE PARKING IDENTIFICATION SIGNAGE

1. REFLECTORIZED SIGN SHALL BE CONSTRUCTED OF PORCELAIN STEEL WITH BEADED TEXT OR EQUAL
2. LETTERS AND SYMBOLS TO BE WHITE ON A DARK BLUE BACKGROUND
3. SIGN TO BE CENTERED AT THE INTERIOR END OF PARKING SPACE
4. CORNERS OF SIGN TO BE RADIUSED 1/2" MINIMUM.

BOTTOM OF SIGNAGE:
WHEN SIGN IS LOCATED IN A PATH OF TRAVEL, BOTTOM OF SIGN SHALL BE A MINIMUM OF 6'-8" ABOVE THE WALKING SURFACE.

WHEN LOCATED IN A LANDSCAPE AREA OR ON A WALL AT THE END OF THE SPACE, THE BOTTOM OF SIGN SHALL BE AT 5'-0" ABOVE ADJACENT GRADE



SIGN TYPE C:
UNAUTHORIZED VEHICLE WARNING SIGN

UNAUTHORIZED VEHICLE WARNING SIGNAGE

1A. MUST BE POSTED CONSPICUOUSLY AT EACH ENTRANCE TO OFF-STREET PARKING FACILITIES, OR

1B. POSTED IMMEDIATELY ADJACENT TO AND VISIBLE FROM EACH ACCESSIBLE STALL OR SPACE.

2. THE PHONE NUMBER OR ADDRESS WHERE TOWED VEHICLES CAN BE RECLAIMED IS POSTED IN THE APPROPRIATE LOCATION ON THE SIGN AND IS A PERMANENT PART OF THE SIGN.

3. THE SIZE OF THE LETTERING IS A MINIMUM OF 1" IN HEIGHT.

3 REFERENCE ONLY ACCESSIBLE PARKING SIGNAGE & UNAUTHORIZED VEHICLE SIGNAGE

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

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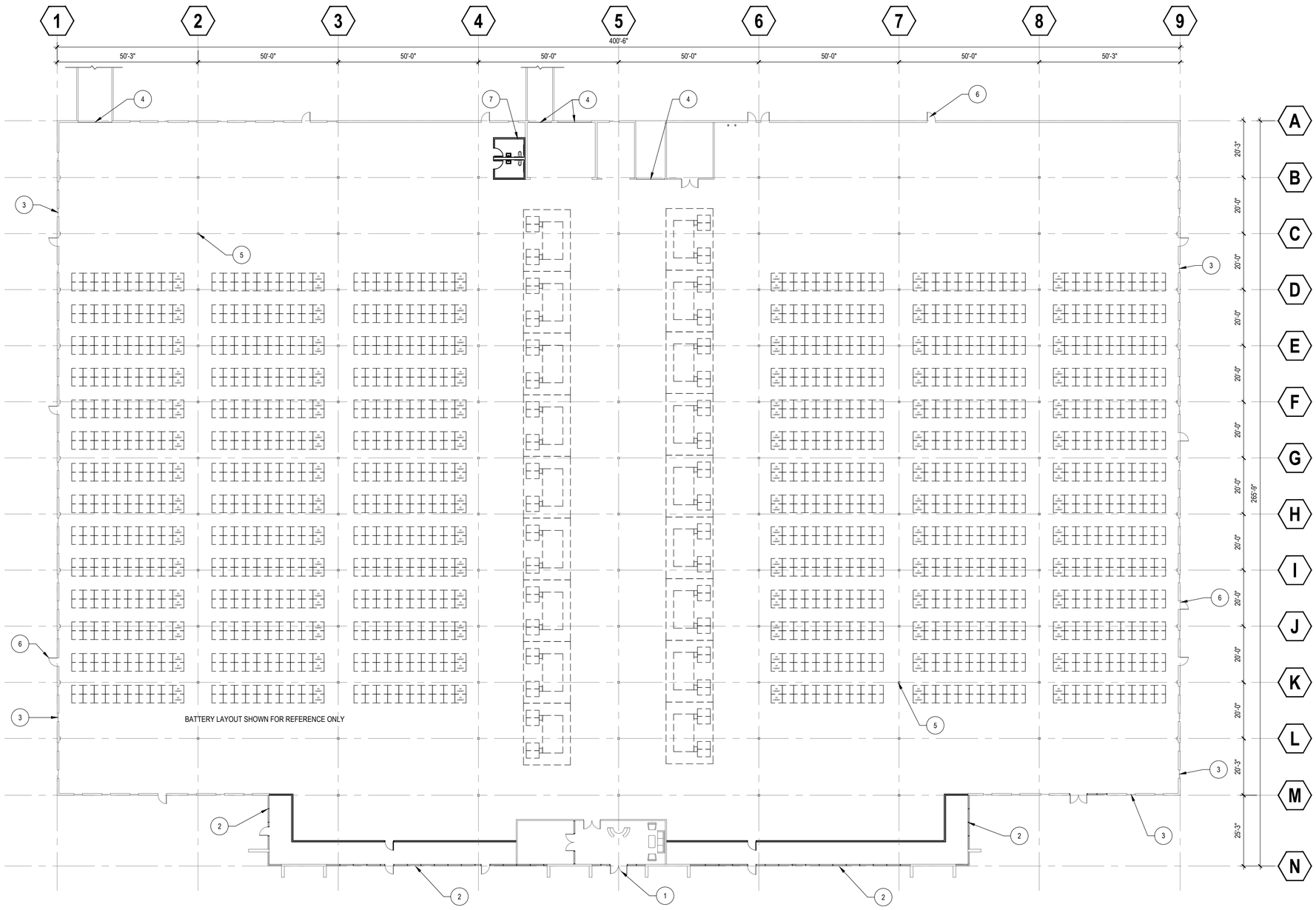
ENLARGED SITE PLAN

A1.02

PROJECT NO: 194852



KEYNOTES

NOTE: NOT ALL KEYNOTES LISTED MAY APPLY TO THIS DRAWING.

1. PROJECT ENTRY.
2. STOREFRONT WINDOWS AND DOORS.
3. ALUMINUM WINDOWS.
4. ROLL UP DOOR AT LOADING AREAS.
5. STRUCTURAL COLUMN.
6. EXTERIOR EGRESS DOOR.
7. NEW BATHROOMS.

FIRST FLOOR PLAN

SCALE: 1" = 20'-0"

0 10 20 40 60 100

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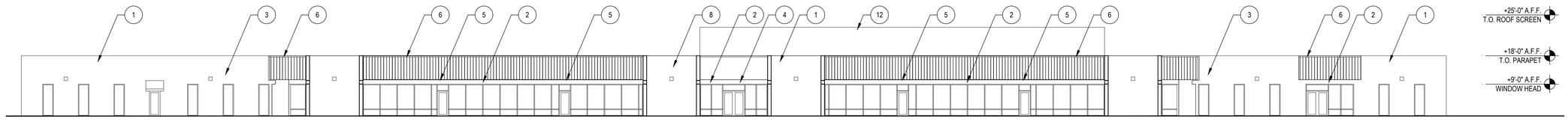
FIRST FLOOR PLAN

A2.11

PROJECT NO: 194852

P:\2019\194852\ - 6321 San Ignacio Avenue\plans\194 - Planning Submittal 1\194852A2.11.dwg - Aug 28, 2019, 2:25pm - dalene

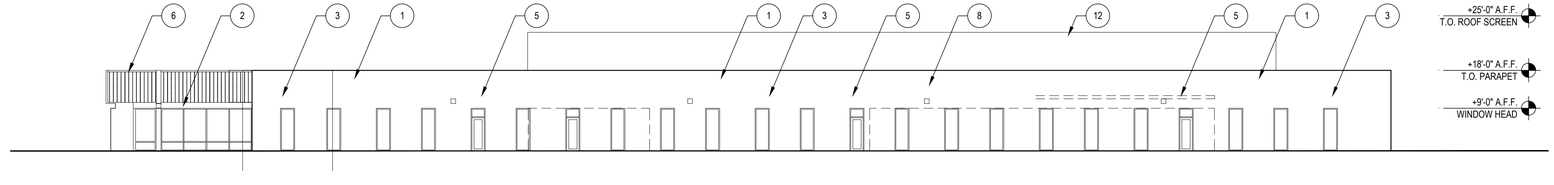


SOUTH ELEVATION - TO REMAIN UNCHANGED

SCALE: 1" = 16'-0"

1

0 10 20 40 60 80

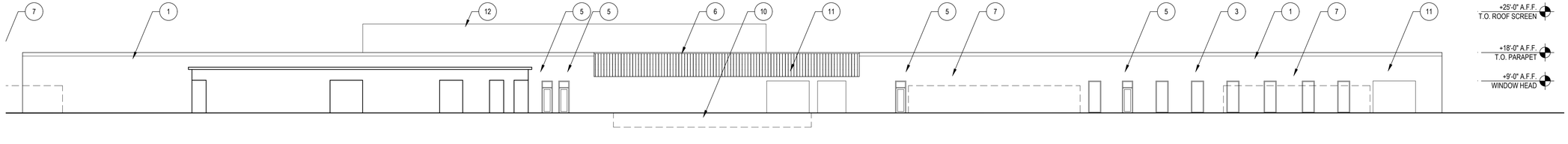


EAST ELEVATION - TO REMAIN UNCHANGED

SCALE: 1" = 16'-0"

2

0 10 20 40 60 80

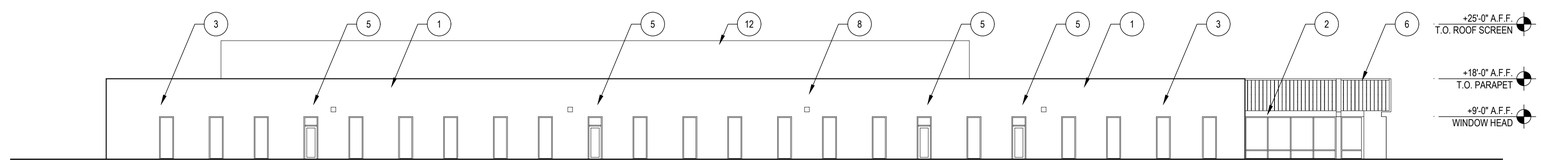


NORTH ELEVATION - TO REMAIN UNCHANGED

SCALE: 1" = 16'-0"

3

0 10 20 40 60 80



WEST ELEVATION - TO REMAIN UNCHANGED

SCALE: 1" = 16'-0"

4

0 10 20 40 60 80

KEYNOTES

NOTE: NO IMPROVEMENTS TO EXISTING BUILDING. ALL MATERIALS AND COLORS TO REMAIN UNCHANGED. ELEVATIONS FOR REFERENCE ONLY.

1. STUCCO - PAINTED
2. STOREFRONT ALUMINUM WINDOWS & DOORS
3. ALUMINUM WINDOW
4. PROJECT ENTRY
5. BUILDING DOOR
6. VERTICAL STANDING SEEM METAL
7. FENCED MECHANICAL YARD DASHED
8. EXTERIOR WALL SCONCE
9. MECHANICAL SCREEN
10. LOADING DOCK
11. ROLL UP DOOR
12. MECHANICAL SCREEN

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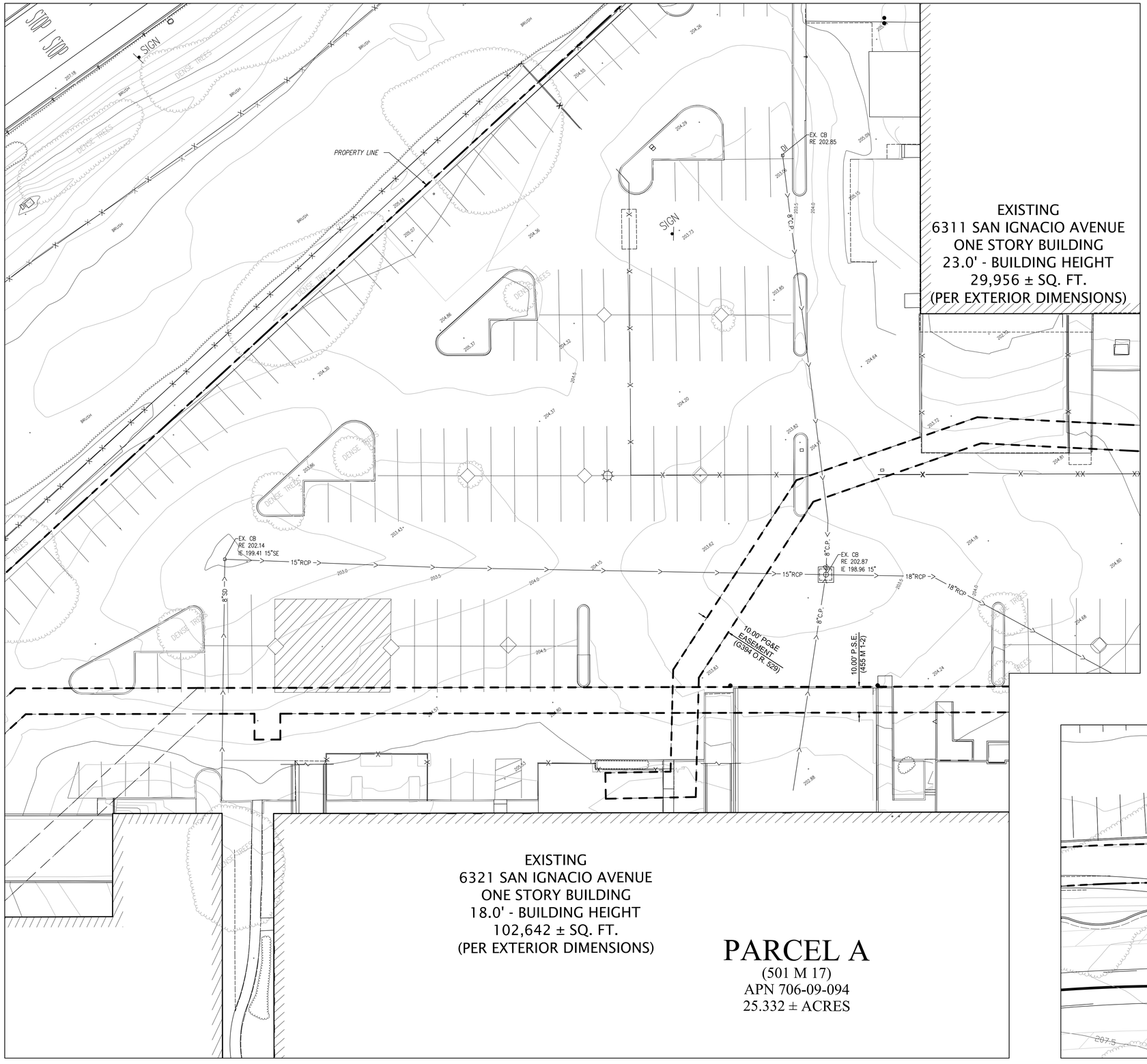
EXTERIOR ELEVATIONS

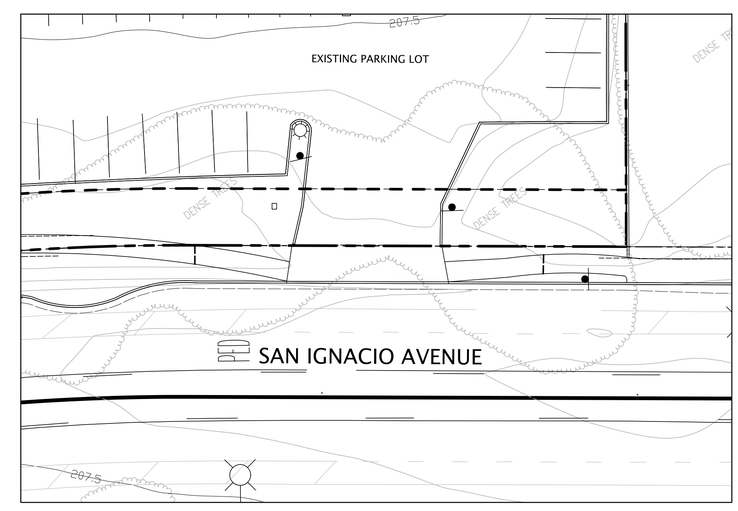
A3.01

PROJECT NO: 194852



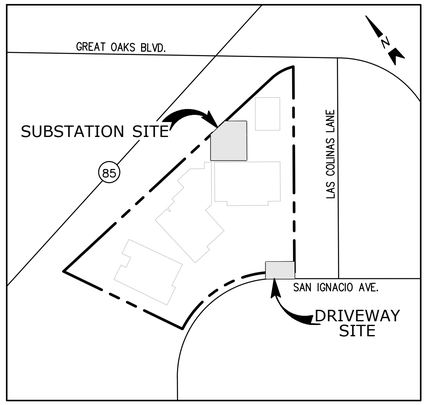
SUBSTATION PLAN VIEW

SCALE 1" = 20'



DRIVEWAY PLAN VIEW

SCALE 1" = 20'



VICINITY MAP

0 10 20 40 60

Scale 1" = 20'

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Rancho Cordova, CA 95670 www.kierwright.com

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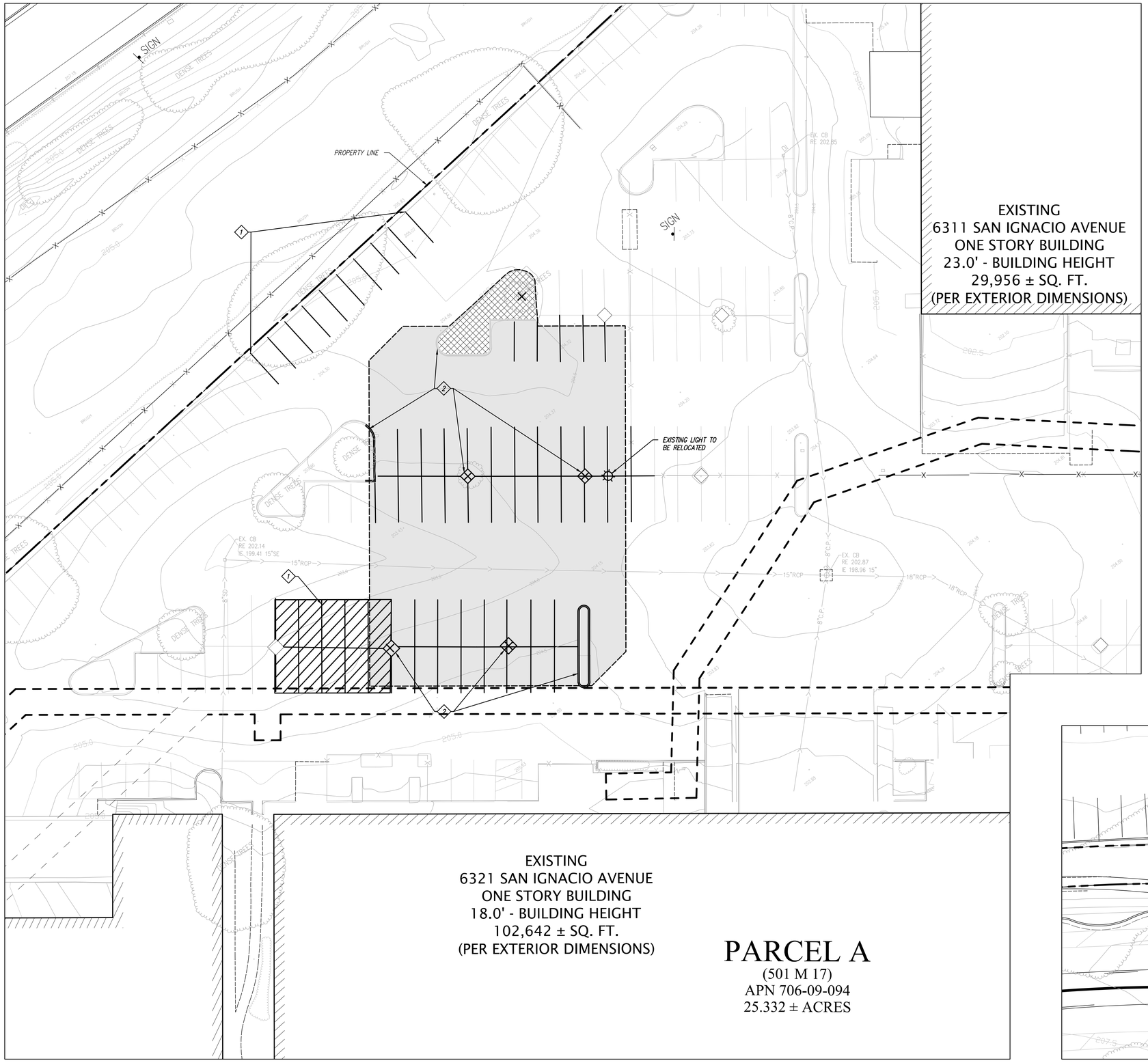
EXISTING CONDITIONS

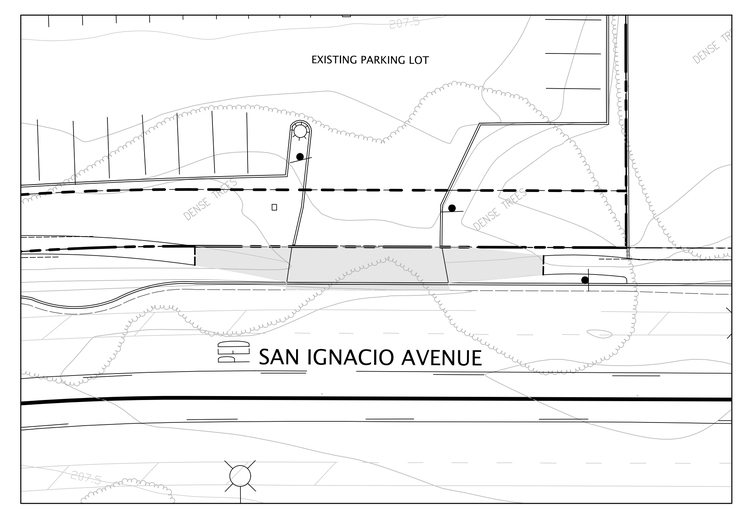
C1

PROJECT NO: 194852



SUBSTATION PLAN VIEW

SCALE 1" = 20'



DRIVEWAY PLAN VIEW

SCALE 1" = 20'

NORTH

0 10 20 40 60

Scale 1" = 20'

KEYNOTES

- EXISTING LANDSCAPING TO BE REMOVED
- EXISTING AC PAVEMENT AND CONCRETE TO BE REMOVED
- SAWCUT LINE
- EXISTING TREE TO BE REMOVED

ARC TEC
ARCHITECTURAL TECHNOLOGIES
www.arctecinc.com

Arizona
2960 East Northern Avenue, Building C
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California
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In Association with:

KIER+WRIGHT

2995 Prospect Park Drive, Suite 100
Rancho Cordova, CA 95670

Phone: (916) 970-5784
www.kierwright.com

A Planning Application for:

DUDEK

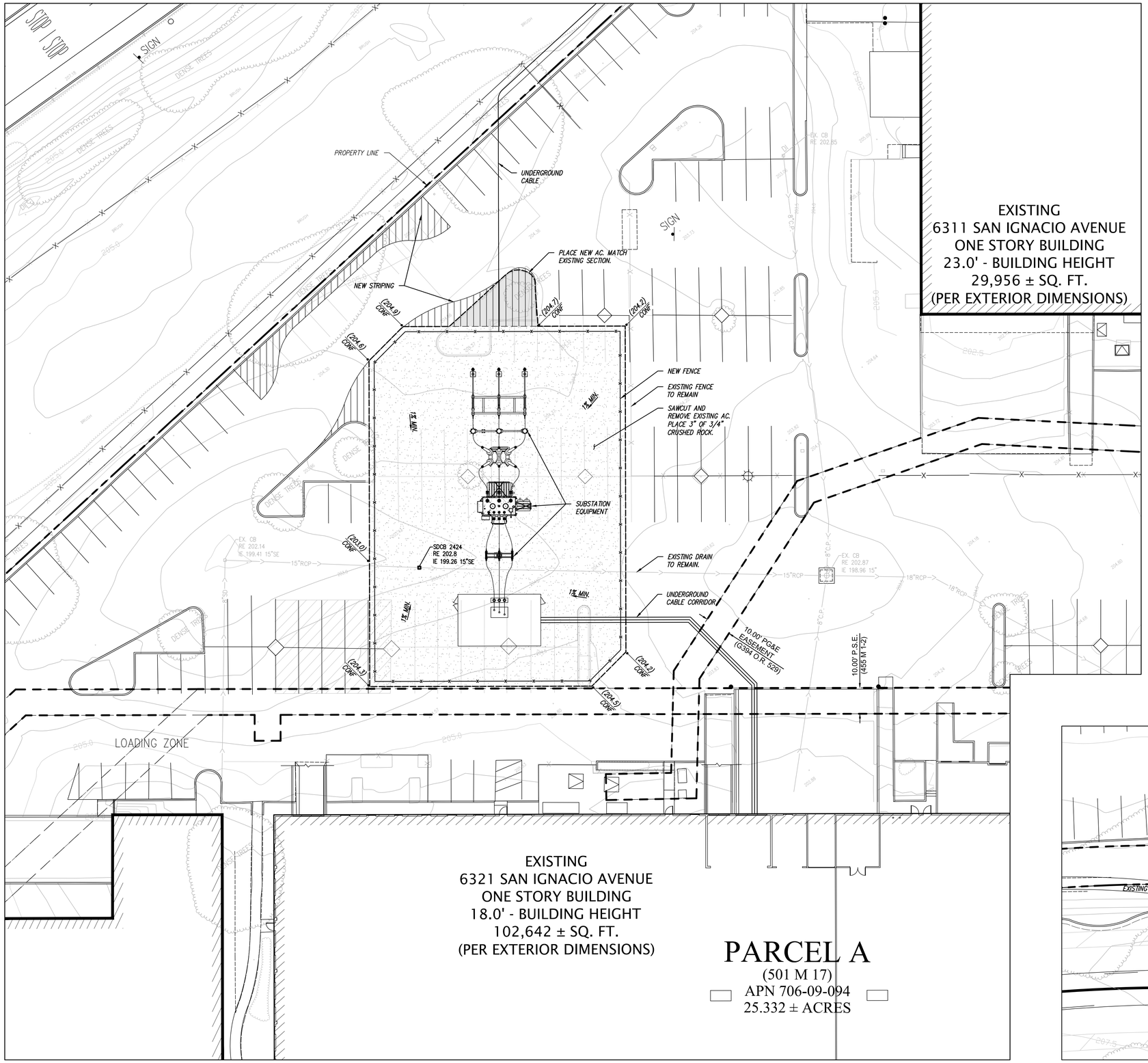
6321 San Ignacio Avenue
San Jose, CA 95119

DATE	DESCRIPTION
06.14.2019	Planning Submittal
08.30.2019	Planning Resubmittal

PRELIMINARY DEMOLITION PLAN

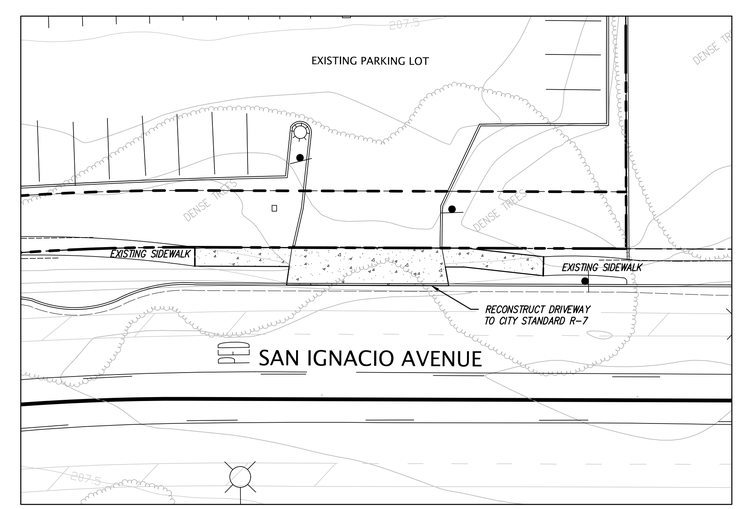
C2

PROJECT NO: 194852



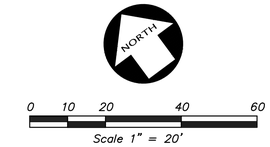
SUBSTATION PLAN VIEW

SCALE 1" = 20'



DRIVEWAY PLAN VIEW

SCALE 1" = 20'



0 10 20 40 60

Scale 1" = 20'

LEGEND

△	AREA DRAIN
□	STORM DRAIN CATCH BASIN
■	STORM DRAIN JUNCTION BOX
●	STORM DRAIN MANHOLE
FL	FLOW LINE
FF	FINISH FLOOR
PV	PAVEMENT
RE	RIM ELEVATION
• 23.8	SPOT ELEVATION
X"SD	STORM DRAIN LINE
TC	TOP OF CURB

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A Planning Application for:

DUDEK

6321 San Ignacio Avenue
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DATE	DESCRIPTION
06.14.2019	Planning Submittal
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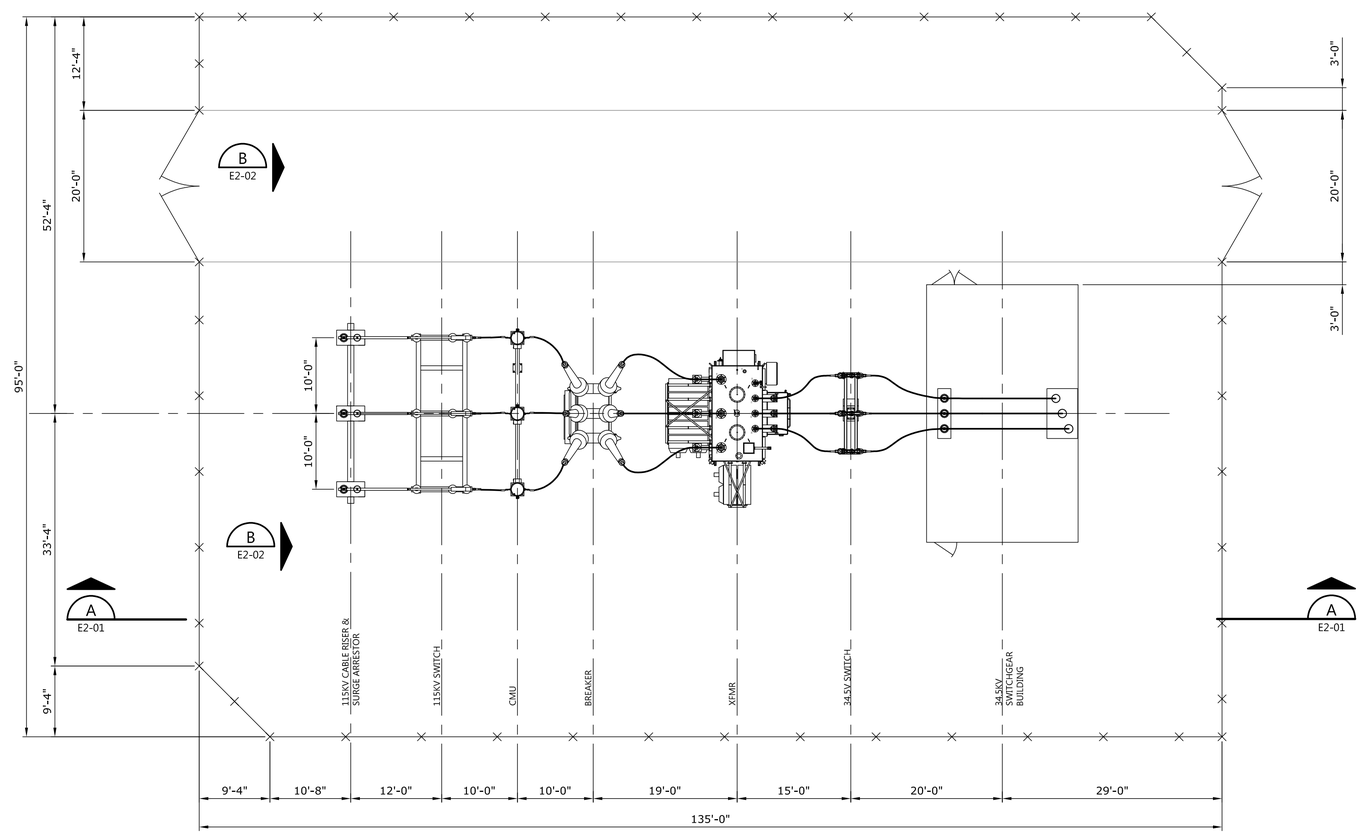
PRELIMINARY GRADING AND DRAINAGE

C3

PROJECT NO: 194852



TriAxis
A DIVISION OF
DAVID EVANS AND ASSOCIATES

NO.	DATE	REVISION	DR	BY	APVD
B	03/12/19	ISSUED FOR REVIEW	KWJ	JCS	PAH
A	01/23/19	ISSUED FOR REVIEW	RSL	JCS	PAH

DESIGNED BY:	J SO	DATE:	MAR 2019
DRAFTED BY:	R LANCE	DRAWING NO.:	ESVO0000-0001E1-01
CHECKED BY:	P HAZEL	PROJECT NO.:	ESVO0000-0001
APPROVED BY:	P HAZEL	REVISION NO.:	A

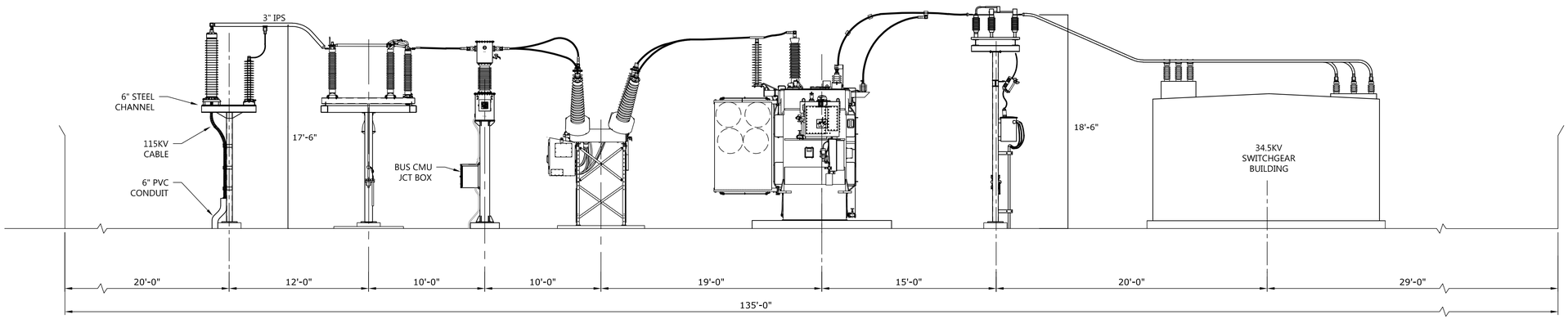
ESVOLTA

HUMMINGBIRD SUBSTATION

GENERAL ARRANGEMENT

SHEET NO.
E1-01

PRELIMINARY



SECTION A
3/16"=1'-0" E1-01

TriAxis
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DAVID EVANS AND ASSOCIATES

NO.	DATE	REVISION	DR	BY	APVD
B	03/12/19	ISSUED FOR REVIEW	KWJ	JCS	PAH
A	01/23/19	ISSUED FOR REVIEW	DMV	JCS	PAH

DESIGNED BY:	J SO	DATE:	March 2019
DRAFTED BY:	D VOSBURG	DRAWING NO.:	ESVO0000-0001E2-01
CHECKED BY:	P HAZEL	PROJECT NO.:	--
APPROVED BY:	P HAZEL	REVISION NO.:	A

ESVOLTA

HUMMINGBIRD SUBSTATION

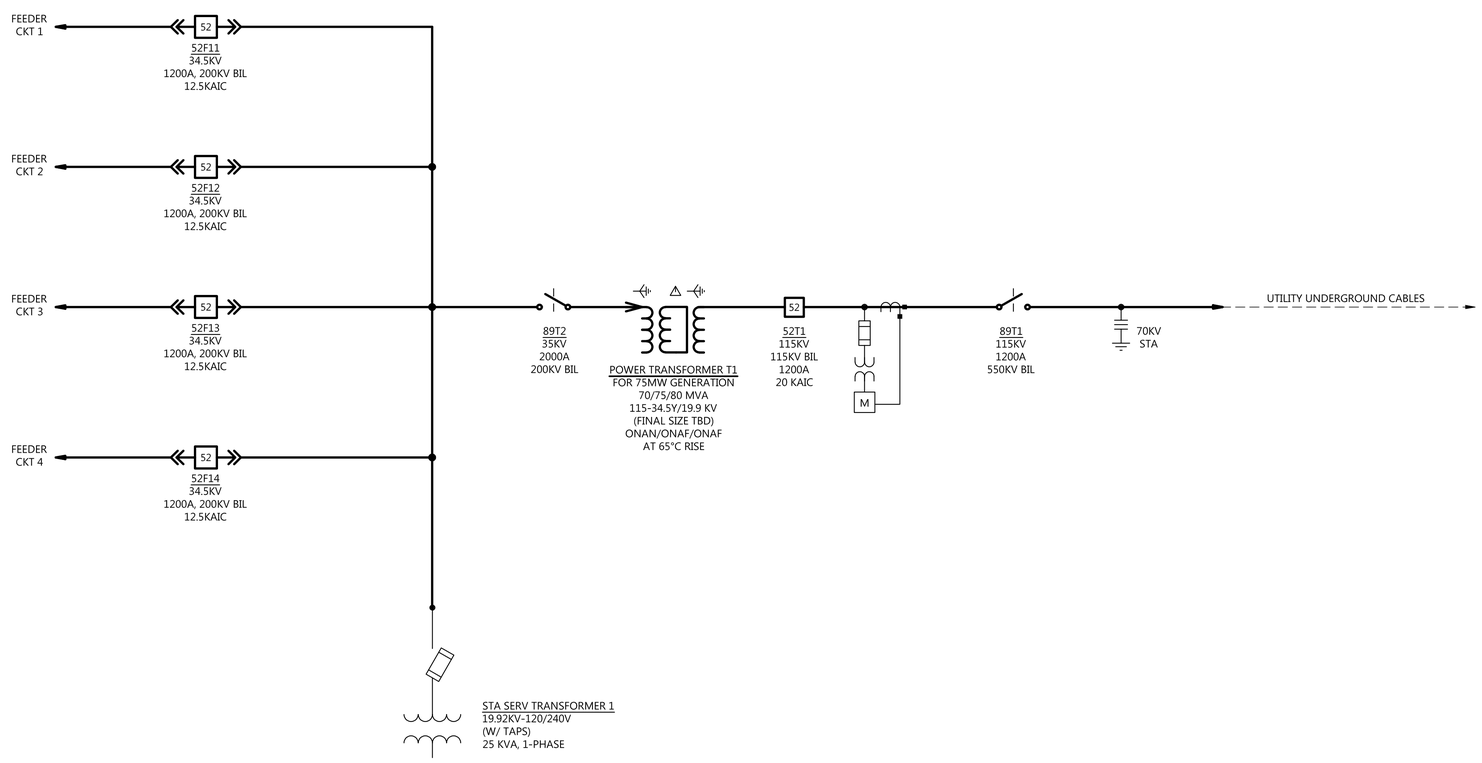
SUBSTATION SECTION A

SHEET NO.
E2-01

PRELIMINARY

EQUIPMENT LEGEND:

- GANG OPERATED DISCONNECT SWITCH
- TRANSFORMER (WITH LOAD TAP CHANGER)
- CIRCUIT BREAKER
- CAPACITOR
- SURGE ARRESTER
- GROUND
- POTENTIAL TRANSFORMER
- STATION SERVICE TRANSFORMER
- METER



N

TriAxis
A DIVISION OF
DAVID EVANS AND ASSOCIATES

NO.	DATE	REVISION	DR	BY	APVD
A	01/23/19	ISSUED FOR REVIEW	MDG	JCS	PAH

DESIGNED BY: J SO	DATE: JAN 2019
DRAFTED BY: M. GUIDOTTI	DRAWING NO.: G2-01
CHECKED BY: P HAZEL	PROJECT NO.: --
APPROVED BY: P HAZEL	REVISION NO.: A

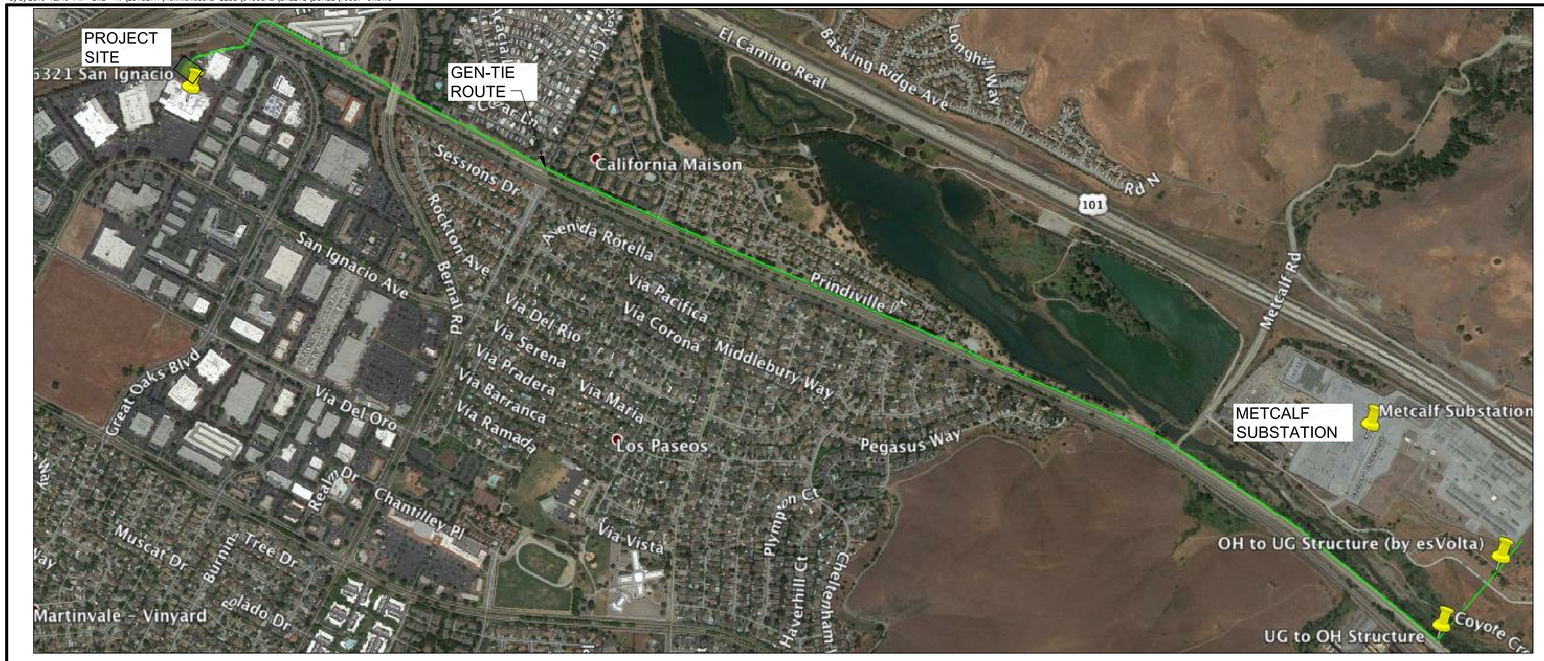
ESVOLTA

HUMMINGBIRD SUBSTATION

SUBSTATION ONE-LINE DIAGRAM

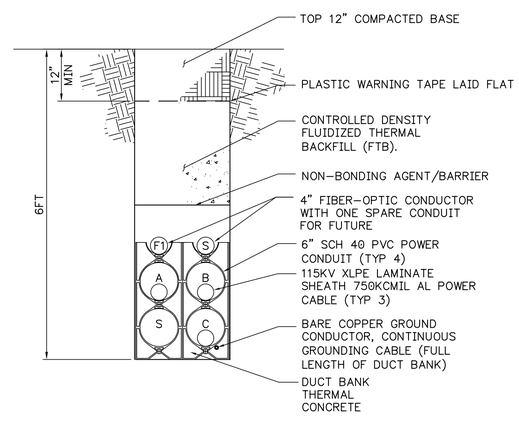
SHEET NO. G2-01

PRELIMINARY



LOCATION MAP

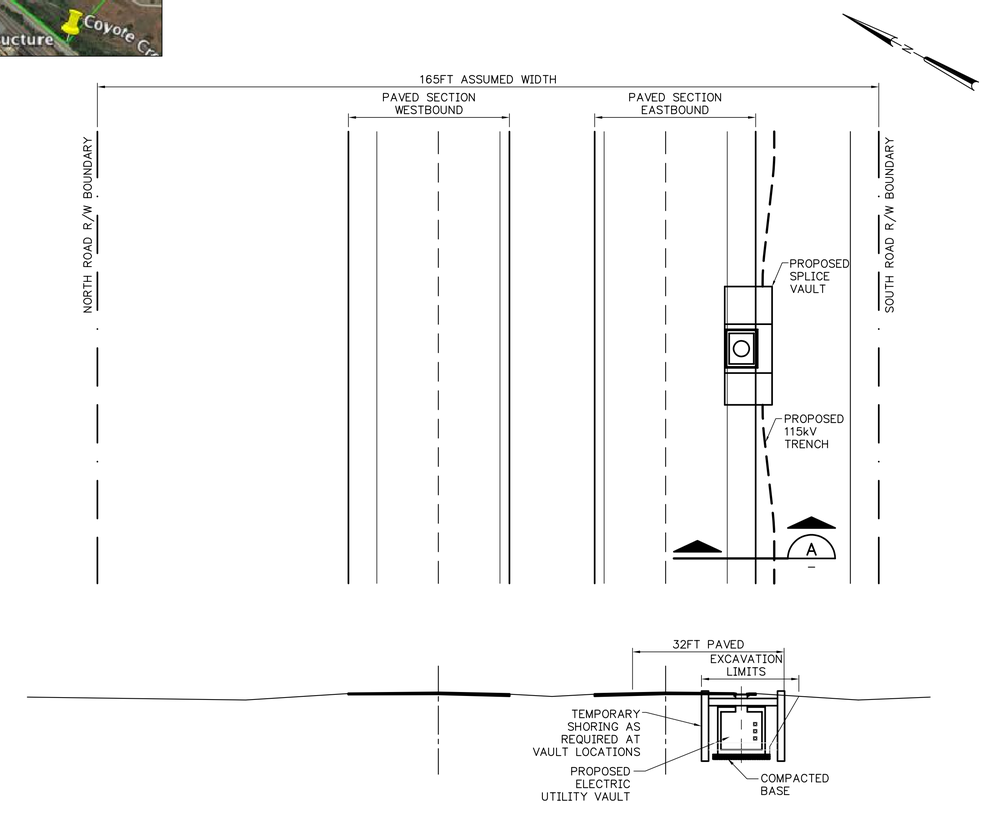
NOTES:
1. ALL DIMENSIONS ARE APPROXIMATE AS DETERMINED FROM ON-LINE RESOURCES AND ARE SUBJECT TO SURVEY AND FINAL DESIGN.
2. DETAILS AS SHOWN ARE PRELIMINARY AND SUBJECT TO CHANGE DURING FINAL DESIGN.



TRENCH SECTION (TYPICAL)

SECTION A

SCALE: 1"=1'-0"



PLAN & CROSS-SECTION (MONTEREY ROAD)

TriAxis Engineering, Inc.

NO.	DATE	REVISION	DR	BY	APVD
C	06/06/19	UPDATED CONCEPT FOR CUP	LWB	JL	
B	2/22/19	CONCEPT FOR PRELIM ANALYSIS	LWB	MDPE	
A	1/23/19	CONCEPT ONLY, FOR OWNER REVIEW	MDPE	MDPE	

DESIGNED BY: M PETRIE	DATE: JANUARY 2019
DRAFTED BY: L BERNLOEHR	DRAWING NO.: 10001-01
CHECKED BY: J LEMON	PROJECT NO.: ESVO0000-0001
APPROVED BY:	REVISION NO.: C

esVOLTA

SANTA CLARA, CA

HUMMINGBIRD ENERGY STORAGE

PRELIMINARY UNDERGROUND 115-kV TRANSMISSION LINE CONCEPT

SHEET NO. SHT 1

PRELIMINARY, NOT APPROVED FOR BIDDING OR CONSTRUCTION