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5.0 ALTERNATIVES

This section discusses alternatives to SV1's proposed GOSDC and GOSBGF. These include the "no project" alternative, reduced development alternative, a reduced backup electric generation alternative, and backup electric generation technology alternatives. As described previously, the City of San José approved a Special Use Permit (SUP) for the GOSDC on January 25, 2017 under City File SP15-031. The GOSDC and GOSBGF project proposes a modification to the data center and backup generating facility that are already approved for construction on the site. As a result, the range of reasonable alternatives is limited. This discussion focuses on alternatives that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the potential impacts.

CEQA Guidelines requires a consideration of a range of reasonable alternatives to the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. Thus, the focus of an alternatives analysis should be on alternatives that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. The CEQA Guidelines further provide that among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts.

5.1 IMPACTS OF THE PROJECT

As mentioned above, the CEQA Guidelines advise that the alternatives analysis in an EIR should be limited to potentially feasible alternatives that would avoid or substantially lessen any of the significant effects of the project, and would achieve most of the project objectives.

As discussed previously in this EIR, the project would not result in any significant unavoidable impacts. The project has incorporated mitigation into the project design to ensure that potentially significant impacts are reduced to less than significant levels. Mitigation incorporated into the project include:

- Air Quality (Construction Dust and Backup Generator Emissions – Incorporation of Diesel Particulate Filters and Limitation on Maintenance and Testing Hours)
- Biological Resources (Construction Impacts to Trees and Nesting Birds)
- Cultural and Tribal Cultural Resources (Construction Impacts to Unknown Subsurface Resources)
- Geology and Soils (Seismic Hazards)
- Hazards and Hazardous Materials (Off-Site Contaminated Soil)
- Hydrology and Water Quality (Construction)
- Noise and Vibration (Construction)

- Water Use (Replaced Evaporative Cooling with Air Cooling for the Data Center Building)

5.2 OVERALL PROJECT OBJECTIVES

The primary goal of the GOSDC, as its name implies, to be a state-of-the-art data center. The GOSDC is designed to be part of the single largest internet hub on the west coast that will reliably meet the increased demand of digital economy, its customers and the continued growth. The GOSDC will house key cloud infrastructure that is integral to the economy as well as critical application providers that build platforms that are essential to the continued functioning and productivity of businesses, markets, governments, academia and general citizens. These platforms are facing an unprecedented need to grow and expand and keep up with increased demands resulting from increased reliance on the Internet.

The SERC's project objectives are as follows:

- Develop a state of the art data center with up to 547,000 square feet;
- Develop the Data Center on land that has been previously approved for a similar size data center'
- Develop a Data Center that can be constructed in phases which can be timed to match projected customer growth;
- Meet high sustainability and green building standards by designing the Data Center to meet US Green Building Code LEED and Cal-Green standards for new construction;
- To incorporate the most reliable and flexible form of backup electric generating technology considering the following evaluation criteria.
    - **Commercial Availability and Feasibility**. The selected backup electric generation technology must currently be in use and proven as an accepted industry standard for technology. It must be operational within a reasonable timeframe where permits and approvals are required.
    - **Technical Feasibility**. The selected backup electric generation technology must utilize systems that are compatible with one another.
    - **Reliability**. The selected backup electric generation technology must be extremely reliable in the case of an emergency loss of electricity from the utility.
    - **Industry Standard**. The selected backup electric generation technology must be considered industry standard or best practice. The customers of SV1 are informed consumers and will request SV1 to provide a detailed description of the type of backup generation that it delivers as part of the customer's due diligence. If the selected technology does not meet the customer's requirements, they will not put their servers in the GOSDC.

5.3 NO PROJECT ALTERNATIVE

The CEQA Guidelines [Section 15126(d)4] require an EIR specifically include a "No Project" alternative. The purpose of including a No Project alternative is to allow decision-makers to compare the impacts of approving the project with the impacts of not approving the project. The Guidelines specifically advise that the No Project alternative is "what would be reasonably expected to occur in the foreseeable future if the project is not approved, based on current plans and consistent with available infrastructure and community services." [Section 15126.6(e)(2)] The Guidelines emphasize that an EIR should take a practical approach, and not "…create and analyze a set of artificial assumptions that would be required to preserve the existing physical environment [Section 15126.6(e)(3)(B)]."

No Project - No Development Alternative

If the project were not constructed, the environmental impacts of the project would be avoided, but SV1's basic project objectives would not be met, and the benefits associated with providing highly efficient and reliable internet and cloud services to meet the increasing demands would not be realized. To continue to build key cloud infrastructure is integral to the economy as well as critical application providers that provide platforms that are essential to the continued functioning and productivity of businesses, markets, governments, academia and general citizens. These platforms are facing an unprecedented need to grow and expand and keep up with increased demands resulting from increased reliance on the Internet. Therefore, because the no project alternative would not satisfactorily meet the project objectives specified above, the no project alternative was rejected in favor of the proposed project.

No Project – Buildout of Approved Development

As described previously, the City of San José approved a Special Use Permit (SUP) for the GOSDC on January 25th, 2017. The SUP included backup generation facilities of 21 3-MW generators. The original configuration of the GOSDC consisted of three, two-story buildings each encompassing 191,000 gross square feet (gsf), for a total of approximately 573,000 gsf. The data center buildings were designated SV-12, SV-13 and SV-14. The City is allowing construction of the GOSDC to continue for SV-12.

The MND completed for the approved project did not identify any significant impacts that could not be reduced to less than significant levels with implementation of mitigation measures. Under the No Project – Buildout of Approved Development Alternative, the project would be constructed as designed under the original approval granted by the City. As a result, this alternative would result in the same construction-related impacts of the project identified in Section 5.1, above. While additional backup generators are part of the proposed project, due to the limitation on maintenance and testing hours and the incorporation of diesel particulate filters, potential impacts associated with emissions are equal to or less than those of the Approved Project. Additionally, this alternative would prevent the project from meeting its objectives related to backup electricity generation due to the reduced number of generators.

5.4 LOCATION ALTERNATIVE

CEQA encourages consideration of an alternative site when significant effects of the project might be avoided or substantially lessened. Only locations that would avoid or substantially lessen any of the significant impacts of the project and meet most of the project objectives need be considered for inclusion in the EIR [CEQA Guidelines Section 15126.6(f)(2)].

As described previously, the City of San José approved a Special Use Permit (SUP) for the GOSDC on January 25th, 2017. The proposed project is a modification to the project already approved on the site, which as discussed above is primary project objective. As a result, an alternative location is not feasible for the project.

5.5 REDUCED DEVELOPMENT ALTERNATIVE

The GOSDC site has been selected due to its close proximity to existing Equinix main campus and to reliable electricity provided by PG&E, through its new Santa Teresa Substation, which was evaluated and approved by the City of San Jose and the California Public Utility Commission. Rather than construct one large building on the 18 acre site, the GOSDC was designed in three phases, each including one building. Development of the full site is necessary to ensure the ever increasing demand for data center use can be met over time. A reduced development alternative would not meet the total projected customer demand over time and therefore would not meet the overall project objectives.

As described in Section 5.1, above, the project would not result in any significant unavoidable impacts. Impacts reduced to a less than significant level through mitigation incorporated into the project design are primarily related to construction activities. As determined by the City of San Jose in its prior environmental review and in the SPPE Application, the full buildout and the buildout in phases would not result in any significant environmental impacts. Although, the Reduced Development Alternative would lessen construction-related impacts of the project, the impacts would be considered less than significant under both scenarios. The Reduced Development Alternative may reduce impacts associated with emissions from testing and maintenance of the backup generators because fewer generators may be needed. However, the Reduced Development Alternative would be subject to the same limitation on the number of hours the backup generators would be allowed to operate on the site, meaning the project could still operate generators the same amount of hours if desired for more frequent testing and maintenance, even if there are fewer generators to test and maintain. .

5.6 BACKUP ELECTRIC GENERATION TECHNOLOGY ALTERNATIVES

As part of the development of the GOSDC and the GOSBGF, SV1 considered alternatives to the backup generators as proposed. As discussed more fully below, SV1 considered a smaller capacity system as well as alternative generating technologies. For completeness purposes, a discussion of the No Backup Electrical Generation Alternative is also included.

5.6.1 Reduced Electric Generation Backup System

SV1 considered a backup generating system with fewer emergency generators. However, any generating capacity less than the total demand of the GOSDC at maximum occupancy, with redundancy, would not allow SV1 to provide the critical and reliable electricity needed during an emergency power outage. It is important to note that in addition to electricity that would be directly consumed by the servers themselves, the next largest electrical demand of the data center building would be related to cooling the server rooms. For the servers to reliably function, they must be kept within temperature tolerance ranges. The industry standard is to design and operate a building that can meet those ranges even during a loss of utility electric power. Therefore, for SV1 to provide the reliability required by its clients, it is necessary to provide a backup generating system that could meet the maximum load during full occupancy on the hottest design day and include redundancy as described in Section 2.2.4.1. A reduced capacity system would not fulfill the basic objectives of the GOSBGF.

As described in Section 5.1, above, the project would not result in any significant unavoidable impacts. Impacts reduced to a less than significant level through mitigation incorporated into the project design are primarily related to construction activities and the reduction of emissions from the generators by incorporation of diesel particulate filters and a limit of the number of hours for maintenance testing. As determined by the City of San Jose in its prior environmental review and in the SPPE Application, the full buildout and the buildout in phases would not result in any significant environmental impacts. The Reduced Electric Generation Backup System Alternative may reduce impacts associated with emissions from testing and maintenance of the backup generators because fewer generators would be included in the project. However, with the incorporation of diesel particulate filters and the limit on the number of hours for maintenance and testing, the emissions related impacts of the proposed project are well below air quality and public health-significance thresholds set by the Bay Area Air Quality Management District.

5.6.2 Alternative Generating Technologies

SV1 considering using potentially available alternative technologies: gas-fired turbines; flywheels; gas-fired engines, batteries; fuel cells; and alternative fuels. None of the technologies considered could meet the overall project objective because they were commercially or technically infeasible and/or would not meet the necessary standard of reliability during an emergency.

As described in Section 5.1, above, the project would not result in any significant unavoidable impacts. As determined by the City of San Jose in its prior environmental review and in the SPPE Application, the full buildout and the buildout in phases would not result in any significant environmental impacts. Impacts reduced to a less than significant level through mitigation incorporated into the project design are primarily related to construction activities. The Alternative Generating Technologies Alternatives discussed below would not reduce the significant construction-related impacts of the project. Impacts associated with emissions from testing and maintenance of the backup generators are mitigated through incorporation of diesel particulate filters and a limitation on the number of testing and maintenance hours. The

Alternative Generating Technologies described below could reduce or avoid some of less-than-significant impacts associated with backup generator emissions, but as described below do not meet the fundamental project objectives or are commercially infeasible.

Flywheels

Flywheel energy storage systems use electric energy input which is stored in the form of kinetic energy. Kinetic energy can be described as "energy of motion," in this case the motion of a spinning mass, called a rotor. The rotor spins in a nearly frictionless enclosure. When short-term backup power is required because utility power fluctuates or is lost, the inertia allows the rotor to continue spinning and the resulting kinetic energy is converted to electricity.[1]

SV1 has concluded that flywheel technology would not be a viable option for the following reasons:

- Flywheel technology does not perform within the required reliability levels of SV1 and is prone to system failure.
- Flywheel technology requires an extensive amount of maintenance to keep each energy storage system functioning.
- Flywheel systems still require backup generation to maintain the electrical load.

Gas-Fired Engines

SV1 considered using natural gas-fired engines instead of diesel generators to supply backup power for the GOSDC. This technology option was rejected because it is not technically feasible. The UPS systems described in Section 2.2.4.2 require backup generation that starts very quickly, and natural gas engines are too slow to start. Loss of natural gas delivery, such as broken pipe or loss of supply, would render the natural gas engines inoperable and unable to reliably provide backup electrical power in an emergency. Further, emergency conditions resulting in loss of power from SVP may also result in temporary loss of gas utility service. Therefore, natural gas engines are not considered reliable enough to meet the industry standard or needs of the GOSDC. Storage of sufficient natural gas on site to maintain emergency electricity to the GOSDC during an outage would not be tenable given the volume of natural gas that would be required. Finally, natural gas-fired engines are not considered industry standard for data centers.

Battery Storage

SV1 considered using batteries alone as a source of emergency backup power. The primary reason batteries alone were rejected by SV1 was the limited duration of battery power. Batteries can provide power quickly, which is the reason SV1 has incorporated them into the overall backup electrical system design. As described in Section 2.2.4.2, batteries would be initiated at the first sign of electricity interruption. However, the current state of battery technology does not allow for very long durations of discharge at building loads as high as planned for the

[1] Energy Storage Association. Accessed November 2019. Available at: http://energystorage.org/energy-storage/technologies/flywheels

GOSDC. Once the standalone batteries are completely discharged, the only way they can be recharged without onsite generation is if the utility electrical system is back up and running. Since it is not possible to predict the duration of an electricity outage batteries are not a viable option for emergency electrical power, and clients and their insurance companies would not consider batteries to provide the redundancy necessary. Therefore, because battery storage cannot provide the duration that may be necessary during an emergency, this technology option was rejected as technically and commercially infeasible.

Fuel Cells

Equinix, SV-1's parent company, is very familiar with fuel cell technology. Equinix has partnered with Bloom Energy over the last 5 years to deploy over 45 MW of fuel cell technology at various sites around the country.

In every application to-date, the fuel cells act as a primary power source running in parallel to the utility supply and are backed up by diesel engine generators. In other words none of the fuel cells are used as replacement for any of the backup emergency diesel-fired generators. The fuel cell technology deployed in large capacity installations cannot function in back up applications because the start-up time for these units from cold start to full and stable power is 12 hours where diesel engines usually start up and provide back-up power within 15 to 20 seconds.

In addition, the majority of large-scale fuel cell installations use natural gas which comes from an off-site supply which means the back-up source is not stand-alone as is desired for critical back-up systems. In other words, introducing a stationary source of fuel increases the risk of interruption of delivery of natural gas during an emergency. While Liquified Natural Gas (LNG) can be used, the footprint required to store it onsite makes it impractical and commercially infeasible at the GOSDC Site. Diesel fuel storage for the minimum required back-up time usually presents very few space challenges as well avoids the potential environmental impacts associated with a failure of an LNG tank at the site.

It is important to note that there are some small fuel cell systems which can serve in a back-up capacity, but so far those found have been in the 10 to 100 kW range, not scalable for a 99 MW facility.

Alternative Fuels

SV1 evaluated the use of biodiesel and renewable diesel as replacement for the CARB diesel proposed for use in the GOSBGF. Neither alternatives provide a highly reliable source of fuel, nor provide any demonstrable reduction in emissions.

Typical biodiesel fuels tend to more unstable than petroleum-based diesel with very little, if any environmental benefit.

Renewable diesel fuel has been claimed to be as stable, if not more stable than petroleum-based diesel fuels, while offering significant environmental benefits., However; no certified data has been located that can be used to document the environmental benefit claims, at this time.

5.6.3 No Backup Electric Generation Alternative

Consumer demand for data storage has grown substantially in recent years. The GOSDC, including the GOSBGF, is proposed in response to this heightened demand. The "No Backup Electric Generation" Alternative would leave the GOSDC exposed to electricity outages. While there are a limited number of potential customers that do not require backup electricity generation facilities, such clients are small and do not represent the majority of those customers that provide the backbone of the internet and cloud infrastructure. Simply put, SV1's existing and the vast majority of the future customers would not locate their servers in the GOSDC without a highly reliable backup generating facility to support it. Therefore, the No Backup Electric Generation Alternative is rejected as commercially infeasible and not consistent with industry standards.

As described in Section 5.1, above, the project would not result in any significant unavoidable impacts. As determined by the City of San Jose in its prior environmental review and in the SPPE Application, the full buildout and the buildout in phases would not result in any significant environmental impacts. Impacts reduced to a less than significant level through mitigation incorporated into the project design are primarily related to construction activities. Construction activities associated with installation of backup electric generation equipment on the site would not contribute substantially to construction-related impacts associated with the project. As a result, the No Backup Electric Generation Alternative would not reduce the significant construction-related impacts of the project. Impacts associated with emissions from testing and maintenance of the backup generators are mitigated through incorporation of diesel particulate filters and a limitation on the number of maintenance and testing hours. The No Backup Electric Generation Alternative would avoid the less-than-significant impacts associated with backup generator emissions.

5.7 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The CEQA Guidelines specify that an EIR must identify the environmentally superior alternative among those alternatives discussed. If the environmental superior alternative is the "No Project" alternative, the EIR shall also identify an environmentally superior alternative amount the other alternatives [Section 15126.6(e)(2)]. Based upon the previous discussion, the environmentally superior alternative would be the No Project – No Development Alternative, which would avoid the identified impacts resulting from development of the project on the site. However, this alternative would not fulfill the project's basic objectives.

As described previously, the project proposes a modification to a data center and backup generating facility that are already approved for construction on the site. As a result, the range of reasonable alternatives is limited. Among the remaining alternatives other than the No Project Alternative, the Reduced Development Alternative would be environmentally superior because it would reduce impacts associated with construction of the project, and may reduce impacts associated with emissions from testing and maintenance of backup generators (less than significant for the Proposed Project). However, this Alternative would not fulfill the project's basic objectives.