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California Energy Commission

Perkins Renewable Energy Project

CEC 2nd Data Request Response for the Opt-in Application 24-OPT-01

April 2026

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California Energy Commission

Perkins Renewable Energy Project

CEC 2nd Data Request Response for the Opt-in Application 24-OPT-01

April 2026

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1 Introduction

On July 11, 2025, IP Perkins, LLC, IP Perkins BAAH, LLC, and affiliates (Applicant) received a Second Determination of Incomplete Application and Request for Information from the California Energy Commission (CEC) for the Perkins Renewable Energy Project (24-OPT-01) in response to the Applicant's Data Responses Set #1 (July 23, 2024), Set #2 (October 21, 2024), and Set #3 (March 17, 2025). On September 10, 2025, the Applicant received a Request for Information Following Second Determination of Incompleteness for the Perkins Renewable Energy Project (24-OPT-01). On December 11, 2025, the Applicant received a Supplemental Revision 1 Data Requests. This document provides the Applicant's responses to the second round of Data Requests received from the CEC.

The responses are grouped by individual discipline or topic area and are presented in the same order and with the same numbering provided by the CEC. New or revised graphics, tables, or attachments are provided throughout and as appendices to this document. At the request of the CEC, a complete tracked version of the Project Description and the Biological Resources Section of the Opt-in Application have been provided. The responses included in this document are considered complete responses to the corresponding individual Data Requests.

2 Data Requests and Responses

2.1 Air Quality

2.1.1 REV 1 DR AQ-1

Please provide an updated AERSCREEN modeling analysis using the revised emission rates consistent with the updated Air Quality Technical Report.

Response: A revised Air Quality Technical Report including updated AERSCREEN modeling (Appendix C of the Report) has been provided as Attachment A. This report supersedes the Air Quality Technical Report included in Docket 257953.

2.1.2 REV 1 DR AQ-2

Please provide a refined ambient air quality impacts analysis using AERMOD for 24-hour and annual PM10 and PM2.5 impacts, and annual NO2 impacts during construction with the revised emission rates discussed above. If results from the revised AERSCREEN modeling analysis requested in REV 1 DR AQ-1 show any new exceedance of SILs for other pollutants or averaging period, please provide a refined ambient air quality impacts analysis using AERMOD for these pollutants and averaging periods as well.

Response: A revised Air Quality Technical Report including updated impact analysis has been provided as Attachment A. This report supersedes the Air Quality Technical Report included in Docket 257953.

2.1.3 REV 1 DR AQ-3

Please provide a completeness determination letter from the ICAPCD confirming that the application submitted to the District have been deemed complete.

Response: Correspondence between the Imperial County Air Pollution Control District and IP Perkins have been included as Attachment A.2. As noted in the email exchange, the CalEEMod results from December 2024 are acceptable as submitted.

2.1.4 Emergency Backup Generator Permit Application

IP Perkins is providing an application to the Imperial County Air Pollution Control District for an Emergency Backup Generator, see Attachment A.4.

2.2 Biological Resources

2.2.1 REV 1 DR BIO-1

Please update Aquatic Resources Map 8 to identify area of avoidance. Please provide an analysis of all foreseeable impacts to jurisdictional waters for data completeness. Please provide the description of any impacts to jurisdictional waters that was noted would be provided in subsequent data responses. See REV 1 DR BIO-3.

Response: The purpose of the Aquatic Resources Report is to define areas of aquatic resources subject to State or federal jurisdiction within the area of investigation. The Aquatic Resources Report, including Aquatic Resources Map 8, reflects the extent of areas that are waters of the State or riparian areas subject to Regional Water Quality Control Board (RWQCB) and California Department of Fish and Wildlife (CDFW) jurisdiction. Pursuant to the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material* Section IV(B)(1)(a), actions were taken to avoid discharges of fill to jurisdictional waters including adjusting the Project fenceline to avoid areas of microphyll woodland and non-vegetated wash. The avoidance strategy was informed by the data in the Aquatic Resources Report. It is very common for an Aquatic Resource Report to reflect a broader survey/study area than the area of final impacts. The LSAA application and WDR application reflect the specific areas of Project impact and areas proposed for avoidance (see Attachment B for the revised LSAA and WDR applications). The LSAA application and WDR rely on the mapping of aquatic resources included in the Aquatic Resources Report, but reflect the current Project design as modified to avoid the microphyll woodland areas. Analysis of impacts to jurisdictional waters is included in the LSAA and WDR applications and in Section 4.2 of the opt-in application.

2.2.2 REV 1 DR BIO-2

Please provide the associated metadata for "Perkins_JD_Net_Label". Please ensure that the metadata for all other GIS files applicable to the Lake and Streambed Alteration Agreement (LSAA) or California Endangered Species Act (CESA) permitting is included. Please include a field correlating the date of the GIS data and the date/version of the impact tables within corresponding reports or permit applications.

Response: All GIS data for the Perkins JD and LSAA are provided in Attachment B.

2.2.3 REV 1 DR BIO-3

Staff has the following requests:

- Please update the descriptions provided in the project description to describe the types of, or if, activities that would occur within a stream-for example, solar array installation involves pile driving (steel pipes, H-beams, etc.) but does not specifically discuss if trenching would occur within stream resources (it states that panel strings would be secured to racking systems).

Response: Section 11A of the LSAA has been revised to clarify the impacts to waters and jurisdictional vegetation communities. Impacts to waters of the State would occur from vegetation removal, trenching of buried collector cables, pile driving of solar pile supports, concrete pads for inverters/transformers, wood poles for overhead collector cables, access road grading, vehicle travel during solar array installation, and fence post installation along the solar facility fence line. The exact impacts and quantity of each type of impact is dependent on the final design. For the purpose of quantifying impacts on waters of the State, it was conservatively assumed that the entirety of water resources and jurisdictional vegetation communities that are not fenced for avoidance would be permanently impacted and that up to ten inverters/transformers would be located in jurisdictional vegetation communities. Table 3 and Table 4 in the LSAA describe the anticipated permanent and temporary impacts to each water feature, respectively.

- Similarly, Table 11A Project Impacts states that the 34.5kV collection cables would be installed below grade in a 4-6 foot trench, or via horizontal directional drilling (HDD). Please elaborate if or where HDD would be used to avoid stream resources. For HDD and all other impacts to streams (e.g., trenching) please identify the layout and trench lines that would cross stream resources.

Response: HDD is not proposed to avoid stream resources. HDD would be used if necessary to avoid utility constraints. Project impacts to stream resources are described in the LSAA and WDR applications.

- Please update Table 2 Permanent Impact to Waters of the State-Bank to Bank to distinguish the above information.

Response: Permanent impacts are provided in Table 3 of the LSAA application. Permanent impacts within bank to bank streams could include native soil and aggregate due to trenching for collector lines and access road construction and steel for solar pile supports. A fence would be located in bank to bank waters as shown in Figure 7 of the LSAA application, see JD Feature 1, 2, and 3.

- Please also provide updated mapping of a scale sufficiently detailed (e.g. 1:300 similar to the aquatic resources report) to reflect stream resources and types of impacts (grading, pile driving, trenching, HDD, etc.)

Response: The maps in the LSAA show the full extent of potential impact assuming that 100 percent of the water resource would be impacted by the activities described in the LSAA application. The LSAA conservatively assumes all water resources and jurisdictional vegetation communities would be impacted.

- Please clarify or consolidate the project impact acreages provided in 11A Tables 3 and 4. Impact tables should discuss and identify both permanent and temporary impacts to stream resources.

Response: Table 4 was mistitled in the initial application. The revised application titles have been corrected. All impacts for IP Perkins are assumed to be permanent. The temporary and permanent impacts of the loop-in line are clarified in the separate application for the loop-in line (see Attachment B.1).

- Please provide an overview figure and large-scale figures (approx. 1:300 scale) indicating the stream features within the project site and a delineation of each of the streambed alteration agreement "project" impacts (footprint) within the stream features that are requested for coverage pursuant to the LSAA, under the CEC's in-lieu permitting authority. Please be certain to visually distinguish between the types of applicable impacts (e.g., grading, pile driving, cement, rip rap, and permanent vs. temporary impacts, etc.). Please also include updated GIS layer(s) with this information

Response: As discussed in the LSAA application, the exact location of IP Perkins Project impacts will be determined during final design. The LSAA application therefore assumes 100 percent of resources that are not fenced for avoidance would be impacted by Project development. The location and acreage of each impact is shown on the figures in the LSAA application and quantified in the LSAA tables.

2.2.4 REV 1 DR BIO-4

Please clarify if the LSAA impacted acreages include PV panels, collectors, and other appurtenant infrastructure occurring within these areas.

Response: Tables 2 and 3 in the LSAA include all potential impacts within 1600 jurisdictional resources, including PV panel piles, collector trenches, access roads, inverter/transformers, wood poles, and other appurtenant infrastructure within the impacted water and jurisdictional vegetation features.

2.2.5 REV 1 DR BIO-5

Please provide revised tables and figures to ensure all documents reflect the accurate impact acreages based on the updated AAR addendum. When resubmitting, please ensure the figures are visible and not cropped in the redline version.

Response: All tables and figures in the biological resources section of the Opt-In Application have been updated to reflect the current ARR. Similarly, all tables and figures in the LSAAs, and ITP application have been updated. The impacts in the WDR application for the loop-in transmission line reflect the ARR Addendum.

2.2.6 REV 1 DR BIO-6

Please provide the following:

- Resumes for T. Cole, T. Silvia, K. Brennan, M. Cloud-Hughes and Nathan Gross.

Response: Resumes for T. Cole, T. Silvia, K. Brennan, M. Cloud-Hughes, and N. Gross are included in Attachment B.3.

- Field survey forms for desert kit fox and burrowing owl protocol surveys conducted in 2023 through 2025. Field survey forms should follow survey report recommendations in the Staff Report on Burrowing Owl Mitigation (CDFW 2012) Appendix D and include timing of surveys, weather conditions, surveyor(s) qualifications, color photos, observational descriptions including individual markers (e.g., bands, transmitters, or unique identifying features), a description of the owl's behavior, coordinate locations for observation, and copies of any California Natural Diversity Database (CNDDB) Field Survey Forms submitted to the CDFW CNDDB office.

Response: Data collected during the desert kit fox and burrowing owl protocol surveys were recorded electronically and not on hard copy data sheets. The electronic data from these surveys were downloaded and printed as PDFs and are included in Attachment B.3. The data was provided to the CDFW in excel format on December 16, 2024. A copy of the email submission to the CDFW CNDDB office is also included.

- A narrative of the methods used during the surveys which is responsive to the report outline provided in CDFW's 2012 Burrowing Owl Staff Report, Appendix D.

Response: The field survey forms in Attachment B.3 span March 2023 through April 2024. Additionally, special species and burrowing owl field survey daily reports conducted by Ironwood are included in Attachment B.4. Reports of sensitive species, submitted to the CDFW CNDDB field office by Ironwood, are included in Attachment B.4. The survey report forms and reports of sensitive species follow the Staff Report on Burrowing Owl Mitigation (CDFW 2012) Appendix D.

Descriptions of the methods used during the surveys for desert kit fox and burrowing owl are provided in the Project's Biological Resources Technical Report. The most up to date Biological Resources Technical Report was provided in Data Response Set 3 to Data Request 1 dated February 2023 and supersedes any previous version of the Report.

- Please clarify if the mammal GIS layer includes all field data collected, if not, please provide additional details on desert kit fox burrows in the comments section of the mammal GIS layer, including but not limited to state of use (e.g., potential den, known den, potential natal/pupping dens-include observations supporting determination), size, incidental sign observations (e.g. tracks, scat, prey remains), mapping of potential prey (e.g., ground squirrel colonies), and provide photos."

Response: The mammal GIS layer provided includes all field data collected by biologists within the Project Area between March 2023 and April 2024, as shown in the field survey forms from Attachment B.3.

2.2.7 REV 1 DR BIO-7

Please provide a brief explanation of the disposition of the two dead burrowing owls, including coordinates of sign, descriptors (e.g., recent or old, feather, decorations, pellets, etc.), field notes, and photos, if available.

Response: The evidence of deceased burrowing owls reported on March 25th, 2023 by Jackie White included the multiple detached wings remains from the carcass, a burrow, and whitewash and scat from the predator. The evidence was left in place at the time of finding. The latitude and longitude of findings respectively were 32.72667 and -115.181. Field notes and photographs can be found in Attachment B.3.

2.2.8 REV 1 DR BIO-8

Please update the Biological Resources Technical Report (BRTR) and LSAA with results of the protocol level surveys, impacts analysis (including loss of foraging habitat, as applicable) and include any avoidance, minimization and/or mitigation measures necessary to fully address potential impacts to the species (i.e. Yuma Ridgway's rail and California black rail). Please provide both a strikethrough and clean version of all changes to the documents, including referenced documents, when resubmitting. Please incorporate any avoidance measures into the appropriate management plans.

Alternatively, if take of California black rail is anticipated, and the applicant is choosing to seek take authorization for this species under the CEC's in lieu permitting authority. Please provide all information that would be required in an ITP application for CESA-listed or candidate species, specifically, California black rail. Information on what is requested in a typical ITP application can be located here:
https://wildlife.ca.gov/Conservation/CESA/Permitting/Incidental-Take-Permits

Response: As discussed in meetings with the CEC, the final BRTR, dated February 2025, and included in Docket number 262219, is not being updated. Impacts analyses are not usually included in the BRTR as they are addressed in the CEQA document. The BRTR was updated for Data Response 1, set 3 (Docket number 262219) and the February 2025 version includes the protocol-level survey results.

The separate Yuma Ridgway's rail and black rail assessment is provided in Attachment B.4 and indicates that while there is nearby habitat, the Project Application Area does not contain suitable habitat for these species. Therefore, an incidental take permit is not being requested for California black rail.

The Biological Resources Section of the Opt-In application has been updated to reflect all the updated protocol level survey results and an updated impact analysis. This updated version of the Biological Resources section is being provided as Attachment B.5.

The updated LSAA (Attachment B.1) currently incorporates all applicable CMAs, BMPs, and mitigation plans to protect sensitive resources.

2.2.9 REV 1 DR BIO-9

Please provide an updated Section 4.2 Biological Resources impact analysis with the addition of 2024 survey data. Please provide redline version of an updated Section 4.2 impact analysis for biological resources and update figures as necessary to include 2024 data.

Response: Section 4.2, Biological Resources, of the Opt-In Application has been updated to reflect the 2024 survey data. Section 4.2 impact analysis and figures have also been updated to reflect the 2024 data and any additional data and reports provided in 2025. Section 4.2 has been provided with this response set as Attachment B.5.

2.2.10 REV 1 DR BIO-10

Please provide a comprehensive table that includes species, resource impacts, avoidance and measures to offset impacts.

Response: Table 4.2-5 has been added to Section 4.2 Biological Resources of the CEC Opt-in Application (Attachment B.5). The table contains the acres of impact to each vegetation type within the Project and the species requiring habitat compensation for each vegetation type. The Project proposed to offset impacts through compensatory mitigation at a 1:1 ratio which is required under the DRECP and Flat Tailed Horned Lizard Management Plan.

2.2.11 REV 1 DR BIO-11

Please provide an updated table reflecting permanent and/or temporary impacts with associated mitigation ratios for each impact and corresponding mitigation requirement.

Response: This data request is following up on Data Request BIO-23 which requested that Section 4.2.2 of the Opt-in Application define the area of impact from which the mitigation acreage would be calculated. Table 4.2-5 has been added to Section 4.2 Biological Resources of the CEC Opt-in Application (Attachment B.5). The table contains the acres of impact to each vegetation type within the Project and the species requiring habitat compensation for each vegetation type. All impacts were assumed to be permanent. As noted previously, the DRECP requires a 1:1 ratio of mitigation to acre impacted for the lands and some species impacted by the Project. It is assumed that the mitigation lands would be nested where appropriate.

2.2.12 REV 1 DR BIO-12

The Data Request Response to DR BIO-25 includes supplemental compensatory information for impacts to FTHL; however, staff still need clarification on the following issues:

- Please provide an analysis of the proposed mitigation lands suitability for offsetting project impacts. The analysis shall compare the species' occupancy and densities between the impact and mitigation sites. The analysis shall support a conclusion that the proposed mitigation is biologically equivalent or superior to the area of impact.

Response: Prior to acquisition of mitigation lands, specific information on density of species occurrence within the mitigation lands will be provided to CDFW to demonstrate that the mitigation lands support an equal or greater population of FTHL and burrowing owl than the impacted lands. Attachment C.9 to Data Response Set #2 in Data Response 1, dated October 2024 provides details regarding the land selection process, performance requirements, schedule, and outline of the plan.

- The proposed mitigation conservation analysis should include an analysis of the population densities of FTHL between the Perkins site and all proposed mitigation sites. For example, the abundance of harvester ants between the Perkins site and the mitigation sites should be analyzed to support a biologically equivalent or superior determination.

Response: Prior to acquisition of mitigation lands, specific information on the density of species and habitat quality in the mitigation lands to support the biological equivalent or superior determination will be submitted to CDFW.

- Please state how the compensatory mitigation currently underway with mitigation partner, Wildlands, is adequate for the impact to the high-quality habitat for the species.

Response: See prior response. Attachment C.9 to Data Response Set #2 in Data Response 1, dated October 2024 provides details regarding the land selection process, performance requirements, schedule, and outline of the plan.

- 477 of the proposed 6,000-acres of mitigation (approximately 8 percent) of the mitigation obligation has been identified for conservation. Given the high density of FTHL and acreage at the Perkins site, CDFW does not recommend conversion to monetary replacement (see FTHL Rangewide Management Strategy (RMS) p. 61).

Response: IP Perkins intends to provide habitat replacement in accordance with the DRECP and FTHL Rangewide Management Strategy which would be in agreement with CDFW's recommendation. Attachment C.9 to Data Response Set #2 in Data Response 1, dated October 2024 provides details regarding the land selection process, performance requirements, schedule, and outline of the plan.

- The Wildlands letter in Appendix J.6 does not provide any specific details – please provide specific details including the land selection process, performance requirements, schedule, and outline of the plan.

Response: Attachment C.9 to Data Response Set #2 in Data Response 1, dated October 2024 provides details regarding the land selection process, performance requirements, schedule, and outline of the plan and updated the letter referenced in Appendix J.6.

- This appears to be in process per the mitigation conservation analysis document "[i]n addition to the parcels included in this analysis, land acquisition of the remaining approximately 5,523-acres of compensatory mitigation is being developed.

Response: Wildlands is in the process of identifying mitigation lands that meet the requirements for the Project. Additional details will be provided to CDFW prior to land acquisition. Attachment C.9 to Data Response Set #2 in Data Response 1, dated October 2024 provides details regarding the land selection process, performance requirements, schedule, and outline of the plan and updated Appendix J.6.

2.2.13 REV 1 DR BIO-13

Please address the project impacts on aeolian sand transport along the fence line. Provide an analysis of the potential impacts to species that could occur in these areas due to impacts on aeolian sand transport. Include in the following in the sand transport study:

- Areas with active or potential sand movement, based on aerial imagery, field data, or soil maps.

Response: A wind erodibility report was prepared for the Project in August 2025[1]. As discussed in the report, Intersect Power operates temporary installations to collect meteorological (MET) data near the Project site. The MET towers installed near the Project site measure wind data including average wind speeds, maximum wind gusts, and average wind direction (see Table 4and Attachment 3). Data shows an overall average wind speed of approximately 4.8 mph, with an average maximum wind gust of 35.6 mph. The maximum average wind speed recorded was 6.5 mph and the Maximum recorded wind gust was 44.1 mph. Winds are generally from the south, ranging from ESE to SW. Wind at the Project site is also relatively low when broadly compared to the entire United States. While the northern boundary of the Project is located at the limit of a sand and dune corridor, the Project itself is not within a sand transport area.

Specifically, the majority of excessively sandy soils (Rositas series) are in the northern boundary of the project site and north of the project and the Project site does not show any active dunes. Interstate 8 is located on the northern boundary of the project site, in the path of the average wind direction and has an existing fence that runs along the border of Interstate 8.

Figure 1 shows the soils types and wind erodibility and Figure 2 shows the wind erodibility group. While portions of the Project site have high wind erodibility and sandy soils, the Project site data do not suggest particular concern for excessive wind speeds contributing to increased

[1] Perkins Renewable Energy Project Wind Erodibility Report. Drafted by Aspen Environmental Group, August 2025. The full report will be made available for the federal process.

wind erodibility, refer to Figure 3. Grading would occur in the areas where the substation, BAAH, BESS, and O&M building areas would be approximately 125 acres. Other areas where existing topography would be disturbed would be mowed or grubbed to retain some original vegetative cover and prevent further wind erosion. Additionally, the most intensive construction activities would occur in the southwest corner of the site (substation, BESS, BAAH, and O&M), furthest from the northern boundary and the sandiest areas and approximately 1.7 miles from Interstate 8.

- Description of sand features intersected by the fence alignment. Assessment of how the fence and other infrastructure may disrupt sand transport.

Response: The project is located at the southern edge of a sand transport corridor but the Project itself does not enter into the corridor, nor would it disrupt sand transport. The Project boundary fence along Interstate 8 would be adjacent and south of an existing fence which already disrupts this southern end of the sand transport corridor. As a result, the proposed fence is not anticipated to measurably disrupt sand transport since existing fences occur in the area.

Figure 1 Soil Type and Wind Erodibility

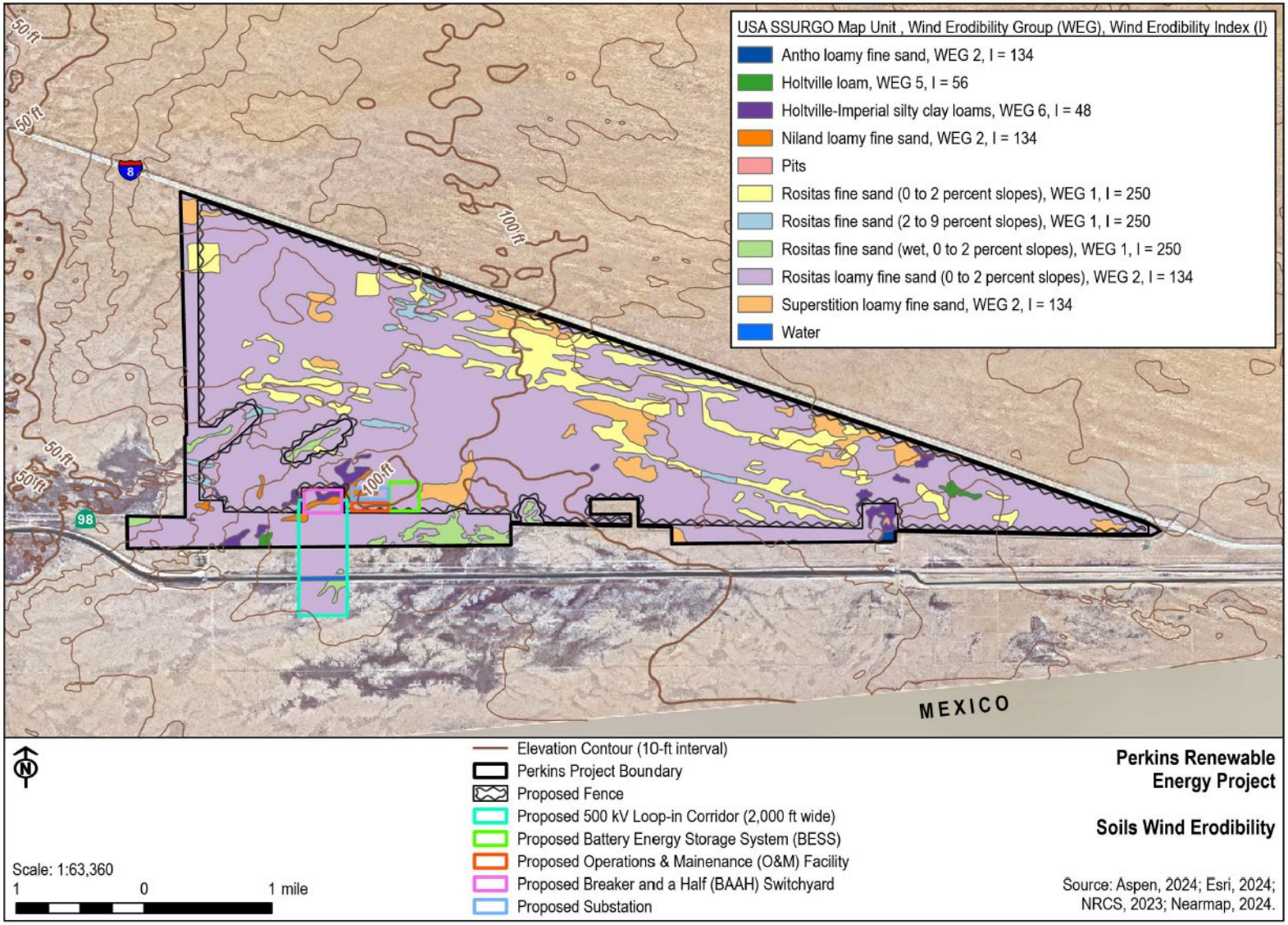


Figure 2 Wind Erodibility and Solar Array

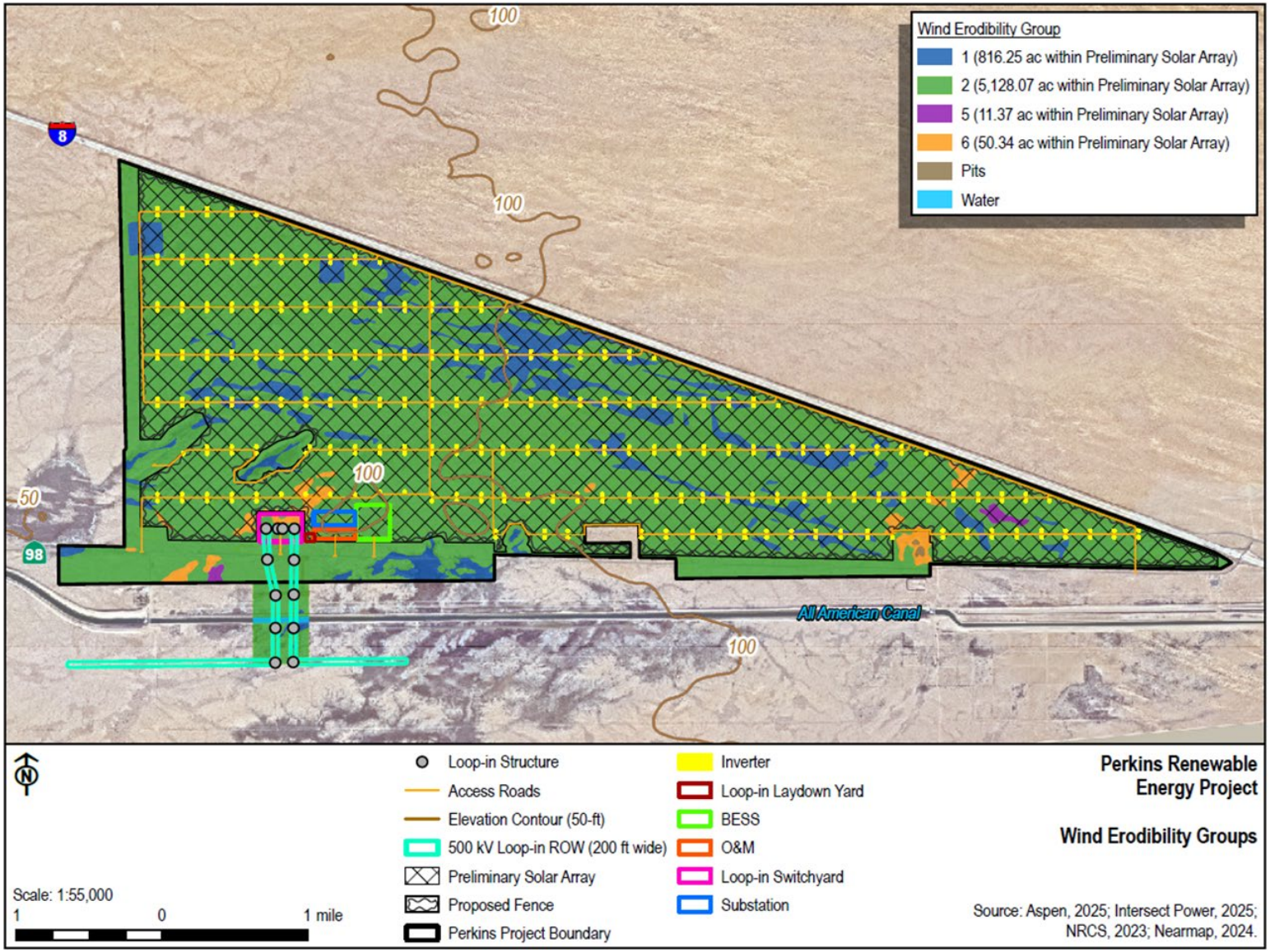


Figure 3 Perkins MET Station Wind Data

Average Monthly Wind Speed (m/s)	2.14
Average Monthly Maximum Recorded Wind Gust (m/s)	15.92
Spring (March-May) Average Monthly Wind Speed (m/s)	2.63
Spring (March-May) Average Monthly Maximum Recorded Wind Gust (m/s)	17.50
Summer (June-August) Average Monthly Wind Speed (m/s)	2.48
Summer (June-August) Average Monthly Maximum Recorded Wind Gust (m/s)	14.20
Fall (September-November) Average Monthly Wind Speed (m/s)	1.80
Fall (September-November) Average Monthly Maximum Recorded Wind Gust (m/s)	17.87
Winter (December-February) Average Monthly Wind Speed (m/s)	1.58
Winter (December-February) Average Monthly Maximum Recorded Wind Gust (m/s)	16.67

0	North
90	East
180	South
270	West

Monthly Wind Data

	Average Wind Speed (m/s)		Maximum Recorded Wind Gust (m/s)		Average Wind Direction		
December 2023	1.1	2.46059	13	29.0797	181	↓	S
January 2024	1.5	3.35535	18.4	41.15896	194.8	↓	SSW
February 2024	1.8	4.02642	14.7	32.88243	216.1	↙	SW
March 2024	2.6	5.81594	19.7	44.06693	189.6	↓	S
April 2024	2.6	5.81594	17	38.0273	191.9	↓	SSW
May 2024	2.3	5.14487	13.9	31.09291	151.95	↗	SSE
June 2024	2.6	5.81594	13.5	30.19815	132.6	↖	SE
July 2024	2.6	5.81594	12.5	27.96125	121	↖	ESE
August 2024	2.3	5.14487	15	33.5535	148.6	↖	SSE
September 2024	2	4.4738	15.8	35.34302	182.7	↓	S
October 2024	1.6	3.57904	19.7	44.06693	183.4	↓	S
November 2024	1.8	4.02642	18.1	40.48789	214.6	↙	SW
December 2024	1.2	2.68428	10.2	22.81638	192.7	↓	SSW
January 2025	1.9	4.25011	15.3	34.22457	218.9	↙	SW
February 2025	2	4.4738	15.4	34.44826	198.1	↓	SSW
March 2025	2.9	6.48701	19.1	42.72479	205.9	↓	SSW
April 2025	2.8	6.26332	16.3	36.46147	187.3	↓	S
May 2025	2.6	5.81594	19	42.5011	177.1	↓	S
June 2025	2.4	5.36856	15.8	35.34302	146.8	↓	SSE
Average	2.14	4.78	15.92	35.60	180.8	↓	S

Direction	Degrees Range	Arrow
N	348.75–11.25	↓
NE	11.25–78.75	↙
E	78.75–101.25	←
SE	101.25–168.75	
S	168.75–191.25	↑
SW	191.25–258.75	↗
W	258.75–281.25	→
NW	281.25–348.75	

Estimating Wind

Beaufort number	Description	Speed	Visual Clues and Damage Effects
0	Calm	Calm	Calm wind. Smoke rises vertically with little if any drift.
1	Light Air	1 to 3 mph	Direction of wind shown by smoke drift, not by wind vanes. Little if any movement with flags. Wind barely moves tree leaves.
2	Light Breeze	4 to 7 mph	Wind felt on face. Leaves rustle and small twigs move. Ordinary wind vanes move.
3	Gentle Breeze	8 to 12 mph	Leaves and small twigs in constant motion. Wind blows up dry leaves from the ground. Flags are extended out.
4	Moderate Breeze	13 to 18 mph	Wind moves small branches. Wind raises dust and loose paper from the ground and drives them along.
5	Fresh Breeze	19 to 24 mph	Large branches and small trees in leaf begin to sway. Crested wavelets form on inland lakes and large rivers.
6	Strong Breeze	25 to 31 mph	Large branches in continuous motion. Whistling sounds heard in overhead or nearby power and telephone lines. Umbrellas used with difficulty.
7	Near Gale	32 to 38 mph	Whole trees in motion. Inconvenience felt when walking against the wind.
8	Gale	39 to 46 mph	Wind breaks twigs and small branches. Wind generally impedes walking.
9	Strong Gale	47 to 54 mph	Structural damage occurs, such as chimney covers, roofing tiles blown off, and television antennas damaged. Ground is littered with many small twigs and broken branches.
10	Whole Gale	55 to 63 mph	Considerable structural damage occurs, especially on roofs. Small trees may be blown over and uprooted.
11	Storm Force	64 to 75 mph	Widespread damage occurs. Larger trees blown over and uprooted.
12	Hurricane Force	over 75 mph	Severe and extensive damage. Roofs can be peeled off. Windows broken. Trees uprooted. RVs and small mobile homes overturned. Moving automobiles can be pushed off the roadways.

- Modeling of wind-driven sand movement including sand supply and transport rates using local wind, terrain, soil, precipitation, and localized soil moisture levels pre and post-project.

Response: See response to the first bullet above. Because of the lack of wind-driven sand movement across the site, additional modeling is not required.

- Any proposed design measures (e.g., raised or permeable fencing) to maintain sand flow.

Response: At this time, IP Perkins does not anticipate raising the fence due to the existing fence which is already resulting in blocking the sand transport corridor. The Project would mitigate any impacts to the site at a 1:1 ratio which would include impacts to sandier areas and any species that use these areas, specifically the FTHL.

2.2.14 REV 1 DR BIO-14

Please identify what this split represents or resubmit accurate figures. For example, Figure 3 in Attachment A, Supplemental Pages. Please provide an explanation of the split through the project footprint, or resubmit accurate figures.

Response: The split in the middle of the Project area was a potential Project site update based on protection for non-biological resources, but was defined preliminarily and has since been removed from the Project proposal. The figures in the LSAA and ITP applications have been revised to remove the split in the Project Application Area. The Project Application Area reflects all areas within the fenced development area. Fencing would be used to avoid desert dry wash woodland areas only.

2.2.15 REV 1 DR BIO-15

Please coordinate with SDG&E to determine whether operation of the IP Perkins BAAH facility would need incidental take coverage for compliance under CESA. If it is anticipated that incidental take coverage would be requested, please provide proposed avoidance, minimization and mitigation measures that SDG&E would implement to ensure impacts to burrowing owls and their habitat are less than significant. Please provide the anticipated schedule for SDG&E to apply for take coverage and submit an ITP application to CDFW.

Response: SDG&E would manage the BAAH and loop-in transmission lines under SDG&E's existing incidental take permits. If SDG&E requires separate incidental take coverage for the BAAH facility, SDG&E would be responsible for obtaining separate coverage for operation of the BAAH facility.

2.3 Cultural and Tribal Cultural Resources

2.3.1 REV 1 DR CUL/TRI-1

Previously, in DR CUL/TRI-4, the CEC staff requested a missing page from resource record P-13-007130: Page 3 of Archeological Site Record YMP-66, PDF page 108, included in Appendix N.1, Cultural Record Search (confidential). Although the applicant states in Set #3 Response 3.5 that it provided the missing page in a confidential filing, the CEC staff found no resource record forms in the confidential filings.

Response: The South Coastal Information Center (SCIC) confirmed that Page 3 of Archeological Site Record YMP-66 is missing in the form on file. A copy of the form from SCIC will be resubmitted confidentially.

2.3.2 REV 1 DR CUL/TRI-2

In DR CUL/TRI-5, the CEC staff noted that page 39 of the PDF file for the P-13-011261 site record form is in an editable format (see 20240220T152927_CONFIDENTIAL Cultural Resource DPR Forms Part 3 and requested confirmation that the information provided on this page is identical to the information contained on it at the time of receipt from the South Coastal Information Center and no changes were made to the form. The applicant indicated in Set #3 Response 3.6 that page 39 of the P-13-011261 PDF file been revised and uploaded to the CEC under request for confidentiality. The CEC staff found no resource record forms in the confidential filings.

Response: The form on file for the resource P-13-011261 totals 9 pages. We assume that the reference to page "39" was a typo referring to page 3. Page 3 of the form on file remains in an editable format. ESA has obtained a copy of this file from SCIC and will submit it as a confidential file.

2.3.3 REV DR CUL/TRI-3

The following previous cultural resource studies are cited in Section 4.3, Cultural Resources, Table 4.3-1, but copies of them are not included in the confidential cultural resources filings provided with the application. Please provide copies of these studies or explain why they do not need to be part of the application:

- Rayle, Christopher E., and Steve Swanson, 2017, IM-01678

Response: ESA has obtained a copy of this file from SCIC and will submit it as a confidential file.

2.3.4 REV DR CUL/TRI-15

No cultural and tribal cultural resources technical report is contained in Appendix N.2 to the application. Please provide this report.

Response: IP Perkins and ESA continue to work with the BLM to finalize the Class III Cultural Resource Report and will provide it to the Energy Commission once BLM has reviewed.

2.4 Greenhouse Gas Emissions (Climate Change)

2.4.1 REV 1 DR GHG-1

Please provide the specifications of the refrigerant(s) to be used in the air conditioning systems proposed for the O&M building and the battery systems.

Response: The O&M building is expected to use R-410A refrigerant (CAS Name R-32/R-125 (50/50]). However, as noted in Section 6.6.2, Refrigerant Prohibition, of the Air Quality Technical Report, R-410A does not comply with California Code of Regulations, Title 17, Section 95374 (c), Table 3. As such, a Mitigation Measure GHG-1 Refrigerant Prohibition is recommended that would require the Applicant to use refrigerants that comply with the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning and Other End-Uses (California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4, Subarticle 5, Sections 95371, et seq.) in all onsite cooling/refrigeration/air conditioning units. Example refrigerants that the Applicant may use include R-454B and R-32 or any other commercially available refrigerant.

The BESS would include 1,705 Tesla Megapack 2XLs (including future augmentation). Each Tesla Megapack 2XLs contains up to 3.3 pounds of R-134a refrigerant (CAS Name 1,1,1,2-Tetrafluoroethane) in its thermal management system, resulting in a total of up to 5,627 pounds of R-134a for the full BESS buildout. At the time of preparation of the analysis in Section 6.6.2, Refrigerant Prohibition, of the Air Quality Technical Report, Tesla has submitted a Variance Application with CARB for Megapack 2XL BESS units manufactured between January 1, 2024 and September 30, 2026[2]. According to the application, Tesla is reengineering the Megapack 2XL TMS to use a compliant refrigerant (HFO-1234yf, with a GWP of <1) without compromising performance. Tesla anticipates completing the reengineering by the end of the third quarter of 2026, after which Megapack 2XLs with the reengineered TMS are expected to be commercially available. As noted above, Mitigation Measure GHG-1 would require the Applicant to use refrigerants including in the Tesla Megapack that meet with the requirements.

2.4.2 REV 1 DR GHG-2

Please explain how the use of the proposed refrigerant(s) would comply with the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning and Other End-Uses.

[2] Available here: https://ww2.arb.ca.gov/sites/default/files/2026-02/Megapack%202XL%20Variance%20Application%20%28Redacted%29.pdf

Response: The Project would use R410A for the O&M building and R-134a refrigerant for the BESS system. The AR4 global warming potential (GWP) for R-410A and R-134a are 2,088 and 1,430, respectively.

The R-410A refrigerant will be used in the O&M building air conditioning units. In accordance with California Code of Regulations, Title 17, Section 95374 (c), Table 3, the prohibition on refrigerants with a GWP of 750 or greater for new stationary air-conditioning equipment took effect on January 1, 2025. Since the date has passed, the use of R-410A does not comply with the regulation.

Similarly, the proposed BESS will use R-134a refrigerant in its thermal management system (TMS). The Tesla Megapack 2XL TMS is classified as "chillers – industrial process refrigeration". In accordance with California Code of Regulations, Title 17, Section 95374 (c), Table 3, the prohibition on refrigerants with a GWP of 750 or greater for chillers where the chilled fluid temperature is above 2°C took effect on January 1, 2024. Since the date has passed, and CARB staff has clarified that the 50-pound exemption does not apply to chillers, the use of R-134a refrigerant does not comply with the regulation.

The project would transition from R-410A and R-134a to compliant refrigerants as such refrigerants become commercially available and in accordance with the California Air Resource Board's regulatory implementation schedule. Implementation of Mitigation Measure GHG-1 Refrigerant Prohibition will ensure that the project complies with the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning and Other End-Uses (17 Cal. Code Regs., § 95371 et seq.).

> **Mitigation Measure GHG-1 Refrigerant Prohibition**
>
> Prior to the installation of any onsite cooling/refrigeration/air conditioning units, the project owner must submit documentation to the CEC compliance project manager to demonstrate that the project would use refrigerants that comply with the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning and Other End-Uses (California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4, Subarticle 5, Sections 95371, et seq.) in all onsite cooling/refrigeration/air conditioning units. [SH2.1]

The Air Quality Technical Report, Attachment A, has been updated to incorporate the discussion of compliance with the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning and Other End-Uses.

2.4.3 REV 1 DR GHG-3

Please explain how the proposed refrigerant(s) would comply with the sale and distribution prohibition timelines established in SB 1206 (2022).

Response: Senate Bill 1206 establishes prohibitions on the sale of bulk or newly produced hydrofluorocarbons (HFCs) with a global warming potential (GWP) greater than 2,200 starting 1/1/2025, greater than 1,500 starting 1/1/2030, and greater than 750 starting in 1/1/2033. Mitigation Measure GHG-1, Refrigerant Prohibition, requires the project to use refrigerant with a GWP less than 750 in all onsite cooling/refrigeration/air conditioning units. Therefore, the project will comply with SB 1206 with the implementation of Mitigation Measure GHG-1.

2.4.4 REV 1 DR GHG-4

Please provide an estimate of the GHG emissions (in metric tons of carbon dioxide equivalent) expected from refrigerant leakage.

Response: GHG emissions associated with R-410A refrigerant leakage from the O&M building during project operation were estimated in the updated Air Quality Technical Report, Attachment A, prepared by IP Perkins (December 2024) using CalEEMod 2022.1.1. The resulting annual refrigerant GHG emission of 0.32 metric tons (MT) of CO2e are included in the total annual Project Operation GHG emissions of 903 MT CO2e reported in Table 15 of the Air Quality Technical Report.

GHG emissions from BESS refrigerant leakage were calculated based on the total charge of R-134a refrigerant and a typical but conservative annual leakage rate of 10 percent. The BESS would include 1,705 units and each unit contains up to 3.3 pounds of R-134a refrigerant in its thermal management system, resulting in a total of up to 5,627 pounds of R-134a refrigerant. According to the IPCC's Fourth Annual Assessment Report, the GWP for R-134a is 1,430. Assuming a 10 percent annual leakage rate, BESS refrigerant leakage would result in GHG emissions of 365 MT CO2e per year. In addition, assuming the full charge contained in a unit will be released during a catastrophic event, approximately 2.14 MT CO2e would be released during such event.

The use of refrigerant R-134a will be prohibited and the project would use low-GWP refrigerants that comply with the California Air Resources Board Hydrofluorocarbons prohibitions. The GHG emissions estimated in this analysis are conservative.

The Air Quality Technical Report has been updated to include the O&M and BESS refrigerant emissions. The detailed calculations are provided in Appendix A of the Air Quality Technical Report.

2.4.5 REV 1 DR GHG-5

If the BESS system would also be charged by the grid, calculate the indirect GHG emissions. Provide assumptions for the number of hours annually the BESS system could be charged by the grid, and the GHG emission intensity factor from the electrical grid during charging.

Response: While the BESS would predominantly be charged by the solar PV facility, the BESS could also draw some energy from the grid if needed. A metering system would be employed

to measure how much energy stored in the BESS is derived from the grid versus the solar facility.

The average energy loss associated with the round-trip efficiency for the life of a lithium-ion BESS is approximately 13 percent. Assuming the 4,600 megawatt-hour (MWh) storage capacity of the BESS completes one full cycle per day and is entirely charged from the grid, which would require approximately 4.2 hours of charging at full capacity per day, then approximately 687 MWh would be lost per day or 251,000 MWh would be lost per year due to the round-trip efficiency.

Imperial Irrigation District is the electricity provider that would serve the Project. The GHG emission intensity factor of 644 lb CO2e/MWh used in this analysis was obtained from the most recent 2024 power content label for Imperial Irrigation District (https://www.iid.com/power/renewable-energy/power-content-label). Consistent with California's carbon neutrality by 2045 goal, an annual reduction of 30.7 lb CO2e/MWh was applied to the 2024 GHG intensity factor of 644 lb CO2e/MWh per year. This approach takes into account the declining statewide average emissions of California's power mix as the state reaches future SB 100 renewable and zero-carbon electricity goals. Using this approach, the total indirect GHG emissions associated with round-trip efficiency losses would be 534,193 metric tons of CO2e over the project's useful life of 30 years, if the BESS were charged exclusively from the electric grid. This would equate to an average of 17,806 metric tons of CO2e per year and the resulting Project emissions would be a net avoidance/reduction of CO2e emissions annually as discussed in Data Response REV 1 DR GHG-6 and shown in Section 6.5, Greenhouse Gas Emissions, of the Air Quality Technical Report.

Because offtake contracts have not yet been executed, the ultimate configuration and ratio of solar and battery storage components of the Project has not been finalized. However, this is a conservative estimate as the BESS would generally be charged with solar generation. The Air Quality Technical Report has been updated to include the BESS efficiency discussion.

Adding storage capacity to the California Independent System Operator (CAISO) system enables the storing of energy when it is produced and subsequently discharging that energy when it is most needed, benefiting CAISO, ratepayers, utilities, and independent power producers. With the aggressive California state renewable energy and zero-carbon electric supply targets accelerating the renewable generator buildout, the energy on the grid is becoming increasingly green. Moreover, the lowest priced energy often occurs in the middle of the day, when solar facilities across the state are simultaneously operating at full capacity, which results in the optimal time to charge batteries with an increasingly higher percentage of green energy. Furthermore, enabling grid charging also allows the batteries to provide critical reliability enhancing ancillary services to the grid, such as frequency regulation and spinning reserves.

2.4.6 REV 1 DR GHG-6

Please conduct an updated analysis of the amount of GHG emissions that would be avoided by the proposed project, taking into account the declining statewide average emissions of California's power mix as the state reaches future SB 100 renewable and zero-carbon electricity goals.

Response: This analysis assumed that the renewable electricity generated by the Project would displace the electricity generated by fossil fuels to meet energy demand. As presented in the Air Quality Technical Report, operation of the project would avoid 256,681 metric tons (MT) of CO2e per year. Consistent with California's carbon neutrality by 2045 goal, the project will no longer result in avoided GHG emissions after 2045 within the State of California when the statewide electricity generation is carbon neutral. Assuming project operation commence in 2028, the project would avoid a total of 4,363,577 metric tons of CO2e GHG emissions over the 17-year period from 2028 through 2044 (256,681 MT CO2e per year × 17 years = 4,363,577 MT CO2e). The total avoided GHG emissions was then averaged over the project's 30-year useful life to derive an average annual avoided GHG emissions of approximately 145,453 MT CO2e per year.

The Air Quality Technical Report has been updated to incorporate the updated calculations. The detailed calculations are provided in Appendix A of the Air Quality Technical Report. It should be noted; however, that for the California grid to reach the GHG emission goals in 2045 and retain those goals for the life of the Project, renewable energy would need to remain on line.

2.5 Hazardous Materials Handling

2.5.1 REV1 DR HAZ-1

Table 4 in Data Response Set #1 lists sulfuric acid for battery cells and Table 5 lists 620 gallons of sulfuric acid. Please clarify if this is leftover from previous battery chemistries (such as lead-acid batteries) and confirm whether it can be removed.

Table 5 measures sulfur hexafluoride in gallons. Sulfur hexafluoride is not typically measured in gallons, as it is a gas and is typically not stored in a liquid state. Please revise this entry accordingly.

Response: Lead-acid batteries will not be used within the project as the Project anticipates the use of one of the following commercially available battery technology: lithium ion, LFP (lithium iron phosphate), NMC (nickel manganese cobalt), or NCA (nickel cobalt aluminum) batteries. The presence of sulfuric acid in Table 4 and Table 5 are from previous battery chemistries and are removed, as shown below.

The measurement for sulfur hexafluoride has been updated in Table 5 to liters, to reflect its storage in a gaseous state.

Table 4 Use and Location of Hazardous Materials

Chemical Name	Use/Purpose	Quantity	Storage Location	State	Type of Storage Container	Project Phase
Cleaning chemicals/ detergents	Cleaning	Not available (NA)	O&M Building	Liquid	Cans, buckets	Construction and/or O&M
Paint	Construction and O&M	NA	O&M Building	Liquid	Cans, buckets	Construction and/or O&M
Diesel (if needed for vehicle refueling)	O&M	400 gallons	Above ground storage tank (AST) ~~for backup generator~~	Liquid	AST	O&M
Propane	Construction and O&M	1,600 gallons	O&M Building	Gas	Pressurized tank	Construction
Adhesives	Construction and O&M	NA	O&M Building	Liquid, Solid	Bottles	Construction and/or O&M
Sealants	Construction and O&M	NA	O&M Building	Liquid	Bottles	Construction and/or O&M
Hydraulic fluids/GSU	O&M	480,000 gallons	Transformers	Liquid	Cans, ASTs	O&M
Hydraulic fluids/MVT	O&M	575,000 gallons	Transformers	Liquid	Cans, ASTs	O&M
Sulfur hexafluoride	O&M	~~620 gallons~~ 2377 liters	High voltage breakers	Gas	Cylinders	O&M
~~Sulfuric acid~~	~~O&M~~	~~690 gallons~~	~~Battery cells~~	~~Liquid~~	~~In cells~~	~~O&M~~
Ethylene glycol solution	O&M - BESS	NA	BESS	Liquid	NA	O&M
1,1,1,2-tetrafluororethane	O&M - BESS	NA	BESS	Gas	Cylinders	O&M
Gasoline	Fueling equipment	1,800 gallons	Flammables storage locker outside O&M Building	Liquid	Cans	Construction
Coolant	Construction and O&M	50 gallons	NA	Liquid	Cans	Construction and/or O&M
Lithium-ion batteries (lithium ion, lithium iron phosphate)	Construction and O&M	7,349 - 14,757 tons	Energy storage	Solid	NA	Construction and/or O&M

Table 5 Chemical Inventory, Description of Hazardous Materials On-site, and Reportable Quantities

Trade name	Chemical name	CAS no.	Maximum quantity on site	CERCLA SARA RQ [1]	RQ of material as used on site [2]	HS TPQ [3]	Regulated substance TQ [4]	Prop 65 [5]
Cleaning chemicals/ detergents	Various	Various	Not available (NA)	nil	nil	nil	nil	No
Paint	Various	Various	NA	nil	nil	nil	nil	No
Diesel (if needed for vehicle refueling)	Diesel	68476-34-6	2,000 gallons	nil	nil	nil	nil	No
Propane	Propane	74-98-6	1,600 gallons	nil	nil	nil	nil	No
Adhesives	Various	Various	NA	nil	nil	nil	nil	No
Sealants	Various	Various	NA	nil	nil	nil	nil	No
Hydraulic fluid (FR3 natural ester fluid)	FR3	None	427,380 gallons	42 gallons [e]	42 gallons [e]	nil	nil	No
Sulfur hexafluoride (SF6)	Sulfur hexafluoride	2551-62-4	~~620 gallons~~ 19,000 lbs	nil	nil	nil	nil	No
~~Electrolyte~~	~~Sulfuric acid~~	~~7664-93-9~~	~~690 gallons~~	~~1,000 lbs.~~	~~3,333 lbs.~~	~~1,000 lbs.~~	~~1,000 lbs.~~	~~Yes~~
Ethylene glycol solution	Ethylene glycol solution	107-21-1	NA	nil	nil	nil	nil	Yes
1,1,1,2-tetrafluororethane	1,1,1,2-tetrafluororethane	811-97-2	NA	nil	nil	nil	nil	No
Gasoline	Gasoline	8006-61-9; 86290-85-1	50 gallons	nil	nil	nil	nil	No
Coolant	Various	Various	50 gallons	nil	nil	nil	nil	No
Lubricants	Oil	None	NA	42 gallons [e]	42 gallons [e]	nil	nil	No

Lithium batteries (lithium ion, lithium iron phosphate)	Lithium-ion batteries	Various	14,757 tons	nil	nil	nil	nil	No

Notes:

nil = No reporting requirements. The chemical has no listed threshold under this requirement.

CAS: Chemical Abstract Service

CCR: California Code of Regulations

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

CFR: Code of Federal Regulations

EHS: extremely hazardous substances lbs.

Prop 65: Proposition 65 RQ (reportable quantity)

SARA: Superfund Amendments and Reauthorization Act

TPQ (threshold planning quantity)

TQ: threshold quantity

[a] RQs are for a pure chemical, per CERCLA SARA (ref. 40 CFR section 302, Table 302.4). Releases equal to or greater than the RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment and human health or safety must be reported.

[b] RQ for materials as used on site. Since some of the hazardous materials are mixtures that only contain a percentage of an RQ, the RQ of the mixture can be different than for a pure chemical. For example, if a substance only contains 10 percent of a reportable chemical and the RQ is 100 pounds, the RQ for that material will be (100 pounds)/(10%) = 1,000 pounds.

[c] EHS TPQ (ref. 40 CFR part 355, Appendix A). If quantities of EHS materials equal to or greater than the TPQ are handled or stored on site, they must be registered with the local Administering Agency (i.e., Fresno County Environmental Health – CUPA/Hazardous Materials Handling Program).

[d] TQ is from Title 19 CCR section 2770.5 (state) or Title 40 CFR section 68.130 (federal).

[e] State RQ for oil spills that will reach California state waters [CA Water Code section 13272(f)].

2.5.2 REV1 DR HAZ-2

The data request response to DR HAZ-3 in Data Request Set #1 introduced changes to the project description including the deletion of certain lithium-ion battery chemistries. To maintain consistency with the updated project description, please remove the following lithium-ion battery chemistries from Table 5: lithium nickel manganese cobalt and lithium nickel cobalt aluminum.

Response: Lithium nickel manganese cobalt and lithium nickel cobalt aluminum have been removed from both Table 4 and Table 5, in response.

Table 1 Use and Location of Hazardous Materials

Chemical Name	Use/Purpose	Quantity	Storage Location	State	Type of Storage Container	Project Phase
Cleaning chemicals/ detergents	Cleaning	Not available (NA)	O&M Building	Liquid	Cans, buckets	Construction and/or O&M
Paint	Construction and O&M	NA	O&M Building	Liquid	Cans, buckets	Construction and/or O&M
Diesel (if needed for vehicle refueling)	O&M	400 gallons	Above ground storage tank (AST) ~~for backup generator~~	Liquid	AST	O&M
Propane	Construction and O&M	1,600 gallons	O&M Building	Gas	Pressurized tank	Construction
Adhesives	Construction and O&M	NA	O&M Building	Liquid, Solid	Bottles	Construction and/or O&M
Sealants	Construction and O&M	NA	O&M Building	Liquid	Bottles	Construction and/or O&M
Hydraulic fluids/GSU	O&M	480,000 gallons	Transformers	Liquid	Cans, ASTs	O&M
Hydraulic fluids/MVT	O&M	575,000 gallons	Transformers	Liquid	Cans, ASTs	O&M
Sulfur hexafluoride	O&M	~~620 gallons~~ 2377 liters	High voltage breakers	Gas	Cylinders	O&M
~~Sulfuric acid~~	~~O&M~~	~~690 gallons~~	~~Battery cells~~	~~Liquid~~	~~In cells~~	~~O&M~~
Ethylene glycol solution	O&M - BESS	NA	BESS	Liquid	NA	O&M
1,1,1,2-tetrafluororethane	O&M - BESS	NA	BESS	Gas	Cylinders	O&M
Gasoline	Fueling equipment	1,800 gallons	Flammables storage locker outside O&M Building	Liquid	Cans	Construction
Coolant	Construction and O&M	50 gallons	NA	Liquid	Cans	Construction and/or O&M

Chemical Name	Use/Purpose	Quantity	Storage Location	State	Type of Storage Container	Project Phase
Lithium-ion batteries (lithium ion, lithium iron phosphate~~, lithium nickel manganese cobalt, or lithium nickel cobalt aluminum~~)	Construction and O&M	7,349 - 14,757 tons	Energy storage	Solid	NA	Construction and/or O&M

Table 2 Chemical Inventory, Description of Hazardous Materials On-site, and Reportable Quantities

Trade name	Chemical name	CAS no.	Maximum quantity on site	CERCLA SARA RQ [1]	RQ of material as used on site [2]	HS TPQ [3]	Regulated substance TQ [4]	Prop 65 [5]
Cleaning chemicals/ detergents	Various	Various	Not available (NA)	nil	nil	nil	nil	No
Paint	Various	Various	NA	nil	nil	nil	nil	No
Diesel (if needed for vehicle refueling)	Diesel	68476-34-6	2,000 gallons	nil	nil	nil	nil	No
Propane	Propane	74-98-6	1,600 gallons	nil	nil	nil	nil	No
Adhesives	Various	Various	NA	nil	nil	nil	nil	No
Sealants	Various	Various	NA	nil	nil	nil	nil	No
Hydraulic fluid (FR3 natural ester fluid)	FR3	None	427,380 gallons	42 gallons [e]	42 gallons [e]	nil	nil	No
Sulfur hexafluoride (SF6)	Sulfur hexafluoride	2551-62-4	~~620 gallons~~ 2377 liters	nil	nil	nil	nil	No
~~Electrolyte~~	~~Sulfuric acid~~	~~7664-93-9~~	~~690 gallons~~	~~1,000 lbs.~~	~~3,333 lbs.~~	~~1,000 lbs.~~	~~1,000 lbs.~~	~~Yes~~
Ethylene glycol solution	Ethylene glycol solution	107-21-1	NA	nil	nil	nil	nil	Yes

Trade name	Chemical name	CAS no.	Maximum quantity on site	CERCLA SARA RQ [1]	RQ of material as used on site [2]	HS TPQ [3]	Regulated substance TQ [4]	Prop 65 [5]
1,1,1,2-tetrafluororethane	1,1,1,2-tetrafluororethane	811-97-2	NA	nil	nil	nil	nil	No
Gasoline	Gasoline	8006-61-9; 86290-85-1	50 gallons	nil	nil	nil	nil	No
Coolant	Various	Various	50 gallons	nil	nil	nil	nil	No
Lubricants	Oil	None	NA	42 gallons [e]	42 gallons [e]	nil	nil	No
Lithium batteries (lithium ion, lithium iron phosphate~~, lithium nickel manganese cobalt, or lithium nickel cobalt aluminum~~)	Lithium-ion batteries	Various	14,757 tons	nil	nil	nil	nil	No

Notes:

nil = No reporting requirements. The chemical has no listed threshold under this requirement.

CAS: Chemical Abstract Service

CCR: California Code of Regulations

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

CFR: Code of Federal Regulations

EHS: extremely hazardous substances lbs.

Prop 65: Proposition 65 RQ (reportable quantity)

SARA: Superfund Amendments and Reauthorization Act

TPQ (threshold planning quantity)

TQ: threshold quantity

[f] RQs are for a pure chemical, per CERCLA SARA (ref. 40 CFR section 302, Table 302.4). Releases equal to or greater than the RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment and human health or safety must be reported.

[g] RQ for materials as used on site. Since some of the hazardous materials are mixtures that only contain a percentage of an RQ, the RQ of the mixture can be different than for a pure chemical. For example, if a substance only contains 10 percent of a reportable chemical and the RQ is 100 pounds, the RQ for that material will be (100 pounds)/(10%) = 1,000 pounds.

[h] EHS TPQ (ref. 40 CFR part 355, Appendix A). If quantities of EHS materials equal to or greater than the TPQ are handled or stored on site, they must be registered with the local Administering Agency (i.e., Fresno County Environmental Health – CUPA/Hazardous Materials Handling Program).

[i] TQ is from Title 19 CCR section 2770.5 (state) or Title 40 CFR section 68.130 (federal).

[j] State RQ for oil spills that will reach California state waters [CA Water Code section 13272(f)].

2.6 Land Use

2.6.1 REV 1 DR LAND-1

Provide the proposed parcel merger, parcel map, and other proposed mapping that will accompany applicable applications that will be submitted to Imperial County to merge lots or otherwise adjust interior lot lines to facilitate project development. Although the merger need not occur prior to a decision, provide a map of the proposed method and timetable for merging and combining parcels.

Response: IP Perkins does not intend to merge any lots or otherwise adjust interior lot lines at this time. .

2.7 Public Health

2.7.1 REV 1 DR PH-1

Please provide a refined HRA of the project during construction and operation to demonstrate that the project impacts to sensitive receptors and off-site worker receptors would be less than significant. The Health Risk Assessment should show risks of cancer, non-cancer chronic exposure, and non-cancer acute exposure. Please provide a listing of the input data and output results, in both electronic and print formats, used to prepare the refined HRA. Please also provide the locations (UTMs or latitude and longitude) of these receptors.

Response: Baseline has revised the AERSCREEN modeling using onsite construction and operation emissions obtained from the updated Air Quality & GHG Report prepared by IP Perkins dated December 2024, see Attachment A. The updated annual $PM_{2.5}$ impacts from pollutant concentrations would be 0.08 $\mu g/m^3$ during construction and <0.0001 $\mu g/m^3$ during operation, which are below the applicable EPA Significant Impact Levels. Because the updated $PM_{2.5}$ concentration at the nearest receptor will be below the EPA Significant Impact Levels, a health risk assessment for exposure to $PM_{2.5}$ will not be required.

2.7.2 REV 1 DR PH-2

Please provide a copy of the UL 9540A report, if a specific battery technology/manufacturer has been chosen, including measured emissions of criteria air pollutants, toxic air contaminants, greenhouse gases (GHG), and hazardous materials. Otherwise, please provide industry average

data or a literature review addressing the emissions and exhaust parameters requested in REV 1 DR PH-3 below.

Response: The UL 9540A Report is confidential. However, the data from the report was used to update the Supplemental Air Quality Analysis for Battery Energy Storage System Thermal Runaway Event, Perkins Renewable Energy Project, Imperial County, California, see Attachment A.

2.7.3 REV 1 DR PH-3

Please provide the exact locations (latitude and longitude or UTM coordinates) and dimensions of the BESS enclosures for modeling purposes. Please provide the following input parameters for a dispersion modeling analysis of all potential criteria air pollutants, greenhouse gases, and toxic air contaminants (TACs) that could be generated during combustion: emission rates (in grams/second), exhaust temperature, pressure, and exhaust gas velocity resulting from battery damage or thermal runaway of the whole project. Please include the calculation worksheet if available.

Response: See Attachment A, the Supplemental Air Quality Analysis for Battery Energy Storage System Thermal Runaway Event, Perkins Renewable Energy Project, Imperial County, California.

2.7.4 REV 1 DR PH-4

Please provide a dispersion modeling analysis of all potential criteria air pollutants and TACs for the thermal runaway scenario using a well- validated model (AERMOD preferred).

Response: See Attachment A, the Supplemental Air Quality Analysis for Battery Energy Storage System Thermal Runaway Event, Perkins Renewable Energy Project, Imperial County, California.

2.7.5 REV 1 DR PH-5

Please compare the modeled fire-related TACs concentrations to the Office of Environmental Health Hazard Assessment (OEHHA)/ California Air Resources Board (CARB) acute Reference Exposure Levels (RELs) and demonstrate whether the acute hazard Index (HI) of TACs would be higher than the significance threshold of 1 at sensitive receptors. If an OEHHA REL is not available, a level 1 U.S. EPA Acute Exposure Guideline Level (AEGL) shall be used as the threshold of significance. Please demonstrate whether the criteria air pollutant impacts would cause or contribute to any exceedance of ambient air quality standards. If exceedances occur, provide a detailed Emergency Response Plan and outline the applicable regulatory notification requirements.

Response: See Attachment A, the Supplemental Air Quality Analysis for Battery Energy Storage System Thermal Runaway Event, Perkins Renewable Energy Project, Imperial County, California.

2.8 Socioeconomics

2.8.1 REV 1 DR SOCIO-1

The California Code of Regulations (CCR), Title 20, Article 6, Appendix B, Information Requirements for an Application, identifies the need to identify a list of the applicable local agencies (including special districts) with taxing powers and their most recent and projected revenues (Appendix B (g) (7) (A) (i)). Please provide data to identify projected revenues to clarify whether the proposed project would have an effect on revenue for each agency including direct and indirect effects.

Response: The project would be located in unincorporated Imperial County. Imperial County has the ability to tax the project through their tax collector. The current tax revenues for Imperial County account for $45.2 million of the General Fund's $122.5 million in revenue budgeted for 2024. The total county budget for 2024 appropriates to $662.5 million.

The Project would result in an increase in tax revenue for Imperial County. In regard to specialty equipment imported to Imperial County, initial construction would generate $33.8 million for Imperial County in sales tax revenue over 2 years or an average of $16.9 million per year. This would be equivalent to 13.8 percent of the general fund. Replacement equipment imported over the lifetime of the Project would generate an estimated average of $50,752 per year for Imperial County.

Construction activity would generate an estimated $1.6 million of tax revenue for Imperial County over the two years of construction or about $800,000 per year for two years, including indirect and induced economic activity. Annually, Project operations would generate an estimated $110,000 in tax impact results for the County on an annual basis, including indirect and induced economic activity, see Appendix R Section 5.4.6 of the Opt-in Application.

2.8.2 REV 1 DR SOCIO-2

Appendix B requires the following data and analysis: an estimate of the total construction payroll and separate estimates of the total operation payroll for permanent and short-term (contract) operations employees; an estimate of the expenditures for locally purchased materials for the construction and operation phases of the project; an estimate of the capital cost (plant and equipment) of the project; an estimate of sales taxes generated during construction and separately during an operational year of the project; an estimate of property taxes generated during an operational year of the project; and the expected direct, indirect, and induced income and employment effects due to construction and operation of the project (Appendix B (g) (7) (B) (vii to xii)). Some data in the section remains redacted. In the event that CEC allows the applicant to exclude this data from public disclosure, the remaining redacted data must be described qualitatively. The remaining outstanding data or incomplete data associated with DR SOCIO-5 includes the following:

- Subsection 4.2, Table 4.10-23, which addresses expenditures for purchased materials (locally or otherwise) remains in the text although all data are redacted, but a discussion of the redacted data is provided. Suggest deleting the table and amending the first paragraph of Section 4.10.2 to identify the four categories of construction expenses identified in the table.

Response: The first paragraph of Impact SC-4 in Section 4.10.2 has been revised to identify the four categories of construction expenses, as follows:

The total construction budget for the Project is [redacted] in 2023 dollars. ~~Table 4.10-23 displays the budgeted capital expenditures between four categories of construction expenses.~~ The Project Applicant anticipates a mixture of construction labor and equipment expenses, sourcing locally when available, and purchasing outside of the region for specialty items. These expenses for construction labor and equipment are associated with the following four categories: PV panels; BESS; the Project substation and gen-tie line; and BAAH switchyard and loop-in transmission lines. PV panels make up the largest expense of the four categories, costing a little over half of the construction budget.

- A discrepancy occurs in Section 4.10.1, Subsection "Employment, Income Economy" for Imperial County. The text states that "As of November 2023, there were 14,048 unemployed persons in Imperial County, representing an 18.7 percent unemployment rate (refer to Figure 4.10-8) (U.S. Bureau of Labor Statistics 2024). The datapoint 11/23 does not appear on the horizontal axis for Figure 4.10-8, and data for preceding years is indicated only for January and July of each year. Please revise to address the discrepancy.

Response: Figure 4.10-8 has been increased in size to expand the date ranges on the horizontal axis and included a data point for November 2023 (refer to Attachment C).

- Section 4.10.1, Subsection "Employment, Income, Economy" for Yuma County states that, "As of November 2023, there were 14,768 unemployed persons in Yuma County, representing a 14.1 percent unemployment rate compared to a national unemployment rate of 3.7 (refer to Figure 4.10-11) (U.S Bureau of Labor Statistics 2024). Datapoint 11/23 does not appear on the horizontal axis for Figure 4.10-11, and data for preceding years is indicated only for January and July of each year. Please revise to address the discrepancy.

Response: Figure 4.10-11 has been increased in size to expand the date ranges on the horizontal axis and to include a data point for November 2023 (refer to Attachment C).

2.8.3 REV 1 DR SOCIO-3

Appendix B requires tables that identify laws, regulations, ordinances, standards; adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project; and a discussion of the applicability of, and conformance with each. The table or matrix

shall explicitly reference pages in the application wherein conformance with each law or standard during both construction and operation of the facility is discussed (Appendix B (i) (1) (A)). Tables 4.10-39 and 4.10-40 do not cross reference conformance with each law. Please provide data or cross-references.

Response: Table 4.10-39, shown below, has been updated with reference to the applicable sections of the Opt-in Application. Table 4.10-40 does include reference to the appropriate sections and was therefore not updated, see table copied over below.

Table 2.8-1 State Laws, Ordinances, Regulations and Standards

LORS	Applicability	Compliance
Government Code Sections 65996–65997	Establishes that the levy of a fee for construction of an industrial facility be considered mitigating impacts on school facilities	School fees and impacts to government facilities, including schools, are discussed on page 4.10-29 and in Impact SC-3 (pages 4.10-48 through 4.10-58) of the Opt-in Application. The Project would consider nearby schools in the development stages of the Project.
Education Code § 17620	Allows a school district to levy a fee against any construction within the boundaries of the district for the purpose of funding construction of school facilities	The Project is within the boundaries of the Holtville Unified School District and would be required to pay a fee for the private parcels used by the Project, which is discussed on page 4.10-29 of the Opt-in Application. As discussed, Panorama coordinated with the Holtville Unified School district regarding conformance with Education Code § 17620. The fee amount would be coordinated with the Holtville Unified School District based on development area.
Gov. Code, § 65040.12, subd. (e)	Defines environmental justice and requires fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies	The Project considered EJ communities in the design of the Project and would consider EJ communities in the implementation of the Project. The impact analysis and mitigation methods are addressed in Impact SC-9 and include Safety and Emergency Preparedness Plans, and a Tribal Participation Plan for Monitoring during construction.

LORS	Applicability	Compliance
Title 14 California Code, Section 15131 (CEQA)	CEQA identifies several environmental factors that are addressed or referenced in this analysis, including Population/Housing, Utilities/Service Systems, Public Services, and Agriculture Resources.	These issues have been addressed throughout this Opt-In Application (see sections 4.00 through 4.17); the Project is not expected to result in any significant and unavoidable impacts in these areas.

Table 2.8-2 Local Laws, Ordinances, Regulations and Standards

LORS	Applicability	Compliance
Imperial County Voluntary Public Benefit Program	Establishes a voluntary program for solar projects in the County to address impacts to agricultural land and public services	Although the Project does not propose to enter into a public benefit agreement under the County's voluntary program, the Project is consistent with the purpose of this program. The Project would not impact agricultural land uses, as no portion of the Project site has historically been, or is currently, in use for agriculture. (See LU-4 and LU-5, Section 4.6). The Project also would not have a significant impact on the provision of public services. (See SC-3, SC-5, and SC-7, above). The Project provides significant benefits to the County through tax revenues and the community benefit agreements described in this section.

2.9 Traffic and Transportation

2.9.1 REV 1 DR TRANS-1

Please explain if internal site circulation could be engineered to require only two access points to SR 98.

Response: The project Proposal reflects up to five access points to provide options for construction access for different crews and to provide access during operations to both the site and the BAAH substation separately.

2.9.2 REV 1 DR TRANS-2

Please explain project coordination undertaken with CalTrans, in particular, are CalTrans aware of the new access points and have they expressed any concerns?

Response: IP is still coordinating with CalTrans regarding the access points at this time. IP Perkins will meet Caltrans requirements for all exits off SR 98.

2.10 Worker Safety

2.10.1 REV1 DR WS-3

Please provide the complete fire protection details including the size, number, and location of fire water tanks, volumes and flow rates, and location of water discharge nozzles plus BESS heat and/or flame sensors. Please also provide the anticipated date of the UL 9540A testing and submission of those results to the CEC for any battery proposed for use, and if the nearest fire authority has been contacted regarding the proposed fire protection plan. Also, as per SB-38, please provide an Emergency Response Plan as described in section g of that Act.

Response: The BESS yard will have thermal detection cameras installed externally on battery containers and will be strategically placed in optimal locations to detect fires. These cameras will be remotely monitored 24 hours a day. The battery systems would require air conditioners or heat exchangers and inverters. In addition, a water tank for emergency use is anticipated for each BESS unit/area. The size, final number, and location of water tanks for emergency use would be determined in accordance with the 2025 California Fire Code (2025 CFC)[3] during the final design process and the Applicant anticipated the CEC would likely require the design and number be reviewed by the local or State Fire Marshal.

The BESS would comply with the current CFC, which governs the code requirements to minimize the risk of fire and life safety hazards specific to BESS used for load shedding, load sharing, and other grid services (Chapter 12 Section 1206 of the 2025 CFC). Per Chapter 12 of the 2025 CFC, Standards required for BESS installations includes NFPA 855: Standard for the Installation of Stationary Energy Storage Systems, and UL 9540: Standard for Energy Storage Systems and Equipment. The anticipated date of the UL 9540A testing is not known at this time as it would depend on when the BESS is anticipated to be installed which is contingent on getting all permits. In accordance with the CFC, the battery enclosure and the site installation design would be reviewed by the local or State Fire Marshal and this coordination will occur closer to the installation date as the appropriate information would be available at that time to share with the local or State Fire Marshall. In accordance with SB 38, the Emergency Response Plan would be prepared prior to operations,. An early stage Security and Emergency Preparedness Plan was submitted with the original Opt-in Application as Appendix I.5.

[3] Office of the State Fire Marshal (OSFM) has established comprehensive regulations to ensure the safe installation and operation of BESS across the state. These regulations are designed to protect public safety, property, and the environment. The OSFM has recently adopted a suite of updated fire safety codes for BESS. Changes to Chapters 3, 12, and 80 of the 2025 CFC are intended to ensure battery facilities are constructed to the latest fire safety standards including the 2023 edition of the NFPA 855 standard.

2.10.2 REV1 DR WS-4

Please provide the estimated response times from the various fire departments' stations for fire, rescue, and hazmat. Staff requires these response times to evaluate impacts on worker safety and determine if on-site first-aid or advanced medical care is required. Please provide estimates of response times from each fire station that may respond for any EMS, fire, or hazmat emergency.

Response: As stated in the Opt-In Application, the closest fire station to the Project site is located approximately 22 miles northwest, at 2514 La Brucherie Road, in the city of Imperial. The response time from this fire station is approximately 36 minutes at normal driving speeds. In the event of an emergency, fire services would primarily be provided by BLM Fire and Imperial County Fire Department, but the El Centro Fire Department could provide assistance located at 775 W State St, El Centro, CA 92243, approximately 27 miles from the site. The response time from the El Centro fire station is approximately 30 minutes at normal driving speeds.

2.11 Transmission System Design (Data Request Submission 9/10/2025)

2.11.1 REV 1 DR TSD-1

Please describe what work would be done for this upgrade needed to interconnect the Perkins Renewable Energy Project to the electric grid. Staff needs to be able to list the work needed as part of the project description and have enough description of the work to be able to evaluate whether this work would result in impacts according to a California Environmental Quality Act analysis. This would include a discussion of how the work would be carried out. Also, staff needs a list and description of all the San Diego Gas and Electric standard Construction Measures that would be implemented, as stated in Table 3.

Table 3 DR TSD-3 Downstream Network Upgrades

Upgrade	Description	Project Cost Allocation	CEQA Analysis
GRNU			
Cost of interconnection	Engineering, Design, Land Management, Administration, Project Management	100%	Any work will occur within the fence line of the Imperial Valley Substation. SDG&E standard Construction Measures will be implemented to ensure impacts are less than significant.

Response: The specific row that the Data Request is about, does not include construction activities as it is pre-construction work. Table 3, DR TSD-3 Downstream Network Upgrades has been updated to clarify as follows.

Table 4 DR TSD-3 Downstream Network Upgrades

Upgrade	Description	Project Cost Allocation	CEQA Analysis
GRNU			
Cost of interconnection	Engineering, Design, Land Management, Administration, Project Management for upgrades to circuit breakers.	100%	This work does not involve disturbance as it is all pre-construction engineering, design, land management, and administration or project management for the remaining work. ~~Any work will occur within the fence line of the Imperial Valley Substation.~~ ~~SDG&E standard Construction Measures will be implemented to ensure impacts are less than significant.~~

2.12 Biological Resources Supplemental Revisions 1 Data Requests (Data Request Submission 12/11/25)

2.12.1 SUP REV 1 DR BIO-1

Please provide the most recent soil crust survey report for the project.

Response: The Soil Crust Survey and report will be provided in a separate submission to the CEC.

2.12.2 SUP REV 1 DR BIO 2

Please provide the most recent monarch butterfly memo for the project, including site evaluation, site specific milkweed and nectar mapping, avoidance and minimization measures, and any coordination with state and/or federal agencies to date.

Response: Please see Attachment B.6.

Attachment A Air Quality Supporting Data

Attachment A.1 Air Quality Technical Report (supersedes the Air Quality Technical Report included in Docket 257953)

AIR QUALITY TECHNICAL REPORT

8 APRIL 2026

PERKINS RENEWABLE ENERGY PROJECT
Imperial County, California

For:

Panorama Environmental, Inc.
San Francisco, California

21215-07

BASELINE
ENVIRONMENTAL CONSULTING

AIR QUALITY TECHNICAL REPORT

8 APRIL 2026

PERKINS RENEWABLE ENERGY PROJECT
Imperial County, California

For:
Panorama Environmental, Inc.
San Francisco, California

By:

BASELINE ENVIRONMENTAL CONSULTING

Prepared By: _____ **Date:** April 8,2026

Patrick Sutton

Principal Environmental Engineer

Prepared By: _____ **Date:** April 8,2026

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AIR QUALITY TECHNICAL REPORT

PERKINS RENEWABLE ENERGY PROJECT
Imperial County, California

1. INTRODUCTION

Baseline Environmental Consulting has prepared this Air Quality Technical Report for the Perkins Renewable Energy Project (Project) in Imperial County, California. The purpose of this technical report is to support environmental review of the Project under the California Environmental Quality Act (CEQA), as well as the California Energy Commission's (CEC) Opt-in application for certification (AFC) program for licensing power plants (20 CCR, Div. 2, Ch. 5 App. B). This report describes the methodology and results for evaluating potential air quality and greenhouse gas (GHG) impacts from implementation of the proposed Project.

1.1 Project Description

IP Perkins, LLC (Applicant) and IP Perkins BAAH, LLC, subsidiaries of Intersect Power, LLC, propose to construct, operate, maintain, and decommission a 1,150 megawatt (MW) solar photovoltaic (PV) facility and battery energy storage system (BESS) on public lands administered by the U.S. Bureau of Land Management (BLM) and Bureau of Reclamation, as well as private lands located approximately 16 miles southeast of El Centro in Imperial County, California (**Figure 1**).

A fenced area referred to as the "Project site" would contain the solar plant, BESS, Project interconnection generation tie (gen-tie) line, Project substation, and operations and maintenance (O&M) yard and facility. The Project site would be constructed, owned, and operated by IP Perkins, LLC. The Project would also include a high-voltage breaker-and-a-half switchyard (BAAH switchyard) and two 500 kilovolt (kV) loop-in transmission lines, each within a 200-foot-wide loop-in transmission corridor, that would be required to interconnect to the existing San Diego Gas and Electric (SDG&E) Southwest Power Link (SWPL) 500 kV transmission line that traverses east–west to the south of the Project site. The BAAH switchyard would be constructed by IP Perkins BAAH, LLC and owned and operated by SDG&E, in coordination with Imperial Irrigation District (IID). San Diego Gas and Electric (SDG&E) would construct the two 500 KV loop-in transmission lines, which SDG&E would own, in coordination with IID, upon completion of construction. Together the Project site, the BAAH switchyard, and the 500 kV loop-in transmission corridors are referred to as the "Project Application Area" in the AFC (**Figure 2**).

The Project Application Area is in Imperial County, approximately 37 miles southeast of the Salton Sea. Imperial County is located in southern California, in the southwestern portion of the Colorado Desert. The Project Application Area is located approximately 1.2 miles north of the

Figure 1. Regional Setting

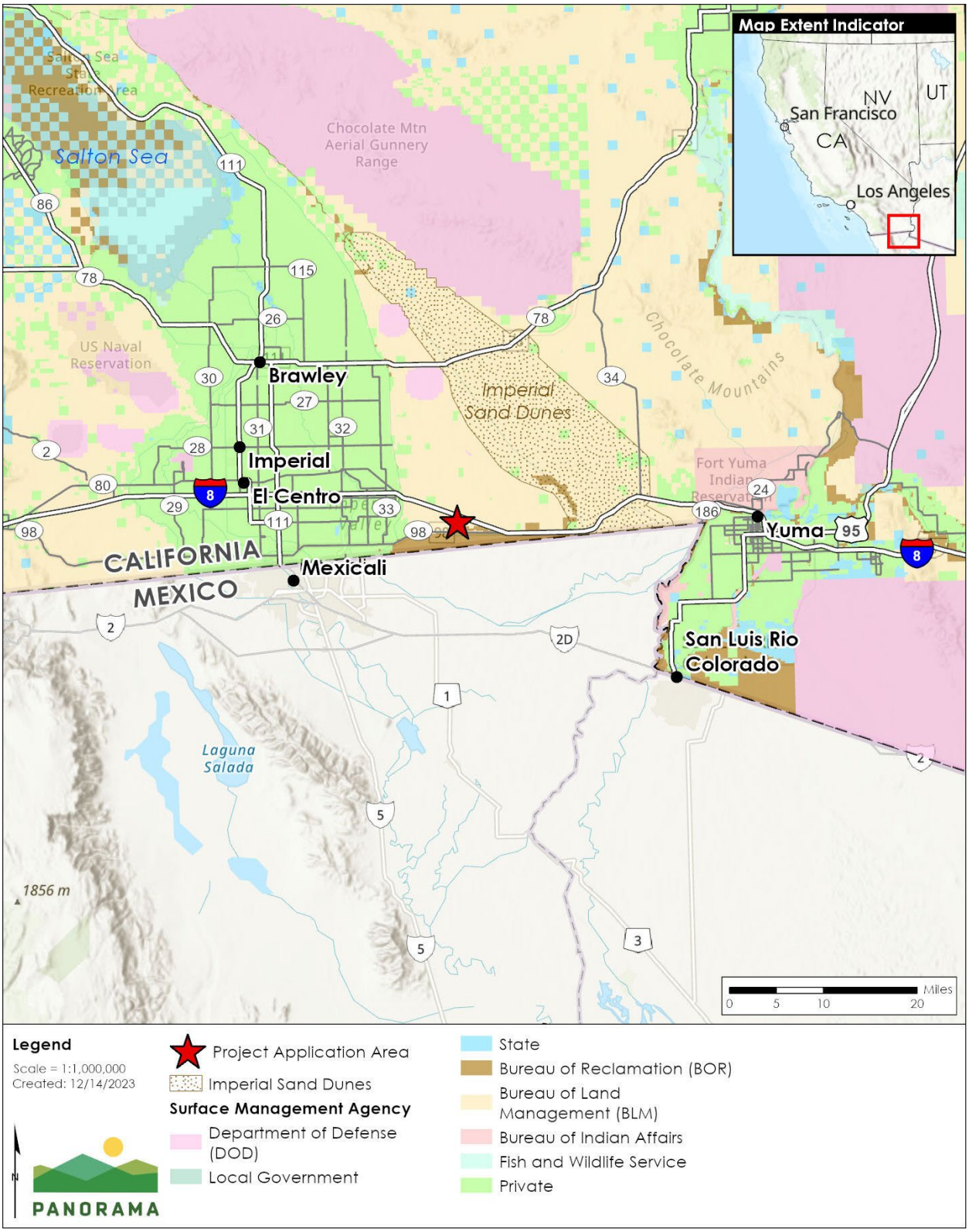
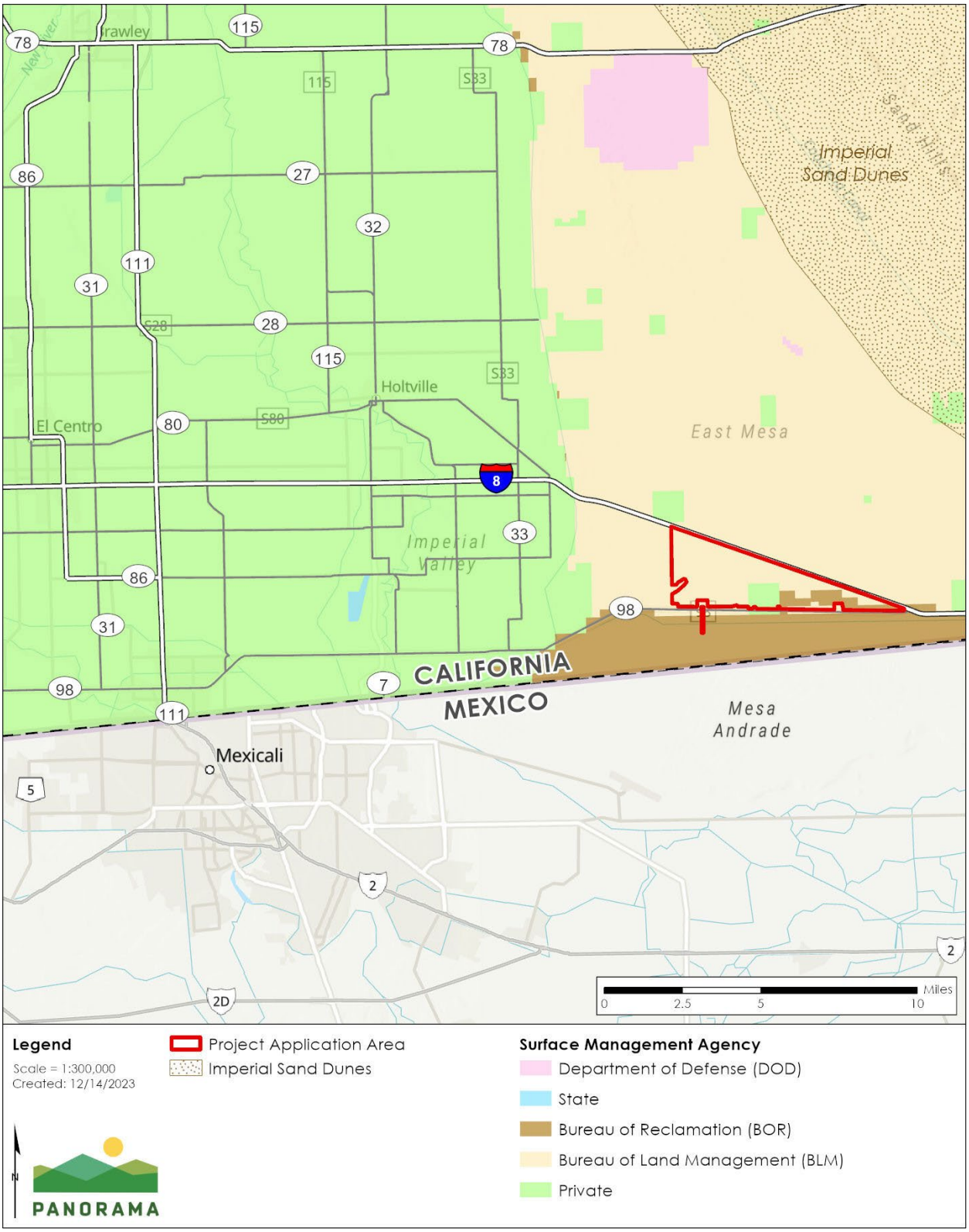


Figure 2. Project Vicinity



U.S.–Mexico border, in a region characterized by undeveloped desert and agricultural uses. The Imperial Valley, which is dominated by agricultural land, is located an estimated 2.5 miles west of the Project Application Area. The Imperial Sand Dunes, the largest mass of sand dunes in California, is located approximately 9 miles east of the Project Application Area.

1.1.1 Solar Facility Description

The Project site layout, including the solar PV facility, BESS, substation, and transmission facilities are shown in **Figure 3**. The solar facility includes the following components:

- Solar PV arrays
- Inverter-transformer stations and electrical collector lines
- BESS
- Operation and maintenance facilities
- Monitoring and telecommunication facilities
- Access roads
- Security fencing and lighting
- Septic system
- Emergency and auxiliary facilities

The Project also includes the Project substation, BAAH switchyard, and two 500 kV loop-in lines. **Table 1** lists the approximate acreages associated with each Project component for the Project site.

Table 1. Estimated Development Area for the Solar Site Permanent Components

Project Component	Approximate Acreage
Fenced solar PV facility with arrays, inverters, transformers, and internal access roads	5,985
BESS	35
Operation and maintenance yard and facility	10
Temporary parking and laydown areas	≤ 25

1.1.2 Solar Facility Construction

The majority of the Project site would be mowed rather than cleared of vegetation. Mass grading of the Project site would not be needed for site preparation due to the relatively flat terrain. Spot grading would be employed for select solar array and storage facility components, including the BESS, substation, BAAH foundations, and access road locations. All applicable best management practices (BMPs), Project Design Features, and Desert Renewable Energy Conservation Plan (DRECP) Conservation and Management Actions (CMAs) would be implemented during all grading, vegetation removal, and construction activities.

The BESS, operation and maintenance facility, and roads would require vegetation clearing, grading, and compaction. Inverter-transformer station locations would require light grubbing. Due to undulations within the Project site, some areas of grading would be needed within the solar arrays. Where solar site grading is necessary for discrete facilities or within the solar

arrays, cut and fill would be balanced to the extent feasible. Some import and export of material would be necessary (**Table 2**). Where excavation is required, most construction activities would be limited to less than 6 feet in depth within the Project Site; however, some excavations, such as those undertaken for the installation of loop-in transmission line structures, may reach depths of 45 feet or more.

Within the solar arrays that do not require grading, mowing and grubbing would be conducted to allow for construction access and installation. Mowing and grubbing involves surface removal of vegetation, including mechanical mowing and removal of larger vegetation by hand cutting/trimming to the ground surface. The intent is to leave root balls and seeds in place to allow for regrowth of native vegetation after construction. During mowing, collection of mowed vegetation would be considered for future mulching to minimize dust and soil erosion on portions of the site and enhance restoration. A qualified restoration biologist would determine where the collected mulching material should be applied.

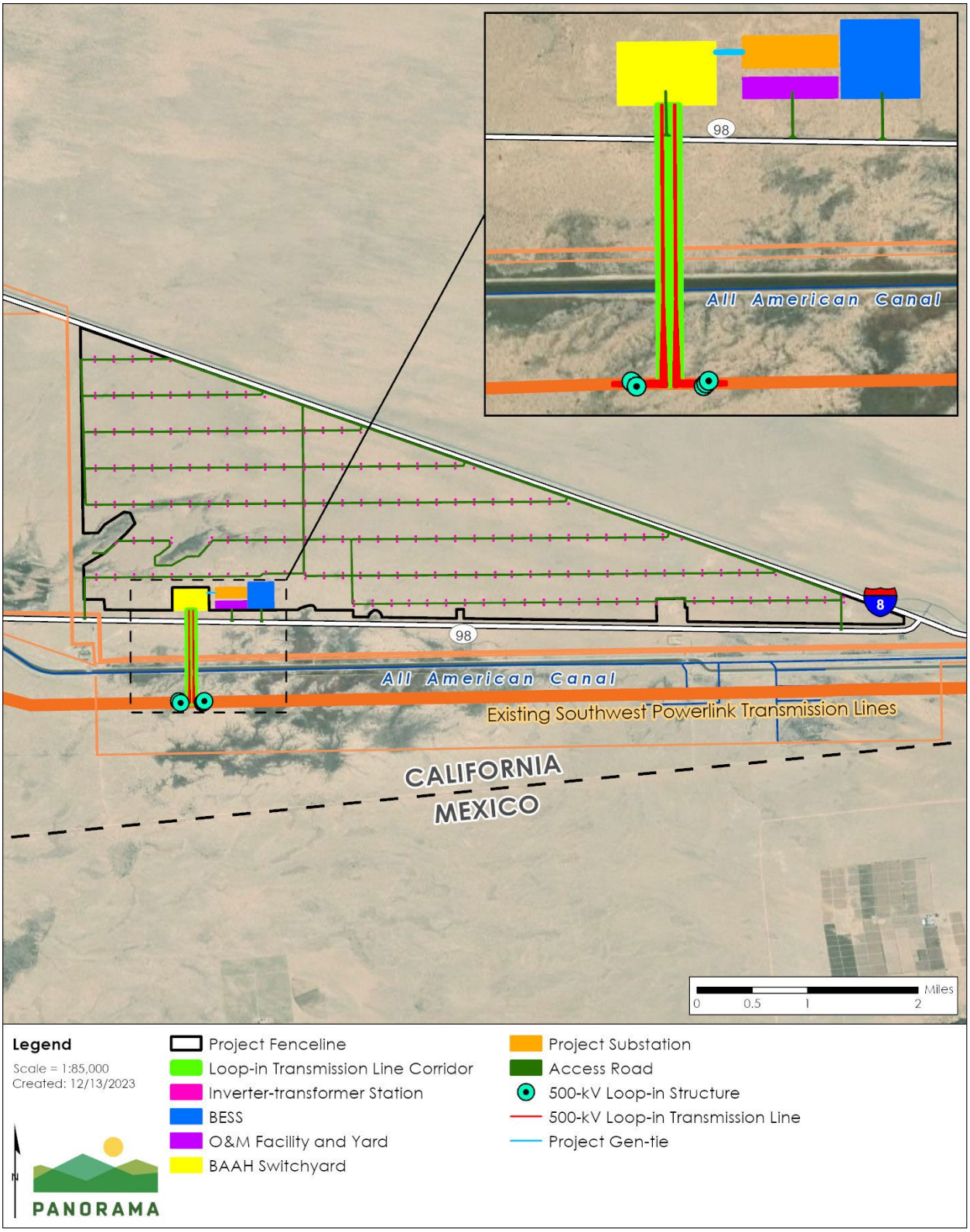
Non-native vegetation would be removed to the extent feasible during the construction phase via manual and mechanical methods and herbicide application. Any non-native species found in the Project Application Area that has not been evaluated for its potential to invade or alter surrounding natural lands would be considered a "weed" for purposes of the Restoration and Integrated Weed Management Plan implementation. Cutting, damaging, or uprooting microphyll woodland tree species would be avoided by Project design and BMPs, in accordance with the CMAs.

Table 2. Solar Facility Disturbance Details

Project Component	Cut/Fill Quantity	Type of Disturbance
Fenced solar facility with arrays and access roads	Balanced	Solar array areas to be mowed and grubbed to provide for construction access and installation
Inverter-transformer stations and electrical collection system	Balanced	Graded and backfilled to an elevation above surrounding grade to avoid flooding for inverter-transformer stations
BESS	54,466 cubic yards of import [a] material; excess soils from storm water basin excavations to also be used	Graded and backfilled to an elevation above surrounding grade to avoid flooding
Operation and maintenance yard and facility	Balanced	Operation and maintenance site to be graded and compacted
Temporary parking and laydown	Balanced	Temporary parking and laydown areas to be graded and compacted

Note:
[a] Estimated base for the areas requiring import of material is assumed to require a 12-inch depth.

Figure 3. Project Layout



Note: The project layout is approximate and may be subject to change.

1.1.3 Transmission System Description

The transmission system would include the following components:

- Substation(s)
- Project gen-tie lines
- BAAH switchyard
- 500 kV loop-in transmission lines

Table 3 lists the acreages associated with each Project component for the transmission system and lines. The area within the project substation and BAAH switchyard will be stabilized with gravel and Project facilities. The disturbance acreage for the gen-tie lines and loop-in transmission lines include temporary disturbance areas for construction.

Table 3. Estimated Surface Disturbance Area for the Transmission System Permanent Components

Proposed Component	Approximate acreage
Project substation	20
Project gen-tie lines	1
BAAH switchyard	40
500 kV loop-in transmission lines	≤ 35

1.1.4 Transmission Facility Construction

The transmission system components would require grading and excavation for installation and construction. Import of soil would be needed for several of the components, as detailed in **Table 4**.

Table 4. Transmission System Grading and Excavation Details

Project Component	Cut/Fill Quantity	Type of Disturbance
Project substation [b]	32,266 cubic yards of import [a] material; excess soils from storm water basin excavations to also be used	Graded and backfilled to an elevation above surrounding grade to avoid flooding
BAAH switchyard	88,732 cubic yards of import [a] material on BLM land; excess soils from storm water basin excavations to also be used;	Graded and backfilled to an elevation above surrounding grade to avoid flooding
500 kV loop-in transmission lines	Balanced	Excavation for structure installation; grading for access roads

Note:

[a] Estimated base for the areas requiring import of material is assumed to require a 12-inch depth.

[b] Additional import may be needed if a second substation is constructed.

2. ENVIRONMENTAL SETTING

2.1 Regional Climate, Meteorology, and Topography

The Project site is located in the southern part of the Salton Sea Area Air Basin (SSAB). Air basins have natural characteristics that limit the ability of natural processes to either dilute or transport air pollutants. The major determinants of air pollution transport and dilution are climatic and topographic factors such as wind, atmospheric stability, terrain that influence air movement, and sunshine. Wind and terrain can combine to transport pollutants away from upwind areas, while exposure to sunshine can chemically transform pollutants in the air to create secondary photochemical pollutants such as ozone.

The SSAB is comprised of Imperial County and a portion of Riverside County. As an arid desert region, the SSAB climate is largely governed by the large-scale sinking and warming of air within the semi-permanent subtropical high-pressure center over the Pacific Ocean. When the fringes of mid-latitude storms pass through the Imperial Valley in winter, the coastal mountains create a strong “rain shadow” effect that makes Imperial Valley the second driest location in the U.S.

Imperial County experiences average temperatures as high as about 106 degrees (°) Fahrenheit in the summer and as low as 40° Fahrenheit in the winter. The annual precipitation in this region is 2.9 inches, which mostly occurs during the months of December to March (U.S. Climate Data, 2024). Due to temperature inversions and light nighttime winds, local air pollution emissions can become trapped near the ground. The area is subject to frequent hazy conditions at sunrise, followed by rapid daytime dissipation as winds pick up and the temperature warms. During periods of strong solar heating and intense convection, turbulent motion creates good mixing and low levels of air pollution. Imperial County experiences surface inversions almost every day of the year. These inversions often last for long periods of time, which allows for air stagnation and buildup of pollutants, including ozone.

Winds in the area are driven by a complex pattern of local, regional, and global forces, but primarily reflect the temperature difference between the cool ocean to the west and the heated interior of the entire desert southwest. For much of the year, winds flow predominantly from the west to the east. In summer, intense solar heating in the Imperial Valley creates a more localized wind pattern, as air comes up from the southeast via the Gulf of California.

2.2 Air Pollutants of Concern

The California Air Resources Board (CARB) and United States (U.S.) Environmental Protection Agency (EPA) focus on the following air pollutants as regional indicators of ambient air quality:

- Ozone (O_3)
- Coarse particulate matter (PM_{10})
- Fine particulate matter ($PM_{2.5}$)
- Nitrogen dioxide (NO_2)
- Carbon monoxide (CO)

- Sulfur dioxide ($S0_2$)
- Lead

Because these are the most prevalent air pollutants known to be harmful to human health based on extensive criteria documents, they are referred to as "criteria air pollutants." In Imperial County, the primary criteria air pollutants of concern are ground-level ozone, which is formed through reactions of oxides of nitrogen (NOx) and reactive organic gases (ROG), PM_{10}, and $PM_{2.5}$. These regional air pollutants can be formed and/or transported over long distances and affect ambient air quality far from the emissions source. Imperial County is predominately agricultural land, which is a major factor in the regional ambient air quality levels. Agricultural production generates fugitive PM_{10} emissions (i.e., dust) from the use of agricultural equipment on unpaved roads, land preparation, and harvest practices. As a result, Imperial County experiences unhealthful air quality from the formation of ground-level ozone, including photochemical smog, and fugitive PM_{10} because of the agricultural activities and very arid climate. The magnitude and location of specific health effects from exposure to increased ozone and PM_{10} concentrations are the result of emissions generated throughout Imperial County, as opposed to a single project.

The Imperial County Air Pollution Control District (ICAPCD) and other air districts use regional air dispersion models to correlate the cumulative emissions of regional pollutants to potential community health effects. However, these dispersion models have limited sensitivity to the relatively small (or negligible) changes in criteria air pollutant concentrations associated with an individual project. Therefore, it is not feasible to provide reliable estimates of specific health risks associated with regional air pollutant emissions from an individual project.

The ICAPCD operates a network of air monitoring stations throughout Imperial County to monitor ambient levels of criteria pollutants such as ozone, PM_{10}, and $PM_{2.5}$. **Table 5** presents a five-year summary for the period from 2018 to 2022 of the highest annual concentrations of ozone, PM_{10}, and $PM_{2.5}$ measured at the two nearest monitoring stations:

- Calexico-Ethel Street located about 16 miles southwest of the Project site; and
- El Centro-9th Street located about 20 miles northwest of the Project site.

The Brawley station is the third closest monitoring station to the Project site, but the station has been closed since 2009. The fourth closest station, Westmorland, is about 35 miles northwest of the Project site and is not considered representative of the Project site conditions due to its distance and location near the Salton Sea.

Table 5 compares the measured pollutant concentrations at the nearby monitoring stations with applicable State and federal ambient air quality standards, which are discussed further under Regulatory Framework, below. As shown in **Table 5**, the ozone concentrations are relatively similar at both monitoring stations; however, the PM_{10} and $PM_{2.5}$ concentrations are substantially higher at the Calexico Station than the El Centro Station. This is because the city of Calexico shares a border with the densely populated city of Mexicali, Mexico, whose

metropolitan area has more than five times the population of Imperial County. Both the Project site and the El Centro station are located about 10 miles away from the city of Mexicali; therefore, the ambient criteria air pollutant data collected at the El Centro station are likely the most representative of the Project site conditions.

Table 5. Regional Air Quality Trends

Pollutant	Standard	2018	2019	2020	2021	2022
Calexico-Ethel Street Station						
Ozone	Max 1-hour Concentration (ppm)	0.103	0.106	0.107	0.122	0.097
	Days > CAAQS (0.09 ppm)	2	4	6	4	1
	Max 8-hour Concentration (ppm)	0.084	0.089	0.087	0.090	0.083
	Days > CAAQS (0.070 ppm)	10	18	19	14	7
	Days > NAAQS (0.070 ppm)	9	17	16	13	6
Coarse Particulate Matter (PM_{10})	Max 24-hour Concentration (µg/m^3)	419.0	146.1	194.5	301.1	184.8
	Days > CAAQS (50 µg/m^3)	*	112.0	166.3	150.7	163.9
	Days > NAAQS (150 µg/m^3)	9.3	0.0	4.0	3.0	2.0
	Annual Arithmetic Mean (µg/m^3)	61.6	44.5	54.4	52.5	54.0
Fine Particulate Matter ($PM_{2.5}$)	Max 24-hour Concentration (µg/m^3)	90.6	53.1	46.1	60.8	41.9
	Days > NAAQS (35 µg/m^3)	*	1.1	5.4	2.1	5.1
	Annual Arithmetic Mean (µg/m^3)	*	10.7	12.0	10.3	11.0
El Centro – 9th Street Station						
Ozone	Max 1-hour Concentration (ppm)	0.102	0.080	0.097	0.096	0.113
	Days > CAAQS (0.09 ppm)	2	0	1	1	2
	Max 8-hour Concentration (ppm)	0.090	0.071	0.077	0.084	0.079
	Days > CAAQS (0.070 ppm)	15	1	2	7	10
	Days > NAAQS (0.070 ppm)	14	1	2	6	10
Coarse Particulate Matter (PM_{10})	Max 24-hour Concentration (µg/m^3)	256.3	130.0	197.7	194.5	554.6
	Days > CAAQS (50 µg/m^3)	113	53.7	92.0	88.6	99.3
	Days > NAAQS (150 µg/m^3)	5.1	0.0	2.0	1.0	2.1
	Annual Arithmetic Mean (µg/m^3)	47.3	35.6	41.5	41.8	45.5
Fine Particulate Matter ($PM_{2.5}$)	Max 24-hour Concentration (µg/m^3)	22.4	21.4	28.5	19.1	30.3
	Days > NAAQS (35 µg/m^3)	0.0	0.0	0.0	0.0	0.0
	Annual Arithmetic Mean (µg/m^3)	8.7	7.9	9.8	8.4	8.9

Notes: CAAQS = California ambient air quality standards; µg/m^3 = micrograms per cubic meter; NAAQS = National ambient air quality standards; ppm = parts per million; * = insufficient data available to determine the value. State statistics are based on California-approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers. When the measured state and national concentrations varied due to different sample methods, the highest concentration was reported in the summary table.
Source: California Air Resources Board (CARB) 2024.

Localized air pollutants generally dissipate with distance from the emission source and can pose a health risk to nearby populations. Toxic air contaminants (TACs), such as diesel particulate matter (DPM), are considered localized pollutants. CO is also considered a localized air pollutant. Air dispersion models can be used to reliably quantify the health risks to nearby

receptors associated with emissions of localized air pollutants from an individual project. The primary air pollutants of concern in Imperial County and their associated health risks are discussed further below.

2.2.1 Ozone

While ozone serves a beneficial purpose in the upper atmosphere (stratosphere) by reducing ultraviolet radiation, it can be harmful to the human respiratory system and to sensitive species of plants when it reaches elevated concentrations in the lower atmosphere. Ozone is not emitted directly into the environment but is formed in the atmosphere by chemical reactions between ROG and NOx in the presence of sunlight. Ozone formation is greatest during periods of little or no wind, bright sunshine, and high temperatures. As a result, levels of ozone usually build up during the day and peak in the afternoon.

Sources of ROG and NOx are vehicle tailpipe emissions; evaporation of solvents, paints, and fuels; and biogenic emissions. Short-term ozone exposure can reduce lung function in children, facilitate respiratory infections, and produce symptoms of respiratory distress. Long-term exposure can impair lung defense mechanisms and lead to emphysema and chronic bronchitis. Ozone can also damage plants and trees and materials such as rubber and fabrics.

2.2.2 Particulate Matter

PM_{10} and $PM_{2.5}$ consist of extremely small, suspended particles or droplets that are 10 microns and 2.5 microns or smaller in diameter, respectively. Some sources of particulate, such as pollen, forest fires, and windblown dust matter, are naturally occurring. In populated areas, however, most particulate matter is caused by road dust, combustion by-products, abrasion of tires and brakes, and construction activities. Particulate matter can also be formed in the atmosphere by condensation of SO_2 and ROG.

Exposure to particulate matter can affect breathing, aggravate existing respiratory and cardiovascular disease, alter the body's defense systems against foreign materials, and damage lung tissue, contributing to cancer and premature death. Individuals with chronic obstructive pulmonary or cardiovascular disease, asthmatics, the elderly, and children are most sensitive to the effects of particulate matter.

2.2.3 Carbon Monoxide (CO)

CO is an odorless and colorless gas formed by the incomplete combustion of fuels. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease or anemia, as well as fetuses. Even healthy people exposed to high CO concentrations can experience headaches, dizziness, fatigue, unconsciousness, and even death.

2.2.4 Toxic Air Contaminants (TACs)

TACs include a diverse group of air pollutants that can adversely affect human health. Unlike criteria air pollutants, which generally affect regional air quality, TAC emissions are evaluated based on estimations of localized concentrations and risk assessments. The adverse health effects a person may experience following exposure to any chemical depend on several factors, including the amount (dose), duration, chemical form, and any simultaneous exposure to other chemicals.

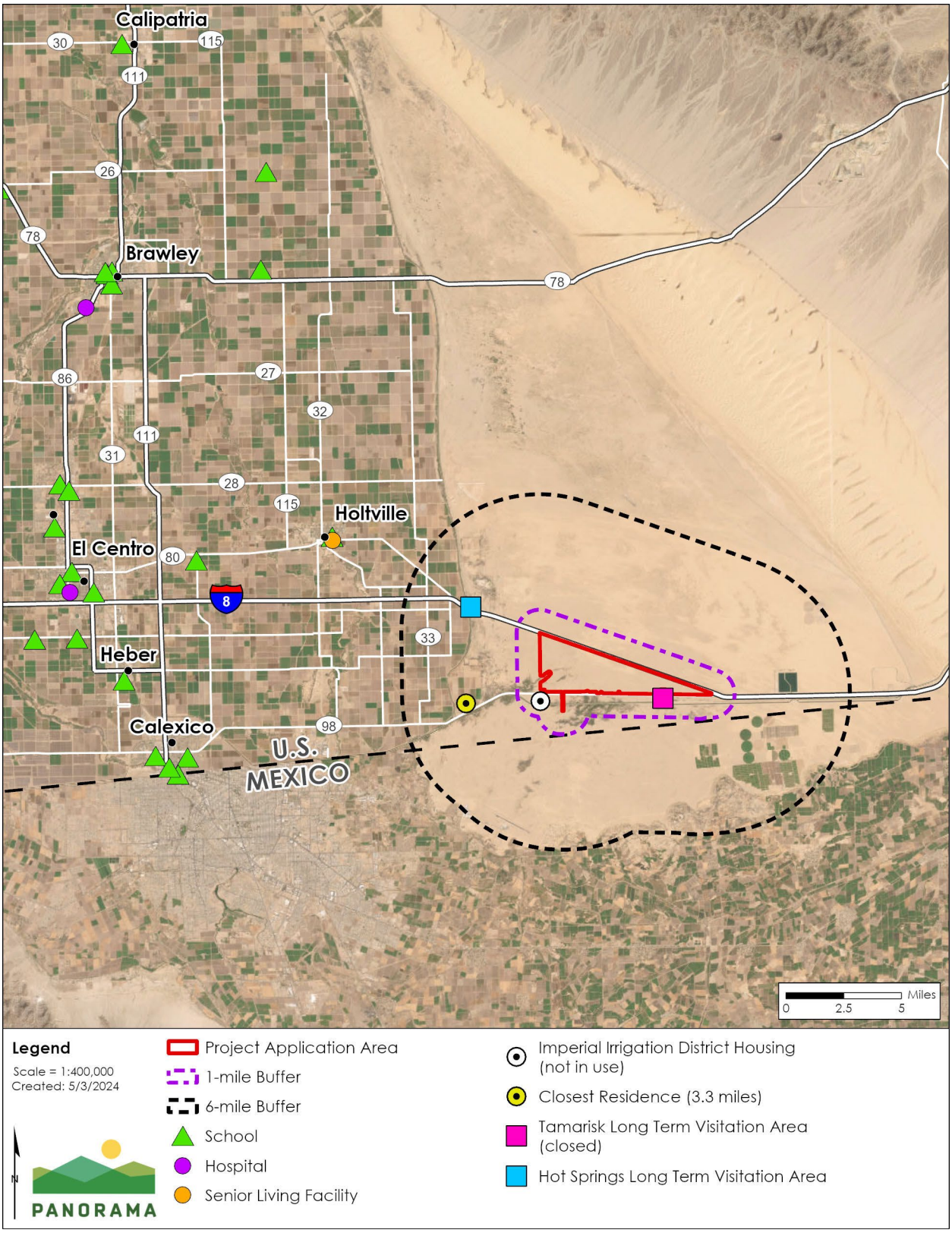
For risk assessment purposes, TACs are separated into carcinogens and non-carcinogens. Carcinogens are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per 1 million exposed individuals over a lifetime of exposure. Non-carcinogenic substances are generally assumed to have a safe threshold below which health impacts would not occur. Acute and chronic exposure to non-carcinogens is expressed as a hazard index, which is the sum of expected exposure levels divided by the corresponding acceptable exposure levels.

Emissions of DPM generated from the exhaust of diesel-powered engines are a complex mixture of soot, ash particulates, metallic abrasion particles, volatile organic compounds, and other components that can penetrate deeply into the lungs and contribute to a range of health problems. In 1998, CARB identified DPM from diesel-powered engines as a TAC based on its potential to cause cancer and other adverse health effects (CARB, 1998). While diesel exhaust is a complex mixture that includes hundreds of individual constituents, DPM is used as a surrogate measure of exposure, under California regulatory guidelines, for the mixture of chemicals that make up diesel exhaust as a whole. More than 90 percent of DPM is less than 1 micron in diameter and is thus a subset of PM_{10} (CARB, 2016). The estimated cancer risk from exposure to diesel exhaust is much higher than the risk associated with any other TAC routinely measured in the region.

2.3 Sensitive Receptors

Sensitive receptor locations are areas where individuals are more susceptible to the adverse effects of poor air quality. Sensitive receptor locations include, but are not limited to, hospitals, schools, daycare facilities, elderly housing, and convalescent facilities. Residential areas are also considered sensitive receptors because people are often at home for extended periods, thereby increasing the duration of exposure to potential air contaminants. The Project site is located in a relatively remote region of Imperial County. There nearest sensitive receptor is a residence 3.3 miles west of the Project Application Area (**Figure 4**).

Figure 4. Sensitive Receptor Locations



2.4 Climate Change and GHG Emissions

Climate change refers to change in the Earth's weather patterns, including the rise in average global temperature due to an increase in heat-trapping GHGs in the atmosphere. Existing GHGs allow about two-thirds of the visible and ultraviolet light from the sun to pass through the atmosphere and be absorbed by the Earth's surface. To balance the absorbed incoming energy, the surface radiates thermal energy back to space at longer wavelengths primarily in the infrared part of the spectrum. Much of the thermal radiation emitted from the surface is absorbed by the GHGs in the atmosphere and is re-radiated in all directions. Since part of the re-radiation is back toward the surface and the lower atmosphere, the global surface temperatures are elevated above what they would be in the absence of GHGs. This process of trapping heat in the lower atmosphere is known as the greenhouse effect.

An increase of GHGs in the atmosphere affects the energy balance of the Earth and results in a global warming trend. Increases in global average temperatures have been observed since the mid-20th century and have been linked to observed increases in GHG emissions from anthropogenic sources. The primary GHG emissions of concern are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Other GHGs of concern include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6), but their contribution to climate change is less than 1 percent of the total GHGs that are well-mixed (i.e., that have atmospheric lifetimes long enough to be homogeneously mixed in the troposphere) (IPCC, 2013). Each GHG has a different global warming potential (GWP). For instance, CH_4 traps about 28 times more heat per molecule than CO_2 (IPCC, 2014). As a result, emissions of GHGs are reported in metric tons of carbon dioxide equivalents (CO_2e), wherein each GHG is weighted by its GWP relative to CO_2.

Ice-core records of historical atmospheric CO_2 concentrations, which currently extend back about 800,000 years, indicate that CO_2 concentrations naturally fluctuate between glacial and interglacial periods. According to the Intergovernmental Panel on Climate Change (IPCC), over the past few hundred years the atmospheric concentrations of CO_2 have increased to unprecedented levels compared to previous fluctuations in CO_2 concentrations observed over the past 800,000 years due to anthropogenic sources. In 2011, concentrations of CO_2, CH_4, and N_2O exceeded the pre-industrial era (before 1750) by about 40, 150, and 20 percent, respectively (BAAQMD, 2015). Based on measurements of the Earth's global average surface temperature, eight of the top 10 warmest years on record since 1880 have occurred in the last decade (NASA, 2022).

The global increases in CO_2 concentration are due primarily to fossil fuel combustion and land use change (e.g., deforestation). The dominant anthropogenic sources of CH_4 are from ruminant livestock, fossil fuel extraction and use, rice paddy agriculture, and landfills, while the dominant anthropogenic sources of N_2O are from ammonia for fertilizer and industrial activity. Emissions of HFCs, PFCs, and SF_6 are not naturally occurring; they originate from industrial processes such as semiconductor manufacturing, their use as refrigerants and other products, and electric power transmission and distribution (BAAQMD, 2015).

2.5 Effects of GHG Emissions

Some of the potential effects of increased GHG emissions and associated climate change may include loss of snowpack (affecting water supply), more frequent extreme weather events, more large forest fires, more drought years, and sea level rise. In addition, climate change may increase electricity demand for cooling, decrease the availability of hydroelectric power, and affect regional air quality and public health (BAAQMD, 2017a).

In October 2018, the IPCC published a special report on potential long-term climate change impacts based on the projected increases in temperature due to global climate change. The IPCC report found that the Earth is already seeing the consequences of global warming due to a 1° Celsius increase in pre-industrial levels, such as extreme weather, rising sea levels, and diminishing Arctic Sea ice. Global warming is likely to reach 1.5° Celsius above pre-industrial levels between 2030 and 2050 if it continues to increase at the current rate. Some of the impacts due to ongoing global warming could be avoided by limiting future global warming to 1.5° Celsius compared to 2° Celsius. For example, by limiting global warming to 1.5° Celsius or lower, the likelihood of an Arctic Ocean free of sea ice in summer would be ten times lower compared to the likelihood under the scenario of a 2° Celsius increase. Beyond the 1.5° Celsius threshold, there would be significant increases in the risk associated with long-lasting or irreversible changes, such as the loss of ecosystems (IPCC, 2018).

The IPCC Sixth Assessment Report published in 2023 updates prior versions of the report and notes that global temperature increases have already caused extreme weather and climate across the globe, which has damaged nature and people. The report found that global GHG emissions make it likely that warming will exceed 1.5°Celsius during the 21st century and make it harder to limit warming below 2°Celsius. The report finds that some future changes are unavoidable and/or irreversible but can be limited by deep, rapid, and sustained global greenhouse gas emissions reduction. Limiting warming to 1.5°Celsius with no or limited overshoot, and those that limit warming to 2°Celsius, requires rapid and deep and, in most cases, immediate greenhouse gas emissions reductions in all sectors this decade (IPCC 2023).

3. REGULATORY FRAMEWORK

3.1 Federal and State Regulations

3.1.1 Federal and State Air Quality Regulations

The U.S. EPA is responsible for implementing the programs established under the Federal Clean Air Act, such as establishing and reviewing the National Ambient Air Quality Standards (NAAQS) and judging the adequacy of State Implementation Plans to attain the NAAQS. A State Implementation Plan must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs. If a state fails to enforce its implementation of approved regulations, or if the U.S. EPA determines that a State Implementation Plan is inadequate, the U.S. EPA is required to prepare and enforce a Federal

Implementation Plan to promulgate comprehensive control measures for a given State Implementation Plan.

CARB is responsible for establishing and reviewing the California Ambient Air Quality Standards (CAAQS), developing and managing the California State Implementation Plans, identifying TACs, and overseeing the activities of regional air quality management districts. In California, mobile emissions sources (e.g., construction equipment, trucks, and automobiles) are regulated by CARB and stationary emissions sources (e.g., industrial facilities) are regulated by the regional air quality management districts.

The CAAQS and NAAQS, which were developed for criteria air pollutants, are intended to incorporate an adequate margin of safety to protect the public health and welfare. California also has ambient air quality standards for sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride. To achieve CAAQS, criteria air pollutant emissions are managed through control measures described in regional air quality plans as well as emission limitations placed on permitted stationary sources. The CAAQS and NAAQS are summarized in **Table 6**.

Table 6. Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS Concentration	NAAQS Concentration
Ozone	1-Hour	0.09 ppm	Revoked in 2005
	8-Hour	0.070 ppm	0.070 ppm
Coarse Particulate Matter (PM_{10})	24-Hour	50 µg/m^3	150 µg/m^3
	Annual	20 µg/m^3	---
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	---	35 µg/m^3
	Annual	12 µg/m^3	12 µg/m^3
Nitrogen Dioxide (NO_2)	1-Hour	0.18 ppm	0.100 ppm
	Annual	0.030 ppm	0.053 ppm
Carbon Monoxide (CO)	1-Hour	20 ppm	35 ppm
	8-Hour	9.0 ppm	9 ppm
Sulfur Dioxide (SO_2)	1-Hour	0.25 ppm	0.075 ppm
	24-Hour	0.04 ppm	0.14 ppm
	Annual	---	0.030 ppm
Lead	30-Day	1.5 µg/m^3	---
	Calendar Quarter	---	1.5 µg/m^3
	Rolling 3-Month	---	0.15 µg/m^3
Sulfates	24-Hour	25 µg/m3	---
Hydrogen Sulfide	1-Hour	0.03 ppm	---
Vinyl Chloride	24-Hour	0.010 ppm	---
Visibility Reducing Particles	8-Hour	---	---

Notes: ppm = parts per million; µg/m^3 = micrograms per cubic meter.
Source: BAAQMD, 2017b.

In accordance with the Federal Clean Air Act and California Clean Air Act, areas in California are classified as either in attainment, maintenance (i.e., former nonattainment), or nonattainment of the NAAQS and CAAQS for each criteria air pollutant. As shown in **Table 7**, Imperial County (specifically the portion where the Project site is located) is designated as a nonattainment area

for ozone and PM_{10} under the State standards, a marginal nonattainment area for ozone under the federal standards, and an attainment or unclassified area for all other ambient air quality standards.

Table 7. Attainment Status for Imperial County

Pollutant	State Designation	Federal Designation
Ozone	Nonattainment	Moderate-Nonattainment[1]
Coarse Particulate Matter (PM_{10})	Nonattainment	Maintenance / Attainment[2]
Fine Particulate Matter ($PM_{2.5}$)	Attainment[3]	Attainment[4]
Nitrogen Dioxide (NO_2)	Attainment	Unclassified / Attainment
Carbon Monoxide (CO)	Unclassified	Unclassified / Attainment
Sulfur Dioxide (SO_2)	Attainment	Unclassified / Attainment
Lead	Attainment	Unclassified / Attainment
Sulfates	Attainment	---
Hydrogen Sulfide	Unclassified	---
Vinyl Chloride	Unclassified	---
Visibility Reducing Particles	Unclassified	---

Notes:
[1] Imperial County is designated a marginal nonattainment area for the 2015 ozone standard and a moderate attainment area for the 2008 standard.
[2] Imperial County was previously designated a serious-nonattainment area for PM_{10}, but the U.S. EPA approved redesignation as an attainment area on September 18, 2020.
[3] The City of Calexico, which is within the Salton Sea Air Basin and shares a border with Imperial County, is designated a nonattainment area for $PM_{2.5}$, but Imperial County (which includes the Project site) is designated an attainment area.
[4] A portion of the Imperial Valley in south-central Imperial County is designated a moderate nonattainment area for $PM_{2.5}$, but the remainder of Imperial County (which includes the Project site) is designated an attainment area.
Sources: CARB, 2020; CARB, 2022a; U.S. EPA, 2023.

The U.S. EPA has developed significant impact levels (SILs) to assess if ambient concentrations of criteria air pollutants from a new or modified stationary source would cause or contribute to a violation of the NAAQS. Air dispersion modeling analyses are conducted to predict the ground level ambient air concentrations of pollutants from facility emissions at nearby receptors. If the estimated ambient concentrations exceed the SILs, then additional modeling of cumulative sources is required to further assess if the facility emissions would cause or contribute to a violation of the NAAQS.

Regulation of TACs, referred to as hazardous air pollutants (HAPs) under federal regulations, is achieved through federal, state, and local controls on individual sources. The air toxics provisions of the Federal Clean Air Act require the U.S. EPA to identify HAPs that are known or suspected to cause cancer or other serious health effects to protect public health and welfare, and to establish National Emission Standards for Hazardous Air Pollutants. California regulates TACs primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). The Tanner Act created California's program to identify and reduce exposure to TACs. To date, CARB has identified over 21 TACs and adopted the EPA's list of 189 HAPs as TACs. The Hot Spots Act supplements the

Tanner Act by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

3.1.2 Federal Climate Action Goals

The U.S. participates in the United Nations Framework Convention on Climate Change. In 1998, the U.S. signed the Kyoto Protocol, which would have required reductions in GHGs; however, the protocol did not become binding in the U.S. as it was never ratified by Congress. Instead, the federal government chose voluntary and incentive-based programs to reduce emissions and has established programs to promote climate technology and science. In 2002, the U.S. announced a strategy to reduce the GHG intensity of the American economy by 18 percent over a 10-year period from 2002 to 2012. In 2015, the U.S. submitted its "intended nationally determined contribution" to the framework convention, which targets to cut net GHG emissions by 26 to 28 percent below 2005 levels by 2025. In 2015, the U.S. signed the Paris Agreement on climate change. The goal of the Paris Agreement is to hold the increase in global temperatures to below the 2°Celsius above pre-industrial levels. On January 27, 2021, the President issued Executive Order (EO) 14008: Tackling the Climate Crisis at Home and Abroad. EO 14008 set a federal clean electricity and vehicle procurement strategy that includes achieving a carbon free electricity sector by 2035.

The U.S. EPA is responsible for enforcing the Federal Clean Air Act and the 1990 amendments to it. On April 2, 2007, the U.S. Supreme Court ruled that CO_2 is an air pollutant as defined under the Clean Air Act, and that the EPA has the authority to regulate emissions of GHGs (U.S. Supreme Court, 2007). The EPA made two distinct findings regarding GHGs under Section 202(a) of the Clean Air Act, as follows:

- Endangerment Finding: The current and projected concentrations of the six key well-mixed GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in the atmosphere threaten the public health and welfare of current and future generations.

- Cause or Contribute Finding: The combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, they were a prerequisite for implementing GHG emissions standards for vehicles.

3.1.3 Federal Vehicle Emission Regulations

The U.S. EPA has established national GHG emission and fuel economy regulations for vehicles that would achieve substantial GHG emissions reductions along with reductions in other criteria pollutants. Some of the key U.S. EPA regulations related to GHG emissions from vehicles are as follows:

- In 2010, the U.S. EPA in collaboration with the National Highway Traffic Safety Administration (NHTSA) finalized updated Corporate Average Fuel Economy (CAFE) and

GHG emissions standards for passenger cars and light trucks light-duty vehicles for model years 2012 to 2016.

- In 2012, the U.S. EPA and NHTSA extended the CAFE and GHG emissions standards for light-duty vehicles for model years 2017 to 2025. Combined with the 2012 to 2016 standards, the regulation will result in vehicles emitting 50 percent less than 2010 levels in 2025.

- In 2016, the U.S. EPA and NHTSA finalized national GHG emission and fuel economy standards for medium- and heavy-duty vehicles that would cover model years 2018 to 2027 for certain trailers and model years 2021 to 2027 for semi-trucks, large pickup trucks, vans, and all types and sizes of buses and work trucks.

- In 2020, the U.S. EPA and NHTSA finalized updated CAFE and GHG emissions standards for passenger cars and light trucks and established new standards, covering model years 2021 through 2026.

- In 2021, the U.S. EPA revised the GHG emissions standards for passenger cars and light trucks for model years 2023 through 2026 to leverage advances in clean car technology.

- In 2022, the NHSTA revised the CAFE standards for passenger cars and light trucks for model years 2024 to 2026. These standards are expected to result in average fuel economy label values of 49 miles per gallon.

3.1.4 California Climate Action Goals

The State of California has established the following long-term climate action goals:

- **Assembly Bill (AB) 1279:** Codifies the economy-wide 2045 carbon neutrality goal and requires that at least 85% of the reductions come from emission reductions.

3.1.5 California Clean Electricity Goals

The State of California has established the following clean electricity requirements:

- Senate Bill (SB) 100: Requires renewable energy and zero-carbon resources supply 100 percent of electric retail sales to end-use customers by 2045.

- SB 1020: Revised zero-carbon energy goals originally set in SB 100, with more aggressive targets: 90% by 2035; 95% by 2040; 100% by 2045.

3.1.6 California Vehicle Emission Regulations

The State of California has established statewide GHG emission and fuel economy regulations for vehicles that align with or supersede the national standards. The key state regulations related to GHG emissions from vehicles are as follows:

- The Pavley Regulations (AB 1493), as amended in 2009, required a 30 percent reduction in state GHG emissions from new passenger vehicles from 2009 through 2016.

- The Advanced Clean Cars Program extends the Pavley Regulations beyond 2016 and established a technology mandate for zero-emission vehicles.

- The Advanced Clean Cars II Program requires all new passenger cars, trucks, and sport utility vehicles sold in California to be zero-emission vehicles by 2035.

- The Low-Carbon Fuel Standard (Executive Order S-1-07), as amended in 2019, requires a 20 percent reduction in the carbon intensity of California's transportation fuels by 2030.

SB 375 establishes regional GHG reduction targets from passenger vehicles for the years 2020 and 2035 by requiring metropolitan planning organizations to develop and implement Sustainable Communities Strategies that align regional transportation planning efforts with regional housing allocation needs.

3.1.7 California Energy Efficiency Regulations

The State of California has established statewide energy efficiency regulations:

- Title 24 Building Efficiency Standards are updated every three years with the long-term vision to support zero-net energy for all new single-family and low-rise residential buildings by 2020 and new high-rise residential and nonresidential buildings by 2030.

Title 24 California Green Building Standards, referred to as the CALGreen Code, aim to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: (1) planning and design, (2) energy efficiency, (3) water efficiency and conservation, (4) material conservation and resource efficiency, and (5) environmental air quality.

3.1.8 California Cap-and-Trade Program

The Cap-and-Trade Program is a key element of California's strategy to reduce GHG emissions from covered entities[1] that are responsible for about 85 percent of California's GHG emissions. The program establishes a declining limit on major sources of GHG emissions throughout California, and it creates a powerful economic incentive for significant investment in cleaner and more efficient technologies. CARB creates allowances equal to the total amount of permissible GHG emissions (i.e., the "cap"). Each year, fewer allowances are created and the annual cap declines. As a result, the annual auction reserve price for allowances increases, which creates a steady and sustained carbon price signal to incentivize actions to reduce GHG emissions and enable a smooth transition to a cleaner economy.

[1] The program's covered entities include electric power plants, fuel distributors (natural gas and petroleum), and large industrial facilities that emit more than 25,000 million metric tons of CO_2e per year.

3.1.9 California's Short-Lived Climate Pollutant Reduction Strategy

The Short-Lived Climate Pollutant (SLCP) Reduction Strategy is California's plan for reducing emissions of high global-warming potential gases with short atmospheric lifetimes (CARB, 2017a). SLCPs include methane, HFCs, and anthropogenic black carbon. In accordance with SB 1383, the SLCP Reduction Strategy has set the following targets for statewide reductions in SLCP emissions:

- 40 percent below 2013 levels by 2030 for methane and HFCs.
- 50 percent below 2013 levels by 2030 for anthropogenic black carbon.

The SLCP Reduction Strategy also provides specific direction for reductions from dairy and livestock operations and from landfills by diverting organic materials.

To help meet the HFC reduction, CARB adopted the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning, and Other End-Uses (CCR Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4, §95371). The regulation establishes end-use-specific prohibitions on HFC refrigerants based on their GWP. In addition, Senate Bill 1206 establishes statewide prohibitions on the sale and distribution of bulk or newly produced HFCs with a GWP greater than 2,200 starting 1 January 2025, greater than 1,500 starting 1 January 2030, and greater than 750 starting 1 January 2033.

3.1.10 California's Climate Change Scoping Plan

In December 2008, CARB adopted the Climate Change Scoping Plan to identify how the state can achieve its 2020 climate action goal under AB 32. In 2017, CARB updated the Scoping Plan to identify how the state can achieve its 2030 climate action goal under SB 32, and substantially advance toward its 2050 climate action goal under Executive Order S-3-05. The 2017 Scoping Plan includes the regulatory programs identified above, such as the Advanced Clean Cars Program, Low-Carbon Fuel Standard, Renewable Portfolio Standard Program, energy efficiency standards, SLCP Reduction Strategy, and Cap-and-Trade Program (CARB, 2017b).

In December 2022, CARB adopted the 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan), which outlines a roadmap to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below 1990 levels no later than 2045 (CARB, 2022b). Building on the 2017 Scoping Plan, the 2022 Scoping Plan evaluates the progress made toward meeting the 2030 GHG reduction target established in SB 32 and identifies a technologically feasible, cost-effective, and equity-focused path to achieve carbon neutrality by 2045. The 2022 Scoping Plan presents an approach for an aggressive reduction of fossil fuels and a rapid transition to renewable energy resources and zero-emission vehicles. The 2022 Scoping Plan identifies actions and outcomes such as rapidly moving to zero-emission transportation; electrifying cars, buses, trains, and trucks; phasing out the use of fossil gas used for heating homes and buildings; clamping down on chemicals and refrigerants; providing communities with sustainable options for walking, biking, and public transit; building out clean, renewable energy resources (such as solar arrays and wind turbine capacity) to displace fossil-

fuel fired electrical generation; and scaling up new options such as renewable hydrogen and biomethane. Appendix D of the 2022 Scoping Plan includes recommendations for local government to take actions that align with the state's climate goals, with a focus on local climate action plans and local authority over new residential and mixed-use development. Appendix D of the 2022 Scoping Plan recommends for local jurisdictions to focus on three priority areas when preparing a climate action plan: transportation electrification, vehicle miles travelled reduction, and building decarbonization.

3.1.11 California's Sulfur Hexafluoride Regulation

High-voltage equipment that transmits and distributes electricity has typically used SF_6 as an electrical insulator. Fugitive emissions of SF_6 can escape from gas insulated substations and switchgear through seals and can also be released during equipment installation and when equipment is opened for servicing.

As required by AB 32, CARB approved the reduction of SF_6 emissions from electricity transmission and distribution equipment as an early action measure in 2007. In 2010, CARB adopted the Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear, which requires switchgear owners to reduce their SF_6 emission rates to 1 percent by 2020. CARB amended the regulation in 2021 to phase out the acquisition of SF_6 gas-insulated equipment. Other changes are also adopted to cover other GHGs beyond SF_6 and enhance accuracy of emissions accounting and reporting. The amended regulation became effective January 1, 2022.

3.2 Regional Regulations

3.2.1 ICAPCD Rules and Responsibilities

ICAPCD is primarily responsible for ensuring that the NAAQS and CAAQS are attained and maintained in the SSAB. ICAPCD fulfills this responsibility by adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits, inspecting stationary sources of air pollutants, responding to citizen complaints, and monitoring ambient air quality and meteorological conditions. **Table 8** summarizes the ICAPCD's rules and regulations relevant to controlling emissions from the Project.

Table 8. ICAPCD Rules and Regulations

Pollutant	Description
Rule 207 - New and Modified Stationary Source Review	Establishes preconstruction review requirements for new and modified stationary sources (e.g., standby generators) to ensure the operations of equipment does not interfere with attainment or maintenance of ambient air quality standards.
Rule 208 – Permit to Operate	Allows the ICAPCD to inspect and evaluate a permitted facility to ensure the facility will operate to comply with the provisions of the Authority to Construct permit (see Rule 207) and comply with all applicable laws, rules, standards, and guidelines.
Regulation VIII – Fugitive Dust Rules (Rules 800 to 806)	Sets forth rules regarding the control of fugitive dust, including fugitive dust from construction activities. The regulation requires implementation

Pollutant	Description
	of fugitive dust control measures to reduce emissions from earthmoving, unpaved roads, handling of bulk materials, and control of track-out/carry-out dust from active construction sites. For construction of non-residential developments greater than 5 acres, a dust control plan must be prepared and implemented, and the ICAPCD must be notified 10 days prior to the commencement of any construction activities. The dust control plan must identify Best Available Control Measures to reduce fugitive dust during construction activities, which may include but are not limited to following: • Phase work to minimize the amount of disturbed surface area at any one time. • Apply water or chemical stabilizers to disturbed soils. • Construct and maintain wind barriers. • Cover bulk materials stored outdoors. • Use track-out control devices or wash down systems at access points to paved roads.

Source: ICAPCD, 2024a.

3.2.2 CEQA Air Quality Handbook

In 2017, ICAPCD published the *CEQA Air Quality Handbook* that include guidelines and thresholds of significance to assist lead agencies in evaluating and mitigating air quality impacts under CEQA (ICAPCD, 2017a). ICAPCD's thresholds establish levels at which emissions of criteria air pollutants and precursors, TACs, and odors could cause significant air quality impacts.

3.2.3 Air Quality Plans

In accordance with the California Clean Air Act, ICAPCD is required to prepare and update air quality plans that outline measures by which both stationary and mobile sources of pollutants can be controlled to achieve the NAAQS and CAAQS in areas designated as nonattainment.

- In 2017, ICAPCD adopted the *Imperial County Plan for the 2008 8-hour Ozone Standard* (2017 Ozone Plan), which includes the identification of control measures to reduce ozone precursors (ICAPCD, 2017b).

- In 2018, ICAPCD adopted the *Redesignation Request and Maintenance Plan for Particulate Matter Less than 10 microns in Diameter* (2018 PM_{10} Plan), which shows that Imperial County has attained and will maintain the 24-hour PM_{10} standard out to 2030 and addresses all requirements under the Federal Clean Air Act (ICAPCD, 2018a). On September 18, 2020, the U.S. EPA approved the 2018 PM_{10} Plan, including the State's request to redesignate Imperial County from nonattainment to attainment for the federal PM_{10} air quality standard (U.S. EPA, 2020).

- In 2014, ICAPCD adopted the *Imperial County 2013 State Implementation Plan for the 2006 24-Hour $PM_{2.5}$ Moderate Nonattainment Area* (ICAPCD, 2014); however, this only applies to the non-attainment status in the south-central portion of Imperial County which does not include the Project site.

- In 2018, ICAPCD adopted the Imperial County *2018 Annual Particulate Matter Less than 2.5 Microns in Diameter State Implementation Plan* (ICAPCD, 2018b); however, this only applies to the non-attainment status in the south-central portion of Imperial County which does not include the Project site.

3.2.4 Imperial County General Plan

The Conservation and Open Space Element of the Imperial County General Plan (Imperial County Planning and Development Services Department, 2016) includes the following policy and program related to air quality and GHG emissions that would be applicable to the Project:

> **Policy:** Reduce PM_{10} and $PM_{2.5}$ emissions from unpaved roads, agricultural fields, and exposed Salton Sea lakebed.
>
> **Program:** Implement all ICAPCD particulate matter (PM) emission controls including the Final PM10 2009 State Implementation Plan and the 2013 State Implementation Plan for the 2006 24-Hour PM2.5 Moderate Nonattainment Area.

3.2.5 Desert Renewable Energy Conservation Plan

The entirety of the Project Application Area within BLM-administered public land is designated a Development Focus Area under the Desert Renewable Energy Conservation Plan (DRECP) and its associated Record of Decision (BLM, 2016a). The DRECP was developed to advance federal and state natural resource conservation goals and other state laws while facilitating a timely and streamlined permit process for renewable energy projects (BLM, 2015). A Development Focus Area is considered an area suitable for renewable energy development under the DRECP.

Conservation and Management Actions (CMAs) are required mitigation measures for Development Focus Areas in California. These were identified in the 2016 DRECP Land Use Plan Amendment (LUPA) (BLM, 2016b), which are applicable for some BLM-administered lands in southern California. The CMAs were designed to achieve the goals and objectives for activities within the LUPA's various land use allocations. These measures identify a specific set of avoidance, minimization, and compensation measures, and allowable and non-allowable actions for siting, design, pre-construction, construction, maintenance, implementation, operation, and decommissioning activities on BLM-managed lands. The intent of these is to provide certainty on what avoidance and minimization measures, design features, and compensation/mitigation measures would be required for a particular action within any one of the LUPA's land use allocation types. Some CMAs apply planning-area wide, whereas others apply only within specific land use allocations.

3.3 Project Best Management Practices and Design Features

In December 2023, the Applicant adopted the *Preliminary Best Management Practices and Project Design Features for the Project* (IP Perkins, LLC, 2023a), which identifies preliminary best management practices (BMPs) and Project design features associated with the siting and design, construction, operation and maintenance, and decommissioning of the Project: these

are subject to change as the Project proceeds through the permitting process. BMPs are state-of-the-art measures applied on a site-specific basis to avoid, minimize, reduce, rectify, or compensate for adverse environmental or social impacts. They are selectively applied to aid in achieving desired outcomes for safe, environmentally responsible development, by preventing, minimizing, or mitigating adverse impacts and reducing conflicts. Design features are requirements that must be incorporated into Project-specific plans and implemented by the contractor team. In general, the design features are accepted practices that are known to be effective when implemented properly.

Table 9 summarized the BMPs related to air quality that would be incorporated into the Project. Implementation of BMPs would comply with the CMAs identified in the 2016 DRECP LUPA.

Table 9. Best Management Practices for Air Quality

No.	Topic	Description of Measures	Phase
1	Emissions	Vehicle use shall be reduced to the extent feasible. Carpooling will be used to reduce the amount of daily vehicle trips to the project site. The project will comply with LUPA-AIR-3.	C, O, D
2	Emissions	Idling of diesel equipment shall be limited to no more than 5 minutes unless idling must be maintained for proper operation (e.g., drilling, hoisting, and trenching). The project will comply with LUPA-AIR-3.	C, O, D
3	Emissions	Consider using electric vehicles, biodiesel, or alternative fuels where feasible during construction and operation phases to reduce the project's criteria and GHG pollutant emissions. The project will comply with LUPA-AIR-3.	C, O, D
4	Fugitive Dust	Workers shall be trained to comply with the speed limit, use good engineering practices, minimize drop height of materials, and minimize disturbed areas. The project will comply with LUPA-AIR-5.	C, O, D
5	Fugitive Dust	Construction shall be staged to limit the amount of exposed area at any time, whenever practical. The project will comply with LUPA-AIR-5.	C, O, D
6	Fugitive Dust	Access to the construction site and staging areas shall be limited to authorized vehicles only on the designated treated roads. The project will comply with LUPA-AIR-5.	C, O, D
7	Fugitive Dust	Access roads, on-site roads, and parking lots shall be surfaced with aggregate with hardness sufficient to prevent vehicles from crushing the aggregate and thus causing dust or compacted soil conditions. Paving could also be used on access roads and parking lots. Alternatively, agency-approved chemical dust suppressants (calcium chloride, FSB-100, Plas-Tex, Soil Sement, SRB-1000, etc.) or durable polymeric soil stabilizers shall be used on these locations (e.g., Gorilla-Snot, Soiltac, or Earthguard pellets). The project will comply with LUPA-AIR-5.	C, O, D
8	Fugitive Dust	All unpaved roads, disturbed areas (e.g., areas of scraping, excavation, backfilling, grading, and compacting), and loose materials generated during project activities shall be watered as frequently as necessary to minimize fugitive dust generation. In water-deprived locations, water spraying shall be limited to active disturbance areas only and non-water-based dust control measures shall be implemented in areas with intermittent or non-heavy use, such as stockpiles or access roads. The project will comply with LUPA-AIR-5.	C, O, D
9	Fugitive Dust	Speed limits (e.g., 15 mph) within the construction site shall be posted with visible signs and enforced to minimize airborne fugitive dust. The project will comply with LUPA-AIR-5.	C, D

No.	Topic	Description of Measures	Phase
10	Fugitive Dust	All vehicles transporting loose materials traveling on public roads shall be covered, and loads shall be sufficiently wet and kept below the freeboard of the truck. The project will comply with LUPA-AIR-5.	C, O, D
11	Fugitive Dust	Tires of all construction-related vehicles shall be inspected and cleaned as necessary to be free of dirt prior to entering paved public roadways. The project will comply with LUPA-AIR-5.	C, D
12	Fugitive Dust	Visible track-out or runoff dirt on public roadways from the construction site shall be cleaned (e.g., through street vacuum sweeping). The project will comply with LUPA-AIR-5.	C, D
13	Fugitive Dust	Use wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) where soils are disturbed in construction, access and maintenance routes, and materials stockpile areas. Keep related windbreaks in place until the soil is stabilized or permanently covered with vegetation. The project will comply with LUPA-AIR-5.	C, O, D
14	Fugitive Dust	All soil disturbance activities and travel on unpaved roads shall be minimized. The project will comply with LUPA-AIR-5.	C, O, D
15	Fugitive Dust	Any stockpiles shall be sprayed with water, covered with tarpaulins, and/or treated with appropriate dust suppressants, especially in preparation for high wind or storm conditions. Chemical dust suppressants that emit volatile organic compounds (VOCs) shall be avoided within or near zone nonattainment areas. The project will comply with LUPA-AIR-5.	C
16	Fugitive Dust	Potential environmental impacts from the use of dust palliatives shall be minimized by taking all necessary measures to keep the chemicals out of sensitive soil and streams. In addition, the application of dust palliatives shall comply with federal, state, and local laws and regulations. The project will comply with LUPA-AIR-5.	C, O, D

Notes: C = Construction, O = Operations, D = Decommissioning

The Project Design Features that would be incorporated into the Project are summarized in **Table 10**. It should be noted that the design feature PDF AQ-1, *Fugitive Dust Control Plan*, has already been prepared in accordance with the ICAPCD Regulation VIII fugitive dust rules (IP Perkins, LLC, 2023b).

Table 10. Project Design Features for Air Quality

No.	Description of Measures	Phase
PDF AQ-1	**Fugitive Dust Control Plan.** The project owner or owner's contractor shall prepare and implement a Fugitive Dust Control Plan to reduce fugitive dust emissions during project construction. The project owner shall maintain and implement equivalent fugitive dust control strategies during operation, maintenance, and decommissioning. The plan would apply to activities including, but not limited to, development of laydown and staging areas, site grading, vegetation management, and installing all project facilities through post-construction cleanup. The project owner or owner's contractor shall take every reasonable precaution to prevent all airborne fugitive dust plumes from leaving the project site and to prevent visible particulate matter from being deposited upon public roadways, as specified below. Where specified below, loose materials and soils shall be stabilized with a non-toxic soil stabilizer or soil weighting agent or watered two times daily or as frequently as necessary to minimize fugitive dust generation. Non-water-based soil stabilizers shall be as efficient as or more efficient for fugitive dust control than CARB-approved soil stabilizers and shall	C, O, D

No.	Description of Measures	Phase
	not increase any other environmental impacts, including loss of vegetation, adverse odors, or emissions of ozone precursor reactive organic gases (ROG) or volatile organic compounds (VOC). Prior to any earthmoving activity, the Fugitive Dust Control Plan shall be submitted to the CEC for review and approval to ensure compliance with the standards in ICAPCD Rule 801, Section F, Best Available Control Measures for Fugitive Dust, and recordkeeping requirements in ICAPCD Rule 801, Section G, Record of Control Implementation. Records shall be readily accessible for two years after the date of each entry and shall be provided to the lead agency and/or ICAPCD upon request. The following control measures would be included within the plan: • All disturbed areas, including bulk material storage which is not being actively utilized, shall be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by using water, chemical stabilizers, dust suppressants, tarps or other suitable material such as vegetative ground cover. • All on site unpaved roads will be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants and/or watering. • All unpaved traffic areas one (1) acre or more with 75 or more average vehicle trips per day will be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants and/or watering. • The transport of bulk materials shall be completely covered unless six inches of freeboard space from the top of the container is maintained with no spillage and loss of bulk material. In addition, the cargo compartment of all haul trucks is to be cleaned and/or washed at delivery site after removal of bulk material. • All track-out or carry-out will be cleaned at the end of each workday or immediately when mud or dirt extends a cumulative distance of 50 linear feet or more onto a paved road. • Movement of bulk material handling or transfer shall be stabilized prior to handling or at points of transfer with application of sufficient water, chemical stabilizers or by sheltering or enclosing the operation and transfer line. • Temporary unpaved roads shall be effectively stabilized, and visible emissions shall be limited to no greater than 20 percent opacity for dust emission by paving, chemical stabilizers, dust suppressants and/or watering. • All unpaved roads, disturbed areas (e.g., areas of scraping, excavation, backfilling, grading, and compacting), and loose materials generated during project activities shall be watered as frequently as necessary to minimize fugitive dust generation. In water-deprived locations, water spraying shall be limited to active disturbance areas only and non-water-based dust control measures shall be implemented in areas with intermittent or non-heavy use, such as stockpiles or access roads. • Replace or revegetate ground cover in disturbed areas as quickly as possible. • Install automatic sprinkler systems on soil piles, if visible dust emissions are observed. • Vehicle speed for all construction vehicles shall not exceed 15 mph on any unpaved surface at the construction site. • Vehicle travel shall be minimized through a trip reduction plan to achieve a target of 2 occupants per vehicle for construction employees.	

No.	Description of Measures	Phase
	• Implement a shuttle service to and from retail services and food establishments during lunch hours. • Construction operations shall cease when wind speeds (not gusts) exceed 25 mph until the wind speeds reduce for one hour below 25 mph.	
PDF AQ-2	**Control On-Site Off-Road Equipment Emissions.** The Project owner, its contractor, and its subcontractors, when entering into construction contracts or when procuring off-road equipment or vehicles for on-site construction or O&M activities, shall ensure that the following measures are included within contract or procurement specifications: • All construction diesel engines not registered under California Air Resources Board's Statewide Portable Equipment Registration Program, with a rating of 50 hp or higher shall meet the Tier 4 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good faith effort demonstrates that such engine is not available for a particular item of equipment. In the event that a Tier 4 engine is not available for any off-road equipment larger than 50 hp, a Tier 3 engine shall be used or that equipment shall be equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 3 levels unless certified by the engine manufacturers that the use of such devices is not practical for specific engine types. • The contractor shall provide equipment logs demonstrating Tier level compliance for all off-road diesel equipment and registration of portable diesel equipment. • All diesel-fueled engines used in the construction of the facility shall have clearly visible tags showing that the engine meets the standards of this measure. Records of inspections of visible tags shall be maintained and readily accessible for two years after the date of each entry and shall be provided to the lead agency and/or ICAPCD upon request. • All equipment and trucks used in the construction or O&M of the facility shall be properly maintained and the engines tuned to the engine manufacturer's specifications. • All diesel heavy construction equipment shall not idle for more than five minutes. Vehicles that need to idle as part of their normal operation (such as concrete trucks) are exempted from this requirement. • Diesel and gasoline-fueled equipment shall be replaced with electrically driven equivalents, provided they are not run via a portable generator set, where practical.	C, O, D

Notes: C = Construction, O = Operations, D = Decommissioning

4. SIGNIFICANCE CRITERIA

Based on Appendix G of the CEQA Guidelines, implementation of the Project would result in a significant air quality impact if it would:

1) Conflict with or obstruct implementation of the applicable air quality plan;
2) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard;
3) Expose sensitive receptors to substantial pollutant concentrations; or
4) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Implementation of the proposed project would result in a significant GHG impact if it would:

5) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
6) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

The ICAPCD's recommended thresholds of significance for CEQA analysis establish levels at which emissions of air pollutants and precursors (ROG, NOx, PM_{10}, CO, SO_2, $PM_{2.5}$, and TACs) could cause significant air quality impacts (ICAPCD, 2017). The ICAPCD's thresholds of significance used in this analysis are summarized in **Table 11**. According to the ICAPCD, a project that exceeds these thresholds is required to implement all standard mitigation measures as well as all feasible discretionary mitigation measures listed in Sections 7.2 and 7.3 of the ICAPCD's *Air Quality Handbook*. The Imperial County has not established formal quantitative or qualitative GHG thresholds for CEQA analysis.

Table 11. CEQA Thresholds of Significance

Impact Analysis	Pollutant	Threshold of Significance
Construction	ROG	75 lbs/day
	NOx	100 lbs/day
	PM_{10}	150 lbs/day
	CO	550 lbs/day
Operation	ROG	137 lbs/day
	NOx	137 lbs/day
	PM10	150 lbs/day
	SOx [1]	150 lbs/day
	CO	550 lbs/day
	$PM_{2.5}$	550 lbs/day

Notes: lbs = pounds
[1] Emissions that lead to high concentrations of SO_2 generally also lead to the formation of other sulfur oxides (SOx). Therefore, emissions of SO_2 are used as an indicator for SOx in this analysis.
Source: ICAPCD, 2017a.

5. METHODOLOGY AND ASSUMPTIONS

The Project's potential environmental impacts related to air quality and GHGs are evaluated in accordance with the significance criteria as described above. The Project's emissions of criteria air pollutants and precursors and GHGs during construction and operation were estimated based on project-specific information provided by the Applicant.

During construction, sources of criteria air pollutant and GHG emissions include earth-moving activities, off-road construction equipment, on-road construction vehicles related to worker vehicles, vendor trucks, and haul trucks, helicopters, and water usage (GHG only). Criteria air pollutant emissions include fugitive dust from earth-moving activities and construction vehicles traveling on offsite public roads and onsite unpaved surfaces. The Project's construction criteria air pollutant and GHG emissions from off-road construction equipment, on-road construction vehicles, and water usage (GHG only) were estimated using the California Emissions Estimator

Model (CalEEMod) version 2022.1.1, as well as spreadsheets based on CalEEMod methodology. CalEEMod uses widely accepted models for emission estimates combined with appropriate default data for a variety of land-use projects that can be used if site-specific information is not available. Criteria air pollutant and GHG emissions from helicopter usage were estimated based on the *Guidance on the Determination of Helicopter Emissions* (FOCA, 2015). The primary input data used to estimate emissions associated with construction of the Project were provided by the Applicant and contain information on the anticipated construction schedule and duration; construction equipment inventory and usage for each phase of construction (including the type, quantity, and hours of operation); construction trip rates and trip lengths for each phase of construction; the fractions of off-site public roads traveled that would be paved and unpaved; helicopter usage; and water usage. Project design features presented in **Table 10** were incorporated in the calculations. The modeling assumptions, input parameters, methodology, and model outputs are documented in **Appendix A** and **Appendix B**.

During operation, sources of criteria air pollutant and GHG emissions include operation and maintenance activities, on-road vehicles, an up to 300-kilowatt emergency propane generator,[2] BESS refrigerant leakage (GHG only), and SF_6 leakage from gas-insulated equipment (GHG only). In addition, construction of the Project would result in the removal of existing vegetation, which provide carbon uptake and act as a CO_2 sink. The loss of natural carbon uptake due to land-use conversion was estimated for the Project. Criteria air pollutant and GHG emissions from all the sources described above, except for BESS refrigerant and SF_6 leakage, were estimated using the methodology from CalEEMod version 2022.1.1. GHG emissions from BESS refrigerant leakage were calculated based on the total charge of refrigerant and a typical but conservative annual leakage rate of 10 percent.[3] GHG emissions from SF_6 leakage were calculated based on the methodology documented in U.S. EPA 40 CFR 98, Subpart A.

After commencing operation, the Project would deliver 1,150 MW of clean, renewable solar energy to California ratepayers. The renewable electricity generated by the Project would displace electricity generated by fossil fuels for meeting energy demand. The avoided GHG emissions from conventional power plants were estimated based on Project electricity production and CO_2 emissions factors for conventional generation technologies for marginal generation obtained from the CEC's *Estimated Cost of New Utility-Scale Generation in California: 2018 Update* (CEC, 2019).

[2] To be conservative, emissions of criteria air pollutants and GHGs from the propane generator were modeled as a diesel generator operating for up to 50 hours per year. "IID has been able to meet the energy demand and avoid rotating power outages despite tight market conditions and harsh weather" (IID 2022). The modeled 50 hours of use is, therefore, a conservative estimate.

[3] The BESS would include 1,705 units and each unit contains up to 3.3 pounds of R-134a refrigerant (CAS Name 1,1,1,2-Tetrafluoroethane) in its thermal management system, resulting in a total of up to 5,627 pounds of R-134a refrigerant. According to the IPCC's Fourth Annual Assessment Report, the GWP for R-134a is 1,430.

6. ENVIRONMENTAL IMPACT ANALYSIS

6.1 Consistency with Applicable Air Quality Plans

There are two air quality plans that would apply to the Project the 2017 Ozone Plan and the 2018 PM_{10} Plan. These plans outline measures by which both stationary, area, and mobile sources of pollutants can be controlled to achieve the NAAQS and CAAQS in areas designated as nonattainment or maintenance.

The 2017 Ozone Plan identifies control measures for stationary sources, area sources, and transportation to reduce emissions of ozone precursors. The ICAPCD has the primary responsibility for regulating emissions from stationary sources as well as from some area sources found within the County. Operation and maintenance of the proposed 300-kilowatt emergency propane generator at the Project site will be required to comply with ICAPCD Rule 207 - *New and Modified Stationary Source Review* and Rule 208 - *Permit to Operate* to ensure the stationary source operations do not interfere with attainment or maintenance of ambient air quality standards. At the state level, CARB is responsible for regulating on-road motor vehicles, some off-road mobile sources, consumer products, as well as setting motor vehicle fuel specifications in California. The Project would provide a new source of renewable energy that will facilitate in California's transition from fossil fuel to clean electrical power for on-road motor vehicles. In addition, the Applicant has adopted BMP 3 and the Project would implement PDF AQ-2, which would involve use of zero emission vehicles where available and increased efficiency in all construction equipment to reduce ozone emissions. The Project would not introduce any major area sources for ozone emissions, such as consumer products, and the use of off-road equipment during construction would be temporary. Therefore, the Project would support and be consistent with the control measures identified in the 2017 Ozone Plan.

The 2018 PM_{10} Plan identifies control measures to ensure Imperial County continues to maintain the 24-hour PM_{10} standard out to 2030. The ICAPCD Regulation VIII fugitive dust rules form the core control measures for reducing PM_{10} emissions in the County. Implementation of Project design feature PDF AQ-1, *Fugitive Dust Control Plan*, would ensure that the Project would comply with the ICAPCD Regulation VIII fugitive dust rules. It should also be noted that implementation of Project design feature PDF AQ-1, *Fugitive Dust Control Plan*, would be consistent with the policy and program for reducing particulate matter emissions in the Conservation and Open Space Element of the Imperial County General Plan. In addition, the Applicant has adopted BMPs 4 through 16 to help reduce fugitive dust emissions during all phases of the Project. Therefore, the Project would be consistent with the control measures identified in the 2018 PM_{10} Plan.

Overall, the Project would not conflict with or obstruct implementation of the applicable air quality plans.

6.2 Criteria Air Pollutant Emissions

6.2.1 Construction

Construction of the Project is expected to commence in January 2026 and extend to December 2027 for a duration of 24 months. Project construction includes six phases with the potential to overlap: 1) site preparation; 2) installation of solar PV panel system; 3) installation of inverters, substation, and electrical collector system; 4) construction of 500 kV gen-tie and loop-in transmission lines; 5) BESS installation; and 6) construction of the BAAH switchyard.

Project construction activities would generate criteria air pollutant emissions and precursors that could potentially affect regional air quality. During construction, the primary pollutant emissions of concern would be ROG, NOx, CO, and PM_{10} from the exhaust of off-road construction equipment, helicopters, and on-road construction vehicles related to worker vehicles, vendor trucks, and haul trucks. In addition, grading activities during construction would generate fugitive dust emissions of PM_{10}. The calculations for all criteria air pollutant emissions during construction, including NOx, SO_2, CO, PM_{10}, and $PM_{2.5}$, are included in **Appendix A**.

To analyze daily construction emission rates for ROG, NOx, CO, and PM_{10}, the total emissions estimated during construction were averaged over the total working days (520 days) and compared to the ICAPCD's recommended thresholds of significance. Project design features PDF AQ-1 and PDF AQ-2 to control fugitive dust emissions and on-site off-road equipment emissions, respectively, were incorporated in the calculations. As shown in **Table 12**, the Project's average daily construction emissions of PM_{10} would exceed the ICAPCD's threshold of significance. It should be noted that an exceedance of the ICAPCD's threshold of significance is not expected to result in the region becoming a nonattainment area due to the short-term duration of construction activities. Furthermore, Project design feature PDF AQ-1 for the control of fugitive dust emissions (e.g., ceasing construction operation when wind speeds exceed 25 mph) is consistent with the standard and discretionary mitigation measures for fugitive PM_{10} emissions recommended by the ICAPCD's *CEQA Air Quality Handbook* and the ICAPCD Regulation VIII fugitive dust rules. Project design feature PDF AQ-2 for the control of on-site off-road equipment emissions is consistent with the standard and discretionary mitigation measures for NOx and PM_{10} emissions from construction combustion equipment recommended by the ICAPCD's *CEQA Air Quality Handbook*. In addition, the Applicant has adopted BMPs 1 through 3 (e.g., encouraging carpooling and use of electric vehicles) to reduce exhaust emissions and BMPs 4 through 16 (e.g., posting 15 mph speed limits) to reduce fugitive dust emissions during all phases of construction. Collectively, the ICAPCD considers implementation of these enhanced dust control measures adequate to reduce PM_{10} emissions to a level less than significant (ICAPCD, 2024b).

Table 12. Average Daily Construction Emissions for Criteria Air Pollutants (Pounds per Day)

Emission Scenario	ROG	NOx	CO	PM_{10}
Construction Emissions	11.7	89.6	277.8	**590.2**
ICAPCD Thresholds	75	100	550	150

Notes: **Bold and orange shaded** values indicate exceedance of the threshold of significance.
Source: **Appendix A** and **Appendix B.**

As shown in **Table 12**, the Project's average daily construction emissions of ROG, NOx, and CO would be below the ICAPCD's thresholds of significance. However, the estimated NOx emissions are relatively close to the threshold with emissions only about 10 percent below. There is the possibility that Project construction could be completed in a shorter period than anticipated by increasing the amount of off-road equipment used per day, which would result in an increase in the average daily emissions of NOx. According to the ICAPCD, this is a reasonable concern because it has occurred during the construction of other solar PV facilities in Imperial County. Therefore, to ensure that Project construction emissions of NOx do not exceed the threshold of significance due to an increase in the amount of off-road equipment used daily, Mitigation Measures AIR-1 would be implemented. Mitigation Measure AIR-1 requires tracking of emissions and payment into the ICAPCD in-lieu fee program if emissions of NOx exceed the ICAPCD threshold to ensure the impact is less than significant.

Mitigation Measure AIR-1: NOx Mitigation

Before starting onsite construction activities, the Project Applicant shall submit a Construction Emissions Monitoring Plan (Plan) describing how the Project sponsor will track the actual hours of equipment use for each piece of off-road equipment during each phase of construction. A summary report of the off-road equipment use shall periodically be submitted to the Imperial County Air Pollution Control District (ICAPCD) for review. The summary report shall include, but is not limited to, the equipment type, equipment manufacturer, engine certification (Tier rating), horsepower, fuel type, and actual hours of operation. The frequency of summary report submittals shall be identified in the Plan as determined between the ICAPCD and the Applicant.

If the ICAPCD determines that the Project's actual NOx emissions during construction exceed the recommended threshold of significance, then the Applicant shall be required to comply with ICAPCD Policy Number 5, "Off-site Mitigation/In-lieu Fee". Policy Number 5 requires the Applicant to prepare and implement the following measures, as approved by the ICAPCD, to reduce construction emissions of NOx below the threshold of significance:

1) Propose an off-site mitigation project providing supporting documentation that the reductions are met, or

2) Pay an in-lieu mitigation fee in accordance with the ICAPCD's Off-Site Mitigation/In-Lieu Fee Policy.

The Project Applicant shall ensure that all applicable requirements of the Plan have been incorporated into the contract specifications. The Plan shall include a certification statement that the Project sponsor agrees to comply fully with the Plan.

Implementation of Mitigation Measure AIR-1 together with Project design features PDF AQ-1 and PDF AQ-2, would ensure that all criteria air pollutant emissions are reduced to a level of insignificance.

6.2.2 Operation

Project operation would generate criteria air pollutant emissions that could potentially affect regional air quality. The primary pollutant emissions of concern during Project operation would be ROG, NOx, CO, SO_2, PM_{10}, and $PM_{2.5}$ from operation and maintenance activities, on-road vehicles, off-road equipment for occasional unscheduled maintenance, and a 300-kilowatt emergency propane generator. Stationary sources of emissions would be limited to the testing of the propane-powered backup generators. Project operational emissions were estimated using CalEEMod 2022.1.1. The results for all criteria air pollutant emissions during operation, including NOx, SO_2, CO, PM_{10}, and $PM_{2.5}$, are included in **Appendix B**.

Project emissions were estimated for 2028, which is the earliest expected year of operation. Since statewide vehicle emission standards are required to improve over time in accordance with the Advanced Clean Cars II Program and associated vehicle emission regulations, estimating emissions for the earliest year of operation provides the maximum expected annual emissions. The estimated operational maximum daily emissions for the Project are presented in **Table 13**.

Table 13. Average Daily Operation Emissions for Criteria Air Pollutants (Pounds per day)

Emission Scenario	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
Mobile	0.30	3.37	10.40	0.05	131.0	13.6
Area	0.24	< 0.005	0.33	< 0.005	< 0.005	< 0.005
Off-Road	0.08	0.77	1.47	< 0.005	0.02	0.02
Stationary [1]	2.31	0.22	6.00	< 0.005	0.01	0.01
Total	2.93	4.36	18.20	0.05	131.03	13.63
ICAPCD Thresholds	137	137	550	150	150	550
Threshold Exceedance?	No	No	No	No	No	No

Notes:
[1] To be conservative, emissions of criteria air pollutants from the propane generator were modeled as a diesel generator.
Source: **Appendix A** and **Appendix B.**

As shown in **Table 13**, the increase in operational emissions from the Project would not exceed the ICAPCD recommended thresholds of significance for ROG, NOx, CO, SO_2, PM_{10}, and $PM_{2.5}$. In addition, operation and maintenance of the proposed emergency propane generator at the Project site will be required to comply with ICAPCD Rule 207 – *New and Modified Stationary Source Review* to ensure the stationary source operations do not interfere with attainment or

maintenance of ambient air quality standards. Therefore, operation of the Project would not result in a cumulatively considerable net increase in criteria air pollutants for which the region is in nonattainment.

6.3 Local Community Risks and Hazards

6.3.1 Criteria Air Pollutants

The CEC's AFC guidance (20 CCR, Div. 2, Ch. 5 App. B) requires a screening level air quality modeling analysis of the direct criteria pollutant impacts of project construction and operation on local air quality. The nearest sensitive receptor that could be exposed to criteria air pollutants generated by the Project is a residence located approximately 3.3 miles to the west.

A screening level modeling analysis of criteria air pollutants generated during Project construction and operation was conducted using the U.S. EPA's AERSCREEN dispersion model. Construction emissions were modeled as an approximately 247-acre volume source and included all onsite emissions (e.g., off-road equipment, onsite truck, and onsite fugitive dusts). Operation emissions were modeled as a volume source[4] located at the O&M yard/facility and included all onsite emissions (e.g., area, off-road equipment, and emergency generator). Because AERSCREEN applies a theoretical worst-case scenario for meteorological conditions (i.e., wind speed, wind direction, temperature, and atmospheric stability) to conservatively estimate pollutant concentrations, the use and analysis of local meteorological data was not required. A copy of the input parameters and modeling results are included in **Appendix C**. As shown in **Table 14**, the estimated concentrations of NOx, SO_2, CO, PM_{10}, and $PM_{2.5}$ at the nearest sensitive receptor during Project construction and operation would be below the U.S. EPA SILs for the NAAQS, and the impact from pollutant concentrations would be less than significant.

[4] The emissions from annual maintenance and testing of the emergency propane generator were not modeled as a separate point source, because the emissions account for about 5% or less of the total emissions for NOx, PM_{10}, and $PM_{2.5}$.

Table 14. Estimated Criteria Air Pollutant Concentrations at the Nearest Sensitive Receptor

Pollutant	Averaging Time	Units	EPA Significant Levels	Concentrations at the Nearest Sensitive Receptor	
				Construction	Operation
PM_{10}	24-Hour	µg/m^3	5 [1]	1.04	0.0003
	Annual	µg/m^3	1.0 [1]	0.17	<0.0001
$PM_{2.5}$	24-Hour	µg/m^3	1.2 [2]	0.47	0.0003
	Annual	µg/m^3	0.13 [3]	0.08	<0.0001
NO_2	1-Hour	µg/m^3	7.5 [4]	6.73	0.016
	Annual	µg/m^3	1.0 [1]	0.67	0.002
CO	1-Hour	µg/m^3	2,000 [1]	20.03	0.13
	8-Hour	µg/m^3	500 [1]	18.02	0.11
SO_2	1-Hour	µg/m^3	7.86 [5]	0.032	<0.0001
	3-Hour	µg/m^3	25 [1]	0.032	<0.0001
	24-Hour	µg/m^3	5 [1]	0.019	<0.0001
	Annual	µg/m^3	1.0 [1]	0.003	<0.0001

Notes: ppm = parts per million; µg/m^3 = micrograms per cubic meter.
[1] SIL values provided in 40 CFR 51.165(b).
[2] 24-hour $PM_{2.5}$ SIL (U.S. EPA, 2018)
[3] Annual $PM_{2.5}$ SIL (U.S. EPA, 2024).
[4] Interim 1-hour NO_2 SIL (4 ppm) (U.S. EPA, 2010a).
[5] Interim 1-hour SO_2 SIL (3 ppm) (U.S. EPA, 2010b).
Source: **Appendix C.**

There are two cumulative projects located within a 6 miles radius of the Project Application Area that have pending entitlements:

- The VEGA SES 4 Solar Energy Project (4.0 miles to the southwest)
- Viking Solar Energy Generation and Battery Storage Project (4.5 miles to the northwest)

Neither of these projects are proposing to operate a stationary source (e.g., emergency generator). Therefore, a protocol for a cumulative air quality modeling impacts analysis of the Project's typical operating mode in combination with other stationary emissions sources that have received construction permits but are not yet operational or are in the permitting process is not required.

6.3.2 Toxic Air Contaminants (TACs)

Construction activities would generate DPM emissions from off-road diesel construction equipment, helicopters, and on-road heavy-duty diesel trucks accessing the Project site that could potentially result in elevated health risks at nearby sensitive receptors. As described in Section 2.3, the Project site is located in a relatively remote region of Imperial County and there are no sensitive receptors within approximately three miles of the Project Application Area. According to CARB's *Land Use Compatibility Handbook* (CARB, 2005), concentrations of DPM are reduced substantially and can even be indistinguishable from upwind background concentrations at a distance of 1,000 feet downwind from sources such as freeways or large

distribution centers. Therefore, sensitive receptors located more than three miles away are not expected to be affected by DPM emissions associated with the Project.

In addition, with implementation of Project design feature PDF AQ-2, most of the construction offroad equipment that would be used for this Project would be equipped with Tier 4 engines, which are considered the best available technology for reducing DPM emissions. Operation and maintenance of the emergency propane generator would not generate DPM emissions. Therefore, construction and operation of the Project would not expose existing sensitive receptors to substantial concentrations of TACs.

6.3.3 Valley Fever

Valley fever, also known as coccidioidomycosis, is a disease caused by inhaling spores of the fungus Coccidioides from airborne dust and soil. Coccidioides are thought to grow best in soil after heavy rainfall and then disperse into the air most effectively during hot, dry conditions. In California, most cases of Valley fever are reported among people residing in counties of the southern Central Valley and Central Coast. Coccidioides usually infect the lungs and can cause respiratory symptoms including cough, fever, chest pain, and tiredness.

Project construction activities such as grading would disturb the soil, which can cause fugitive dust emissions. The Project includes design feature PDF AQ-1 to control fugitive dust emissions during construction. As discussed above, PDF AQ-1 is consistent with the standard and discretionary mitigation measures for fugitive PM_{10} emissions recommended by the ICAPCD's *CEQA Air Quality Handbook* and the ICAPCD Regulation VIII fugitive dust rules. With implementation of PDF AQ-1, the Project would not expose existing people to substantial concentrations of fugitive dust that could potentially contain spores of the fungus Coccidioides.

6.4 Odors and Other Emissions

PV facility and BESS operations associated with the Project would not be expected to generate significant odors or other emissions for a substantial duration. Therefore, the Project would not generate odors or other emissions that would adversely affect a substantial number of people.

6.5 Greenhouse Gas Emissions

During construction, the Project would generate temporary GHG emissions through construction activities, such as operation of on-site heavy construction equipment, helicopters, water usage, and off-site construction vehicle trips. During operation, primary sources of GHG emissions would include operation and maintenance activities, on-road vehicles, land-use conversion, BESS refrigerant leakage, and SF_6 leakage from gas-insulated equipment. In addition, after commencing operation, the renewable electricity generated by the Project would displace the electricity generated by fossil fuels to meet energy demand.

There are two ways in which the Project could offset generation from conventional power sources: (1) production of solar power during daylight hours that displaces the daytime production from conventional, fossil fuel powered generators, and (2) discharge of stored

energy from the BESS during evening or nighttime hours when the demand for conventional, fossil fuel powered generators is typical highest, thereby displacing evening/nighttime fossil generation.

While the solar PV component of the Project would provide power to the grid during daylight hours, the BESS component allows that power to be stored and discharged during high demand periods. The BESS component and energy storage in general helps to reduce the swing in demand for electricity from conventional, fossil fuel powered generators that is depicted by California's "duck curve." The "duck curve" is defined by the shape of net electricity demand over a typical day, where net demand, also referred to as net load, is the demand for electricity remaining after all electricity from variable sources of renewable electricity (e.g., solar, wind) have been dispatched. The pattern is characterized by drastic increases in net demand during the evening hours as solar generation decreases, and a net peak occurs later in the evening when solar generation fully drops off (U.S. EIA, 2023).

Energy storage provides an economic opportunity to shift the production of the Project to the hours of highest demand for electricity from dispatchable resources. The Project's dispatch strategy would use the BESS to respond to power price differentials. The battery system would be charged fully during the cheapest CAISO generation hours (i.e., during middle of the day when solar generation is highest and power prices are lowest across the grid, commonly referred to as the "belly of the duck"). Energy from the BESS would then be dispatched during the evening ramp after the sun goes down and power prices peak as natural gas-fired power plants must be dispatched rapidly to meet evening demand. The most common form of generation used to meet CAISO's evening demand peak is conventional combined cycle natural gas, so the above dispatch strategy for the BESS is expected be both charged and discharged fully each day.

While the BESS would predominantly be charged by the solar PV facility, the BESS could also draw some energy from the grid if needed. A metering system would be employed to measure how much energy stored in the BESS is derived from the grid versus the solar facility. The average energy loss associated with the round-trip efficiency for the life of a lithium-ion BESS is approximately 13 percent. Assuming the 4,600 megawatt-hour (MWh) storage capacity of the BESS completes one full cycle per day and is entirely charged from the grid, which would require approximately 4.2 hours of charging at full capacity per day, then approximately 687 MWh would be lost per day or 251,000 MWh would be lost per year due to the round-trip efficiency. Imperial Irrigation District is the electricity provider that would serve the Project. The GHG intensity factor of 644 lb CO_2e/MWh used in this analysis was obtained from the most recent 2024 power content label for Imperial Irrigation District.[5] Consistent with California's carbon neutrality by 2045 goal, an annual reduction of 30.7 lb CO_2e/MWh was applied to the 2024 GHG intensity factor of 644 lb CO_2e/MWh per year. This approach considers the declining statewide average emissions of California's power mix as the state reaches future SB 100 renewable and zero-carbon electricity goals. Using this approach, the total indirect GHG

[5] Imperial Irrigation District, 2025. Renewable Energy, Power Content Label. Available at: https://www.iid.com/power/renewable-energy/power-content-label

emissions associated with round-trip efficiency losses would be 534,193 metric tons of CO_2e over the project's useful life of 30 years, if the BESS were charged exclusively from the electric grid. The total indirect GHG emissions was then averaged over the project's 30-year useful life to derive an average annual indirect GHG emissions of 17,806 metric tons of CO_2e per year. This is a conservative estimate as the BESS would generally be charged with solar generation.

This analysis demonstrates that by discharging stored energy to displace natural gas resources, the Perkins Project would avoid a greater quantity of GHG emissions being generated off-site than it would cause on-site. Detailed summaries of the estimated CO_2e emissions from Project construction and operation, as well as the avoided emissions by producing renewal electricity, are provided in **Appendix A** and **Appendix B**. The estimated GHG emissions for the Project are summarized in **Table 15**.

As shown in **Table 15**, the avoided GHG emissions by producing renewable electricity would significantly offset the GHG emissions from Project construction and operation. The Project would result in a net reduction in GHG emissions of approximately 140,520 metric tons of CO_2e per year. Therefore, Project construction and operation would not result in a cumulatively considerable net increase in GHG emissions.

Table 15. Annual Greenhouse Gas Emissions (Metric Tons per Year)

Source Scenario	CO_2e
Project Construction (30-year Amortized)[1]	478
Project Operation[2]	903
Effects of Land Use Conversion	2,205
Gas-Insulated Equipment SF_6 Leakage	982
BESS Refrigerant Leakage	365
Indirect GHG Emissions[3]	17,806
GHG Emissions Avoided by Producing Renewable Energy	-145,453
Total GHG Emissions	-122,713

Notes:
[1] GHG emissions during construction were amortized over the 30-year life of the project.
[2] Includes 0.32 annual metric tons of CO_2e from refrigerant leakage from the O&M building.
[3] The BESS would generally be charged with solar generation, but may draw some energy from the grid. Indirect GHG emissions from round-trip efficiency loss were calculated based on the amount of energy charged from the grid, the average round-trip efficiency loss of 13%, and the GHG emissions intensity factor for the project's energy provider (Imperial Irrigation District). It was assumed that the 4,600 megawatt-hour storage capacity of the BESS completes one full cycle per day and is entirely charged from the grid. This is a conservative estimate as the BESS would generally be charged with solar generation.
Source: **Appendix A** and **Appendix B.**

6.6 Greenhouse Gas Plans, Policies, and Regulations

6.6.1 2022 Scoping Plan

Local climate action plans have not been adopted in the Project vicinity. The 2022 Scoping Plan outlines a roadmap for the State to achieve targets for carbon neutrality and reduce

anthropogenic GHG emissions by 85 percent below 1990 levels no later than 2045 (CARB, 2022b). The 2022 Scoping Plan identifies actions and outcomes such as rapidly moving to zero-emission transportation; electrifying cars, buses, trains, and trucks; phasing out the use of fossil gas used for heating homes and buildings; clamping down on chemicals and refrigerants; providing communities with sustainable options for walking, biking, and public transit; building out clean, renewable energy resources (such as solar arrays and wind turbine capacity) to displace fossil-fuel fired electrical generation; and scaling up new options such as renewable hydrogen and biomethane.

The Project would build a PV facility and BESS, supporting the displacement of electrical generation by fossil fuels from conventional power plants with a renewable energy resource. Therefore, the Project would not conflict with the 2022 Scoping Plan.

6.6.2 Refrigerant Prohibition

The Project would use R410A and R-134a refrigerant for the O&M building and the BESS system, respectively. According to the IPCC's Fourth Annual Assessment Report, the GWP for R-410A and R-134a are 2,088 and 1,430, respectively.

The R-410A refrigerant will be used in the O&M building air conditioning units. In accordance with California Code of Regulations, Title 17, Section 95374 (c), Table 3, the prohibition on refrigerants with a GWP of 750 or greater for new stationary air-conditioning equipment took effect on January 1, 2025. Since the date has passed, the use of R-410A does not comply with the regulation.

Similarly, the proposed BESS will use R-134a refrigerant in its thermal management system (TMS). The Tesla Megapack 2XL TMS is classified as "chillers – industrial process refrigeration". CARB staff has clarified that the 50-pound exemption does not apply to chillers. In accordance with California Code of Regulations, Title 17, Section 95374 (c), Table 3, the prohibition on refrigerants with a GWP of 750 or greater for chillers where the chilled fluid temperature is above 2°C took effect on January 1, 2024. Since the date has passed, the use of R-134a refrigerant does not comply with the regulation.

At the time of preparation of this analysis, Tesla has submitted a Variance Application with CARB for Megapack 2XL BESS units manufactured between January 1, 2024 and September 30, 2026 (Tesla, 2026). According to the application, Tesla is reengineering the Megapack 2XL TMS to use a compliant refrigerant (HFO-1234yf, with a GWP of <1) without compromising performance. Tesla anticipates completing the reengineering by the end of the third quarter of 2026, after which Megapack 2XLs with the reengineered TMS are expected to be commercially available. The project applicant has not yet procured the BESS at the time of preparation of this report. Although it is highly likely that BESS procurement would occur beyond the variance timeframe, this analysis evaluates the project's GHG emissions and compliance with the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning and Other End-Uses (17 Cal. Code Regs., § 95371 et seq.) based on the currently available Tesla Megapack 2XL specifications to be conservative.

The project would transition from R-410A and R-134a to compliant refrigerants as such refrigerants become commercially available in accordance with the CARB's regulatory implementation schedule. Implementation of **Mitigation Measure GHG-1 Refrigerant Prohibition** will ensure that the project complies with the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning and Other End-Uses (17 Cal. Code Regs., § 95371 et seq.).

> **Mitigation Measure GHG-1 Refrigerant Prohibition**
>
> Prior to the installation of any onsite cooling/refrigeration/air conditioning units, the project owner must submit documentation to the CEC compliance project manager to demonstrate that the project would use refrigerants that comply with the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning and Other End-Uses (California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4, Subarticle 5, Sections 95371, et seq.) in all onsite cooling/refrigeration/air conditioning units.

The project will be consistent with the regulation with the implementation of **Mitigation Measure GHG-1 Refrigerant Prohibition**.

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APPENDICES

APPENDIX A

AIR QUALITY AND GREENHOUSE GAS EMISSION CALCULATION DETAILS

IP Perkins, LLC - Construction, Activity Estimates

Construction - Phasing Assumptions, input to CalEEMod

20	work days per month

Total (months)	Start	End
24	1/2/2026	1/2/2028

Seq.	Phase	Duration (work days)	Duration (months)	Start	End	Worker (trip/day)	Vendor (trip/day)	Hauling (trip/day)
1	Ph 1: Site Preparation	100	5	1/2/2026	6/2/2026	160	10	10
2	Ph 2: PV Panel System (500-1,150 MW)	150	8	4/2/2026	11/2/2026	460	15	40
3	Ph 3: Inverters, Substation, Electrical	150	8	9/2/2026	4/2/2027	560	15	40
4	Ph 4: Gen-tie and Loop-in Transmission	30	2	2/2/2027	3/2/2027	100	5	5
5	Ph 5: Battery Storage (500-1,150 MW)	160	8	2/2/2027	10/2/2027	100	5	15
6	Ph 6: Utility Switchyard (500 kV)	200	10	2/2/2027	12/2/2027	50	5	20

Peak Days of Overlapping Phases	Worker (trip/day)	Vendor (trip/day)	Hauling (trip/day)
Ph 1 + Ph 2	620	25	50
Ph 2 + Ph 3	1,020	30	80
Ph 3 + Ph 4 + Ph 5 + Ph 6	810	30	80

For CalEEMod Assumptions:

Basis: Project Description: Plan of Development and supporting studies, circa Feb 2024.

- Work occurs 5 days a week, equipment typically running 10 hr/day; ~ 6,126 ac site. Appx 24-month construction duration.
- POD for PV generation between 500 to 1,150 MW, w/ storage BESS.
- On-road motor vehicle trips are counted as one-way for emissions. Average haul trip length to APCD boundary = 70 mi. Commute length = 40 mi (El Centro or Yuma).
- On-road hauling up to 110 one-way trips (55 roundtrip deliveries) per day includes 80 for materials plus 30 water trucks (Draft TIA, Feb 2024).
- On-road workers up to 1,020 one-way trips per day, w/ mandatory carpooling / ridesharing (Draft TIA, Feb 2024).

User-Specified input to CalEEMod, Construction - Percent of travel on Paved Roads



CalEEMod® — caleemod.com/model/inputs?construction/on-road-fugitive-dust

CalEEMod California Emissions Estimator Model ® — Perkins v12062024

Perkins v12062024

- Characteristics
- Land Use
- Construction
  - Construction Phases
  - Off-Road Equipment
  - Off-Road Equipment EF
  - Dust from Material Movement
  - Demolition
  - Trips and VMT
  - On-Road Fugitive Dust
  - Architectural Coatings
  - Paved Area
  - Electricity

	Percent (%) of Travel on Paved Roads				Roadway Characteristics			Vehicle Characteristics	
Phase Name	% Pave Worker	% Pave Vendor	% Pave Hauling	% Pave Onsite Truck	Road Silt Loading (g/m²)	Material Silt Content (%)	Material Moisture Content (%)	Average Vehicle Weight (tons)	Mean Vehicle Speed (mph)
Ph 1 Site Preparation	96	96	96	0	0.1	4.3	0.5	2.4	40
Ph 2 PV Panel System	96	96	96	0	0.1	4.3	0.5	2.4	40
Ph 3 Inverters, Transformers, Substation, Electrical	96	96	96	0	0.1	4.3	0.5	2.4	40
Ph 4 Gen Tie	96	96	96	0	0.1	4.3	0.5	2.4	40
Ph 5 Battery Storage	96	96	96	0	0.1	4.3	0.5	2.4	40
Ph 6 Utility Switchyard	96	96	96	0	0.1	4.3	0.5	2.4	40

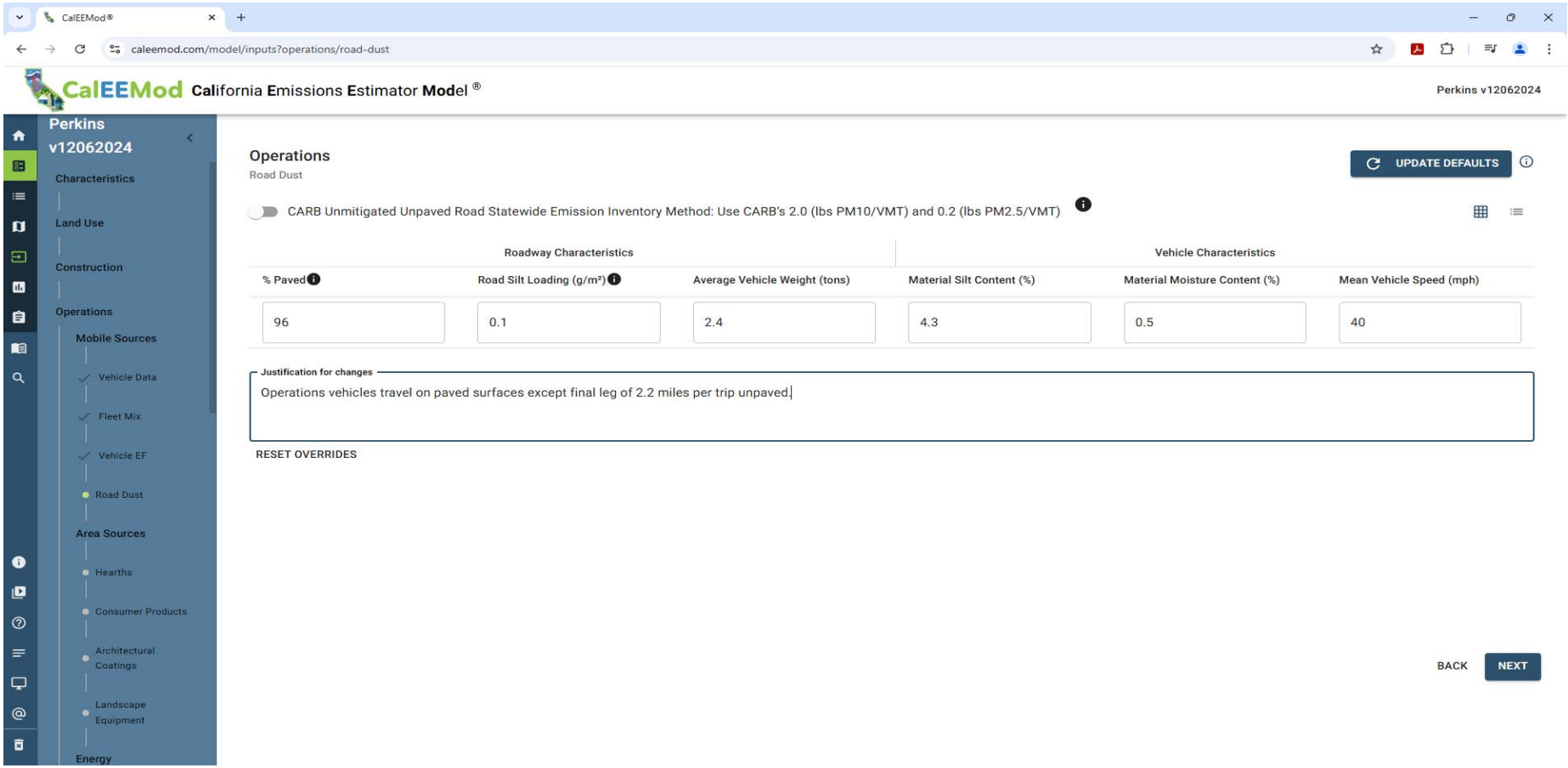
Justification for changes

Offsite vehicles travel on paved roads, except final leg of 1.6 to 2.8 miles per trip unpaved. Onsite trucks travel 100 percent unpaved, with dust suppressants for control. Silt Content set at 4.3 percent reflects default for operation phase, per AP-42 Table 13.2.2-1 for service roads. All offsite unpaved roads subject to ICAPCD Reg VIII controls (USEPA-approved PM10 SIP).

RESET OVERRIDES

BACK NEXT

User-Specified input to CalEEMod, Operations - Percent of travel on Paved Roads



IP Perkins - Construction, Air Pollutants - Unmitigated

Duration of Construction: **24 months**

Summary from CalEEMod, Unmitigated, Daily (Max, lb/day)

Phase	Unmit/Mit	Location	Rate	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T
3.1. Ph 1 Site Preparation (2026) - Unmitigated	Unmitigated	Onsite	Daily (Max)	20.91	191.33	206.15	0.33	8.36	107.35	115.71	7.69	51.44	59.13
3.1. Ph 1 Site Preparation (2026) - Unmitigated	Unmitigated	Offsite	Daily (Max)	1.27	6.38	36.42	0.04	0.08	237.9	237.9	0.08	24.48	24.55
3.3. Ph 2 PV Panel System (2026) - Unmitigated	Unmitigated	Onsite	Daily (Max)	37.31	287.33	339.15	0.50	13.30	59.45	72.75	12.2	27.64	39.84
3.3. Ph 2 PV Panel System (2026) - Unmitigated	Unmitigated	Offsite	Daily (Max)	3.65	18.48	104.06	0.08	0.24	677.9	678.2	0.24	69.84	70.08
3.5. Ph 3 Inverters, Transformers, Substation, Electrical (2026) - Unmitigated	Unmitigated	Onsite	Daily (Max)	6.45	60.73	79.65	0.14	2.16	3.35	5.51	1.98	0.34	2.32
3.5. Ph 3 Inverters, Transformers, Substation, Electrical (2026) - Unmitigated	Unmitigated	Offsite	Daily (Max)	4.41	19.80	126.06	0.08	0.24	799.9	800.2	0.24	82.34	82.58
3.7. Ph 3 Inverters, Transformers, Substation, Electrical (2027) - Unmitigated	Unmitigated	Onsite	Daily (Max)	6.16	58.23	79.35	0.14	1.91	3.35	5.26	1.76	0.34	2.1
3.7. Ph 3 Inverters, Transformers, Substation, Electrical (2027) - Unmitigated	Unmitigated	Offsite	Daily (Max)	4.22	18.86	114.91	0.08	0.24	799.9	800.2	0.24	82.34	82.58
3.9. Ph 4 Gen Tie (2027) - Unmitigated	Unmitigated	Onsite	Daily (Max)	1.83	19.93	23.65	0.05	0.53	3.35	3.88	0.49	0.34	0.83
3.9. Ph 4 Gen Tie (2027) - Unmitigated	Unmitigated	Offsite	Daily (Max)	0.55	3.26	10.97	0.02	0.04	143.4	143.5	0.04	14.74	14.78
3.11. Ph 5 Battery Storage (2027) - Unmitigated	Unmitigated	Onsite	Daily (Max)	4.60	44.83	59.25	0.11	1.39	3.35	4.74	1.28	0.34	1.62
3.11. Ph 5 Battery Storage (2027) - Unmitigated	Unmitigated	Offsite	Daily (Max)	0.79	5.61	20.79	0.03	0.09	164.9	165	0.09	16.99	17.07
3.13. Ph 6 Utility Switchyard (2027) - Unmitigated	Unmitigated	Onsite	Daily (Max)	4.50	42.63	53.35	0.09	1.34	9.97	11.31	1.23	3.72	4.95
3.13. Ph 6 Utility Switchyard (2027) - Unmitigated	Unmitigated	Offsite	Daily (Max)	0.43	6.18	10.95	0.04	0.11	114.5	114.6	0.11	11.87	11.97

Other Sources, Estimated outside CalEEMod

Offroad, Grading Equipment Passes	Duration (work days)
Ph 1: Site Preparation	100
Ph 2: PV Panel System (500-1,150 MW)	150
Ph 6: Utility Switchyard (500 kV)	200

Grading, Subtotals Daily Emissions (lbs/day)	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
		13.26	13.26		2.21	2.21
		7.95	7.95		1.32	1.32
		2.12	2.12		0.35	0.35

Other Sources, Estimated outside CalEEMod

Helicopters	Duration (work days)
Ph 3: Inverters, Substation, Electrical	150
Ph 4: Gen-tie and Loop-in Transmission	30

Helicopter, Subtotals Daily Emissions (lbs/day)

ROG	NOX	CO	SO2	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
14.63	6.61	18.39		0.22		0.22	0.22		0.22
14.63	6.61	18.39		0.22		0.22	0.22		0.22

Perkins Project: Construction, Daily Emissions without Mitigation (lb/day)

	ROG	NOX	CO	SO2	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
Ph 1: Site Preparation	22.2	197.7	242.6	0.4	8.4	358.5	366.9	7.8	78.1	85.9
Ph 2: PV Panel System (500-1,150 MW)	41.0	305.8	443.2	0.6	13.5	745.3	758.9	12.4	98.8	111.2
Ph 3: Inverters, Substation, Electrical	25.5	87.1	224.1	0.2	2.6	803.3	805.9	2.4	82.7	85.1
Ph 4: Gen-tie and Loop-in Transmission	17.0	29.8	53.0	0.1	0.8	146.8	147.6	0.8	15.1	15.8
Ph 5: Battery Storage (500-1,150 MW)	5.4	50.4	80.0	0.1	1.5	168.3	169.7	1.4	17.3	18.7
Ph 6: Utility Switchyard (500 kV)	4.9	48.8	64.3	0.1	1.5	126.6	128.0	1.3	15.9	17.3
Daily Emissions, by Phase without Mitigation	**41.0**	**305.8**	**443.2**	**0.6**	**13.5**	**803.3**	**805.9**	**12.4**	**98.8**	**111.2**

Peak Day of Emissions, Overlapping Phases without Mitigation	ROG	NOX	CO	SO2	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
Ph 1 + Ph 2	63.1	503.5	685.8	1.0	22.0	1,103.8	1,125.8	20.2	176.9	197.1
Ph 2 + Ph 3	66.5	393.0	667.3	0.8	16.2	1,548.6	1,564.8	14.9	181.5	196.4
Ph 3 + Ph 4 + Ph 5 + Ph 6	52.8	216.2	421.5	0.6	6.3	1,244.8	1,251.3	5.9	131.0	136.9

IP Perkins - Construction, Air Pollutants - Unmitigated

Summary from CalEEMod, Unmitigated, Annual (tons)

Phase	Unmit/Mit	Location	Rate	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T
3.1. Ph 1 Site Preparation (2026) - Unmitigated	Unmitigated	Onsite	Annual	1.04	9.55	10.31	0.02	0.42	5.35	5.77	0.38	2.57	2.95
3.1. Ph 1 Site Preparation (2026) - Unmitigated	Unmitigated	Offsite	Annual	0.05	0.31	1.29	0.00	0.00	11.74	11.74	0	1.21	1.21
3.3. Ph 2 PV Panel System (2026) - Unmitigated	Unmitigated	Onsite	Annual	2.80	21.52	25.41	0.04	1.00	4.46	5.46	0.92	2.07	3
3.3. Ph 2 PV Panel System (2026) - Unmitigated	Unmitigated	Offsite	Annual	0.24	1.37	5.54	0.00	0.01	50.23	50.25	0.01	5.18	5.19
3.5. Ph 3 Inverters, Transformers, Substation, Electrical (2026) - Unmitigated	Unmitigated	Onsite	Annual	0.28	2.62	3.44	0.01	0.09	0.14	0.23	0.09	0.01	0.1
3.5. Ph 3 Inverters, Transformers, Substation, Electrical (2026) - Unmitigated	Unmitigated	Offsite	Annual	0.16	0.85	3.86	0.00	0.01	34.13	34.14	0.01	3.51	3.52
3.7. Ph 3 Inverters, Transformers, Substation, Electrical (2027) - Unmitigated	Unmitigated	Onsite	Annual	0.20	1.91	2.60	0.00	0.06	0.11	0.17	0.06	0.01	0.07
3.7. Ph 3 Inverters, Transformers, Substation, Electrical (2027) - Unmitigated	Unmitigated	Offsite	Annual	0.12	0.60	2.64	0.00	0.01	25.92	25.93	0.01	2.67	2.68
3.9. Ph 4 Gen Tie (2027) - Unmitigated	Unmitigated	Onsite	Annual	0.03	0.29	0.35	0.00	0.01	0.05	0.06	0.01	0	0.02
3.9. Ph 4 Gen Tie (2027) - Unmitigated	Unmitigated	Offsite	Annual	0.01	0.05	0.21	0.00	0.00	2.12	2.12	0	0.23	0.23
3.11. Ph 5 Battery Storage (2027) - Unmitigated	Unmitigated	Onsite	Annual	0.37	3.59	4.74	0.01	0.11	0.26	0.37	0.1	0.03	0.13
3.11. Ph 5 Battery Storage (2027) - Unmitigated	Unmitigated	Offsite	Annual	0.05	0.44	1.18	0.00	0.01	13.01	13.02	0.01	1.35	1.35
3.13. Ph 6 Utility Switchyard (2027) - Unmitigated	Unmitigated	Onsite	Annual	0.45	4.26	5.33	0.01	0.13	0.99	1.12	0.12	0.37	0.49
3.13. Ph 6 Utility Switchyard (2027) - Unmitigated	Unmitigated	Offsite	Annual	0.03	0.61	0.78	0.00	0.01	11.31	11.32	0.01	1.17	1.18

Other Sources, Estimated outside CalEEMod

Offroad, Grading Equipment Passes	Duration (work days)
Ph 1: Site Preparation	100
Ph 2: PV Panel System (500-1,150 MW)	150
Ph 6: Utility Switchyard (500 kV)	200

Grading, Subtotals (tons)	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
		0.66	0.66		0.11	0.11
		0.60	0.60		0.10	0.10
		0.21	0.21		0.04	0.04

Other Sources, Estimated outside CalEEMod

Helicopters	Duration (work days)
Ph 3: Inverters, Substation, Electrical	150
Ph 4: Gen-tie and Loop-in Transmission	30

Helicopter, Subtotals (tons)

ROG	NOX	CO	SO2	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
1.10	0.50	1.38		0.02		0.02	0.02		0.02
0.22	0.10	0.28		0.00		0.00	0.00		0.00

Unmitigated - Duration of Construction (tons)

Onsite Portion	ROG	NOX	CO	SO2	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
Ph 1: Site Preparation	1.04	9.55	10.31	0.02	0.42	6.01	6.43	0.38	2.68	3.06
Ph 2: PV Panel System (500-1,150 MW)	2.80	21.52	25.41	0.04	1.00	5.06	6.06	0.92	2.17	3.10
Ph 3: Inverters, Substation, Electrical	0.48	4.53	6.04	0.01	0.15	0.25	0.40	0.15	0.02	0.17
Ph 4: Gen-tie and Loop-in Transmission	0.03	0.29	0.35	0.00	0.01	0.05	0.06	0.01	0.00	0.02
Ph 5: Battery Storage (500-1,150 MW)	0.37	3.59	4.74	0.01	0.11	0.26	0.37	0.10	0.03	0.13
Ph 6: Utility Switchyard (500 kV)	0.45	4.26	5.33	0.01	0.13	1.20	1.33	0.12	0.41	0.53
Offsite Portion										
Ph 1: Site Preparation	0.05	0.31	1.29	0.00	0.00	11.74	11.74	0.00	1.21	1.21
Ph 2: PV Panel System (500-1,150 MW)	0.24	1.37	5.54	0.00	0.01	50.23	50.25	0.01	5.18	5.19
Ph 3: Inverters, Substation, Electrical	1.38	1.95	7.88	0.00	0.04	60.05	60.09	0.04	6.18	6.22
Ph 4: Gen-tie and Loop-in Transmission	0.23	0.15	0.49	0.00	0.00	2.12	2.12	0.00	0.23	0.23
Ph 5: Battery Storage (500-1,150 MW)	0.05	0.44	1.18	0.00	0.01	13.01	13.02	0.01	1.35	1.35
Ph 6: Utility Switchyard (500 kV)	0.03	0.61	0.78	0.00	0.01	11.31	11.32	0.01	1.17	1.18
Unmitigated - Total Duration of Construction (tons)	**7.15**	**48.57**	**69.34**	**0.09**	**1.89**	**161.29**	**163.19**	**1.75**	**20.63**	**22.39**

Perkins Project: Construction, Annual Emissions without Mitigation (ton/year)	ROG	NOX	CO	SO2	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
Onsite Portion	2.59	21.87	26.09	0.05	0.91	6.42	7.33	0.84	2.65	3.50
Offsite Portion	0.99	2.41	8.58	0.00	0.03	74.23	74.27	0.03	7.66	7.69
Annual Average Construction Emissions, without Mitigation	**3.57**	**24.28**	**34.67**	**0.05**	**0.94**	**80.65**	**81.60**	**0.87**	**10.31**	**11.19**
Unmitigated - Duration of Construction, Average Daily Rate (lb/day)	**19.6**	**133.1**	**190.0**	**0.2**	**5.2**	**441.9**	**447.1**	**4.8**	**56.5**	**61.3**

IP Perkins - Construction, Air Pollutants - Mitigated

Duration of Construction: **24 months**

Summary from CalEEMod, Mitigated, Daily (Max, lb/day)

Phase	Unmit/Mit	Location	Rate	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T
3.2. Ph 1 Site Preparation (2026) - Mitigated	Mitigated	Onsite	Daily (Max)	3.77	40.03	210.15	0.33	0.68	41.91	42.6	0.68	20.05	20.74
3.2. Ph 1 Site Preparation (2026) - Mitigated	Mitigated	Offsite	Daily (Max)	1.27	6.38	36.42	0.04	0.08	237.9	237.9	0.08	24.48	24.55
3.4. Ph 2 PV Panel System (2026) - Mitigated	Mitigated	Onsite	Daily (Max)	6.55	129.33	341.15	0.50	0.97	23.41	24.39	0.97	10.85	11.83
3.4. Ph 2 PV Panel System (2026) - Mitigated	Mitigated	Offsite	Daily (Max)	3.65	18.48	104.06	0.08	0.24	677.9	678.2	0.24	69.84	70.08
3.6. Ph 3 Inverters, Transformers, Substation, Electrical (2026) - Mitigated	Mitigated	Onsite	Daily (Max)	1.72	29.23	92.45	0.14	0.27	1.51	1.79	0.27	0.15	0.43
3.6. Ph 3 Inverters, Transformers, Substation, Electrical (2026) - Mitigated	Mitigated	Offsite	Daily (Max)	4.41	19.80	126.06	0.08	0.24	799.9	800.2	0.24	82.34	82.58
3.8. Ph 3 Inverters, Transformers, Substation, Electrical (2027) - Mitigated	Mitigated	Onsite	Daily (Max)	1.72	29.23	92.45	0.14	0.27	1.51	1.79	0.27	0.15	0.43
3.8. Ph 3 Inverters, Transformers, Substation, Electrical (2027) - Mitigated	Mitigated	Offsite	Daily (Max)	4.22	18.86	114.91	0.08	0.24	799.9	800.2	0.24	82.34	82.58
3.10. Ph 4 Gen Tie (2027) - Mitigated	Mitigated	Onsite	Daily (Max)	0.60	12.23	29.65	0.05	0.09	1.51	1.61	0.09	0.15	0.25
3.10. Ph 4 Gen Tie (2027) - Mitigated	Mitigated	Offsite	Daily (Max)	0.55	3.26	10.97	0.02	0.04	143.4	143.5	0.04	14.74	14.78
3.12. Ph 5 Battery Storage (2027) - Mitigated	Mitigated	Onsite	Daily (Max)	1.35	25.03	70.15	0.11	0.21	1.51	1.73	0.21	0.15	0.37
3.12. Ph 5 Battery Storage (2027) - Mitigated	Mitigated	Offsite	Daily (Max)	0.79	5.61	20.79	0.03	0.09	164.9	165	0.09	16.99	17.07
3.14. Ph 6 Utility Switchyard (2027) - Mitigated	Mitigated	Onsite	Daily (Max)	1.18	23.13	59.85	0.09	0.17	4.09	4.27	0.17	1.47	1.65
3.14. Ph 6 Utility Switchyard (2027) - Mitigated	Mitigated	Offsite	Daily (Max)	0.43	6.18	10.95	0.04	0.11	114.5	114.6	0.11	11.87	11.97

Other Sources, Estimated outside CalEEMod

Offroad, Grading Equipment Passes	Duration (work days)
Ph 1: Site Preparation	100
Ph 2: PV Panel System (500-1,150 MW)	150
Ph 6: Utility Switchyard (500 kV)	200

Grading, Subtotals Daily Emissions (lbs/day)	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
		2.12	2.12		0.35	0.35
		1.27	1.27		0.21	0.21
		0.34	0.34		0.06	0.06

Other Sources, Estimated outside CalEEMod

Helicopters	Duration (work days)
Ph 3: Inverters, Substation, Electrical	150
Ph 4: Gen-tie and Loop-in Transmission	30

Helicopter, Subtotals Daily Emissions (lbs/day)

ROG	NOX	CO	SO2	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
14.63	6.61	18.39		0.22		0.22	0.22		0.22
14.63	6.61	18.39		0.22		0.22	0.22		0.22

Perkins Project: Construction, Mitigated Daily Emissions (lb/day)

	ROG	NOX	CO	SO2	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
Ph 1: Site Preparation	5.0	46.4	246.6	0.4	0.8	281.9	282.6	0.8	44.9	45.6
Ph 2: PV Panel System (500-1,150 MW)	10.2	147.8	445.2	0.6	1.2	702.6	703.9	1.2	80.9	82.1
Ph 3: Inverters, Substation, Electrical	20.8	55.6	236.9	0.2	0.7	801.4	802.2	0.7	82.5	83.2
Ph 4: Gen-tie and Loop-in Transmission	15.8	22.1	59.0	0.1	0.4	144.9	145.3	0.4	14.9	15.3
Ph 5: Battery Storage (500-1,150 MW)	2.1	30.6	90.9	0.1	0.3	166.4	166.7	0.3	17.1	17.4
Ph 6: Utility Switchyard (500 kV)	1.6	29.3	70.8	0.1	0.3	118.9	119.2	0.3	13.4	13.7
Daily Emissions, by Phase with Mitigation	**20.8**	**147.8**	**445.2**	**0.6**	**1.2**	**801.4**	**802.2**	**1.2**	**82.5**	**83.2**

Peak Day of Emissions, Overlapping Phases with Mitigation	ROG	NOX	CO	SO2	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
Ph 1 + Ph 2	15.2	194.2	691.8	1.0	2.0	984.5	986.5	2.0	125.8	127.8
Ph 2 + Ph 3	31.0	203.5	682.1	0.8	1.9	1,504.0	1,506.1	1.9	163.4	165.4
Ph 3 + Ph 4 + Ph 5 + Ph 6	40.3	137.7	457.7	0.6	1.7	1,231.7	1,233.5	1.7	127.9	129.6

IP Perkins - Construction, Air Pollutants - Mitigated

Summary from CalEEMod, Mitigated, Annual (tons)

Phase	Unmit/Mit	Location	Rate	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T
3.2. Ph 1 Site Preparation (2026) - Mitigated	Mitigated	Onsite	Annual	0.19	2.01	10.51	0.02	0.03	2.09	2.12	0.03	1.01	1.04
3.2. Ph 1 Site Preparation (2026) - Mitigated	Mitigated	Offsite	Annual	0.05	0.31	1.29	0.00	0.00	11.74	11.74	0	1.21	1.21
3.4. Ph 2 PV Panel System (2026) - Mitigated	Mitigated	Onsite	Annual	0.49	9.73	25.51	0.04	0.07	1.75	1.82	0.07	0.81	0.88
3.4. Ph 2 PV Panel System (2026) - Mitigated	Mitigated	Offsite	Annual	0.24	1.37	5.54	0.00	0.01	50.23	50.25	0.01	5.18	5.19
3.6. Ph 3 Inverters, Transformers, Substation, Electrical (2026) - Mitigated	Mitigated	Onsite	Annual	0.07	1.26	4.00	0.01	0.01	0.06	0.07	0.01	0.01	0.02
3.6. Ph 3 Inverters, Transformers, Substation, Electrical (2026) - Mitigated	Mitigated	Offsite	Annual	0.16	0.85	3.86	0.00	0.01	34.13	34.14	0.01	3.51	3.52
3.8. Ph 3 Inverters, Transformers, Substation, Electrical (2027) - Mitigated	Mitigated	Onsite	Annual	0.06	0.96	3.03	0.00	0.01	0.05	0.06	0.01	0	0.02
3.8. Ph 3 Inverters, Transformers, Substation, Electrical (2027) - Mitigated	Mitigated	Offsite	Annual	0.12	0.60	2.64	0.00	0.01	25.92	25.93	0.01	2.67	2.68
3.10. Ph 4 Gen Tie (2027) - Mitigated	Mitigated	Onsite	Annual	0.01	0.18	0.44	0.00	0.00	0.02	0.02	0	0	0
3.10. Ph 4 Gen Tie (2027) - Mitigated	Mitigated	Offsite	Annual	0.01	0.05	0.21	0.00	0.00	2.12	2.12	0	0.23	0.23
3.12. Ph 5 Battery Storage (2027) - Mitigated	Mitigated	Onsite	Annual	0.11	2.01	5.61	0.01	0.02	0.12	0.14	0.02	0.01	0.03
3.12. Ph 5 Battery Storage (2027) - Mitigated	Mitigated	Offsite	Annual	0.05	0.44	1.18	0.00	0.01	13.01	13.02	0.01	1.35	1.35
3.14. Ph 6 Utility Switchyard (2027) - Mitigated	Mitigated	Onsite	Annual	0.12	2.31	5.98	0.01	0.02	0.41	0.43	0.02	0.15	0.17
3.14. Ph 6 Utility Switchyard (2027) - Mitigated	Mitigated	Offsite	Annual	0.03	0.61	0.78	0.00	0.01	11.31	11.32	0.01	1.17	1.18

Other Sources, Estimated outside CalEEMod

Offroad, Grading Equipment Passes	Duration (work days)
Ph 1: Site Preparation	100
Ph 2: PV Panel System (500-1,150 MW)	150
Ph 6: Utility Switchyard (500 kV)	200

Grading, Subtotals (tons)	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
		0.11	0.11		0.02	0.02
		0.10	0.10		0.02	0.02
		0.03	0.03		0.01	0.01

Other Sources, Estimated outside CalEEMod

Helicopters	Duration (work days)
Ph 3: Inverters, Substation, Electrical	150
Ph 4: Gen-tie and Loop-in Transmission	30

Helicopter, Subtotals (tons)

ROG	NOX	CO	SO2	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
1.10	0.50	1.38		0.02		0.02	0.02		0.02
0.22	0.10	0.28		0.00		0.00	0.00		0.00

Mitigated - Duration of Construction (tons)

Onsite Portion	ROG	NOX	CO	SO2	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
Ph 1: Site Preparation	0.19	2.01	10.51	0.02	0.03	2.20	2.23	0.03	1.03	1.06
Ph 2: PV Panel System (500-1,150 MW)	0.49	9.73	25.51	0.04	0.07	1.85	1.92	0.07	0.83	0.90
Ph 3: Inverters, Substation, Electrical	0.13	2.22	7.03	0.01	0.02	0.11	0.13	0.02	0.01	0.04
Ph 4: Gen-tie and Loop-in Transmission	0.01	0.18	0.44	0.00	0.00	0.02	0.02	0.00	0.00	0.00
Ph 5: Battery Storage (500-1,150 MW)	0.11	2.01	5.61	0.01	0.02	0.12	0.14	0.02	0.01	0.03
Ph 6: Utility Switchyard (500 kV)	0.12	2.31	5.98	0.01	0.02	0.44	0.46	0.02	0.16	0.18
Offsite Portion										
Ph 1: Site Preparation	0.05	0.31	1.29	0.00	0.00	11.74	11.74	0.00	1.21	1.21
Ph 2: PV Panel System (500-1,150 MW)	0.24	1.37	5.54	0.00	0.01	50.23	50.25	0.01	5.18	5.19
Ph 3: Inverters, Substation, Electrical	1.38	1.95	7.88	0.00	0.04	60.05	60.09	0.04	6.18	6.22
Ph 4: Gen-tie and Loop-in Transmission	0.23	0.15	0.49	0.00	0.00	2.12	2.12	0.00	0.23	0.23
Ph 5: Battery Storage (500-1,150 MW)	0.05	0.44	1.18	0.00	0.01	13.01	13.02	0.01	1.35	1.35
Ph 6: Utility Switchyard (500 kV)	0.03	0.61	0.78	0.00	0.01	11.31	11.32	0.01	1.17	1.18
Mitigated - Total Duration of Construction (tons)	**3.03**	**23.29**	**72.24**	**0.09**	**0.23**	**153.20**	**153.44**	**0.23**	**17.35**	**17.58**

Perkins Project: Construction, Annual Emissions with Mitigation (ton/year)	ROG	NOX	CO	SO2	PM10 (Exhaust)	PM10 (Dust)	PM10 (Total)	PM2.5 (Exhaust)	PM2.5 (Dust)	PM2.5 (Total)
Onsite Portion	0.53	9.23	27.54	0.05	0.08	2.37	2.45	0.08	1.01	1.10
Offsite Portion	0.99	2.41	8.58	0.00	0.03	74.23	74.27	0.03	7.66	7.69
Annual Average Construction Emissions, with Mitigation (ton/year)	**1.51**	**11.64**	**36.12**	**0.05**	**0.11**	**76.60**	**76.72**	**0.11**	**8.67**	**8.79**
Mitigated - Duration of Construction, Average Daily Rate (lb/day)	**8.3**	**63.8**	**197.9**	**0.2**	**0.6**	**419.7**	**420.4**	**0.6**	**47.5**	**48.2**

IP Perkins - Construction, Grading Equipment Passes

Construction Phase - Fugitive Dust, per CalEEMod Factors for Grading Equipment Passes

CalEEMod User Guide, Appendix C - 4.4.1 Grading Equipment Passes

Basis: Section 11.9 of USEPA's AP-42 (USEPA 1998b)

EFPM15 = 0.051 × (S)2.0, and EFPM10 = EFPM15 × FPM10

EFTSP = 0.04 × (S)2.5, and EFPM2.5 = EFTSP × FPM2.5

CalEEMod User Guide (2022), Activity Factors: Table G-14. Daily Acres Graded by Equipment Type

Equipment	Acres Graded per 8 Hour Day
Crawler Tractors	0.5
Graders	0.5
Rubber Tired Dozers	0.5
Scrapers	1

Source: South Coast Air Quality Management District Construction Survey.

CalEEMod User Guide (2022), Emission Factors, without mitigation

Where:		PM10	PM2.5
F - scaling factor (AP-42)		0.6	0.031
S (mph)		7.1	7.1
EF (lb/VMT)		1.543	0.167
Dust Control Plan Mitigation % -		84%	84%

VMT = As/Wb × UC1 ÷ UC2

Wb (blade, ft)	12
UC1 (sqft/ac)	43560
UC2 (ft/mile)	5280

	Graders / or / Rubber Tire Dozer (equipment / day)	As (ac/day)	VMT per day	Unmitigated PM10 (lb/day)	Unmitigated PM2.5 (lb/day)	Mitigated PM10 (lb/day)	Mitigated PM2.5 (lb/day)
Ph 1: Site Preparation	25	12.5	8.59375	13.26	2.21	2.12	0.35
Ph 2: PV Panel System (500-1,150 MW)	15	7.5	5.15625	7.95	1.32	1.27	0.21
Ph 6: Utility Switchyard (500 kV)	2	2	1.375	2.12	0.35	0.34	0.06

IP Perkins - Construction, Helicopter Emission Factors and Activity Estimates

Construction Phase - Helicopter Activity during Construction: Add to CalEEMod Results

Basis: Swiss Confederation, FOCA, 2015 (Guidance on the Determination of Helicopter Emissions, Edition 2, Dec 2015, FOCA, CH-3003 Bern)

Criteria Air Pollutant Emission Factors

		Rating (shp/engine)	# engines	LTO Fuel (kg)	LTO HC (g)	LTO NOx (g)	LTO CO (g)	LTO PM (g)	One-hour Fuel (kg)	One-hour HC (kg)	One-hour NOx (kg)	One-hour CO (kg)	One-hour PM (kg)
H500 - Hughes 500 (DDA250-C18)		317	1	16.4	438.2	59.5	571.2	2.3	98.8	0.96	0.48	1.2	0.016
single engine, turboshaft (typ ops)	10 min per LTO (ground idle plus TO or App)												
				0.0273 LTO avg rate Fuel Use (kg/sec)					0.0274 One-hour Fuel Use (kg/sec)				
				5.39 LTO Fuel Use (gal)					32.46 One-hour Fuel Use (gal/hr)				

Jet fuel A, density std conditions (appx)
804 kg/m3
3.04 kg/gal
0.135 MMBtu/gal

Emissions per LTO

ROG (lb/LTO)	NOx (lb/LTO)	CO (lb/LTO)	PM (lb/LTO)
0.97	0.13	1.26	0.01

Emissions per Hour

ROG (lb/hr)	NOx (lb/hr)	CO (lb/hr)	PM (lb/hr)
2.12	1.06	2.65	0.04

GHG Emission Factors

Factors for: Kerosene-Type Jet Fuel	CO2 (kg/MMBtu)	CH4 (kg/MMBtu)	N2O (kg/MMBtu)
US EPA, 40 CFR 98, Subchapter C Table C-1:	72.22	0.003	0.0006

CO2 (g/gal)	CH4 (g/gal)	N2O (g/gal)
9749.7	0.405	0.081

Emissions per LTO

CO2e (lb/LTO)	CO2 (lb/LTO)	CH4 (lb/LTO)	N2O (lb/LTO)
116.23	115.82	0.005	0.001

Emissions per Hour

CO2e (lb/hr)	CO2 (lb/hr)	CH4 (lb/hr)	N2O (lb/hr)
700.21	697.76	0.029	0.006

Helicopter Activity Estimates

Helicopter Activity, Phase 3 Peak Day	Activity
Days in phase	150
Helicopters per day	1

		ROG (lbs/day)	NOx (lbs/day)	CO (lbs/day)	PM (lbs/day)	CO2e (MT total)
Overall LTO	300	1.93	0.26	2.52	0.01	15.8
Overall Hours	900	12.70	6.35	15.87	0.21	285.9
Phase 3, Daily:		14.63	6.61	18.39	0.222	301.7

Helicopter Activity, Phase 4 Peak Day	Activity
Days in phase	30
Helicopters per day	1

		ROG (lbs/day)	NOx (lbs/day)	CO (lbs/day)	PM (lbs/day)	CO2e (MT total)
Overall LTO	60	1.93	0.26	2.52	0.01	3.2
Overall Hours	180	12.70	6.35	15.87	0.21	57.2
Phase 4, Daily:		14.63	6.61	18.39	0.222	60.3

	CO2e (MT total)
Total GHG (MT):	362.0

IP Perkins - Construction, GHG related to Water Supply

Construction Phase - Water Use during Construction: Add to CalEEMod Results

Water Energy Intensity Factors: CalEEMod, v. 2022.1.1.3. Table G-32

Construction Water Use : 1,000 acre-feet per entire construction
325.85 million gallons

Hydrologic Region	Supply Water (kWh/million gallons)	Treat Water (kWh/million gallons)	Distribute Water (kWh/million gallons)	Wastewater Treatment (kWh/million gallons)	Sum (kWh/million gallons)
Colorado River Basin	2304	748	166	1519	4,737

CalEEMod (v.2022.1.1.3) for IID: GHG Intensity of Electricity

CO2 (lb/MWh)	CH4 (lb/MWh)	N2O (lb/MWh)
456.54	0.033	0.004

	MWh	CO2e Factor (MT/MWh)
Construction Water Supply, Electricity Use :	1,544	0.208

Construction Water Supply, GHG Emissions :	Water Use CO2e (MT)
	321.1

IP Perkins - Operational Activities, Emissions Estimates

Operation Phase - Emissions Summary from CalEEMod Results

Operation includes:
- O&M building(s) up to 7,500 square-feet.
- Water supply of 50 acre-feet annually for panel washing, minimal indoor water uses.
- Off-road equipment, typically forklifts and loaders for routine and unscheduled maintenance.
- Standby generator (one or two propane powered generators, rated at 150 kW each or up to 2 x 262 brake-horsepower).

Operation Phase - Annual Typical O&M

Operations Emissions by Sector, Annual

	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO_2	$NBCO_2$	CO_2T	CH_4	N_2O	R	CO_2e
Category	tons/yr										MT/yr						
Mobile	0.05	0.60	1.35	0.01	0.01	23.60	23.60	0.01	2.43	2.44		827	827	0.01	0.07	0.92	851
Area	0.04	< 0.005	0.03	< 0.005	< 0.005		< 0.005	< 0.005		< 0.005		0.11	0.11	< 0.005	< 0.005		0.1
Energy	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00	0.00		0.0
Water											0.55	12.60	13.10	0.06	< 0.005		15.0
Waste											0.83	0.00	0.83	0.08	0.00		2.9
Refrig.																0.32	0.3
Off-Road	0.01	0.10	0.19	< 0.005	< 0.005		< 0.005	< 0.005		< 0.005		26.10	26.10	< 0.005	< 0.005		26.2
Stationary	0.12	0.01	0.30	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	6.68	6.68	0.01	0.00	0.00	7.0
Vegetation												2,205	2,205				2,205
Total	**0.21**	**0.72**	**1.87**	**0.01**	**0.02**	**23.60**	**23.60**	**0.02**	**2.43**	**2.45**	**1.38**	**3,078**	**3,080**	**0.16**	**0.08**	**1.24**	**3,108**

Operations Emissions by Sector, Maximum Daily (Winter or Summer)

	ROG	NOx	CO	SO_2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T
Category	lb/day									
Mobile	0.30	3.37	10.40	0.05	0.07	131.00	131.00	0.06	13.50	13.60
Area	0.24	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.08	0.77	1.47	0.00	0.02	0.00	0.02	0.02	0.00	0.02
Stationary	2.31	0.22	6.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01
Total	**2.93**	**4.36**	**18.20**	**0.05**	**0.10**	**131.00**	**131.03**	**0.09**	**13.50**	**13.63**

IP Perkins - GHG Emissions, Combined Construction and Operations

GHG Summary, Duration of Construction (one-time and Annualized) plus Operation

Construction GHG Emissions by Activity, Summary	Construction One-Time (MTCO2e)	Construction, Total divided by 30 years (MTCO2e per year)
Summary from CalEEMod, Construction Offroad Equipment and Onroad Vehicles		
2026	9,290	310
2027	4,343	145
Other Sources, Estimated outside CalEEMod		
Helicopters	362	12
Subtotal Construction Water Use	321	11
GHG Emissions, Construction Total (one-time)	**14,316**	
GHG Emissions, Construction Amortized (per year, 30-year life)		**478**

Operations GHG Emissions by Source Type or Activity, Summary	Operation, Annual Emissions (MTCO2e per year)
Operation and Maintenance	903
Effects of Land Use Conversion	2,205
Gas-Insulated Equipment (SF6 Leaks, in CO2e)	982
Emissions Avoided by Producing Electricity	-256,681
GHG Emissions, Operation (per year)	**-252,591**
Total GHG Emissions, Construction Amortized and Operations (per year)	**-252,113**

GHG, Gas-Insulated Equipment

Operations GHG Subtotal, Gas-Insulated Switchgear

SF6 GWP (100-yr basis) per U.S. EPA 40 CFR 98, Subpt.A - Table A-1

22,800

Location	Components	Count ("k")	SF6 Contained per device "k" (lb SF6 / k)	(kg SF6 / k)	(MTCO2e / k)	industry-anticipated leakage (loss / year)	GHG Emisisons, leakage (MTCO2e / year)
Substation	3-ph breaker	9	1500	680	15,510	0.005	698
BAAH	3-ph breaker	3	1500	680	15,510	0.005	233
BAAH	single-phase	2	500	227	5,170	0.005	52
						Total GHG for Gas-Insulated Equipment	**982**

Baseline Env - GHG Emissions from BESS Refrigerant Leakage

Overview

GHG emissions from BESS refrigerant leakage were calculated based on the total charge of refrigerant and a typical but conservative annual leakage rate of 10 percent.

BESS Refrigerant	GWP	Charge per unit (pound)	# of units	Total charge (pound)	Annual Leakage Rate	Annual Emissions ($MTCO_2e$ per year)	Emissions during Catastrophic Event [2] ($MTCO_2e$ per year)
R-134a[1]	1,430	3.3	1,705	5,627	10%	365	2.14

Notes:

[1] The use of refrigerant R-134a which will be prohibited and the project would use low-GWP refrigerants that comply with the California Air Resources Board Hydrofluorocarbons prohibitions. The GHG emissions estimated in this analysis are conservative.

[2] It was assumed that the full charge contained in a unit will be released during a catastrophic event.

Abbreviations

GWP = global warming potential; MT = metric tons; CO_2e = carbon dioxide equivalents

Conversion Factors

4.54E-04 metric ton/lbs

Baseline Env - BESS Efficiency

Overview

The BESS would generally be charged with solar generation, but may draw some energy from the grid. Indirect GHG emissions from round-trip efficiency loss were calculated based on the amount of energy charged from the grid, the average round-trip efficiency loss of 13%, and the GHG emissions intensity factor for the project's energy provider (Imperial Irrigation District). Assuming the 4,600 megawatt-hour BESS completes 1 full cycle per day and is entirely charged from the grid, it would result in 251,000 MWh of lost round-trip efficiency per year. Consistent with California's carbon neutrality by 2045 goal, an annual reduction of 30.7 lb CO2e/MWh was applied to the 2024 GHG intensity factor of 644 lb CO2e/MWh per year. It was assumed that project operation would begin in 2028.

Year	Project Operation Year	Lost Round-Trip Efficiency per Year	Imperial Irrigation District GHG Emissions Intensity Factor	Annual Indirect GHG Emissions from Round-Trip Efficiency Loss
		MWh	lbs CO_2e/MWh	Metric Tons CO_2e
2024	--	--	644	--
2025	--	--	613	--
2026	--	--	583	--
2027	--	--	552	--
2028	1	251,000	521	59,355
2029	2	251,000	491	55,863
2030	3	251,000	460	52,372
2031	4	251,000	429	48,880
2032	5	251,000	399	45,389
2033	6	251,000	368	41,897
2034	7	251,000	337	38,406
2035	8	251,000	307	34,915
2036	9	251,000	276	31,423
2037	10	251,000	245	27,932
2038	11	251,000	215	24,440
2039	12	251,000	184	20,949
2040	13	251,000	153	17,457
2041	14	251,000	123	13,966
2042	15	251,000	92	10,474
2043	16	251,000	61	6,983
2044	17	251,000	31	3,491
2045 to	18 to 30	251,000	0	0
			30-year Total	**534,193**

Abbreviations

MWh = megawatt-hour; lbs = pounds; CO_2e = carbon dioxide equivalents; MT = metric tons

Conversion Factors

4.54E-04 metric ton/lbs

Avoided GHG Emissions - Electricity Production

Operation - Emissions Avoided by Producing Electricity

Generation Project - approximate production minus transmission losses

Generation Capacity (MW)	**1,150**
Capacity Factor (est.)	0.204
Transmission Line Loss Factor	7.8%
1,894,799	**MWh/yr**

Basis: production = MW Capacity * Capacity Factor * (1 - Transmission Loss) * 8760 hr/year

DC Capacity Factor estimate from NREL PVWatts calculator: Holtville, CA

BESS Component - discharged, annual estimate

500 MW PV w/BESS	**1,150 MW PV w/BESS**
(MWh/yr)	**(MWh/yr)**
688,000	1,582,400

GHG Emission Factors - for conventional generation technologies for marginal generation

Notes: Marginal generation is from less efficient (higher emitting) generators in the mix of dispatchable resources.

e.g., avoided emissions from power plants that would turn down to accommodate additional renewable generation. (CPUC 2022)

Estimated CO2 Emission Factors (CEC 2019, Table B-22)			**500 MW PV w/BESS**	**1,150 MW PV w/BESS**
Technology	**Low Case (lbs/MWh)**	**Low Case (MTCO2/MWh)**	**Avoided (MTCO2/yr)**	**Avoided (MTCO2/yr)**
Conventional Combustion Turbines	1,167.70	0.530	364,410	838,142
Advanced Combustion Turbines	1,123.20	0.509	350,522	806,201
Conventional Combined Cycle Technologies	822.5	0.373	256,681	590,367
Conventional Combined Cycle w/Duct Firing	822.5	0.373	256,681	590,367

References:

CEC (California Energy Commission) . 2019. :

Staff Report. Estimated Cost of New Utility-Scale Generation in California: 2018 Update. CEC-200-2019-500. May.

CPUC (California Public Utilities Commission) . 2022. :

Greenhouse Gas and Criteria Pollutant Accounting Methodology for use in Load -Serving Entity Portfolio Development in 2022 Integrated Resource Plans. July.

GHG Emission Factors - for electricity imported from an "unspecified" source for marginal generation

			500 MW PV w/BESS	**1,150 MW PV w/BESS**
Unspecified Resources CO2 Emission Factor		**Unspecified (MTCO2/MWh)**	**Avoided (MTCO2/yr)**	**Avoided (MTCO2/yr)**
Open Market Purchases, western power system GHG		0.428	294,464	677,267

California ARB (Air Resources Board) . Regulation for Mandatory Reporting of GHG Emissions (17 CCR 95111).

California ARB . July 2017. Final Statement of Reasons. Amendments to the Regulation for the Mandatory Reporting of GHG Emissions.

IP Perkins - GHG Balance of Construction Emissions for Year 1

Months to balance one-time Construction emissions - offset by the combined effects of O&M, Land Use Conversion, and Emissions Avoided by Producing Electricity

	Construction (MTCO2e)	Operations (MTCO2e/yr)
Construction Total (one-time)	14,316	
Operation and Maintenance		903
Land Use Conversion		2,205
Gas-Insulated Equipment		982

	Operations	500 MW PV w/BESS	1,150 MW PV w/BESS		500 MW PV w/BESS	1,150 MW PV w/BESS
After Commencing Operation	(MTCO2e/yr)	Avoided (MTCO2/yr)	Avoided (MTCO2/yr)		Construction Balance, Year 1 (MT)	Construction Balance, Year 1 (MT)
Year 1 of Operation	4,090	-256,681	-590,367		-238,275	-571,961
Rolling Months 1 through 12	(MTCO2e/month)	(MTCO2/month)	(MTCO2/month)		Running Balance	Running Balance
Month 1	341	-21,390	-49,197		-6,733	-34,540
Month 2	341	-21,390	-49,197		-27,783	-83,397
Month 3	341	-21,390	-49,197		-48,832	-132,253
Month 4	341	-21,390	-49,197		-69,881	-181,110
Month 5	341	-21,390	-49,197		-90,930	-229,966
Month 6	341	-21,390	-49,197		-111,980	-278,823
Month 7	341	-21,390	-49,197		-133,029	-327,679
Month 8	341	-21,390	-49,197		-154,078	-376,535
Month 9	341	-21,390	-49,197		-175,127	-425,392
Month 10	341	-21,390	-49,197		-196,177	-474,248
Month 11	341	-21,390	-49,197		-217,226	-523,105
Month 12	341	-21,390	-49,197		-238,275	-571,961
Year 1, Sum of Months 1 through 12	4,090	-256,681	-590,367			

IP Perkins - GHG Balance of Life-of-Project Emissions

Years to balance 30-year Life-of-Project Construction, O&M, Land Use Conversion - offset by Emissions Avoided by Producing Electricity

	Construction (MTCO2e)	Operations (MTCO2e/life-of-project)
Construction Total (one-time)	14,316	
Operation and Maintenance		27,090
Land Use Conversion		66,150
Gas-Insulated Equipment		29,469

	500 MW PV w/BESS	1,150 MW PV w/BESS		500 MW PV w/BESS	1,150 MW PV w/BESS
After Commencing Operation	**Avoided (MTCO2)**	**Avoided (MTCO2)**		**Project Lifetime Balance (MT)**	**Project Lifetime Balance (MT)**
30 years Life-of-Project	-7,700,445	-17,711,022		-7,563,419	-17,573,997
Rolling Years 1 through 30	**Avoided (MTCO2/yr)**	**Avoided (MTCO2/yr)**		**Running Balance**	**Running Balance**
Year 1	-256,681	-590,367		-119,656	-453,342
Year 2	-256,681	-590,367		-376,338	-1,043,709
Year 3	-256,681	-590,367		-633,019	-1,634,077
Year 4	-256,681	-590,367		-889,701	-2,224,444
Year 5	-256,681	-590,367		-1,146,382	-2,814,812
Year 6	-256,681	-590,367		-1,403,064	-3,405,179
Year 7	-256,681	-590,367		-1,659,745	-3,995,547
Year 8	-256,681	-590,367		-1,916,426	-4,585,914
Year 9	-256,681	-590,367		-2,173,108	-5,176,281
Year 10	-256,681	-590,367		-2,429,789	-5,766,649
Year 11	-256,681	-590,367		-2,686,471	-6,357,016
Year 12	-256,681	-590,367		-2,943,152	-6,947,384
Year 13	-256,681	-590,367		-3,199,834	-7,537,751
Year 14	-256,681	-590,367		-3,456,515	-8,128,118
Year 15	-256,681	-590,367		-3,713,197	-8,718,486
Year 16	-256,681	-590,367		-3,969,878	-9,308,853
Year 17	-256,681	-590,367		-4,226,560	-9,899,221
Year 18	-256,681	-590,367		-4,483,241	-10,489,588
Year 19	-256,681	-590,367		-4,739,923	-11,079,955
Year 20	-256,681	-590,367		-4,996,604	-11,670,323
Year 21	-256,681	-590,367		-5,253,286	-12,260,690
Year 22	-256,681	-590,367		-5,509,967	-12,851,058
Year 23	-256,681	-590,367		-5,766,649	-13,441,425
Year 24	-256,681	-590,367		-6,023,330	-14,031,793
Year 25	-256,681	-590,367		-6,280,012	-14,622,160
Year 26	-256,681	-590,367		-6,536,693	-15,212,527
Year 27	-256,681	-590,367		-6,793,375	-15,802,895
Year 28	-256,681	-590,367		-7,050,056	-16,393,262
Year 29	-256,681	-590,367		-7,306,738	-16,983,630
Year 30	-256,681	-590,367		-7,563,419	-17,573,997
Life-of-Project, Sum of Years 1 through 30	-7,700,445	-17,711,022			

Consistent with California's carbon neutrality by 2045 goal, the project will no longer result in avoided GHG emissions after 2045, when statewide electricity generation is carbon neutral. Assuming project operation commence in 2028, the project would avoid **a total of 4,363,577 $MTCO_{2e}$** GHG emissions over the 17-year period from 2028 through 2044 (256,681 MT CO_{2e} per year × 17 years). The total avoided GHG emissions was then averaged over the project's 30-year useful life to derive an average annual avoided GHG emissions of approximately **145, 453 $MTCO_{2e}$ per year.**

APPENDIX B

CALEEMOD REPORTS

Perkins v12062024 Detailed Report

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Data Field	Value
Project Name	Perkins v12062024
Construction Start Date	1/2/2026
Operational Year	2028
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.40
Precipitation (days)	4.80
Location	32.725196893913576, -115.13972167427241
County	Imperial
City	Unincorporated
Air District	Imperial County APCD
Air Basin	Salton Sea
TAZ	5614
EDFZ	19
Electric Utility	Imperial Irrigation District
Gas Utility	Southern California Gas
App Version	2022.1.1.29

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Heavy Industry	8,712	1000sqft	6,126	0.00	0.00	0.00	—	Application area

General Light Industry	7.50	1000sqft	25.0	7,500	0.00	0.00	—	O&M Building

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-2*	Limit Heavy-Duty Diesel Vehicle Idling
Construction	C-5	Use Advanced Engine Tiers
Construction	C-10-A	Water Exposed Surfaces
Construction	C-10-C	Water Unpaved Construction Roads

* Qualitative or supporting measure. Emission reductions not included in the mitigated emissions results.

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	75.0	63.1	501	686	0.95	22.0	1,541	1,557	20.2	180	195	—	126,834	126,834	4.43	5.30	165	128,205
Mit.	17.5	16.3	193	692	0.95	1.97	1,503	1,505	1.97	163	165	—	126,834	126,834	4.43	5.30	165	128,205
% Reduced	77%	74%	61%	-1%	—	91%	2%	3%	90%	9%	15%	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	60.0	50.5	387	544	0.81	15.9	1,541	1,557	14.7	180	195	—	120,854	120,854	4.08	5.31	4.27	122,541
Mit.	16.2	15.0	197	558	0.81	1.71	1,503	1,505	1.71	163	165	—	120,854	120,854	4.08	5.31	4.27	122,541
% Reduced	73%	70%	49%	-3%	—	89%	2%	3%	88%	9%	15%	—	—	—	—	—	—	—

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	29.9	25.1	199	273	0.40	8.44	581	589	7.77	79.7	87.5	—	55,428	55,428	1.90	2.04	25.9	56,110
Mit.	7.11	6.68	85.1	278	0.40	0.82	548	549	0.82	64.2	65.0	—	55,428	55,428	1.90	2.04	25.9	56,110
% Reduced	76%	73%	57%	-2%	—	90%	6%	7%	89%	20%	26%	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.45	4.59	36.3	49.9	0.07	1.54	106	108	1.42	14.6	16.0	—	9,177	9,177	0.32	0.34	4.30	9,290
Mit.	1.30	1.22	15.5	50.7	0.07	0.15	100.0	100	0.15	11.7	11.9	—	9,177	9,177	0.32	0.34	4.30	9,290
% Reduced	76%	73%	57%	-2%	—	90%	6%	7%	89%	20%	26%	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	75.0	63.1	501	686	0.95	22.0	1,541	1,557	20.2	180	195	—	126,834	126,834	4.43	5.30	165	128,205
2027	24.5	20.7	173	338	0.50	5.08	1,096	1,101	4.70	116	120	—	80,145	80,145	2.36	4.44	116	81,644
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	60.0	50.5	387	544	0.81	15.9	1,541	1,557	14.7	180	195	—	120,854	120,854	4.08	5.31	4.27	122,541
2027	25.8	21.6	200	306	0.56	5.65	1,243	1,248	5.24	131	136	—	86,392	86,392	2.72	4.93	3.38	87,932
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	29.9	25.1	199	273	0.40	8.44	581	589	7.77	79.7	87.5	—	55,428	55,428	1.90	2.04	25.9	56,110
2027	8.33	6.99	64.4	97.8	0.18	1.88	295	297	1.74	31.9	33.6	—	25,767	25,767	0.78	1.44	14.3	26,229
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

2026	5.45	4.59	36.3	49.9	0.07	1.54	106	108	1.42	14.6	16.0	—	9,177	9,177	0.32	0.34	4.30	9,290
2027	1.52	1.27	11.7	17.9	0.03	0.34	53.8	54.1	0.32	5.82	6.13	—	4,266	4,266	0.13	0.24	2.37	4,343

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	17.5	16.3	193	692	0.95	1.97	1,503	1,505	1.97	163	165	—	126,834	126,834	4.43	5.30	165	128,205
2027	10.5	9.68	105	369	0.50	1.09	1,086	1,087	1.09	113	114	—	80,145	80,145	2.36	4.44	116	81,644
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	16.2	15.0	197	558	0.81	1.71	1,503	1,505	1.71	163	165	—	120,854	120,854	4.08	5.31	4.27	122,541
2027	10.3	9.36	123	342	0.56	1.22	1,231	1,232	1.22	128	129	—	86,392	86,392	2.72	4.93	3.38	87,932
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	7.11	6.68	85.1	278	0.40	0.82	548	549	0.82	64.2	65.0	—	55,428	55,428	1.90	2.04	25.9	56,110
2027	3.08	2.84	39.1	109	0.18	0.39	290	291	0.39	30.5	30.9	—	25,767	25,767	0.78	1.44	14.3	26,229
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	1.30	1.22	15.5	50.7	0.07	0.15	100.0	100	0.15	11.7	11.9	—	9,177	9,177	0.32	0.34	4.30	9,290
2027	0.56	0.52	7.14	19.9	0.03	0.07	53.0	53.0	0.07	5.57	5.64	—	4,266	4,266	0.13	0.24	2.37	4,343

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Unmit.	1.19	2.93	4.03	18.2	0.05	0.10	131	131	0.10	13.5	13.6	8.34	18,984	18,992	1.21	0.46	14.8	19,174
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.08	2.83	4.37	13.2	0.05	0.10	131	131	0.10	13.5	13.6	8.34	18,609	18,617	1.21	0.46	2.29	18,787
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.75	1.17	3.92	10.3	0.05	0.09	129	129	0.08	13.3	13.4	8.34	18,592	18,601	0.98	0.46	7.50	18,770
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.14	0.21	0.72	1.87	0.01	0.02	23.6	23.6	0.02	2.43	2.45	1.38	3,078	3,080	0.16	0.08	1.24	3,108

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.37	0.30	3.03	10.4	0.05	0.07	131	131	0.06	13.5	13.6	—	5,218	5,218	0.05	0.45	12.9	5,365
Area	0.25	0.24	< 0.005	0.33	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.34	1.34	< 0.005	< 0.005	—	1.35
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	3.32	75.9	79.2	0.35	0.01	—	90.4
Waste	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Off-Road	0.09	0.08	0.77	1.47	< 0.005	0.02	—	0.02	0.02	—	0.02	—	221	221	0.01	< 0.005	—	222
Stationary	0.48	2.31	0.22	6.00	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	147	147	0.31	0.00	0.00	155
Vegetation	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Total	1.19	2.93	4.03	18.2	0.05	0.10	131	131	0.10	13.5	13.6	8.34	18,984	18,992	1.21	0.46	14.8	19,174

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.32	0.26	3.37	5.74	0.05	0.07	131	131	0.06	13.5	13.6	—	4,844	4,844	0.05	0.45	0.33	4,980
Area	0.19	0.19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	3.32	75.9	79.2	0.35	0.01	—	90.4
Waste	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Off-Road	0.09	0.08	0.77	1.47	< 0.005	0.02	—	0.02	0.02	—	0.02	—	221	221	0.01	< 0.005	—	222
Stationary	0.48	2.31	0.22	6.00	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	147	147	0.31	0.00	0.00	155
Vegetation	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Total	1.08	2.83	4.37	13.2	0.05	0.10	131	131	0.10	13.5	13.6	8.34	18,609	18,617	1.21	0.46	2.29	18,787
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.33	0.27	3.31	7.42	0.05	0.07	129	129	0.06	13.3	13.4	—	4,997	4,997	0.05	0.45	5.55	5,138
Area	0.22	0.22	< 0.005	0.16	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.66	0.66	< 0.005	< 0.005	—	0.66
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	3.32	75.9	79.2	0.35	0.01	—	90.4
Waste	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Off-Road	0.07	0.06	0.55	1.05	< 0.005	0.02	—	0.02	0.02	—	0.02	—	158	158	0.01	< 0.005	—	158
Stationary	0.13	0.63	0.06	1.64	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	40.3	40.3	0.08	0.00	0.00	42.5
Vegetation	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Total	0.75	1.17	3.92	10.3	0.05	0.09	129	129	0.08	13.3	13.4	8.34	18,592	18,601	0.98	0.46	7.50	18,770
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Mobile	0.06	0.05	0.60	1.35	0.01	0.01	23.6	23.6	0.01	2.43	2.44	—	827	827	0.01	0.07	0.92	851
Area	0.04	0.04	< 0.005	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.11	0.11	< 0.005	< 0.005	—	0.11
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.55	12.6	13.1	0.06	< 0.005	—	15.0
Waste	—	—	—	—	—	—	—	—	—	—	—	0.83	0.00	0.83	0.08	0.00	—	2.90
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.32	0.32
Off-Road	0.01	0.01	0.10	0.19	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	26.1	26.1	< 0.005	< 0.005	—	26.2
Stationary	0.02	0.12	0.01	0.30	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	6.68	6.68	0.01	0.00	0.00	7.03
Vegetation	—	—	—	—	—	—	—	—	—	—	—	—	2,205	2,205	—	—	—	2,205
Total	0.14	0.21	0.72	1.87	0.01	0.02	23.6	23.6	0.02	2.43	2.45	1.38	3,078	3,080	0.16	0.08	1.24	3,108

2.6. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.37	0.30	3.03	10.4	0.05	0.07	131	131	0.06	13.5	13.6	—	5,218	5,218	0.05	0.45	12.9	5,365
Area	0.25	0.24	< 0.005	0.33	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.34	1.34	< 0.005	< 0.005	—	1.35
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	3.32	75.9	79.2	0.35	0.01	—	90.4
Waste	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Off-Road	0.09	0.08	0.77	1.47	< 0.005	0.02	—	0.02	0.02	—	0.02	—	221	221	0.01	< 0.005	—	222
Stationary	0.48	2.31	0.22	6.00	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	147	147	0.31	0.00	0.00	155

Vegetation	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Total	1.19	2.93	4.03	18.2	0.05	0.10	131	131	0.10	13.5	13.6	8.34	18,984	18,992	1.21	0.46	14.8	19,174
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.32	0.26	3.37	5.74	0.05	0.07	131	131	0.06	13.5	13.6	—	4,844	4,844	0.05	0.45	0.33	4,980
Area	0.19	0.19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	3.32	75.9	79.2	0.35	0.01	—	90.4
Waste	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Off-Road	0.09	0.08	0.77	1.47	< 0.005	0.02	—	0.02	0.02	—	0.02	—	221	221	0.01	< 0.005	—	222
Stationary	0.48	2.31	0.22	6.00	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	147	147	0.31	0.00	0.00	155
Vegetation	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Total	1.08	2.83	4.37	13.2	0.05	0.10	131	131	0.10	13.5	13.6	8.34	18,609	18,617	1.21	0.46	2.29	18,787
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.33	0.27	3.31	7.42	0.05	0.07	129	129	0.06	13.3	13.4	—	4,997	4,997	0.05	0.45	5.55	5,138
Area	0.22	0.22	< 0.005	0.16	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.66	0.66	< 0.005	< 0.005	—	0.66
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	3.32	75.9	79.2	0.35	0.01	—	90.4
Waste	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Off-Road	0.07	0.06	0.55	1.05	< 0.005	0.02	—	0.02	0.02	—	0.02	—	158	158	0.01	< 0.005	—	158
Stationary	0.13	0.63	0.06	1.64	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	40.3	40.3	0.08	0.00	0.00	42.5

Vegetation	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Total	0.75	1.17	3.92	10.3	0.05	0.09	129	129	0.08	13.3	13.4	8.34	18,592	18,601	0.98	0.46	7.50	18,770
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.06	0.05	0.60	1.35	0.01	0.01	23.6	23.6	0.01	2.43	2.44	—	827	827	0.01	0.07	0.92	851
Area	0.04	0.04	< 0.005	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.11	0.11	< 0.005	< 0.005	—	0.11
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.55	12.6	13.1	0.06	< 0.005	—	15.0
Waste	—	—	—	—	—	—	—	—	—	—	—	0.83	0.00	0.83	0.08	0.00	—	2.90
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.32	0.32
Off-Road	0.01	0.01	0.10	0.19	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	26.1	26.1	< 0.005	< 0.005	—	26.2
Stationary	0.02	0.12	0.01	0.30	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	6.68	6.68	0.01	0.00	0.00	7.03
Vegetation	—	—	—	—	—	—	—	—	—	—	—	—	2,205	2,205	—	—	—	2,205
Total	0.14	0.21	0.72	1.87	0.01	0.02	23.6	23.6	0.02	2.43	2.45	1.38	3,078	3,080	0.16	0.08	1.24	3,108

3. Construction Emissions Details

3.1. Ph 1 Site Preparation (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	24.9	20.9	191	206	0.33	8.36	—	8.36	7.69	—	7.69	—	36,288	36,288	1.47	0.29	—	36,412

Dust From Material Movement	—	—	—	—	—	—	104	104	—	51.1	51.1	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.31	0.14	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	181	181	< 0.005	0.03	0.35	190
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	24.9	20.9	191	206	0.33	8.36	—	8.36	7.69	—	7.69	—	36,288	36,288	1.47	0.29	—	36,412
Dust From Material Movement	—	—	—	—	—	—	104	104	—	51.1	51.1	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	182	182	< 0.005	0.03	0.01	190
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	6.81	5.72	52.2	56.6	0.09	2.29	—	2.29	2.11	—	2.11	—	9,942	9,942	0.40	0.08	—	9,976
Dust From Material Movement	—	—	—	—	—	—	28.4	28.4	—	14.0	14.0	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.09	0.04	< 0.005	< 0.005	0.90	0.91	< 0.005	0.09	0.09	—	49.7	49.7	< 0.005	0.01	0.04	52.1
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.24	1.04	9.53	10.3	0.02	0.42	—	0.42	0.38	—	0.38	—	1,646	1,646	0.07	0.01	—	1,652

Dust From Material Movement	—	—	—	—	—	—	5.18	5.18	—	2.55	2.55	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.17	0.17	< 0.005	0.02	0.02	—	8.23	8.23	< 0.005	< 0.005	0.01	8.62
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.37	1.21	1.82	35.6	0.00	0.00	195	195	0.00	20.0	20.0	—	5,194	5,194	0.17	0.16	17.2	5,261
Vendor	0.06	0.04	1.67	0.49	0.02	0.03	21.4	21.4	0.03	2.23	2.26	—	2,047	2,047	0.02	0.28	5.32	2,136
Hauling	0.04	0.02	2.18	0.33	0.02	0.05	21.5	21.5	0.05	2.25	2.29	—	2,278	2,278	0.02	0.36	4.88	2,390
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.16	1.01	2.11	19.0	0.00	0.00	195	195	0.00	20.0	20.0	—	4,384	4,384	0.18	0.16	0.44	4,435
Vendor	0.05	0.04	1.86	0.48	0.02	0.03	21.4	21.4	0.03	2.23	2.26	—	2,047	2,047	0.02	0.28	0.14	2,131
Hauling	0.04	0.02	2.41	0.33	0.02	0.05	21.5	21.5	0.05	2.25	2.29	—	2,278	2,278	0.02	0.36	0.13	2,386
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.33	0.29	0.58	6.83	0.00	0.00	52.7	52.7	0.00	5.41	5.41	—	1,292	1,292	0.05	0.04	2.03	1,308
Vendor	0.02	0.01	0.50	0.14	< 0.005	0.01	5.79	5.80	0.01	0.60	0.61	—	561	561	< 0.005	0.08	0.63	584
Hauling	0.01	0.01	0.65	0.09	< 0.005	0.01	5.80	5.82	0.01	0.61	0.62	—	624	624	< 0.005	0.10	0.58	654
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.10	1.25	0.00	0.00	9.62	9.62	0.00	0.99	0.99	—	214	214	0.01	0.01	0.34	217
Vendor	< 0.005	< 0.005	0.09	0.02	< 0.005	< 0.005	1.06	1.06	< 0.005	0.11	0.11	—	92.8	92.8	< 0.005	0.01	0.10	96.8
Hauling	< 0.005	< 0.005	0.12	0.02	< 0.005	< 0.005	1.06	1.06	< 0.005	0.11	0.11	—	103	103	< 0.005	0.02	0.10	108

3.2. Ph 1 Site Preparation (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.76	3.76	39.7	210	0.33	0.68	—	0.68	0.68	—	0.68	—	36,288	36,288	1.47	0.29	—	36,412
Dust From Material Movement	—	—	—	—	—	—	40.4	40.4	—	19.9	19.9	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.31	0.14	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	181	181	< 0.005	0.03	0.35	190
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.76	3.76	39.7	210	0.33	0.68	—	0.68	0.68	—	0.68	—	36,288	36,288	1.47	0.29	—	36,412
Dust From Material Movement	—	—	—	—	—	—	40.4	40.4	—	19.9	19.9	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	182	182	< 0.005	0.03	0.01	190
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.03	1.03	10.9	57.5	0.09	0.19	—	0.19	0.19	—	0.19	—	9,942	9,942	0.40	0.08	—	9,976
Dust From Material Movement	—	—	—	—	—	—	11.1	11.1	—	5.46	5.46	—	—	—	—	—	—	—

Onsite truck	< 0.005	< 0.005	0.09	0.04	< 0.005	< 0.005	0.41	0.41	< 0.005	0.04	0.04	—	49.7	49.7	< 0.005	0.01	0.04	52.1
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.19	0.19	1.99	10.5	0.02	0.03	—	0.03	0.03	—	0.03	—	1,646	1,646	0.07	0.01	—	1,652
Dust From Material Movement	—	—	—	—	—	—	2.02	2.02	—	1.00	1.00	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.07	0.07	< 0.005	0.01	0.01	—	8.23	8.23	< 0.005	< 0.005	0.01	8.62
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.37	1.21	1.82	35.6	0.00	0.00	195	195	0.00	20.0	20.0	—	5,194	5,194	0.17	0.16	17.2	5,261
Vendor	0.06	0.04	1.67	0.49	0.02	0.03	21.4	21.4	0.03	2.23	2.26	—	2,047	2,047	0.02	0.28	5.32	2,136
Hauling	0.04	0.02	2.18	0.33	0.02	0.05	21.5	21.5	0.05	2.25	2.29	—	2,278	2,278	0.02	0.36	4.88	2,390
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.16	1.01	2.11	19.0	0.00	0.00	195	195	0.00	20.0	20.0	—	4,384	4,384	0.18	0.16	0.44	4,435
Vendor	0.05	0.04	1.86	0.48	0.02	0.03	21.4	21.4	0.03	2.23	2.26	—	2,047	2,047	0.02	0.28	0.14	2,131
Hauling	0.04	0.02	2.41	0.33	0.02	0.05	21.5	21.5	0.05	2.25	2.29	—	2,278	2,278	0.02	0.36	0.13	2,386
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.33	0.29	0.58	6.83	0.00	0.00	52.7	52.7	0.00	5.41	5.41	—	1,292	1,292	0.05	0.04	2.03	1,308
Vendor	0.02	0.01	0.50	0.14	< 0.005	0.01	5.79	5.80	0.01	0.60	0.61	—	561	561	< 0.005	0.08	0.63	584
Hauling	0.01	0.01	0.65	0.09	< 0.005	0.01	5.80	5.82	0.01	0.61	0.62	—	624	624	< 0.005	0.10	0.58	654
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.10	1.25	0.00	0.00	9.62	9.62	0.00	0.99	0.99	—	214	214	0.01	0.01	0.34	217

Vendor	< 0.005	< 0.005	0.09	0.02	< 0.005	< 0.005	1.06	1.06	< 0.005	0.11	0.11	—	92.8	92.8	< 0.005	0.01	0.10	96.8
Hauling	< 0.005	< 0.005	0.12	0.02	< 0.005	< 0.005	1.06	1.06	< 0.005	0.11	0.11	—	103	103	< 0.005	0.02	0.10	108

3.3. Ph 2 PV Panel System (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	44.4	37.3	287	339	0.50	13.3	—	13.3	12.2	—	12.2	—	53,552	53,552	2.17	0.43	—	53,736
Dust From Material Movement	—	—	—	—	—	—	56.1	56.1	—	27.3	27.3	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.31	0.14	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	181	181	< 0.005	0.03	0.35	190
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	44.4	37.3	287	339	0.50	13.3	—	13.3	12.2	—	12.2	—	53,552	53,552	2.17	0.43	—	53,736
Dust From Material Movement	—	—	—	—	—	—	56.1	56.1	—	27.3	27.3	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	182	182	< 0.005	0.03	0.01	190
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	18.2	15.3	118	139	0.21	5.46	—	5.46	5.02	—	5.02	—	22,008	22,008	0.89	0.18	—	22,083
Dust From Material Movement	—	—	—	—	—	—	23.1	23.1	—	11.2	11.2	—	—	—	—	—	—	—
Onsite truck	0.01	< 0.005	0.13	0.06	< 0.005	< 0.005	1.36	1.36	< 0.005	0.14	0.14	—	74.6	74.6	< 0.005	0.01	0.06	78.1
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	3.33	2.80	21.5	25.4	0.04	1.00	—	1.00	0.92	—	0.92	—	3,644	3,644	0.15	0.03	—	3,656
Dust From Material Movement	—	—	—	—	—	—	4.21	4.21	—	2.05	2.05	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.25	0.25	< 0.005	0.02	0.03	—	12.3	12.3	< 0.005	< 0.005	0.01	12.9
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	3.93	3.49	5.24	102	0.00	0.00	560	560	0.00	57.5	57.5	—	14,932	14,932	0.49	0.45	49.3	15,127
Vendor	0.08	0.06	2.50	0.74	0.02	0.05	32.1	32.2	0.05	3.35	3.40	—	3,070	3,070	0.03	0.42	7.98	3,204
Hauling	0.17	0.10	8.73	1.32	0.06	0.19	85.8	86.0	0.19	8.99	9.18	—	9,111	9,111	0.07	1.43	19.5	9,559
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	3.35	2.89	6.05	54.6	0.00	0.00	560	560	0.00	57.5	57.5	—	12,603	12,603	0.51	0.45	1.28	12,750
Vendor	0.08	0.06	2.79	0.72	0.02	0.05	32.1	32.2	0.05	3.35	3.40	—	3,070	3,070	0.03	0.42	0.21	3,196
Hauling	0.17	0.09	9.64	1.34	0.06	0.19	85.8	86.0	0.19	8.99	9.18	—	9,113	9,113	0.07	1.43	0.51	9,542
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.44	1.26	2.48	29.5	0.00	0.00	227	227	0.00	23.3	23.3	—	5,572	5,572	0.20	0.18	8.75	5,640

Vendor	0.03	0.02	1.13	0.31	0.01	0.02	13.0	13.0	0.02	1.36	1.38	—	1,262	1,262	0.01	0.17	1.41	1,315
Hauling	0.07	0.04	3.90	0.54	0.03	0.08	34.8	34.9	0.08	3.65	3.73	—	3,745	3,745	0.03	0.59	3.46	3,924
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.26	0.23	0.45	5.38	0.00	0.00	41.5	41.5	0.00	4.26	4.26	—	922	922	0.03	0.03	1.45	934
Vendor	0.01	< 0.005	0.21	0.06	< 0.005	< 0.005	2.38	2.38	< 0.005	0.25	0.25	—	209	209	< 0.005	0.03	0.23	218
Hauling	0.01	0.01	0.71	0.10	< 0.005	0.01	6.35	6.37	0.01	0.67	0.68	—	620	620	< 0.005	0.10	0.57	650

3.4. Ph 2 PV Panel System (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	6.54	6.54	129	341	0.50	0.97	—	0.97	0.97	—	0.97	—	53,552	53,552	2.17	0.43	—	53,736
Dust From Material Movement	—	—	—	—	—	—	21.9	21.9	—	10.7	10.7	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.31	0.14	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	181	181	< 0.005	0.03	0.35	190
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	6.54	6.54	129	341	0.50	0.97	—	0.97	0.97	—	0.97	—	53,552	53,552	2.17	0.43	—	53,736

Dust From Material Movement	—	—	—	—	—	—	21.9	21.9	—	10.7	10.7	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	182	182	< 0.005	0.03	0.01	190
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.69	2.69	53.2	140	0.21	0.40	—	0.40	0.40	—	0.40	—	22,008	22,008	0.89	0.18	—	22,083
Dust From Material Movement	—	—	—	—	—	—	9.00	9.00	—	4.38	4.38	—	—	—	—	—	—	—
Onsite truck	0.01	< 0.005	0.13	0.06	< 0.005	< 0.005	0.61	0.61	< 0.005	0.06	0.06	—	74.6	74.6	< 0.005	0.01	0.06	78.1
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.49	0.49	9.71	25.5	0.04	0.07	—	0.07	0.07	—	0.07	—	3,644	3,644	0.15	0.03	—	3,656
Dust From Material Movement	—	—	—	—	—	—	1.64	1.64	—	0.80	0.80	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.11	0.11	< 0.005	0.01	0.01	—	12.3	12.3	< 0.005	< 0.005	0.01	12.9
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	3.93	3.49	5.24	102	0.00	0.00	560	560	0.00	57.5	57.5	—	14,932	14,932	0.49	0.45	49.3	15,127
Vendor	0.08	0.06	2.50	0.74	0.02	0.05	32.1	32.2	0.05	3.35	3.40	—	3,070	3,070	0.03	0.42	7.98	3,204
Hauling	0.17	0.10	8.73	1.32	0.06	0.19	85.8	86.0	0.19	8.99	9.18	—	9,111	9,111	0.07	1.43	19.5	9,559

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	3.35	2.89	6.05	54.6	0.00	0.00	560	560	0.00	57.5	57.5	—	12,603	12,603	0.51	0.45	1.28	12,750
Vendor	0.08	0.06	2.79	0.72	0.02	0.05	32.1	32.2	0.05	3.35	3.40	—	3,070	3,070	0.03	0.42	0.21	3,196
Hauling	0.17	0.09	9.64	1.34	0.06	0.19	85.8	86.0	0.19	8.99	9.18	—	9,113	9,113	0.07	1.43	0.51	9,542
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.44	1.26	2.48	29.5	0.00	0.00	227	227	0.00	23.3	23.3	—	5,572	5,572	0.20	0.18	8.75	5,640
Vendor	0.03	0.02	1.13	0.31	0.01	0.02	13.0	13.0	0.02	1.36	1.38	—	1,262	1,262	0.01	0.17	1.41	1,315
Hauling	0.07	0.04	3.90	0.54	0.03	0.08	34.8	34.9	0.08	3.65	3.73	—	3,745	3,745	0.03	0.59	3.46	3,924
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.26	0.23	0.45	5.38	0.00	0.00	41.5	41.5	0.00	4.26	4.26	—	922	922	0.03	0.03	1.45	934
Vendor	0.01	< 0.005	0.21	0.06	< 0.005	< 0.005	2.38	2.38	< 0.005	0.25	0.25	—	209	209	< 0.005	0.03	0.23	218
Hauling	0.01	0.01	0.71	0.10	< 0.005	0.01	6.35	6.37	0.01	0.67	0.68	—	620	620	< 0.005	0.10	0.57	650

3.5. Ph 3 Inverters, Transformers, Substation, Electrical (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	7.68	6.44	60.4	79.5	0.14	2.16	—	2.16	1.98	—	1.98	—	14,626	14,626	0.59	0.12	—	14,676
Onsite truck	0.01	0.01	0.31	0.14	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	181	181	< 0.005	0.03	0.35	190
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	7.68	6.44	60.4	79.5	0.14	2.16	—	2.16	1.98	—	1.98	—	14,626	14,626	0.59	0.12	—	14,676
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	182	182	< 0.005	0.03	0.01	190
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	1.82	1.52	14.3	18.8	0.03	0.51	—	0.51	0.47	—	0.47	—	3,463	3,463	0.14	0.03	—	3,475
Onsite truck	< 0.005	< 0.005	0.08	0.03	< 0.005	< 0.005	0.78	0.78	< 0.005	0.08	0.08	—	43.0	43.0	< 0.005	0.01	0.04	45.0
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.33	0.28	2.61	3.43	0.01	0.09	—	0.09	0.09	—	0.09	—	573	573	0.02	< 0.005	—	575
Onsite truck	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.14	0.14	< 0.005	0.01	0.01	—	7.11	7.11	< 0.005	< 0.005	0.01	7.45
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	4.79	4.25	6.38	124	0.00	0.00	682	682	0.00	70.0	70.0	—	18,178	18,178	0.59	0.54	60.0	18,415
Vendor	0.08	0.06	2.50	0.74	0.02	0.05	32.1	32.2	0.05	3.35	3.40	—	3,070	3,070	0.03	0.42	7.98	3,204
Hauling	0.17	0.10	8.73	1.32	0.06	0.19	85.8	86.0	0.19	8.99	9.18	—	9,111	9,111	0.07	1.43	19.5	9,559
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	4.07	3.52	7.37	66.5	0.00	0.00	682	682	0.00	70.0	70.0	—	15,343	15,343	0.62	0.54	1.55	15,521
Vendor	0.08	0.06	2.79	0.72	0.02	0.05	32.1	32.2	0.05	3.35	3.40	—	3,070	3,070	0.03	0.42	0.21	3,196
Hauling	0.17	0.09	9.64	1.34	0.06	0.19	85.8	86.0	0.19	8.99	9.18	—	9,113	9,113	0.07	1.43	0.51	9,542
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	1.01	0.88	1.74	20.7	0.00	0.00	159	159	0.00	16.4	16.4	—	3,908	3,908	0.14	0.13	6.14	3,956
Vendor	0.02	0.01	0.65	0.18	0.01	0.01	7.51	7.52	0.01	0.78	0.79	—	727	727	0.01	0.10	0.82	758
Hauling	0.04	0.02	2.25	0.31	0.01	0.04	20.1	20.1	0.04	2.10	2.15	—	2,158	2,158	0.02	0.34	1.99	2,261
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.18	0.16	0.32	3.77	0.00	0.00	29.1	29.1	0.00	2.99	2.99	—	647	647	0.02	0.02	1.02	655
Vendor	< 0.005	< 0.005	0.12	0.03	< 0.005	< 0.005	1.37	1.37	< 0.005	0.14	0.14	—	120	120	< 0.005	0.02	0.13	125
Hauling	0.01	< 0.005	0.41	0.06	< 0.005	0.01	3.66	3.67	0.01	0.38	0.39	—	357	357	< 0.005	0.06	0.33	374

3.6. Ph 3 Inverters, Transformers, Substation, Electrical (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.71	1.71	28.9	92.3	0.14	0.27	—	0.27	0.27	—	0.27	—	14,626	14,626	0.59	0.12	—	14,676
Onsite truck	0.01	0.01	0.31	0.14	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	181	181	< 0.005	0.03	0.35	190
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.71	1.71	28.9	92.3	0.14	0.27	—	0.27	0.27	—	0.27	—	14,626	14,626	0.59	0.12	—	14,676
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	182	182	< 0.005	0.03	0.01	190
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road	0.40	0.40	6.85	21.9	0.03	0.06	—	0.06	0.06	—	0.06	—	3,463	3,463	0.14	0.03	—	3,475
Onsite truck	< 0.005	< 0.005	0.08	0.03	< 0.005	< 0.005	0.35	0.35	< 0.005	0.04	0.04	—	43.0	43.0	< 0.005	0.01	0.04	45.0
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.07	1.25	3.99	0.01	0.01	—	0.01	0.01	—	0.01	—	573	573	0.02	< 0.005	—	575
Onsite truck	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.06	0.06	< 0.005	0.01	0.01	—	7.11	7.11	< 0.005	< 0.005	0.01	7.45
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	4.79	4.25	6.38	124	0.00	0.00	682	682	0.00	70.0	70.0	—	18,178	18,178	0.59	0.54	60.0	18,415
Vendor	0.08	0.06	2.50	0.74	0.02	0.05	32.1	32.2	0.05	3.35	3.40	—	3,070	3,070	0.03	0.42	7.98	3,204
Hauling	0.17	0.10	8.73	1.32	0.06	0.19	85.8	86.0	0.19	8.99	9.18	—	9,111	9,111	0.07	1.43	19.5	9,559
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	4.07	3.52	7.37	66.5	0.00	0.00	682	682	0.00	70.0	70.0	—	15,343	15,343	0.62	0.54	1.55	15,521
Vendor	0.08	0.06	2.79	0.72	0.02	0.05	32.1	32.2	0.05	3.35	3.40	—	3,070	3,070	0.03	0.42	0.21	3,196
Hauling	0.17	0.09	9.64	1.34	0.06	0.19	85.8	86.0	0.19	8.99	9.18	—	9,113	9,113	0.07	1.43	0.51	9,542
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.01	0.88	1.74	20.7	0.00	0.00	159	159	0.00	16.4	16.4	—	3,908	3,908	0.14	0.13	6.14	3,956
Vendor	0.02	0.01	0.65	0.18	0.01	0.01	7.51	7.52	0.01	0.78	0.79	—	727	727	0.01	0.10	0.82	758
Hauling	0.04	0.02	2.25	0.31	0.01	0.04	20.1	20.1	0.04	2.10	2.15	—	2,158	2,158	0.02	0.34	1.99	2,261
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.18	0.16	0.32	3.77	0.00	0.00	29.1	29.1	0.00	2.99	2.99	—	647	647	0.02	0.02	1.02	655
Vendor	< 0.005	< 0.005	0.12	0.03	< 0.005	< 0.005	1.37	1.37	< 0.005	0.14	0.14	—	120	120	< 0.005	0.02	0.13	125

Hauling	0.01	< 0.005	0.41	0.06	< 0.005	0.01	3.66	3.67	0.01	0.38	0.39	—	357	357	< 0.005	0.06	0.33	374

3.7. Ph 3 Inverters, Transformers, Substation, Electrical (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	7.33	6.15	57.9	79.2	0.14	1.91	—	1.91	1.76	—	1.76	—	14,625	14,625	0.59	0.12	—	14,676
Onsite truck	0.01	0.01	0.30	0.14	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	177	177	< 0.005	0.03	0.32	186
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	7.33	6.15	57.9	79.2	0.14	1.91	—	1.91	1.76	—	1.76	—	14,625	14,625	0.59	0.12	—	14,676
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	178	178	< 0.005	0.03	0.01	186
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.32	1.11	10.4	14.3	0.03	0.34	—	0.34	0.32	—	0.32	—	2,633	2,633	0.11	0.02	—	2,642
Onsite truck	< 0.005	< 0.005	0.06	0.03	< 0.005	< 0.005	0.59	0.60	< 0.005	0.06	0.06	—	31.9	31.9	< 0.005	0.01	0.03	33.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipm	0.24	0.20	1.90	2.60	< 0.005	0.06	—	0.06	0.06	—	0.06	—	436	436	0.02	< 0.005	—	437
Onsite truck	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.11	0.11	< 0.005	0.01	0.01	—	5.29	5.29	< 0.005	< 0.005	< 0.005	5.55
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	4.59	4.06	5.86	113	0.00	0.00	682	682	0.00	70.0	70.0	—	17,862	17,862	0.59	0.54	54.6	18,093
Vendor	0.08	0.06	2.36	0.65	0.02	0.05	32.1	32.2	0.05	3.35	3.40	—	3,007	3,007	0.03	0.42	6.95	3,140
Hauling	0.17	0.10	8.48	1.26	0.06	0.19	85.8	86.0	0.19	8.99	9.18	—	8,903	8,903	0.07	1.43	18.1	9,349
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	3.46	2.91	6.85	59.6	0.00	0.00	682	682	0.00	70.0	70.0	—	15,082	15,082	0.62	0.54	1.41	15,261
Vendor	0.06	0.06	2.62	0.63	0.02	0.05	32.1	32.2	0.05	3.35	3.40	—	3,008	3,008	0.03	0.42	0.18	3,134
Hauling	0.17	0.09	9.39	1.27	0.06	0.19	85.8	86.0	0.19	8.99	9.18	—	8,905	8,905	0.07	1.43	0.47	9,334
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.74	0.65	1.14	14.1	0.00	0.00	121	121	0.00	12.4	12.4	—	2,921	2,921	0.11	0.10	4.25	2,956
Vendor	0.01	0.01	0.47	0.12	< 0.005	0.01	5.71	5.72	0.01	0.60	0.60	—	541	541	< 0.005	0.08	0.54	565
Hauling	0.03	0.02	1.66	0.23	0.01	0.03	15.3	15.3	0.03	1.60	1.63	—	1,603	1,603	0.01	0.26	1.41	1,682
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.12	0.21	2.58	0.00	0.00	22.1	22.1	0.00	2.27	2.27	—	484	484	0.02	0.02	0.70	489
Vendor	< 0.005	< 0.005	0.09	0.02	< 0.005	< 0.005	1.04	1.04	< 0.005	0.11	0.11	—	89.6	89.6	< 0.005	0.01	0.09	93.5
Hauling	0.01	< 0.005	0.30	0.04	< 0.005	0.01	2.78	2.79	0.01	0.29	0.30	—	265	265	< 0.005	0.04	0.23	278

3.8. Ph 3 Inverters, Transformers, Substation, Electrical (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.71	1.71	28.9	92.3	0.14	0.27	—	0.27	0.27	—	0.27	—	14,625	14,625	0.59	0.12	—	14,676
Onsite truck	0.01	0.01	0.30	0.14	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	177	177	< 0.005	0.03	0.32	186
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.71	1.71	28.9	92.3	0.14	0.27	—	0.27	0.27	—	0.27	—	14,625	14,625	0.59	0.12	—	14,676
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	178	178	< 0.005	0.03	0.01	186
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.31	0.31	5.21	16.6	0.03	0.05	—	0.05	0.05	—	0.05	—	2,633	2,633	0.11	0.02	—	2,642
Onsite truck	< 0.005	< 0.005	0.06	0.03	< 0.005	< 0.005	0.27	0.27	< 0.005	0.03	0.03	—	31.9	31.9	< 0.005	0.01	0.03	33.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.06	0.95	3.03	< 0.005	0.01	—	0.01	0.01	—	0.01	—	436	436	0.02	< 0.005	—	437
Onsite truck	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.05	0.05	< 0.005	< 0.005	0.01	—	5.29	5.29	< 0.005	< 0.005	< 0.005	5.55
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	4.59	4.06	5.86	113	0.00	0.00	682	682	0.00	70.0	70.0	—	17,862	17,862	0.59	0.54	54.6	18,093
Vendor	0.08	0.06	2.36	0.65	0.02	0.05	32.1	32.2	0.05	3.35	3.40	—	3,007	3,007	0.03	0.42	6.95	3,140
Hauling	0.17	0.10	8.48	1.26	0.06	0.19	85.8	86.0	0.19	8.99	9.18	—	8,903	8,903	0.07	1.43	18.1	9,349
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	3.46	2.91	6.85	59.6	0.00	0.00	682	682	0.00	70.0	70.0	—	15,082	15,082	0.62	0.54	1.41	15,261
Vendor	0.06	0.06	2.62	0.63	0.02	0.05	32.1	32.2	0.05	3.35	3.40	—	3,008	3,008	0.03	0.42	0.18	3,134
Hauling	0.17	0.09	9.39	1.27	0.06	0.19	85.8	86.0	0.19	8.99	9.18	—	8,905	8,905	0.07	1.43	0.47	9,334
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.74	0.65	1.14	14.1	0.00	0.00	121	121	0.00	12.4	12.4	—	2,921	2,921	0.11	0.10	4.25	2,956
Vendor	0.01	0.01	0.47	0.12	< 0.005	0.01	5.71	5.72	0.01	0.60	0.60	—	541	541	< 0.005	0.08	0.54	565
Hauling	0.03	0.02	1.66	0.23	0.01	0.03	15.3	15.3	0.03	1.60	1.63	—	1,603	1,603	0.01	0.26	1.41	1,682
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.12	0.21	2.58	0.00	0.00	22.1	22.1	0.00	2.27	2.27	—	484	484	0.02	0.02	0.70	489
Vendor	< 0.005	< 0.005	0.09	0.02	< 0.005	< 0.005	1.04	1.04	< 0.005	0.11	0.11	—	89.6	89.6	< 0.005	0.01	0.09	93.5
Hauling	0.01	< 0.005	0.30	0.04	< 0.005	0.01	2.78	2.79	0.01	0.29	0.30	—	265	265	< 0.005	0.04	0.23	278

3.9. Ph 4 Gen Tie (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.17	1.82	19.6	23.5	0.05	0.53	—	0.53	0.49	—	0.49	—	4,779	4,779	0.19	0.04	—	4,796
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	178	178	< 0.005	0.03	0.01	186
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.18	0.15	1.61	1.93	< 0.005	0.04	—	0.04	0.04	—	0.04	—	393	393	0.02	< 0.005	—	394
Onsite truck	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.27	0.27	< 0.005	0.03	0.03	—	14.6	14.6	< 0.005	< 0.005	0.01	15.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.29	0.35	< 0.005	0.01	—	0.01	0.01	—	0.01	—	65.0	65.0	< 0.005	< 0.005	—	65.3
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.05	0.05	< 0.005	< 0.005	0.01	—	2.41	2.41	< 0.005	< 0.005	< 0.005	2.53
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.62	0.52	1.22	10.6	0.00	0.00	122	122	0.00	12.5	12.5	—	2,693	2,693	0.11	0.10	0.25	2,725
Vendor	0.02	0.02	0.87	0.21	0.01	0.02	10.7	10.7	0.02	1.12	1.13	—	1,003	1,003	0.01	0.14	0.06	1,045
Hauling	0.02	0.01	1.17	0.16	0.01	0.02	10.7	10.8	0.02	1.12	1.15	—	1,113	1,113	0.01	0.18	0.06	1,167
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.06	0.05	0.09	1.15	0.00	0.00	9.88	9.88	0.00	1.01	1.01	—	238	238	0.01	0.01	0.35	241
Vendor	< 0.005	< 0.005	0.07	0.02	< 0.005	< 0.005	0.87	0.87	< 0.005	0.09	0.09	—	82.4	82.4	< 0.005	0.01	0.08	85.9
Hauling	< 0.005	< 0.005	0.09	0.01	< 0.005	< 0.005	0.87	0.87	< 0.005	0.09	0.09	—	91.5	91.5	< 0.005	0.01	0.08	96.0
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.02	0.21	0.00	0.00	1.80	1.80	0.00	0.19	0.19	—	39.4	39.4	< 0.005	< 0.005	0.06	39.9
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.16	0.16	< 0.005	0.02	0.02	—	13.6	13.6	< 0.005	< 0.005	0.01	14.2
Hauling	< 0.005	< 0.005	0.02	< 0.005	< 0.005	< 0.005	0.16	0.16	< 0.005	0.02	0.02	—	15.1	15.1	< 0.005	< 0.005	0.01	15.9

3.10. Ph 4 Gen Tie (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.59	0.59	11.9	29.5	0.05	0.09	—	0.09	0.09	—	0.09	—	4,779	4,779	0.19	0.04	—	4,796
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	178	178	< 0.005	0.03	0.01	186
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.05	0.97	2.42	< 0.005	0.01	—	0.01	0.01	—	0.01	—	393	393	0.02	< 0.005	—	394
Onsite truck	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.12	0.12	< 0.005	0.01	0.01	—	14.6	14.6	< 0.005	< 0.005	0.01	15.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	0.01	0.01	0.18	0.44	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	65.0	65.0	< 0.005	< 0.005	—	65.3
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	2.41	2.41	< 0.005	< 0.005	< 0.005	2.53
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.62	0.52	1.22	10.6	0.00	0.00	122	122	0.00	12.5	12.5	—	2,693	2,693	0.11	0.10	0.25	2,725
Vendor	0.02	0.02	0.87	0.21	0.01	0.02	10.7	10.7	0.02	1.12	1.13	—	1,003	1,003	0.01	0.14	0.06	1,045
Hauling	0.02	0.01	1.17	0.16	0.01	0.02	10.7	10.8	0.02	1.12	1.15	—	1,113	1,113	0.01	0.18	0.06	1,167
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.09	1.15	0.00	0.00	9.88	9.88	0.00	1.01	1.01	—	238	238	0.01	0.01	0.35	241
Vendor	< 0.005	< 0.005	0.07	0.02	< 0.005	< 0.005	0.87	0.87	< 0.005	0.09	0.09	—	82.4	82.4	< 0.005	0.01	0.08	85.9
Hauling	< 0.005	< 0.005	0.09	0.01	< 0.005	< 0.005	0.87	0.87	< 0.005	0.09	0.09	—	91.5	91.5	< 0.005	0.01	0.08	96.0
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.02	0.21	0.00	0.00	1.80	1.80	0.00	0.19	0.19	—	39.4	39.4	< 0.005	< 0.005	0.06	39.9
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.16	0.16	< 0.005	0.02	0.02	—	13.6	13.6	< 0.005	< 0.005	0.01	14.2
Hauling	< 0.005	< 0.005	0.02	< 0.005	< 0.005	< 0.005	0.16	0.16	< 0.005	0.02	0.02	—	15.1	15.1	< 0.005	< 0.005	0.01	15.9

3.11. Ph 5 Battery Storage (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	5.47	4.59	44.5	59.1	0.11	1.39	—	1.39	1.28	—	1.28	—	11,140	11,140	0.45	0.09	—	11,178
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.30	0.14	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	177	177	< 0.005	0.03	0.32	186
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	5.47	4.59	44.5	59.1	0.11	1.39	—	1.39	1.28	—	1.28	—	11,140	11,140	0.45	0.09	—	11,178
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	178	178	< 0.005	0.03	0.01	186
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	2.40	2.01	19.5	25.9	0.05	0.61	—	0.61	0.56	—	0.56	—	4,883	4,883	0.20	0.04	—	4,900
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.01	< 0.005	0.14	0.06	< 0.005	< 0.005	1.45	1.45	< 0.005	0.15	0.15	—	77.7	77.7	< 0.005	0.01	0.06	81.6
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.44	0.37	3.56	4.73	0.01	0.11	—	0.11	0.10	—	0.10	—	808	808	0.03	0.01	—	811
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.26	0.26	< 0.005	0.03	0.03	—	12.9	12.9	< 0.005	< 0.005	0.01	13.5
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.82	0.73	1.05	20.1	0.00	0.00	122	122	0.00	12.5	12.5	—	3,190	3,190	0.11	0.10	9.75	3,231
Vendor	0.03	0.02	0.79	0.22	0.01	0.02	10.7	10.7	0.02	1.12	1.13	—	1,002	1,002	0.01	0.14	2.32	1,047
Hauling	0.06	0.04	3.18	0.47	0.02	0.07	32.2	32.3	0.07	3.37	3.44	—	3,339	3,339	0.03	0.54	6.79	3,506
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.62	0.52	1.22	10.6	0.00	0.00	122	122	0.00	12.5	12.5	—	2,693	2,693	0.11	0.10	0.25	2,725
Vendor	0.02	0.02	0.87	0.21	0.01	0.02	10.7	10.7	0.02	1.12	1.13	—	1,003	1,003	0.01	0.14	0.06	1,045
Hauling	0.06	0.04	3.52	0.48	0.02	0.07	32.2	32.3	0.07	3.37	3.44	—	3,339	3,339	0.03	0.54	0.18	3,500
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.32	0.28	0.50	6.14	0.00	0.00	52.7	52.7	0.00	5.41	5.41	—	1,270	1,270	0.05	0.04	1.85	1,285
Vendor	0.01	0.01	0.38	0.09	< 0.005	0.01	4.63	4.64	0.01	0.48	0.49	—	439	439	< 0.005	0.06	0.44	458
Hauling	0.03	0.02	1.52	0.21	0.01	0.03	13.9	14.0	0.03	1.46	1.49	—	1,464	1,464	0.01	0.24	1.29	1,535
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.09	1.12	0.00	0.00	9.62	9.62	0.00	0.99	0.99	—	210	210	0.01	0.01	0.31	213
Vendor	< 0.005	< 0.005	0.07	0.02	< 0.005	< 0.005	0.85	0.85	< 0.005	0.09	0.09	—	72.8	72.8	< 0.005	0.01	0.07	75.9
Hauling	0.01	< 0.005	0.28	0.04	< 0.005	0.01	2.54	2.55	0.01	0.27	0.27	—	242	242	< 0.005	0.04	0.21	254

3.12. Ph 5 Battery Storage (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipm	1.34	1.34	24.7	70.0	0.11	0.21	—	0.21	0.21	—	0.21	—	11,140	11,140	0.45	0.09	—	11,178
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.30	0.14	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	177	177	< 0.005	0.03	0.32	186
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.34	1.34	24.7	70.0	0.11	0.21	—	0.21	0.21	—	0.21	—	11,140	11,140	0.45	0.09	—	11,178
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	178	178	< 0.005	0.03	0.01	186
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.59	0.59	10.8	30.7	0.05	0.09	—	0.09	0.09	—	0.09	—	4,883	4,883	0.20	0.04	—	4,900
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.01	< 0.005	0.14	0.06	< 0.005	< 0.005	0.65	0.66	< 0.005	0.07	0.07	—	77.7	77.7	< 0.005	0.01	0.06	81.6
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.11	1.98	5.60	0.01	0.02	—	0.02	0.02	—	0.02	—	808	808	0.03	0.01	—	811
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.12	0.12	< 0.005	0.01	0.01	—	12.9	12.9	< 0.005	< 0.005	0.01	13.5
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.82	0.73	1.05	20.1	0.00	0.00	122	122	0.00	12.5	12.5	—	3,190	3,190	0.11	0.10	9.75	3,231
Vendor	0.03	0.02	0.79	0.22	0.01	0.02	10.7	10.7	0.02	1.12	1.13	—	1,002	1,002	0.01	0.14	2.32	1,047
Hauling	0.06	0.04	3.18	0.47	0.02	0.07	32.2	32.3	0.07	3.37	3.44	—	3,339	3,339	0.03	0.54	6.79	3,506
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.62	0.52	1.22	10.6	0.00	0.00	122	122	0.00	12.5	12.5	—	2,693	2,693	0.11	0.10	0.25	2,725
Vendor	0.02	0.02	0.87	0.21	0.01	0.02	10.7	10.7	0.02	1.12	1.13	—	1,003	1,003	0.01	0.14	0.06	1,045
Hauling	0.06	0.04	3.52	0.48	0.02	0.07	32.2	32.3	0.07	3.37	3.44	—	3,339	3,339	0.03	0.54	0.18	3,500
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.32	0.28	0.50	6.14	0.00	0.00	52.7	52.7	0.00	5.41	5.41	—	1,270	1,270	0.05	0.04	1.85	1,285
Vendor	0.01	0.01	0.38	0.09	< 0.005	0.01	4.63	4.64	0.01	0.48	0.49	—	439	439	< 0.005	0.06	0.44	458
Hauling	0.03	0.02	1.52	0.21	0.01	0.03	13.9	14.0	0.03	1.46	1.49	—	1,464	1,464	0.01	0.24	1.29	1,535
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.09	1.12	0.00	0.00	9.62	9.62	0.00	0.99	0.99	—	210	210	0.01	0.01	0.31	213
Vendor	< 0.005	< 0.005	0.07	0.02	< 0.005	< 0.005	0.85	0.85	< 0.005	0.09	0.09	—	72.8	72.8	< 0.005	0.01	0.07	75.9
Hauling	0.01	< 0.005	0.28	0.04	< 0.005	0.01	2.54	2.55	0.01	0.27	0.27	—	242	242	< 0.005	0.04	0.21	254

3.13. Ph 6 Utility Switchyard (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipm	5.36	4.49	42.3	53.2	0.09	1.34	—	1.34	1.23	—	1.23	—	9,497	9,497	0.39	0.08	—	9,530
Dust From Material Movement	—	—	—	—	—	—	6.62	6.62	—	3.38	3.38	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.30	0.14	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	177	177	< 0.005	0.03	0.32	186
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	5.36	4.49	42.3	53.2	0.09	1.34	—	1.34	1.23	—	1.23	—	9,497	9,497	0.39	0.08	—	9,530
Dust From Material Movement	—	—	—	—	—	—	6.62	6.62	—	3.38	3.38	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	3.35	3.35	< 0.005	0.34	0.34	—	178	178	< 0.005	0.03	0.01	186
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.94	2.46	23.2	29.1	0.05	0.73	—	0.73	0.68	—	0.68	—	5,204	5,204	0.21	0.04	—	5,222
Dust From Material Movement	—	—	—	—	—	—	3.63	3.63	—	1.85	1.85	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.17	0.08	< 0.005	< 0.005	1.81	1.81	< 0.005	0.18	0.18	—	97.2	97.2	< 0.005	0.02	0.08	102
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.54	0.45	4.23	5.32	0.01	0.13	—	0.13	0.12	—	0.12	—	862	862	0.03	0.01	—	865
Dust From Material Movement	—	—	—	—	—	—	0.66	0.66	—	0.34	0.34	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.33	0.33	< 0.005	0.03	0.03	—	16.1	16.1	< 0.005	< 0.005	0.01	16.9
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.36	0.52	10.1	0.00	0.00	60.9	60.9	0.00	6.25	6.25	—	1,595	1,595	0.05	0.05	4.87	1,615
Vendor	0.03	0.02	0.79	0.22	0.01	0.02	10.7	10.7	0.02	1.12	1.13	—	1,002	1,002	0.01	0.14	2.32	1,047
Hauling	0.09	0.05	4.24	0.63	0.03	0.09	42.9	43.0	0.09	4.50	4.59	—	4,451	4,451	0.03	0.72	9.05	4,675
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.31	0.26	0.61	5.32	0.00	0.00	60.9	60.9	0.00	6.25	6.25	—	1,347	1,347	0.06	0.05	0.13	1,363
Vendor	0.02	0.02	0.87	0.21	0.01	0.02	10.7	10.7	0.02	1.12	1.13	—	1,003	1,003	0.01	0.14	0.06	1,045
Hauling	0.08	0.05	4.70	0.64	0.03	0.09	42.9	43.0	0.09	4.50	4.59	—	4,452	4,452	0.03	0.72	0.24	4,667
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.20	0.18	0.31	3.84	0.00	0.00	32.9	32.9	0.00	3.38	3.38	—	794	794	0.03	0.03	1.15	803
Vendor	0.02	0.01	0.47	0.12	< 0.005	0.01	5.79	5.80	0.01	0.60	0.61	—	549	549	< 0.005	0.08	0.55	573
Hauling	0.05	0.03	2.53	0.35	0.02	0.05	23.2	23.3	0.05	2.43	2.48	—	2,439	2,439	0.02	0.39	2.15	2,559
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.06	0.70	0.00	0.00	6.01	6.01	0.00	0.62	0.62	—	131	131	< 0.005	< 0.005	0.19	133
Vendor	< 0.005	< 0.005	0.09	0.02	< 0.005	< 0.005	1.06	1.06	< 0.005	0.11	0.11	—	90.9	90.9	< 0.005	0.01	0.09	94.8
Hauling	0.01	< 0.005	0.46	0.06	< 0.005	0.01	4.24	4.25	0.01	0.44	0.45	—	404	404	< 0.005	0.06	0.36	424

3.14. Ph 6 Utility Switchyard (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.17	1.17	22.8	59.7	0.09	0.17	—	0.17	0.17	—	0.17	—	9,497	9,497	0.39	0.08	—	9,530
Dust From Material Movement	—	—	—	—	—	—	2.58	2.58	—	1.32	1.32	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.30	0.14	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	177	177	< 0.005	0.03	0.32	186
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.17	1.17	22.8	59.7	0.09	0.17	—	0.17	0.17	—	0.17	—	9,497	9,497	0.39	0.08	—	9,530
Dust From Material Movement	—	—	—	—	—	—	2.58	2.58	—	1.32	1.32	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.33	0.15	< 0.005	< 0.005	1.51	1.52	< 0.005	0.15	0.16	—	178	178	< 0.005	0.03	0.01	186
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.64	0.64	12.5	32.7	0.05	0.10	—	0.10	0.10	—	0.10	—	5,204	5,204	0.21	0.04	—	5,222

Dust From Material Movement	—	—	—	—	—	—	1.42	1.42	—	0.72	0.72	—	—	—	—	—	—	—
Onsite truck	0.01	0.01	0.17	0.08	< 0.005	< 0.005	0.82	0.82	< 0.005	0.08	0.09	—	97.2	97.2	< 0.005	0.02	0.08	102
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.12	2.28	5.97	0.01	0.02	—	0.02	0.02	—	0.02	—	862	862	0.03	0.01	—	865
Dust From Material Movement	—	—	—	—	—	—	0.26	0.26	—	0.13	0.13	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.15	0.15	< 0.005	0.02	0.02	—	16.1	16.1	< 0.005	< 0.005	0.01	16.9
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.36	0.52	10.1	0.00	0.00	60.9	60.9	0.00	6.25	6.25	—	1,595	1,595	0.05	0.05	4.87	1,615
Vendor	0.03	0.02	0.79	0.22	0.01	0.02	10.7	10.7	0.02	1.12	1.13	—	1,002	1,002	0.01	0.14	2.32	1,047
Hauling	0.09	0.05	4.24	0.63	0.03	0.09	42.9	43.0	0.09	4.50	4.59	—	4,451	4,451	0.03	0.72	9.05	4,675
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.31	0.26	0.61	5.32	0.00	0.00	60.9	60.9	0.00	6.25	6.25	—	1,347	1,347	0.06	0.05	0.13	1,363
Vendor	0.02	0.02	0.87	0.21	0.01	0.02	10.7	10.7	0.02	1.12	1.13	—	1,003	1,003	0.01	0.14	0.06	1,045
Hauling	0.08	0.05	4.70	0.64	0.03	0.09	42.9	43.0	0.09	4.50	4.59	—	4,452	4,452	0.03	0.72	0.24	4,667
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.20	0.18	0.31	3.84	0.00	0.00	32.9	32.9	0.00	3.38	3.38	—	794	794	0.03	0.03	1.15	803
Vendor	0.02	0.01	0.47	0.12	< 0.005	0.01	5.79	5.80	0.01	0.60	0.61	—	549	549	< 0.005	0.08	0.55	573

Hauling	0.05	0.03	2.53	0.35	0.02	0.05	23.2	23.3	0.05	2.43	2.48	—	2,439	2,439	0.02	0.39	2.15	2,559
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.06	0.70	0.00	0.00	6.01	6.01	0.00	0.62	0.62	—	131	131	< 0.005	< 0.005	0.19	133
Vendor	< 0.005	< 0.005	0.09	0.02	< 0.005	< 0.005	1.06	1.06	< 0.005	0.11	0.11	—	90.9	90.9	< 0.005	0.01	0.09	94.8
Hauling	0.01	< 0.005	0.46	0.06	< 0.005	0.01	4.24	4.25	0.01	0.44	0.45	—	404	404	< 0.005	0.06	0.36	424

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Mobile source emissions results are presented in Sections 2.6. No further detailed breakdown of emissions is available.

4.1.2. Mitigated

Mobile source emissions results are presented in Sections 2.5. No further detailed breakdown of emissions is available.

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.16	0.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.03	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landsca Equipment	0.06	0.05	< 0.005	0.33	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.34	1.34	< 0.005	< 0.005	—	1.35
Total	0.25	0.24	< 0.005	0.33	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.34	1.34	< 0.005	< 0.005	—	1.35
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.16	0.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.03	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	0.19	0.19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.03	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.01	< 0.005	< 0.005	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.11	0.11	< 0.005	< 0.005	—	0.11
Total	0.04	0.04	< 0.005	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.11	0.11	< 0.005	< 0.005	—	0.11

4.3.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Consum Products	0.16	0.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.03	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.06	0.05	< 0.005	0.33	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.34	1.34	< 0.005	< 0.005	—	1.35
Total	0.25	0.24	< 0.005	0.33	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.34	1.34	< 0.005	< 0.005	—	1.35
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.16	0.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.03	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	0.19	0.19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.03	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.01	< 0.005	< 0.005	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.11	0.11	< 0.005	< 0.005	—	0.11
Total	0.04	0.04	< 0.005	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.11	0.11	< 0.005	< 0.005	—	0.11

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	65.6	65.6	< 0.005	< 0.005	—	65.9
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	3.32	10.3	13.6	0.34	0.01	—	24.6
Total	—	—	—	—	—	—	—	—	—	—	—	3.32	75.9	79.2	0.35	0.01	—	90.4
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	65.6	65.6	< 0.005	< 0.005	—	65.9
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	3.32	10.3	13.6	0.34	0.01	—	24.6
Total	—	—	—	—	—	—	—	—	—	—	—	3.32	75.9	79.2	0.35	0.01	—	90.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	10.9	10.9	< 0.005	< 0.005	—	10.9
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.55	1.70	2.25	0.06	< 0.005	—	4.07
Total	—	—	—	—	—	—	—	—	—	—	—	0.55	12.6	13.1	0.06	< 0.005	—	15.0

4.4.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	65.6	65.6	< 0.005	< 0.005	—	65.9
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	3.32	10.3	13.6	0.34	0.01	—	24.6
Total	—	—	—	—	—	—	—	—	—	—	—	3.32	75.9	79.2	0.35	0.01	—	90.4
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	65.6	65.6	< 0.005	< 0.005	—	65.9
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	3.32	10.3	13.6	0.34	0.01	—	24.6
Total	—	—	—	—	—	—	—	—	—	—	—	3.32	75.9	79.2	0.35	0.01	—	90.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	10.9	10.9	< 0.005	< 0.005	—	10.9
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.55	1.70	2.25	0.06	< 0.005	—	4.07
Total	—	—	—	—	—	—	—	—	—	—	—	0.55	12.6	13.1	0.06	< 0.005	—	15.0

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Total	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Total	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.83	0.00	0.83	0.08	0.00	—	2.90
Total	—	—	—	—	—	—	—	—	—	—	—	0.83	0.00	0.83	0.08	0.00	—	2.90

4.5.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Total	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Total	—	—	—	—	—	—	—	—	—	—	—	5.01	0.00	5.01	0.50	0.00	—	17.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.83	0.00	0.83	0.08	0.00	—	2.90
Total	—	—	—	—	—	—	—	—	—	—	—	0.83	0.00	0.83	0.08	0.00	—	2.90

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.32	0.32
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.32	0.32

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.95	1.95
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.32	0.32
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.32	0.32

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Forklifts	0.04	0.03	0.29	0.52	< 0.005	0.01	—	0.01	0.01	—	0.01	—	76.2	76.2	< 0.005	< 0.005	—	76.5
Tractors/ Loaders/ Backhoes	0.06	0.05	0.48	0.96	< 0.005	0.01	—	0.01	0.01	—	0.01	—	145	145	0.01	< 0.005	—	146
Total	0.09	0.08	0.77	1.47	< 0.005	0.02	—	0.02	0.02	—	0.02	—	221	221	0.01	< 0.005	—	222
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Forklifts	0.04	0.03	0.29	0.52	< 0.005	0.01	—	0.01	0.01	—	0.01	—	76.2	76.2	< 0.005	< 0.005	—	76.5

Tractors/ Loaders/	0.06	0.05	0.48	0.96	< 0.005	0.01	—	0.01	0.01	—	0.01	—	145	145	0.01	< 0.005	—	146
Total	0.09	0.08	0.77	1.47	< 0.005	0.02	—	0.02	0.02	—	0.02	—	221	221	0.01	< 0.005	—	222
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Forklifts	< 0.005	< 0.005	0.04	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	8.99	8.99	< 0.005	< 0.005	—	9.02
Tractors/ Loaders/ Backhoes	0.01	0.01	0.06	0.12	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	17.1	17.1	< 0.005	< 0.005	—	17.2
Total	0.01	0.01	0.10	0.19	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	26.1	26.1	< 0.005	< 0.005	—	26.2

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Forklifts	0.04	0.03	0.29	0.52	< 0.005	0.01	—	0.01	0.01	—	0.01	—	76.2	76.2	< 0.005	< 0.005	—	76.5
Tractors/ Loaders/ Backhoes	0.06	0.05	0.48	0.96	< 0.005	0.01	—	0.01	0.01	—	0.01	—	145	145	0.01	< 0.005	—	146
Total	0.09	0.08	0.77	1.47	< 0.005	0.02	—	0.02	0.02	—	0.02	—	221	221	0.01	< 0.005	—	222
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Forklifts	0.04	0.03	0.29	0.52	< 0.005	0.01	—	0.01	0.01	—	0.01	—	76.2	76.2	< 0.005	< 0.005	—	76.5
Tractors/ Loaders/ Backhoes	0.06	0.05	0.48	0.96	< 0.005	0.01	—	0.01	0.01	—	0.01	—	145	145	0.01	< 0.005	—	146
Total	0.09	0.08	0.77	1.47	< 0.005	0.02	—	0.02	0.02	—	0.02	—	221	221	0.01	< 0.005	—	222

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Forklifts	< 0.005	< 0.005	0.04	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	8.99	8.99	< 0.005	< 0.005	—	9.02
Tractors/ Loaders/ Backhoes	0.01	0.01	0.06	0.12	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	17.1	17.1	< 0.005	< 0.005	—	17.2
Total	0.01	0.01	0.10	0.19	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	26.1	26.1	< 0.005	< 0.005	—	26.2

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.48	2.31	0.22	6.00	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	147	147	0.31	0.00	0.00	155
Total	0.48	2.31	0.22	6.00	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	147	147	0.31	0.00	0.00	155
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.48	2.31	0.22	6.00	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	147	147	0.31	0.00	0.00	155
Total	0.48	2.31	0.22	6.00	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	147	147	0.31	0.00	0.00	155
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Emergency Generator	0.02	0.12	0.01	0.30	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	6.68	6.68	0.01	0.00	0.00	7.03
Total	0.02	0.12	0.01	0.30	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	6.68	6.68	0.01	0.00	0.00	7.03

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.48	2.31	0.22	6.00	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	147	147	0.31	0.00	0.00	155
Total	0.48	2.31	0.22	6.00	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	147	147	0.31	0.00	0.00	155
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.48	2.31	0.22	6.00	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	147	147	0.31	0.00	0.00	155
Total	0.48	2.31	0.22	6.00	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	147	147	0.31	0.00	0.00	155
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.02	0.12	0.01	0.30	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	6.68	6.68	0.01	0.00	0.00	7.03
Total	0.02	0.12	0.01	0.30	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	6.68	6.68	0.01	0.00	0.00	7.03

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cropland	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Total	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cropland	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Total	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cropland	—	—	—	—	—	—	—	—	—	—	—	—	2,205	2,205	—	—	—	2,205
Total	—	—	—	—	—	—	—	—	—	—	—	—	2,205	2,205	—	—	—	2,205

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Remove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cropland	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Total	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cropland	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Total	—	—	—	—	—	—	—	—	—	—	—	—	13,320	13,320	—	—	—	13,320
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Croplan	—	—	—	—	—	—	—	—	—	—	—	—	2,205	2,205	—	—	—	2,205
Total	—	—	—	—	—	—	—	—	—	—	—	—	2,205	2,205	—	—	—	2,205

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Ph 1 Site Preparation	Site Preparation	01/2/2026	6/2/2026	5.00	100	—

Ph 2 PV Panel System	Grading	4/2/2026	11/2/2026	5.00	150	—
Ph 3 Inverters, Transformers, Substation, Electrical	Building Construction	9/2/2026	4/2/2027	5.00	150	—
Ph 4 Gen Tie	Building Construction	2/2/2027	3/2/2027	5.00	30.0	—
Ph 5 Battery Storage	Paving	2/2/2027	10/2/2027	5.00	160	—
Ph 6 Utility Switchyard	Trenching	2/2/2027	12/2/2027	5.00	200	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Ph 1 Site Preparation	Skid Steer Loaders	Diesel	Average	15.0	8.00	71.0	0.37
Ph 1 Site Preparation	Rubber Tired Dozers	Diesel	Average	15.0	8.00	367	0.40
Ph 1 Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	15.0	8.00	84.0	0.37
Ph 1 Site Preparation	Graders	Diesel	Average	10.0	8.00	148	0.41
Ph 1 Site Preparation	Rollers	Diesel	Average	8.00	8.00	36.0	0.38
Ph 1 Site Preparation	Forklifts	Diesel	Average	5.00	8.00	82.0	0.20
Ph 2 PV Panel System	Cranes	Diesel	Average	5.00	8.00	367	0.29
Ph 2 PV Panel System	Aerial Lifts	Diesel	Average	10.0	8.00	46.0	0.31
Ph 2 PV Panel System	Skid Steer Loaders	Diesel	Average	15.0	8.00	71.0	0.37
Ph 2 PV Panel System	Rubber Tired Dozers	Diesel	Average	8.00	8.00	367	0.40
Ph 2 PV Panel System	Welders	Diesel	Average	5.00	10.0	46.0	0.45
Ph 2 PV Panel System	Trenchers	Diesel	Average	5.00	8.00	40.0	0.50
Ph 2 PV Panel System	Forklifts	Diesel	Average	16.0	8.00	82.0	0.20
Ph 2 PV Panel System	Bore/Drill Rigs	Diesel	Average	3.00	8.00	83.0	0.50
Ph 2 PV Panel System	Graders	Diesel	Average	7.00	8.00	148	0.41
Ph 2 PV Panel System	Rollers	Diesel	Average	7.00	8.00	36.0	0.38

Ph 2 PV Panel System	Tractors/Loaders/Back	Diesel	Average	20.0	8.00	84.0	0.37
Ph 2 PV Panel System	Other Construction Equipment	Diesel	Average	60.0	10.0	48.0	0.42
Ph 3 Inverters, Transformers, Substation, Electrical	Skid Steer Loaders	Diesel	Average	7.00	8.00	71.0	0.37
Ph 3 Inverters, Transformers, Substation, Electrical	Cranes	Diesel	Average	5.00	8.00	367	0.29
Ph 3 Inverters, Transformers, Substation, Electrical	Aerial Lifts	Diesel	Average	5.00	8.00	46.0	0.31
Ph 3 Inverters, Transformers, Substation, Electrical	Forklifts	Diesel	Average	12.0	8.00	82.0	0.20
Ph 3 Inverters, Transformers, Substation, Electrical	Trenchers	Diesel	Average	7.00	8.00	40.0	0.50
Ph 3 Inverters, Transformers, Substation, Electrical	Welders	Diesel	Average	5.00	8.00	46.0	0.45
Ph 3 Inverters, Transformers, Substation, Electrical	Tractors/Loaders/Backhoes	Diesel	Average	10.0	8.00	84.0	0.37
Ph 4 Gen Tie	Skid Steer Loaders	Diesel	Average	2.00	8.00	71.0	0.37
Ph 4 Gen Tie	Cranes	Diesel	Average	2.00	8.00	367	0.29
Ph 4 Gen Tie	Aerial Lifts	Diesel	Average	8.00	8.00	46.0	0.31
Ph 4 Gen Tie	Welders	Diesel	Average	2.00	10.0	46.0	0.45
Ph 4 Gen Tie	Forklifts	Diesel	Average	4.00	8.00	82.0	0.20
Ph 5 Battery Storage	Skid Steer Loaders	Diesel	Average	6.00	8.00	71.0	0.37
Ph 5 Battery Storage	Cranes	Diesel	Average	4.00	8.00	367	0.29
Ph 5 Battery Storage	Aerial Lifts	Diesel	Average	7.00	8.00	46.0	0.31
Ph 5 Battery Storage	Forklifts	Diesel	Average	7.00	8.00	82.0	0.20
Ph 5 Battery Storage	Trenchers	Diesel	Average	4.00	8.00	40.0	0.50

Ph 5 Battery Storage	Welders	Diesel	Average	4.00	10.0	46.0	0.45
Ph 5 Battery Storage	Tractors/Loaders/Backhoes	Diesel	Average	6.00	8.00	84.0	0.37
Ph 6 Utility Switchyard	Cranes	Diesel	Average	2.00	8.00	367	0.29
Ph 6 Utility Switchyard	Aerial Lifts	Diesel	Average	8.00	8.00	46.0	0.31
Ph 6 Utility Switchyard	Skid Steer Loaders	Diesel	Average	4.00	8.00	71.0	0.37
Ph 6 Utility Switchyard	Rubber Tired Loaders	Diesel	Average	1.00	8.00	150	0.36
Ph 6 Utility Switchyard	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Ph 6 Utility Switchyard	Welders	Diesel	Average	5.00	10.0	46.0	0.45
Ph 6 Utility Switchyard	Trenchers	Diesel	Average	2.00	8.00	40.0	0.50
Ph 6 Utility Switchyard	Forklifts	Diesel	Average	4.00	8.00	82.0	0.20
Ph 6 Utility Switchyard	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Ph 6 Utility Switchyard	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Ph 1 Site Preparation	Skid Steer Loaders	Diesel	Tier 4 Final	15.0	8.00	71.0	0.37
Ph 1 Site Preparation	Rubber Tired Dozers	Diesel	Tier 4 Final	15.0	8.00	367	0.40
Ph 1 Site Preparation	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	15.0	8.00	84.0	0.37
Ph 1 Site Preparation	Graders	Diesel	Tier 4 Final	10.0	8.00	148	0.41
Ph 1 Site Preparation	Rollers	Diesel	Tier 4 Final	8.00	8.00	36.0	0.38
Ph 1 Site Preparation	Forklifts	Diesel	Tier 4 Final	5.00	8.00	82.0	0.20
Ph 2 PV Panel System	Cranes	Diesel	Tier 4 Final	5.00	8.00	367	0.29
Ph 2 PV Panel System	Aerial Lifts	Diesel	Tier 4 Final	10.0	8.00	46.0	0.31
Ph 2 PV Panel System	Skid Steer Loaders	Diesel	Tier 4 Final	15.0	8.00	71.0	0.37
Ph 2 PV Panel System	Rubber Tired Dozers	Diesel	Tier 4 Final	8.00	8.00	367	0.40
Ph 2 PV Panel System	Welders	Diesel	Tier 4 Final	5.00	10.0	46.0	0.45

Ph 2 PV Panel System	Trenchers	Diesel	Tier 4 Final	5.00	8.00	40.0	0.50
Ph 2 PV Panel System	Forklifts	Diesel	Tier 4 Final	16.0	8.00	82.0	0.20
Ph 2 PV Panel System	Bore/Drill Rigs	Diesel	Tier 4 Final	3.00	8.00	83.0	0.50
Ph 2 PV Panel System	Graders	Diesel	Tier 4 Final	7.00	8.00	148	0.41
Ph 2 PV Panel System	Rollers	Diesel	Tier 4 Final	7.00	8.00	36.0	0.38
Ph 2 PV Panel System	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	20.0	8.00	84.0	0.37
Ph 2 PV Panel System	Other Construction Equipment	Diesel	Tier 4 Final	60.0	10.0	48.0	0.42
Ph 3 Inverters, Transformers, Substation, Electrical	Skid Steer Loaders	Diesel	Tier 4 Final	7.00	8.00	71.0	0.37
Ph 3 Inverters, Transformers, Substation, Electrical	Cranes	Diesel	Tier 4 Final	5.00	8.00	367	0.29
Ph 3 Inverters, Transformers, Substation, Electrical	Aerial Lifts	Diesel	Tier 4 Final	5.00	8.00	46.0	0.31
Ph 3 Inverters, Transformers, Substation, Electrical	Forklifts	Diesel	Tier 4 Final	12.0	8.00	82.0	0.20
Ph 3 Inverters, Transformers, Substation, Electrical	Trenchers	Diesel	Tier 4 Final	7.00	8.00	40.0	0.50
Ph 3 Inverters, Transformers, Substation, Electrical	Welders	Diesel	Tier 4 Final	5.00	8.00	46.0	0.45
Ph 3 Inverters, Transformers, Substation, Electrical	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	10.0	8.00	84.0	0.37
Ph 4 Gen Tie	Skid Steer Loaders	Diesel	Tier 4 Final	2.00	8.00	71.0	0.37
Ph 4 Gen Tie	Cranes	Diesel	Tier 4 Final	2.00	8.00	367	0.29
Ph 4 Gen Tie	Aerial Lifts	Diesel	Tier 4 Final	8.00	8.00	46.0	0.31
Ph 4 Gen Tie	Welders	Diesel	Tier 4 Final	2.00	10.0	46.0	0.45

Ph 4 Gen Tie	Forklifts	Diesel	Tier 4 Final	4.00	8.00	82.0	0.20
Ph 5 Battery Storage	Skid Steer Loaders	Diesel	Tier 4 Final	6.00	8.00	71.0	0.37
Ph 5 Battery Storage	Cranes	Diesel	Tier 4 Final	4.00	8.00	367	0.29
Ph 5 Battery Storage	Aerial Lifts	Diesel	Tier 4 Final	7.00	8.00	46.0	0.31
Ph 5 Battery Storage	Forklifts	Diesel	Tier 4 Final	7.00	8.00	82.0	0.20
Ph 5 Battery Storage	Trenchers	Diesel	Tier 4 Final	4.00	8.00	40.0	0.50
Ph 5 Battery Storage	Welders	Diesel	Tier 4 Final	4.00	10.0	46.0	0.45
Ph 5 Battery Storage	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	6.00	8.00	84.0	0.37
Ph 6 Utility Switchyard	Cranes	Diesel	Tier 4 Final	2.00	8.00	367	0.29
Ph 6 Utility Switchyard	Aerial Lifts	Diesel	Tier 4 Final	8.00	8.00	46.0	0.31
Ph 6 Utility Switchyard	Skid Steer Loaders	Diesel	Tier 4 Final	4.00	8.00	71.0	0.37
Ph 6 Utility Switchyard	Rubber Tired Loaders	Diesel	Tier 4 Final	1.00	8.00	150	0.36
Ph 6 Utility Switchyard	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.00	367	0.40
Ph 6 Utility Switchyard	Welders	Diesel	Tier 4 Final	5.00	10.0	46.0	0.45
Ph 6 Utility Switchyard	Trenchers	Diesel	Tier 4 Final	2.00	8.00	40.0	0.50
Ph 6 Utility Switchyard	Forklifts	Diesel	Tier 4 Final	4.00	8.00	82.0	0.20
Ph 6 Utility Switchyard	Rollers	Diesel	Tier 4 Final	2.00	8.00	36.0	0.38
Ph 6 Utility Switchyard	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.00	8.00	84.0	0.37

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Ph 1 Site Preparation	—	—	—	—
Ph 1 Site Preparation	Worker	160	40.0	LDA,LDT1,LDT2
Ph 1 Site Preparation	Vendor	10.0	70.0	HHDT,MHDT
Ph 1 Site Preparation	Hauling	10.0	70.0	HHDT

Ph 1 Site Preparation	Onsite truck	10.0	5.00	HHDT
Ph 2 PV Panel System	—	—	—	—
Ph 2 PV Panel System	Worker	460	40.0	LDA,LDT1,LDT2
Ph 2 PV Panel System	Vendor	15.0	70.0	HHDT,MHDT
Ph 2 PV Panel System	Hauling	40.0	70.0	HHDT
Ph 2 PV Panel System	Onsite truck	10.0	5.00	HHDT
Ph 3 Inverters, Transformers, Substation, Electrical	—	—	—	—
Ph 3 Inverters, Transformers, Substation, Electrical	Worker	560	40.0	LDA,LDT1,LDT2
Ph 3 Inverters, Transformers, Substation, Electrical	Vendor	15.0	70.0	HHDT,MHDT
Ph 3 Inverters, Transformers, Substation, Electrical	Hauling	40.0	70.0	HHDT
Ph 3 Inverters, Transformers, Substation, Electrical	Onsite truck	10.0	5.00	HHDT
Ph 4 Gen Tie	—	—	—	—
Ph 4 Gen Tie	Worker	100	40.0	LDA,LDT1,LDT2
Ph 4 Gen Tie	Vendor	5.00	70.0	HHDT,MHDT
Ph 4 Gen Tie	Hauling	5.00	70.0	HHDT
Ph 4 Gen Tie	Onsite truck	10.0	5.00	HHDT
Ph 5 Battery Storage	—	—	—	—
Ph 5 Battery Storage	Worker	100	40.0	LDA,LDT1,LDT2
Ph 5 Battery Storage	Vendor	5.00	70.0	HHDT,MHDT
Ph 5 Battery Storage	Hauling	15.0	70.0	HHDT
Ph 5 Battery Storage	Onsite truck	10.0	5.00	HHDT
Ph 6 Utility Switchyard	—	—	—	—
Ph 6 Utility Switchyard	Worker	50.0	40.0	LDA,LDT1,LDT2
Ph 6 Utility Switchyard	Vendor	5.00	70.0	HHDT,MHDT
Ph 6 Utility Switchyard	Hauling	20.0	70.0	HHDT

Ph 6 Utility Switchyard	Onsite truck	10.0	5.00	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Ph 1 Site Preparation	—	—	—	—
Ph 1 Site Preparation	Worker	160	40.0	LDA,LDT1,LDT2
Ph 1 Site Preparation	Vendor	10.0	70.0	HHDT,MHDT
Ph 1 Site Preparation	Hauling	10.0	70.0	HHDT
Ph 1 Site Preparation	Onsite truck	10.0	5.00	HHDT
Ph 2 PV Panel System	—	—	—	—
Ph 2 PV Panel System	Worker	460	40.0	LDA,LDT1,LDT2
Ph 2 PV Panel System	Vendor	15.0	70.0	HHDT,MHDT
Ph 2 PV Panel System	Hauling	40.0	70.0	HHDT
Ph 2 PV Panel System	Onsite truck	10.0	5.00	HHDT
Ph 3 Inverters, Transformers, Substation, Electrical	—	—	—	—
Ph 3 Inverters, Transformers, Substation, Electrical	Worker	560	40.0	LDA,LDT1,LDT2
Ph 3 Inverters, Transformers, Substation, Electrical	Vendor	15.0	70.0	HHDT,MHDT
Ph 3 Inverters, Transformers, Substation, Electrical	Hauling	40.0	70.0	HHDT
Ph 3 Inverters, Transformers, Substation, Electrical	Onsite truck	10.0	5.00	HHDT
Ph 4 Gen Tie	—	—	—	—
Ph 4 Gen Tie	Worker	100	40.0	LDA,LDT1,LDT2
Ph 4 Gen Tie	Vendor	5.00	70.0	HHDT,MHDT
Ph 4 Gen Tie	Hauling	5.00	70.0	HHDT
Ph 4 Gen Tie	Onsite truck	10.0	5.00	HHDT
Ph 5 Battery Storage	—	—	—	—

Ph 5 Battery Storage	Worker	100	40.0	LDA,LDT1,LDT2
Ph 5 Battery Storage	Vendor	5.00	70.0	HHDT,MHDT
Ph 5 Battery Storage	Hauling	15.0	70.0	HHDT
Ph 5 Battery Storage	Onsite truck	10.0	5.00	HHDT
Ph 6 Utility Switchyard	—	—	—	—
Ph 6 Utility Switchyard	Worker	50.0	40.0	LDA,LDT1,LDT2
Ph 6 Utility Switchyard	Vendor	5.00	70.0	HHDT,MHDT
Ph 6 Utility Switchyard	Hauling	20.0	70.0	HHDT
Ph 6 Utility Switchyard	Onsite truck	10.0	5.00	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Reduction	PM2.5 Reduction
Apply dust suppressants to unpaved roads	84%	84%
Limit vehicle speeds on unpaved roads to 25 mph	44%	44%
Sweep paved roads once per month	9%	9%

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Ph 1 Site Preparation	0.00	—	3,025	0.00	—

Ph 2 PV Panel System	0.00	—	3,025	0.00	—
Ph 5 Battery Storage	0.00	0.00	0.00	0.00	0.00
Ph 6 Utility Switchyard	177,464	—	75.0	0.00	—

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
General Heavy Industry	0.00	0%
General Light Industry	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2027	0.00	457	0.03	< 0.005
2026	0.00	457	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Total all Land Uses	78.0	78.0	78.0	28,470	4,290	4,290	4,290	1,565,850

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Total all Land Uses	78.0	78.0	78.0	28,470	4,290	4,290	4,290	1,565,850

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	11,250	3,750	—

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
General Heavy Industry	0.00	457	0.0330	0.0040	0.00

General Light Industry	0.00	457	0.0330	0.0040	0.00

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
General Heavy Industry	0.00	457	0.0330	0.0040	0.00
General Light Industry	0.00	457	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
General Heavy Industry	0.00	16,290,000
General Light Industry	1,734,375	0.00

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
General Heavy Industry	0.00	16,290,000
General Light Industry	1,734,375	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
General Heavy Industry	0.00	—
General Light Industry	9.30	—

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
General Heavy Industry	0.00	—
General Light Industry	9.30	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
General Light Industry	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
General Light Industry	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Forklifts	Diesel	Average	2.00	2.00	82.0	0.20
Tractors/Loaders/Backhoes	Diesel	Average	2.00	2.00	84.0	0.37

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Forklifts	Diesel	Average	2.00	2.00	82.0	0.20

Tractors/Loaders/Backhoe	Diesel	Average	2.00	2.00	84.0	0.37

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor
Emergency Generator	CNG	2.00	0.50	50.0	262	0.73

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres
Cropland	>70% Sand	6,126	0.00

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres
Cropland	>70% Sand	6,126	0.00

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	28.3	annual days of extreme heat
Extreme Precipitation	0.75	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	2	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	2	1	1	3
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	1	1	1	2

Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	35.2
AQ-PM	13.7
AQ-DPM	0.98
Drinking Water	94.8
Lead Risk Housing	11.3
Pesticides	61.3
Toxic Releases	25.4
Traffic	2.58
Effect Indicators	—
CleanUp Sites	84.6
Groundwater	39.4
Haz Waste Facilities/Generators	1.80
Impaired Water Bodies	99.2
Solid Waste	78.3

Sensitive Population	—
Asthma	56.9
Cardio-vascular	67.9
Low Birth Weights	—
Socioeconomic Factor Indicators	—
Education	29.3
Housing	—
Linguistic	12.3
Poverty	71.4
Unemployment	—

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	—
Employed	—
Median HI	—
Education	—
Bachelor's or higher	—
High school enrollment	—
Preschool enrollment	—
Transportation	—
Auto Access	—
Active commuting	—
Social	—
2-parent households	—
Voting	—

Neighborhood	—
Alcohol availability	—
Park access	—
Retail density	—
Supermarket access	—
Tree canopy	—
Housing	—
Homeownership	—
Housing habitability	—
Low-inc homeowner severe housing cost burden	—
Low-inc renter severe housing cost burden	—
Uncrowded housing	—
Health Outcomes	—
Insured adults	—
Arthritis	0.0
Asthma ER Admissions	15.0
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	0.0
Cognitively Disabled	3.3
Physically Disabled	3.3
Heart Attack ER Admissions	40.8
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0

Obesity	0.0
Pedestrian Injuries	0.0
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	97.4
Elderly	0.3
English Speaking	0.0
Foreign-born	0.0
Outdoor Workers	1.3
Climate Change Adaptive Capacity	—
Impervious Surface Cover	93.0
Traffic Density	0.0
Traffic Access	23.0
Other Indices	—
Hardship	0.0
Other Decision Support	—
2016 Voting	0.0

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	51.0

Healthy Places Index Score for Project Location (b)	—
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	24-mo schedule per POD circa 11-28-2023.
Construction: Trips and VMT	POD and TIA circa 02-12 2024. Peak workforce w double-occupancy 1020 one-way LDA, LDTs, w up to 110 HHDT one-way daily trips includes water delivery.
Construction: On-Road Fugitive Dust	Offsite vehicles travel on paved roads, except final leg of 1.6 to 2.8 miles per trip unpaved. Onsite trucks travel 100 percent unpaved, with dust suppressants for control. Silt Content set at 4.3 percent reflects default for operation phase, per AP-42 Table 13.2.2-1 for service roads. All offsite unpaved roads subject to ICAPCD Reg VIII controls (USEPA-approved PM10 SIP).
Land Use	Feb 2024. Up to 1,150 MW with peak 1000 person construction workforce. Up to 7,500 sq ft O&M building, with up to 25 acres laydown in 6126 acres of total application area.
Construction: Off-Road Equipment	Offroad fleet in CalEEMod uses v.2022 default hp and load factors. Equipment counts consistent with POD circa 11-30-2023.
Construction: Dust From Material Movement	Leveling access roads could occur on up to 3025 or half of 6050 acres for PV system plus 75 acres for Substation, BAAH, and BESS.
Construction: Architectural Coatings	No notable construction coatings.
Operations: Road Dust	Operations vehicles travel on paved surfaces except final leg of 2.2 miles per trip unpaved.

Operations: Water and Waste Water	Operations use up to 50 acre-feet or 16.29 million gal annually for panel washing, minimal indoor water use.
Operations: Energy Use	No notable onsite use of grid supply electricity or natural gas use.
Operations: Refrigerants	O&M building refrigerant default.
Operations: Fleet Mix	Fleet mix includes 18 percent HHDT and 12 percent MDV for water delivery and panel washing during operation.
Operations: Solid Waste	Municipal solid waste stream for O&M building.
Operations: Emergency Generators and Fire Pumps	Optional backup generators, up to two rated at 150 kW each, propane powered.
Operations: Off-Road Equipment	Operations includes occasional unscheduled maintenance using forklifts and loaders.

APPENDIX C

AERSCREEN MODEL RESULTS

Summary of AERSCREEN Model Parameters and Assumptions for Criteria Air Pollutant Emissions

AERSCREEN Model Parameters and Assumptions			
Source Type	**Units**	**Value**	**Notes**
Construction Emissions			
PM_{10} Emission Rate	gram/second	0.07076	Total on-site emissions converted to emission rate based on two years of construction
$PM_{2.5}$ Emission Rate	gram/second	0.03195	Total on-site emissions converted to emission rate based on two years of construction
NO_2 Emission Rate	gram/second	0.27432	Total on-site emissions converted to emission rate based on two years of construction
CO Emission Rate	gram/second	0.81677	Total on-site emissions converted to emission rate based on two years of construction
SO_2 Emission Rate	gram/second	0.00130	Total on-site emissions converted to emission rate based on two years of construction
Construction Volume Source Parameters (volume source located at western boundary if project site closest to receptor)			
Initial Lateral Dimension	meters	232.6	AERMOD Calculator (length of side 1000 meters, AERMOD input upper limit)
Release Height	meters	5.0	SMAQMD, 2015
Initial Vertical Dimension	meters	1.4	USEPA, 2022
Operation Emissions			
PM_{10} Emission Rate	gram/second	0.00016	Maximum daily on-site emissions converted to emission rate
$PM_{2.5}$ Emission Rate	gram/second	0.00016	Maximum daily on-site emissions converted to emission rate
NO_2 Emission Rate	gram/second	0.00520	Maximum daily on-site emissions converted to emission rate
CO Emission Rate	gram/second	0.04099	Maximum daily on-site emissions converted to emission rate
SO_2 Emission Rate	gram/second	0.00003	Maximum daily on-site emissions converted to emission rate
Operation Volume Source Parameter (volume source located at western boundary if project site closest to receptor)			
Initial Lateral Dimension	meters	4	AERMOD Calculator (length of side 17 meters)
Initial Vertical Dimension	meters	1	SMAQMD, 2015
Release Height	meters	5.0	SMAQMD, 2015

Total and maximum daily emissions summarized in Appendix A.

All NOx emissions assumed to be NO_2.

U.S. Environmental Protection Agency (USEPA), 2022. User's Guide for the AMS/EPA Regulatory Model (AERMOD).

Sacramento Metropolitan Air Quality Management District (SMAQMD), 2015. *Guide to Air Quality Assessment in Sacramento County* . June.

Summary of AERSCREEN Results for Criteria Air Pollutant Emissions

The AERSCREEN model results for criteria air pollutant emissions during construction and operation were modeled for the PM_{10} emission rates and then scaled to determined the $PM_{2.5}$, NO_2, CO, and SO_2 concentrations based on the ratio of the corresponding emission rates. All concentrations are reported at the nearest sensitive receptor located approximately 3.3 miles (5,300 meters) west of the project site. In AESCREEN, the distance to the nearest receptor is measured relative to the center of the modeled source. Therefore, the distances to the nearest receptor from the modeled center of the construction and operation sources were 5,811 meters and 5,319 meters, respectively.

AERSCREEN Model Results							
Scenario	**Unit**	**1-hr**	**3-hr**	**8-hr**	**24-hr**	**Annual**	**Note**
AERSCREEN Scaling ratios	--	1	1	0.9	0.6	0.1	AERSCREEN User's Guide (EPA, 2021)
Construction Concentrations							
PM_{10} Concentration	$\mu g/m^3$	1.74	1.74	1.56	1.04	0.17	Receptor 5,811 meters from center of source
$PM_{2.5}$ Concentration	$\mu g/m^3$	0.78	0.78	0.71	0.47	0.08	Receptor 5,811 meters from center of source
NO_2 Concentration	$\mu g/m^3$	6.73	6.73	6.05	4.04	0.67	Receptor 5,811 meters from center of source
CO Concentration	$\mu g/m^3$	20.03	20.03	18.02	12.02	2.00	Receptor 5,811 meters from center of source
SO_2 Concentration	$\mu g/m^3$	0.03	0.03	0.03	0.02	0.003	Receptor 5,811 meters from center of source
Operation Concentrations							
PM_{10} Concentration	$\mu g/m^3$	0.0005	0.0005	0.0004	0.0003	<0.0001	Receptor 5,319 meters from center of source
$PM_{2.5}$ Concentration	$\mu g/m^3$	0.0005	0.0005	0.0004	0.0003	<0.0001	Receptor 5,319 meters from center of source
NO_2 Concentration	$\mu g/m^3$	0.016	0.016	0.015	0.010	0.002	Receptor 5,319 meters from center of source
CO Concentration	$\mu g/m^3$	0.127	0.127	0.114	0.076	0.013	Receptor 5,319 meters from center of source
SO_2 Concentration	$\mu g/m^3$	0.0001	0.0001	<0.0001	<0.0001	<0.0001	Receptor 5,319 meters from center of source

Reference: U.S. Environmental Protection Agency (USEPA), 2021. AERSCREEN User's Guide.

AERSCREEN 21112 / AERMOD 23132 06/12/25
14:45:04

TITLE: CONST

********** VOLUME PARAMETERS **********

SOURCE EMISSION RATE:	0.0708	g/s	0.562	lb/hr
VOLUME HEIGHT:	5.00	meters	16.40	feet
INITIAL LATERAL DIMENSION:	232.60	meters	763.12	feet
INITIAL VERTICAL DIMENSION:	1.40	meters	4.59	feet
RURAL OR URBAN:	RURAL			
FLAGPOLE RECEPTOR HEIGHT:	1.50	meters	4.92	feet
INITIAL PROBE DISTANCE =	9000.	meters	29528.	feet

********** BUILDING DOWNWASH PARAMETERS **********

BUILDING DOWNWASH NOT USED FOR NON-POINT SOURCES

********** PROBE ANALYSIS **********

25 meter receptor spacing: 501. meters - 5000. meters
40 meter receptor spacing: 5040. meters - 9000. meters

SECTOR	Zo ROUGHNESS LENGTH	1-HR CONC (ug/m3)	DIST (m)	TEMPORAL PERIOD
1*	0.150	5.623	501.1	WIN

* = worst case flow sector

********** MAKEMET METEOROLOGY PARAMETERS **********

MIN/MAX TEMPERATURE: 250.0 / 310.0 (K)

MINIMUM WIND SPEED: 0.5 m/s

ANEMOMETER HEIGHT: 10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Desert Shrubland
DOMINANT CLIMATE TYPE: Dry Conditions
DOMINANT SEASON: Winter

ALBEDO: 0.45
BOWEN RATIO: 10.00
ROUGHNESS LENGTH: 0.150 (meters)

SURFACE FRICTION VELOCITY (U*) ADJUSTED

METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT

YR	MO	DY	JDY	HR
10	02	06	6	01

H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS
-3.31	0.088	-9.000	0.020	-999.	60.	15.9	0.150	10.00	0.45	1.00

HT	REF TA	HT
10.0	250.0	2.0

METEOROLOGY CONDITIONS USED TO PREDICT AMBIENT BOUNDARY IMPACT

YR	MO	DY	JDY	HR
10	02	06	6	01

H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS
-3.31	0.088	-9.000	0.020	-999.	60.	15.9	0.150	10.00	0.45	1.00

HT	REF TA	HT
10.0	250.0	2.0

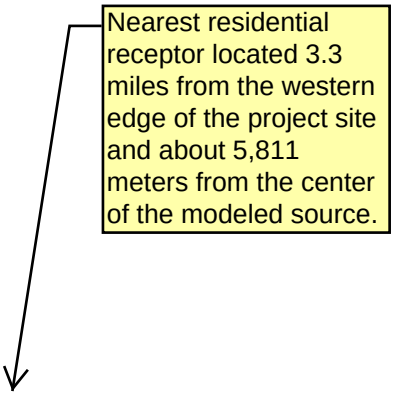
********** AERSCREEN AUTOMATED DISTANCES **********

OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

DIST (m)	MAXIMUM 1-HR CONC (ug/m3)	DIST (m)	MAXIMUM 1-HR CONC (ug/m3)
501.09	5.623	4025.00	2.166
525.00	5.417	4050.00	2.159
550.00	5.218	4075.00	2.151
575.00	5.034	4100.00	2.144
600.00	4.864	4125.00	2.137
625.00	4.705	4150.00	2.130
650.00	4.557	4175.00	2.123
675.00	4.419	4200.00	2.116
700.00	4.289	4225.00	2.109
725.00	4.167	4250.00	2.102
750.00	4.052	4275.00	2.095
775.00	3.944	4300.00	2.088
800.00	3.843	4325.00	2.081
825.00	3.747	4350.00	2.074
850.00	3.665	4375.00	2.067
875.00	3.646	4400.00	2.060
900.00	3.626	4425.00	2.054
925.00	3.607	4450.00	2.047
950.00	3.588	4475.00	2.040
975.00	3.570	4500.00	2.034
1000.00	3.552	4525.00	2.027
1025.00	3.533	4550.00	2.021
1050.00	3.516	4575.00	2.014
1075.00	3.498	4600.00	2.008
1100.00	3.481	4625.00	2.001
1125.00	3.464	4650.00	1.995
1150.00	3.447	4675.00	1.989
1175.00	3.430	4700.00	1.982
1200.00	3.413	4725.00	1.976
1225.00	3.397	4750.00	1.970
1250.00	3.380	4775.00	1.964
1275.00	3.364	4800.00	1.958
1300.00	3.348	4825.00	1.951
1325.00	3.333	4850.00	1.945
1350.00	3.317	4875.00	1.939
1375.00	3.301	4900.00	1.933
1400.00	3.286	4925.00	1.927
1425.00	3.271	4950.00	1.921
1450.00	3.256	4975.00	1.915
1475.00	3.241	5000.00	1.910
1500.00	3.226	5040.00	1.900

1525.00	3.211
1550.00	3.196
1575.00	3.182
1600.00	3.167
1625.00	3.153
1650.00	3.139
1675.00	3.125
1700.00	3.111
1725.00	3.097
1750.00	3.083
1775.00	3.070
1800.00	3.056
1825.00	3.043
1850.00	3.030
1875.00	3.016
1900.00	3.003
1925.00	2.990
1950.00	2.977
1975.00	2.965
2000.00	2.952
2025.00	2.939
2050.00	2.927
2075.00	2.914
2100.00	2.902
2125.00	2.890
2150.00	2.877
2175.00	2.865
2200.00	2.853
2225.00	2.841
2250.00	2.830
2275.00	2.818
2300.00	2.806
2325.00	2.795
2350.00	2.783
2375.00	2.772
2400.00	2.760
2425.00	2.749
2450.00	2.738
2475.00	2.727
2500.00	2.716
2525.00	2.705
2550.00	2.694
2575.00	2.683
2600.00	2.673
2625.00	2.662
2650.00	2.651
2675.00	2.641
2700.00	2.630
2725.00	2.620
2750.00	2.610

5080.00	1.891
5120.00	1.882
5160.00	1.873
5200.00	1.864
5240.00	1.855
5280.00	1.846
5320.00	1.837
5360.00	1.828
5400.00	1.820
5440.00	1.811
5480.00	1.803
5520.00	1.794
5560.00	1.786
5600.00	1.777
5640.00	1.769
5680.00	1.761
5720.00	1.753
5760.00	1.745
5800.00	1.737
5811.00	1.735
5840.00	1.729
5880.00	1.721
5920.00	1.713
5960.00	1.706
6000.00	1.698
6040.00	1.691
6080.00	1.683
6120.00	1.676
6160.00	1.668
6200.00	1.661
6240.00	1.654
6280.00	1.646
6320.00	1.639
6360.00	1.632
6400.00	1.625
6440.00	1.618
6480.00	1.611
6520.00	1.604
6560.00	1.597
6600.00	1.590
6640.00	1.584
6680.00	1.577
6720.00	1.570
6760.00	1.564
6800.00	1.557
6840.00	1.551
6880.00	1.544
6920.00	1.538
6960.00	1.532
7000.00	1.525



2775.00	2.600	7040.00	1.519
2800.00	2.589	7080.00	1.513
2825.00	2.579	7120.00	1.507
2850.00	2.569	7160.00	1.500
2875.00	2.559	7200.00	1.494
2900.00	2.550	7240.00	1.488
2925.00	2.540	7280.00	1.482
2950.00	2.530	7320.00	1.476
2975.00	2.520	7360.00	1.470
3000.00	2.511	7400.00	1.465
3025.00	2.501	7440.00	1.459
3050.00	2.492	7480.00	1.453
3075.00	2.482	7520.00	1.447
3100.00	2.473	7560.00	1.442
3125.00	2.464	7600.00	1.436
3150.00	2.454	7640.00	1.430
3175.00	2.445	7680.00	1.425
3200.00	2.436	7720.00	1.419
3225.00	2.427	7760.00	1.414
3250.00	2.418	7800.00	1.408
3275.00	2.409	7840.00	1.403
3300.00	2.400	7880.00	1.397
3325.00	2.391	7920.00	1.392
3350.00	2.383	7960.00	1.387
3375.00	2.374	8000.00	1.381
3400.00	2.365	8040.00	1.376
3425.00	2.357	8080.00	1.371
3450.00	2.348	8120.00	1.366
3475.00	2.340	8160.00	1.360
3500.00	2.331	8200.00	1.355
3525.00	2.323	8240.00	1.350
3550.00	2.315	8280.00	1.345
3575.00	2.306	8320.00	1.340
3600.00	2.298	8360.00	1.335
3625.00	2.290	8400.00	1.330
3650.00	2.282	8440.00	1.325
3675.00	2.274	8480.00	1.320
3700.00	2.266	8520.00	1.316
3725.00	2.258	8560.00	1.311
3750.00	2.250	8600.00	1.306
3775.00	2.242	8640.00	1.301
3800.00	2.234	8680.00	1.296
3825.00	2.227	8720.00	1.292
3850.00	2.219	8760.00	1.287
3875.00	2.211	8800.00	1.282
3900.00	2.204	8840.00	1.278
3925.00	2.196	8880.00	1.273
3950.00	2.188	8920.00	1.269
3975.00	2.181	8960.00	1.264
4000.00	2.174	9000.00	1.260

********** AERSCREEN MAXIMUM IMPACT SUMMARY **********

CALCULATION PROCEDURE	MAXIMUM 1-HOUR CONC (ug/m3)	SCALED 3-HOUR CONC (ug/m3)	SCALED 8-HOUR CONC (ug/m3)	SCALED 24-HOUR CONC (ug/m3)	SCALED ANNUAL CONC (ug/m3)
FLAT TERRAIN	5.623	5.623	5.061	3.374	0.5623
DISTANCE FROM SOURCE	501.09 meters				
IMPACT AT THE AMBIENT BOUNDARY	5.623	5.623	5.061	3.374	0.5623
DISTANCE FROM SOURCE	501.09 meters				

AERSCREEN 21112 / AERMOD 23132 06/12/25
15:32:30

TITLE: PERKINS RENEWABLE ENERGY PROJECT - OPERATION - PM10

********** VOLUME PARAMETERS **********

SOURCE EMISSION RATE:	0.160E-03	g/s	0.127E-02	lb/hr
VOLUME HEIGHT:	5.00	meters	16.40	feet
INITIAL LATERAL DIMENSION:	4.00	meters	13.12	feet
INITIAL VERTICAL DIMENSION:	1.00	meters	3.28	feet
RURAL OR URBAN:	RURAL			
FLAGPOLE RECEPTOR HEIGHT:	1.50	meters	4.92	feet
INITIAL PROBE DISTANCE =	9000.	meters	29528.	feet

********** BUILDING DOWNWASH PARAMETERS **********

BUILDING DOWNWASH NOT USED FOR NON-POINT SOURCES

********** PROBE ANALYSIS **********
25 meter receptor spacing: 10. meters - 5000. meters
40 meter receptor spacing: 5040. meters - 9000. meters

Zo SECTOR	ROUGHNESS LENGTH	1-HR CONC (ug/m3)	DIST (m)	TEMPORAL PERIOD
1*	0.150	1.389	9.6	WIN

* = worst case flow sector

********** MAKEMET METEOROLOGY PARAMETERS **********

MIN/MAX TEMPERATURE: 250.0 / 310.0 (K)

MINIMUM WIND SPEED: 0.5 m/s

ANEMOMETER HEIGHT: 10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Desert Shrubland
DOMINANT CLIMATE TYPE: Dry Conditions
DOMINANT SEASON: Winter

ALBEDO: 0.45
BOWEN RATIO: 10.00
ROUGHNESS LENGTH: 0.150 (meters)

SURFACE FRICTION VELOCITY (U*) ADJUSTED

METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT

YR	MO	DY	JDY	HR
10	01	06	6	12

H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS
20.87	0.082	0.300	0.020	44.	54.	-2.3	0.150	10.00	0.45	0.50

HT	REF TA	HT
10.0	280.0	2.0

METEOROLOGY CONDITIONS USED TO PREDICT AMBIENT BOUNDARY IMPACT

YR	MO	DY	JDY	HR
10	01	06	6	12

H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS
20.87	0.082	0.300	0.020	44.	54.	-2.3	0.150	10.00	0.45	0.50

HT	REF TA	HT
10.0	280.0	2.0

********** AERSCREEN AUTOMATED DISTANCES **********
OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

DIST (m)	MAXIMUM 1-HR CONC (ug/m3)	DIST (m)	MAXIMUM 1-HR CONC (ug/m3)
9.60	1.389	3775.00	0.6443E-02
25.00	0.8843	3800.00	0.6409E-02
50.00	0.6372	3825.00	0.6376E-02
75.00	0.4314	3850.00	0.6343E-02
100.00	0.3151	3875.00	0.6310E-02
125.00	0.2416	3900.00	0.6278E-02
150.00	0.1925	3925.00	0.6246E-02
175.00	0.1581	3950.00	0.6215E-02
200.00	0.1329	3975.00	0.6184E-02
225.00	0.1138	4000.00	0.6153E-02
250.00	0.9894E-01	4025.00	0.6123E-02
275.00	0.8710E-01	4050.00	0.6092E-02
300.00	0.7749E-01	4075.00	0.6063E-02
325.00	0.6956E-01	4100.00	0.6033E-02
350.00	0.6292E-01	4125.00	0.6004E-02
375.00	0.5729E-01	4150.00	0.5975E-02
400.00	0.5248E-01	4175.00	0.5946E-02
425.00	0.4831E-01	4200.00	0.5918E-02
450.00	0.4468E-01	4225.00	0.5890E-02
475.00	0.4150E-01	4250.00	0.5862E-02
500.00	0.3868E-01	4275.00	0.5834E-02
525.00	0.3618E-01	4300.00	0.5807E-02
550.00	0.3394E-01	4325.00	0.5780E-02
575.00	0.3193E-01	4350.00	0.5753E-02
600.00	0.3012E-01	4375.00	0.5727E-02
625.00	0.2848E-01	4400.00	0.5700E-02
650.00	0.2698E-01	4425.00	0.5674E-02
675.00	0.2562E-01	4450.00	0.5649E-02
700.00	0.2437E-01	4475.00	0.5623E-02
725.00	0.2323E-01	4500.00	0.5598E-02
750.00	0.2217E-01	4525.00	0.5573E-02
775.00	0.2120E-01	4550.00	0.5548E-02
800.00	0.2068E-01	4575.00	0.5524E-02
825.00	0.2022E-01	4600.00	0.5499E-02
850.00	0.1979E-01	4625.00	0.5475E-02
875.00	0.1937E-01	4650.00	0.5451E-02
900.00	0.1898E-01	4675.00	0.5428E-02
925.00	0.1860E-01	4700.00	0.5404E-02
950.00	0.1824E-01	4725.00	0.5381E-02
975.00	0.1790E-01	4750.00	0.5358E-02
1000.00	0.1757E-01	4775.00	0.5335E-02

1025.00	0.1726E-01	4800.00	0.5312E-02
1050.00	0.1695E-01	4825.00	0.5290E-02
1075.00	0.1666E-01	4850.00	0.5268E-02
1100.00	0.1638E-01	4875.00	0.5245E-02
1125.00	0.1612E-01	4900.00	0.5224E-02
1150.00	0.1586E-01	4925.00	0.5202E-02
1175.00	0.1561E-01	4950.00	0.5180E-02
1200.00	0.1537E-01	4975.00	0.5159E-02
1225.00	0.1514E-01	5000.00	0.5138E-02
1250.00	0.1491E-01	5040.00	0.5104E-02
1275.00	0.1470E-01	5080.00	0.5071E-02
1300.00	0.1449E-01	5120.00	0.5039E-02
1325.00	0.1428E-01	5160.00	0.5007E-02
1350.00	0.1409E-01	5200.00	0.4975E-02
1375.00	0.1390E-01	5240.00	0.4944E-02
1400.00	0.1371E-01	5280.00	0.4913E-02
1425.00	0.1354E-01	5319.00	0.4883E-02
1450.00	0.1336E-01	5320.00	0.4882E-02
1475.00	0.1319E-01	5360.00	0.4852E-02
1500.00	0.1303E-01	5400.00	0.4822E-02
1525.00	0.1287E-01	5440.00	0.4793E-02
1550.00	0.1272E-01	5480.00	0.4764E-02
1575.00	0.1257E-01	5520.00	0.4735E-02
1600.00	0.1242E-01	5560.00	0.4707E-02
1625.00	0.1228E-01	5600.00	0.4679E-02
1650.00	0.1214E-01	5640.00	0.4651E-02
1675.00	0.1200E-01	5680.00	0.4623E-02
1700.00	0.1187E-01	5720.00	0.4596E-02
1725.00	0.1174E-01	5760.00	0.4570E-02
1750.00	0.1162E-01	5800.00	0.4543E-02
1775.00	0.1149E-01	5840.00	0.4517E-02
1800.00	0.1137E-01	5880.00	0.4491E-02
1825.00	0.1126E-01	5920.00	0.4466E-02
1850.00	0.1114E-01	5960.00	0.4441E-02
1875.00	0.1103E-01	6000.00	0.4416E-02
1900.00	0.1092E-01	6040.00	0.4391E-02
1925.00	0.1082E-01	6080.00	0.4367E-02
1950.00	0.1071E-01	6120.00	0.4343E-02
1975.00	0.1061E-01	6160.00	0.4319E-02
2000.00	0.1051E-01	6200.00	0.4295E-02
2025.00	0.1041E-01	6240.00	0.4272E-02
2050.00	0.1032E-01	6280.00	0.4249E-02
2075.00	0.1022E-01	6320.00	0.4226E-02
2100.00	0.1013E-01	6360.00	0.4203E-02
2125.00	0.1004E-01	6400.00	0.4181E-02
2150.00	0.9952E-02	6440.00	0.4159E-02
2175.00	0.9865E-02	6480.00	0.4137E-02
2200.00	0.9780E-02	6520.00	0.4115E-02
2225.00	0.9697E-02	6560.00	0.4094E-02
2250.00	0.9615E-02	6600.00	0.4072E-02

Nearest residential receptor located 3.3 miles from the western edge of the project site and about 5,319 meters from the center of the modeled source.

2275.00	0.9535E-02	6640.00	0.4051E-02
2300.00	0.9456E-02	6680.00	0.4031E-02
2325.00	0.9378E-02	6720.00	0.4010E-02
2350.00	0.9302E-02	6760.00	0.3990E-02
2375.00	0.9228E-02	6800.00	0.3969E-02
2400.00	0.9155E-02	6840.00	0.3949E-02
2425.00	0.9083E-02	6880.00	0.3930E-02
2450.00	0.9012E-02	6920.00	0.3910E-02
2475.00	0.8942E-02	6960.00	0.3891E-02
2500.00	0.8874E-02	7000.00	0.3871E-02
2525.00	0.8807E-02	7040.00	0.3852E-02
2550.00	0.8741E-02	7080.00	0.3833E-02
2575.00	0.8676E-02	7120.00	0.3815E-02
2600.00	0.8612E-02	7160.00	0.3796E-02
2625.00	0.8549E-02	7200.00	0.3778E-02
2650.00	0.8487E-02	7240.00	0.3760E-02
2675.00	0.8426E-02	7280.00	0.3742E-02
2700.00	0.8366E-02	7320.00	0.3724E-02
2725.00	0.8307E-02	7360.00	0.3706E-02
2750.00	0.8249E-02	7400.00	0.3689E-02
2775.00	0.8192E-02	7440.00	0.3671E-02
2800.00	0.8135E-02	7480.00	0.3654E-02
2825.00	0.8080E-02	7520.00	0.3637E-02
2850.00	0.8025E-02	7560.00	0.3620E-02
2875.00	0.7971E-02	7600.00	0.3603E-02
2900.00	0.7918E-02	7640.00	0.3587E-02
2925.00	0.7866E-02	7680.00	0.3570E-02
2950.00	0.7814E-02	7720.00	0.3554E-02
2975.00	0.7763E-02	7760.00	0.3538E-02
3000.00	0.7713E-02	7800.00	0.3522E-02
3025.00	0.7663E-02	7840.00	0.3506E-02
3050.00	0.7615E-02	7880.00	0.3490E-02
3075.00	0.7567E-02	7920.00	0.3475E-02
3100.00	0.7519E-02	7960.00	0.3459E-02
3125.00	0.7472E-02	8000.00	0.3444E-02
3150.00	0.7426E-02	8040.00	0.3428E-02
3175.00	0.7381E-02	8080.00	0.3413E-02
3200.00	0.7336E-02	8120.00	0.3398E-02
3225.00	0.7291E-02	8160.00	0.3384E-02
3250.00	0.7248E-02	8200.00	0.3369E-02
3275.00	0.7204E-02	8240.00	0.3354E-02
3300.00	0.7162E-02	8280.00	0.3340E-02
3325.00	0.7120E-02	8320.00	0.3325E-02
3350.00	0.7078E-02	8360.00	0.3311E-02
3375.00	0.7037E-02	8400.00	0.3297E-02
3400.00	0.6996E-02	8440.00	0.3283E-02
3425.00	0.6956E-02	8480.00	0.3269E-02
3450.00	0.6917E-02	8520.00	0.3255E-02
3475.00	0.6878E-02	8560.00	0.3242E-02
3500.00	0.6839E-02	8600.00	0.3228E-02

3525.00	0.6801E-02	8640.00	0.3214E-02
3550.00	0.6763E-02	8680.00	0.3201E-02
3575.00	0.6726E-02	8720.00	0.3188E-02
3600.00	0.6689E-02	8760.00	0.3175E-02
3625.00	0.6653E-02	8800.00	0.3162E-02
3650.00	0.6617E-02	8840.00	0.3149E-02
3675.00	0.6581E-02	8880.00	0.3136E-02
3700.00	0.6546E-02	8920.00	0.3123E-02
3725.00	0.6511E-02	8960.00	0.3110E-02
3750.00	0.6477E-02	9000.00	0.3098E-02

********** AERSCREEN MAXIMUM IMPACT SUMMARY **********

CALCULATION PROCEDURE	MAXIMUM 1-HOUR CONC (ug/m3)	SCALED 3-HOUR CONC (ug/m3)	SCALED 8-HOUR CONC (ug/m3)	SCALED 24-HOUR CONC (ug/m3)	SCALED ANNUAL CONC (ug/m3)
FLAT TERRAIN	1.389	1.389	1.250	0.8335	0.1389

DISTANCE FROM SOURCE 9.60 meters

IMPACT AT THE AMBIENT BOUNDARY	1.389	1.389	1.250	0.8335	0.1389

DISTANCE FROM SOURCE 9.60 meters

Attachment A.2 Imperial County Air Pollution Control District Correspondence

Gmail **Emily Capello <emily.capello@panoramaenv.com>**

Fwd: Perkins, Air Quality Report, Rev. December 2024

Emily Capello <emily.capello@panoramaenv.com> Thu, Jan 29, 2026 at 11:36 AM
To: Emily Capello <emily.capello@panoramaenv.com>

---------- Forwarded message ---------
From: **Ismael Garcia** <ismaelgarcia@co.imperial.ca.us>
Date: Tue, Mar 11, 2025 at 11:22 AM
Subject: RE: Perkins, Air Quality Report, Rev. December 2024
To: Charity Wagner <charity.wagner@intersectpower.com>, Brewster Birdsall <Bbirdsall@aspeneg.com>
Cc: Monica Soucier <MonicaSoucier@co.imperial.ca.us>, Toedtli, Matthew R <mtoedtli@blm.gov>, Giles, Franklin E <fgiles@blm.gov>, Ramirez, Ismael N <iramirez@blm.gov>, Vida Strong <Vstrong@aspeneg.com>

Hello Charity,

I apologize for the late reply, the CalEEMod comparisons for the project have been completed and overall the results of the comparison were satisfactory to the Air District and the CalEEMod is acceptable as submitted with the Memorandum: CalEEMod User-Specified Input, Percent of Travel on Paved Roads. As you mentioned the other direct edits recommended by the Air District are the distinction between construction and operational dust control plans and that the construction dust control plan will be an Enhanced Dust Control Plan exceeding ICAPCD's standard mitigations as the CalEEMod results exceed daily thresholds. If you have any other questions or concerns I can clarify please feel free to reach out to us through email or by calling (442)265-1800.

Thank you,

Ismael Garcia

Environmental Coordinator II

Imperial County Air Pollution Control District

150 S. 9th Street

El Centro, CA 92243-2839

(442) 265-1800

From: Charity Wagner <charity.wagner@intersectpower.com>
Sent: Tuesday, March 4, 2025 12:51 PM

To: Brewster Birdsall <Bbirdsall@aspeneg.com>
Cc: Ismael Garcia <ismaelgarcia@co.imperial.ca.us>; Monica Soucier <MonicaSoucier@co.imperial.ca.us>; Toedtli, Matthew R <mtoedtli@blm.gov>; Giles, Franklin E <fgiles@blm.gov>; Ramirez, Ismael N <iramirez@blm.gov>; Vida Strong <Vstrong@aspeneg.com>
Subject: Re: Perkins, Air Quality Report, Rev. December 2024

CAUTION: This email originated outside our organization; please use caution.

Hi Monica and Ismael, I am following up from our February 4th conference call regarding the updated Perkins AQ & GHG Report. On that call we discussed that Ismael was going to run a couple of spot checks/model comparisons and you shared some direct edits that you'd like incorporated into the report (e.g., specifying there will be construction dust control plan and an operational dust control plan). Have you had a chance to run the comparisons you mentioned? Any follow up you can share with us would be most appreciated as we would like to make sure we are all on the same page moving forward with this report.

Thank you, Charity

On Thu, Jan 30, 2025 at 11:10 AM Brewster Birdsall <Bbirdsall@aspeneg.com> wrote:

> Thank you, Ismael.
>
> Invitation for 2pm Tuesday is now sent. Looking forward to catching up with you then.
>
> - Brewster Birdsall, P.E., QEP
>
> Aspen Environmental Group, San Francisco
>
> Office: 415-696-5305
>
> Cell: 415-269-8174
>
> ---
>
> **From:** Ismael Garcia <ismaelgarcia@co.imperial.ca.us>
> **Sent:** Thursday, January 30, 2025 9:15 AM
> **To:** Monica Soucier <MonicaSoucier@co.imperial.ca.us>; Brewster Birdsall <Bbirdsall@aspeneg.com>
> **Cc:** Toedtli, Matthew R <mtoedtli@blm.gov>; Giles, Franklin E <fgiles@blm.gov>; Ramirez, Ismael N <iramirez@blm.gov>; Vida Strong <Vstrong@aspeneg.com>; Charity Wagner <charity.wagner@intersectpower.com>
> **Subject:** RE: Perkins, Air Quality Report, Rev. December 2024
>
> Hello Brewster,
>
> How does 2pm Tuesday 2/4 sound? That afternoon would work well for us, if that works well please send us a meeting invite.
>
> Thank you,

Ismael Garcia

Environmental Coordinator II

Imperial County Air Pollution Control District

150 S. 9th Street

El Centro, CA 92243-2839

(442) 265-1800

From: Monica Soucier <MonicaSoucier@co.imperial.ca.us>
Sent: Monday, January 27, 2025 4:53 PM
To: Brewster Birdsall <Bbirdsall@aspeneg.com>; Ismael Garcia <ismaelgarcia@co.imperial.ca.us>
Cc: Toedtli, Matthew R <mtoedtli@blm.gov>; Giles, Franklin E <fgiles@blm.gov>; Ramirez, Ismael N <iramirez@blm.gov>; Vida Strong <Vstrong@aspeneg.com>; Charity Wagner <charity.wagner@intersectpower.com>
Subject: RE: Perkins, Air Quality Report, Rev. December 2024

Thank you Brewster

I will discuss with Ismael tomorrow, he is not in today and we will reach out.

Also wanted to give you an update. We had a conference call with BHER and the final Assessment that will be finalized very soon will acknowledge that the original calculations for paved roads exceeded the threshold for PM. Measures were already included in the Draft assessment but BHER will be emphasizing the enhanced dust control plan etc.

Thanks,

Monica N. Soucier, MSL

APC Division Manager

Planning and Monitoring

150 S 9th Street

El Centro, CA 92243

P. 442.265.1800

F. 442.265.1799

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From: Brewster Birdsall <Bbirdsall@aspeneg.com>
Sent: Monday, January 27, 2025 4:31 PM
To: Monica Soucier <MonicaSoucier@co.imperial.ca.us>; Ismael Garcia <ismaelgarcia@co.imperial.ca.us>
Cc: Toedtli, Matthew R <mtoedtli@blm.gov>; Giles, Franklin E <fgiles@blm.gov>; Ramirez, Ismael N <iramirez@blm.gov>; Vida Strong <Vstrong@aspeneg.com>; Charity Wagner <charity.wagner@intersectpower.com>
Subject: RE: Perkins, Air Quality Report, Rev. December 2024

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Monica –

In case it is difficult find a time, please know that BLM reviewed the report earlier in January and agreed these latest revisions. Thanks again.

- Brewster

From: Brewster Birdsall
Sent: Monday, January 27, 2025 4:09 PM
To: Monica Soucier <MonicaSoucier@co.imperial.ca.us>; Ismael Garcia <ismaelgarcia@co.imperial.ca.us>
Cc: Toedtli, Matthew R <mtoedtli@blm.gov>; Giles, Franklin E <fgiles@blm.gov>; Ramirez, Ismael N <iramirez@blm.gov>; Vida Strong <Vstrong@aspeneg.com>; Charity Wagner <charity.wagner@intersectpower.com>
Subject: RE: Perkins, Air Quality Report, Rev. December 2024

Thanks, Monica –

Very happy to have a check-in on this project. Providing my availability below, for you and BLM to consider.

Tues. 1/28 from 1-3.

Thurs. 1/30, 10-11 or 2-3.

Fri. 1/31 from 10-4.

Mon. 2/3 from 11-3.

Tues. 2/4 from 10-4.

Wed. 2/5 from 10-1.

Thanks,

- Brewster Birdsall, P.E., QEP

Aspen Environmental Group, San Francisco

Office: 415-696-5305

Cell: 415-269-8174

From: Monica Soucier <MonicaSoucier@co.imperial.ca.us>
Sent: Monday, January 27, 2025 3:34 PM
To: Brewster Birdsall <Bbirdsall@aspeneg.com>; Ismael Garcia <ismaelgarcia@co.imperial.ca.us>
Cc: Toedtli, Matthew R <mtoedtli@blm.gov>; Giles, Franklin E <fgiles@blm.gov>; Ramirez, Ismael N <iramirez@blm.gov>; Vida Strong <Vstrong@aspeneg.com>; Charity Wagner <charity.wagner@intersectpower.com>
Subject: RE: Perkins, Air Quality Report, Rev. December 2024

Brewster

Apologies we have been a bit backlogged on this end. Would you like to have a quick chat sometime this week or next?

ICAPCD IMPERIAL COUNTY AIR POLLUTION CONTROL DISTRICT

Monica N. Soucier, MSL

APC Division Manager

Planning and Monitoring

150 S 9th Street

El Centro, CA 92243

P. 442.265.1800

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From: Brewster Birdsall <Bbirdsall@aspeneg.com>
Sent: Monday, January 27, 2025 1:47 PM
To: Ismael Garcia <ismaelgarcia@co.imperial.ca.us>; Monica Soucier <MonicaSoucier@co.imperial.ca.us>
Cc: Toedtli, Matthew R <mtoedtli@blm.gov>; Giles, Franklin E <fgiles@blm.gov>; Ramirez, Ismael N <iramirez@blm.gov>; Vida Strong <Vstrong@aspeneg.com>; Charity Wagner <charity.wagner@intersectpower.com>
Subject: RE: Perkins, Air Quality Report, Rev. December 2024

CAUTION: This email originated outside our organization; please use caution.

Hello Monica and Ismael –

Just wanted to follow up to confirm your receipt of our AQ report before the MLK holiday.

Please let me know if you have any questions or would like to schedule a conversation about this.

Thanks!

- Brewster Birdsall, P.E., QEP

Aspen Environmental Group, San Francisco

Office: 415-696-5305

Cell: 415-269-8174

From: Brewster Birdsall
Sent: Thursday, January 16, 2025 1:33 PM
To: Ismael Garcia <ismaelgarcia@co.imperial.ca.us>; Monica Soucier <MonicaSoucier@co.imperial.ca.us>
Cc: Toedtli, Matthew R <mtoedtli@blm.gov>; Giles, Franklin E <fgiles@blm.gov>; Ramirez, Ismael N <iramirez@blm.gov>; Vida Strong <Vstrong@aspeneg.com>
Subject: Perkins, Air Quality Report, Rev. December 2024

Hi Monica and Ismael –

Attached, please find the most-recent AQ & GHG Report for Perkins.

We prepared this report with the assistance of BLM oversight. It is responsive to ICAPCD feedback in October/November on how best to model the travel on public roads.

The changes include the following:

- updated CalEEMod into one run combining construction and operation to streamline review.

- updated the modeling of entrained dust, resulting in new PM10 and PM2.5 totals throughout.

- added a new Attachment D to this report for a description of public road modeling.

- added the current Fugitive Dust Control Plan (now Attachment E).

Please let me know if you have comments. As before, the CalEEMod input files can also be emailed, if you'd like copies of those too.

Thank you –

- Brewster

Brewster Birdsall, P.E., QEP

Project Manager, Senior Engineer

Aspen Environmental Group, San Francisco

Office: 415-696-5305; Cell: 415-269-8174

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--

Attachment A.3 Supplemental Air Quality Analysis for Battery Energy Storage System Thermal Runaway Event, Perkins Renewable Energy Project, Imperial County, California

MEMORANDUM

Date: April 20, 2026 **Job No.:** 21215-07

To: Emily Capello, Panorama Environmental, Inc

From: Patrick Sutton, Baseline Environmental Consulting
Yilin Tian, Baseline Environmental Consulting

Subject: **Supplemental Air Quality Analysis for Battery Energy Storage System Thermal Runaway Event, Perkins Renewable Energy Project, Imperial County, California**

In July 2024, Baseline Environmental Consulting (Baseline) prepared a Draft Air Quality Technical Report for the Perkins Renewable Energy Project (Project) in Imperial County, California. The purpose of this technical report is to support environmental review of the Project under the California Environmental Quality Act (CEQA), as well as the California Energy Commission's (CEC) Opt-in application for certification (AFC) program for licensing power plants (20 CCR, Div. 2, Ch. 5 App. B). Based on review of the air quality analysis results, CEC has requested preparation of an air dispersion modeling analysis and health risks assessment for a potential thermal runaway event during operation of the Battery Electric Storage System (BESS) at the Project site.

Baseline has prepared this technical memorandum to provide a supplemental analysis of potential air quality impacts related to a thermal runaway event at the Project site. A thermal runaway event in a BESS occurs when a damaged lithium-ion battery cell releases flammable or toxic gases, triggering a chain reaction that can potentially spread to adjacent cells. The scope of this supplemental analysis for a BESS thermal runaway event includes the following:

- Estimated mass emissions of criteria air pollutants and toxic air contaminants (TACs) for the worst-case scenario derived from UL 9540A module-level and unit-level testing results;
- Modeled concentrations of criteria air pollutants and TACs at nearby receptors;
- Evaluation of criteria air pollutant impacts that would cause or contribute to any exceedance of ambient air quality standards; and
- Evaluation of potential adverse health effects to nearby sensitive receptors from acute exposure to TACs.

PROJECT DESCRIPTION

IP Perkins, LLC (Applicant) and IP Perkins BAAH, LLC, subsidiaries of Intersect Power, LLC, propose to construct, operate, maintain, and decommission a 1,150 megawatt (MW) solar

photovoltaic (PV) facility and BESS on public lands administered by the U.S. Bureau of Land Management (BLM) and Bureau of Reclamation, as well as private lands located approximately 16 miles southeast of El Centro in Imperial County, California (**Figure 1**).

A fenced area referred to as the "Project site" would contain the solar plant, BESS, Project interconnection generation tie (gen-tie) line, Project substation, and operations and maintenance (O&M) yard and facility. The Project site would be constructed, owned, and operated by IP Perkins, LLC. The Project site layout, including the solar PV facility, BESS, substation, and transmission facilities are shown in **Figure 2.** The Project would also include a high-voltage breaker-and-a-half switchyard (BAAH switchyard) and two 500 kilovolt (kV) loop-in transmission lines, each within a 200-foot-wide loop-in transmission corridor, that would be required to interconnect to the existing San Diego Gas and Electric (SDG&E) Southwest Power Link (SWPL) 500 kV transmission line that traverses east–west to the south of the Project site. Together the Project site, the BAAH switchyard, and the 500 kV loop-in transmission corridors are referred to as the "Project Application Area" in **Figure 1.**

Battery Energy Storage System

A BESS absorbs, holds, and then reinjects energy from the PV system into the electrical grid. The Project would include a BESS capable of storing up to 1,150 MW of electricity for 4 hours and housed in electrical enclosures and buried electrical conduit. The BESS would be located near the Project substation at one of the two optional sites to facilitate interconnection and metering.

Up to 5,000 individual BESS electrical enclosures measuring approximately 40 feet or 52 feet by 8 feet by 8.5 feet high would be installed on piles or concrete foundations. The BESS will use lithium-ion batteries to store energy. Lead acid batteries will not be used for the BESS.

The BESS yard will have thermal detection cameras installed externally on battery containers and will be strategically placed in optimal locations to detect fires. These cameras will be remotely monitored 24 hours a day. The battery systems would require air conditioners or heat exchangers and inverters. In addition, a water tank for emergency use is anticipated for each BESS unit/area. The size, final number, and location of water tanks for emergency use would be determined in accordance with the 2025 California Fire Code (2025 CFC)[1] during the final design process and would be reviewed/approved by the local or State Fire Marshal.

[1] Office of the State Fire Marshal (OSFM) has established comprehensive regulations to ensure the safe installation and operation of BESS across the state. These regulations are designed to protect public safety, property, and the environment. The OSFM has recently adopted a suite of updated fire safety codes for BESS. Changes to Chapters 3, 12, and 80 of the 2025 CFC are intended to ensure battery facilities are constructed to the latest fire safety standards including the 2023 edition of the NFPA 855 standard.

The BESS would comply with the current CFC, which governs the code requirements to minimize the risk of fire and life safety hazards specific to BESS used for load shedding, load sharing, and other grid services (Chapter 12 Section 1206 of the 2025 CFC). Per Chapter 12 of the 2025 CFC, Standards required for BESS installations includes NFPA 855: Standard for the Installation of Stationary Energy Storage Systems, and UL 9540: Standard for Energy Storage Systems and Equipment. In accordance with the CFC, the battery enclosure and the site installation design are all required to be approved by the local or State Fire Marshal.

THERMAL RUNAWAY CONCEPT FOR LITHIUM-ION BATTERY

A lithium-ion battery mainly consists of a positive electrode (cathode), a negative electrode (anode), a lithium-ion-conducting electrolyte, and a separator to prevent short circuits. The anode and cathode store lithium. The electrolyte enables the transfer of positively charged lithium ions between the anode and cathode through a separator. As lithium ions move, they generate free electrons at the anode, creating an electric charge at the positive current collector. During charging, lithium ions migrate from the cathode to the anode, while electrons flow into the battery via an external circuit. This process is reversed during discharge, with lithium ions returning to the cathode and electrons flowing out to power a device.

Thermal runaway in lithium-ion batteries refers to a chain reaction of exothermic chemical processes within the cell, leading to a rapid and uncontrollable rise in temperature and internal pressure. Lithium-ion battery thermal runaway could result in the venting of flammable and/or toxic gases, and may ultimately result in a fire and explosion. Thermal runaway is typically triggered by one of three forms of failure, including mechanical (e.g., mechanical damage causing deformation or puncture), electrical (e.g., overcharging, over-discharging, and external short-circuit), and thermal (e.g., overheating and high ambient temperature).

SENSITIVE RECEPTORS

Sensitive receptor locations are areas where individuals are more susceptible to the adverse effects of poor air quality. Sensitive receptor locations include, but are not limited to, hospitals, schools, daycare facilities, elderly housing, and convalescent facilities. Residential areas are also considered sensitive receptors because people are often at home for extended periods, thereby increasing the duration of exposure to potential air contaminants. The Project site is located in a relatively remote region of Imperial County. The nearest sensitive receptor is a residence 3.3 miles west of the Project Application Area, and about 4.7 miles to the proposed BESS location (**Figure 3**).

Figure 1. Project Vicinity

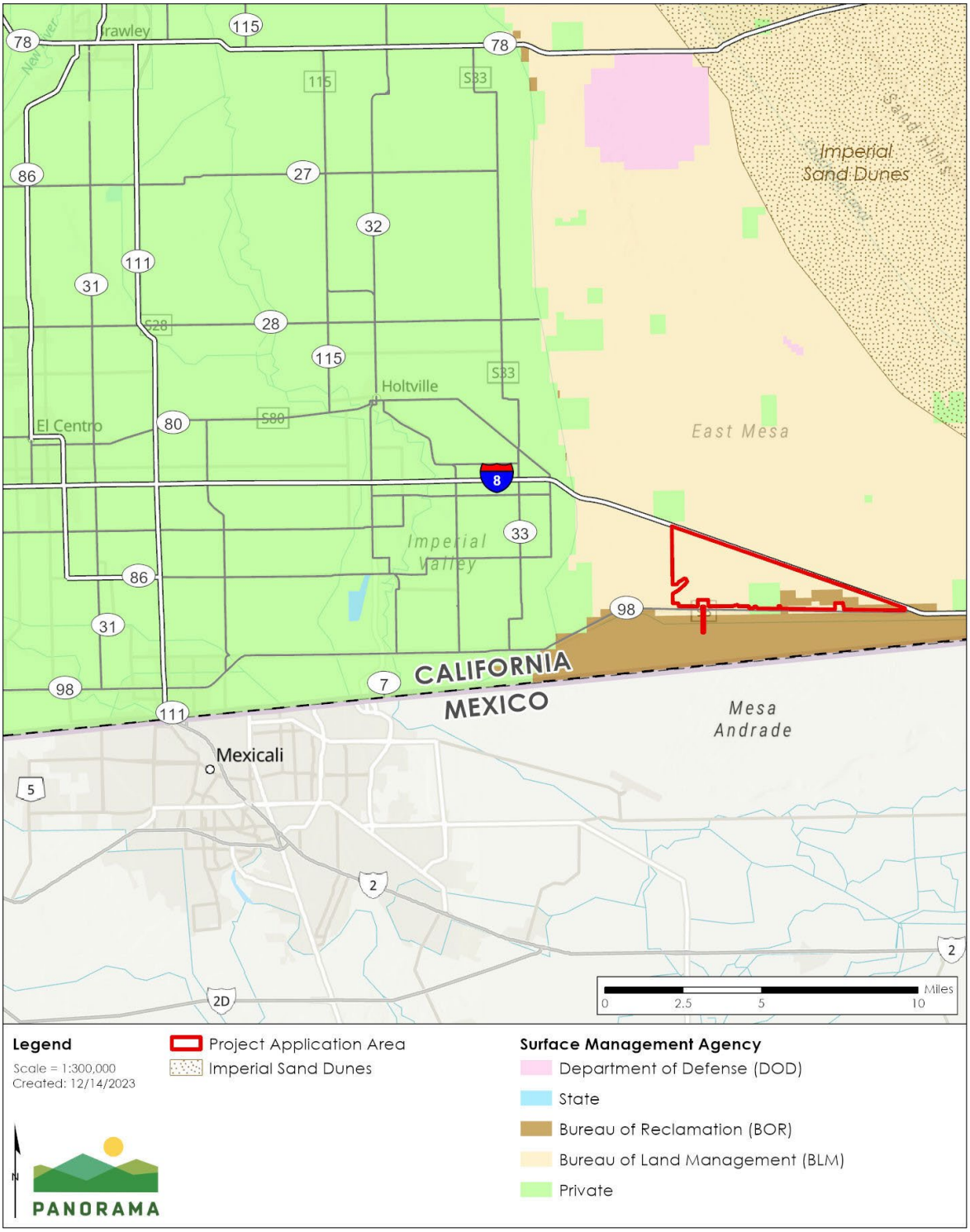
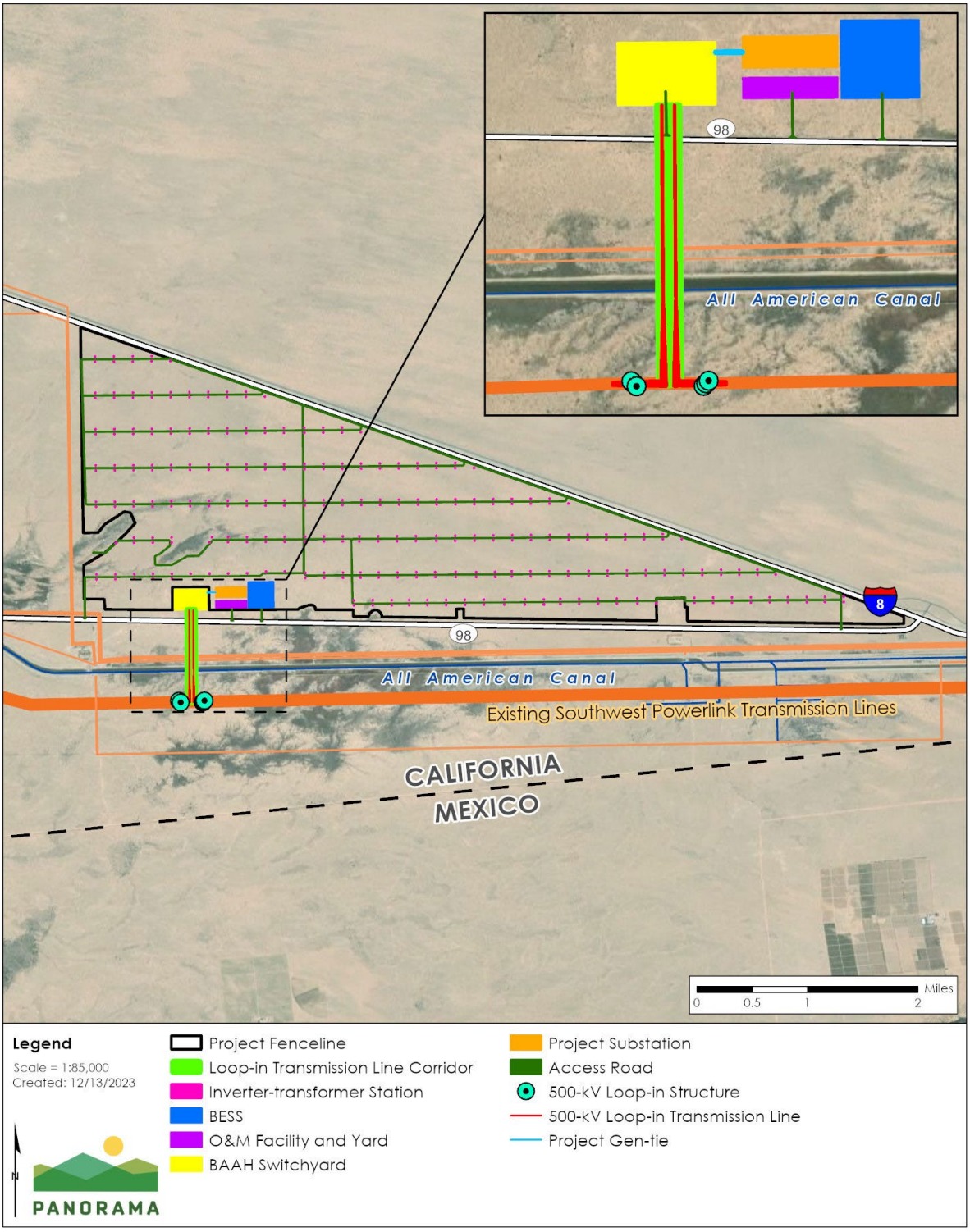
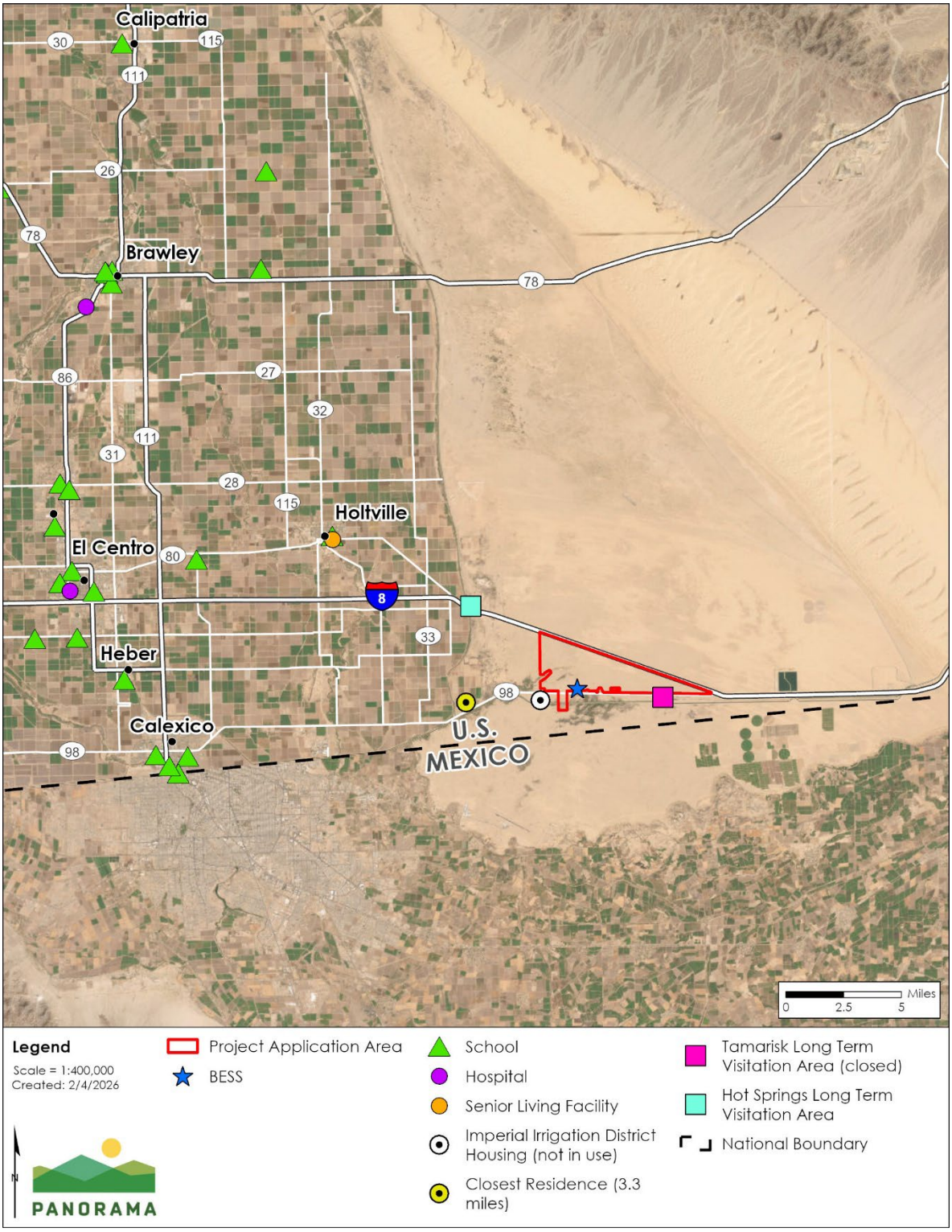


Figure 2. Project Layout



Note: The project layout is approximate and may be subject to change.

Figure 3. Sensitive Receptor Locations



METHODOLOGY

Under normal operation, the BESS would not emit any criteria air pollutants or TACs. As mentioned above, the BESS enclosure would house the required thermal management system, which would maintain the suitable operating temperature within the BESS enclosure. The BESS will be designed and built pursuant National Fire Protection Association (NFPA) codes and Underwriter Laboratories (UL) codes, such as NFPA 855, UL 9540 (system certification) and UL 9540A (fire propagation testing). The BESS equipment will be designed to minimize the risk of an over-pressure event and deflagration, such as by using over-pressure vents and a sparker system. These safety features will be tested pursuant to UL 9540A standards to demonstrate their effectiveness in preventing deflagration in a large-scale fire.

This analysis assumed a highly unlikely, worst-case scenario in which all control systems fail, and a thermal runaway fire-event occurs within the BESS enclosure, as described below.

Emission Estimation Methods

A thermal runaway event may lead to the venting of toxic gases and fire emissions. The nature and extent of emissions generated during a lithium-ion battery thermal runaway event can vary based on factors such as battery type, age, state of charge, and other physical and chemical properties. For this analysis, the chemical composition and emission rates associated with a BESS thermal runaway event were derived from cell level testing results documented in the UL 9540A report for the specific batteries proposed at the Project site.

According to the UL 9540A cell level testing results, the cell vent gases would consist predominantly (approximately 95%) of carbon monoxide (CO), carbon dioxide (CO_2), hydrogen (H_2), and methane (CH_4). Of the 16 constituents detected, two were identified as TACs, which are benzene and toluene. TACs sometimes associated with other types of lithium-ion batteries, such as hydrogen fluoride (HF), hydrogen chloride (HCL), and hydrogen cyanide (HCN), were not vented from the cell. However, for informational purposes the emissions of HF, HCL, and HCN were also evaluated using conservative empirical emission factors selected based on a review of available studies conducted by Ramboll.[2] The UL 9540A testing report is provided as **Attachment A**. Emission factors derived from the UL 9540A cell level testing and obtained from the Ramboll literature review are presented in **Attachment B, Table B-1**.

In terms of the extent and duration of the thermal runaway event, the worst-case scenario was determined based on the UL 9540A module-level and unit-level testing results. With all active

[2] Ramboll. 2024. Offsite Consequence Analysis for Vistra Morro Bay Battery Energy Storage System (BESS) Project. March

control measures disabled, the UL 9540A unit-level testing forced six cells into thermal runaway, which resulted in propagation to a seventh cell; however, thermal runaway did not propagate beyond the seventh cell. The duration of the UL 9540A unit-level testing was 2.5 hours. This analysis conservatively assumed every cell in a battery tray (112 cells) would be affected during a thermal runaway event (16 times the UL 9540A unit-level testing result), representing a reasonable worst-case scenario. The amount of time required for a battery tray fire to burn itself out during the UL 9540A module-level testing, which was approximately 0.5 hour, was used to estimate a conservatively high emission rate for the worst-case scenario.

Concentration Estimation Methods

Air dispersion modeling of the Project's criteria air pollutant (CO) and TAC emissions from a thermal runaway event were conducted using the U.S. Environmental Protection Agency's (EPA) atmospheric dispersion modeling system (AERMOD). Emissions from the thermal runaway event were modeled as a point source located at the west corner of the proposed BESS, resulting in the shortest distance between the source and the nearest sensitive receptor of about 4.7 miles to the west. The locations of the proposed BESS and the nearest sensitive receptor are illustrated in **Figure 3**.

The actual CO emission rate estimated based on the UL 9540A cell level testing results was used for the AERMOD run to estimate the maximum CO concentrations for the 1-hour and 8-hour averaging period. A unit emission rate (1 gram/second) was used for the AERMOD run to estimate the maximum average 1-hour concentrations for the TACs (benzene, toluene, HF, HCL, and HCN). The air dispersion results for TACs were then adjusted based on their actual emission rates. The input parameters and assumptions used for estimating the dispersion of criteria air pollutants and TACs are included in **Table 1**.

A uniform grid of receptors spaced 500 meters apart was created for ground level receptors at heights of 1.5 meters to develop isopleths (i.e., concentration contours) around the Project site that illustrate the general air dispersion pattern from the emissions source. In addition, a discrete receptor was created for a ground level receptor at heights of 1.5 meters to calculate concentrations at the nearest sensitive receptor. The AERMOD model input parameters included 5 years of meteorological data processed by the California Air Resources Board from the Imperial County Airport (KIPL) located about 24 miles northwest of the proposed BESS.

The input parameters and assumptions used for estimating concentrations at the nearest sensitive receptor from the dispersion of air pollutants during a thermal runaway event and the dispersion model results are included in **Attachment B**. The AERMOD files are submitted electronically as **Attachment C**.

Table 1. AERMOD Model Parameters and Assumptions

Source Type	Units	Value	Notes
Modeled Source Type: Stack (point)			
Variable Emissions: None			
Release Height	m	2.794	Approximate height of the enclosure
Stack Diameter	m	0.825	Assumed to be half the depth of the enclosure (0.825 meters) to account for potential deterioration of the thermal roof
Stack Temperature	K	900	Ramboll, 2024
Stack Velocity	m/s	0.207	Estimated based on the assumption that the total gas flow rate is equal to the flow rate required for 10 air changes per hour within the enclosure (Ramboll, 2024)
Emission Rate - CO	g/s	0.736	Actual emission rate
Emission Rate - TACs	g/s	1	Unit emission rate
Scaling Factor - Benzene	unitless	0.0004	Scaling factors were applied to adjust the AERMOD dispersion results from the unit emission rate scenario to reflect the actual emission rates of each pollutant
Scaling Factor - Toluene	unitless	0.0005	
Scaling Factor - HF	unitless	2.1067	
Scaling Factor - HCL	unitless	0.4792	
Scaling Factor - HCN	unitless	0.2332	

Notes:
m = meter; K = kelvin; m/s = meter per second; g/s = gram per second
Sources:
Fire Protection Engineering and UL 9540A Interpretation Report (UL 9540A report).
Ramboll, 2024. Offsite Consequence Analysis for Vistra Morro Bay Battery Energy Storage System (BESS) Project. March

Thresholds of Significance

For criteria air pollutants, the estimated 1-hour and 8-hour concentrations of CO at the nearest sensitive receptor during a thermal runaway event were compared to the EPA's significant impact levels[3] (SILs). Concentrations above the EPA SILs could cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) at a sensitive receptor.

For risk assessment purposes, the non-cancer health effects on a specific organ system from acute exposure to an individual TAC is expressed as a hazard quotient (HQ), which is the 1-hour maximum concentration of the TAC divided by a corresponding acceptable exposure level, also

[3] EPA SIL values provided in 40 CFR 51.165(b).

known as an acute reference exposure level (REL)[4]. The acute RELs used to estimate the HQ for each TAC in this study are summarized in **Table 2**. The cumulative non-cancer health effects from acute exposure to all TACs are expressed as a hazard index (HI), which is the summation of all the HQs related to a specific organ system. To be conservative, this analysis sums all HQs regardless of variations in the target organ system. An acute HI greater than a threshold of 1.0 indicates there is a significant risk for adverse health effects. The acute HQs and HI from a thermal runaway event at the nearest sensitive receptor were evaluated in accordance with guidance from the Office of Environmental Health Hazard Assessment (OEHHA).[5]

Table 2. OEHHA Acute Reference Exposure Levels

Pollutant	Unit	REL
Benzene	µg/m^3	27
Toluene	µg/m^3	5,000
HF	µg/m^3	240
HCL	µg/m^3	2,100
HCN	µg/m^3	340

Notes: µg/m^3 = micrograms per cubic meter; REL = reference exposure level
Sources: Office of Environmental Health Hazard Assessment (OEHHA), 2020. OEHHA Acute, 8-hour and Chronic Reference Exposure Level (REL) Summary.

The thresholds of significance used in this analysis are summarized in **Table 3**.

Table 3. Thresholds of Significance

Pollutant	Threshold Type	Unit	Threshold Value
CO, 1-hour average	EPA SIL	µg/m^3	2,000
CO, 8-hour average	EPA SIL	µg/m^3	500
TACs	Acute HI[1]	Unitless	1.0

Notes: HQ = hazard quotient; HI = hazard index; EPA = United States Environmental Protection Agency; SIL = significant impact level
[1] Based on sum of all hazard quotients.
Sources: OEHHA, 2020; 40 CFR 51.165(b).

RESULTS

As presented in **Table 4**, the estimated concentrations of CO at the nearest sensitive receptor from a thermal runaway event would be below the EPA SILs. Therefore, the Project's criteria air

[4] RELs are airborne concentrations of a chemical that are not anticipated to result in adverse non-cancer health effects for specified exposure durations in the general population, including sensitive subpopulations.
[5] Office of Environmental Health Hazard Assessment (OEHHA), 2015. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. May.

pollutant emissions during a thermal runaway event would not cause or contribute to an exceedance of the ambient air quality standards.

Table 4. Estimated Criteria Air Pollutant Concentrations at the Nearest Sensitive Receptor during a Thermal Runaway Event

Criteria Air Pollutant	Averaging Time	Concentration at Nearest Receptor (µg/m³)	Threshold of Significance (µg/m³)	Exceed Threshold?
Carbon Monoxide	1-Hour	9.52	2,000	No
	8-Hour	1.88	500	No

Notes: ppm = parts per million; µg/m³ = micrograms per cubic meter
Source: Attachment B.

Estimates of acute non-cancer health risks at the nearest sensitive receptor from exposure to TAC emissions during a thermal runaway event are summarized in **Table 5** and compared to the thresholds of significance. At the nearest sensitive receptor, the estimated acute HI for all the TACs from a thermal runaway event were below the threshold of significance. As a result, the Project would not expose sensitive receptors to substantial concentrations of TACs from a thermal runaway event.

Table 5. Acute Health Risks from Exposure to TACs at the Nearest Sensitive Receptor during a Thermal Runaway Event

Toxic Air Contaminants	Concentration at Nearest Receptor (µg/m³)	Acute Hazard Quotient
Benzene	0.005	0.0002
Toluene	0.006	<0.0001
HF[1]	27.28	0.1137
HCL[1]	6.21	0.0030
HCN[1]	3.02	0.0089
Hazard Index		**0.126**
Threshold Of Significance		**1.0**
Exceed Threshold?		**No**

Notes: µg/m³ = micrograms per cubic meter

[1] According to the UL 9540A report, HF, HCL, and HCN would not be vented from the proposed Project battery cell during a thermal runaway event. For informational purposes, emissions of HF, HCL, and HCN were evaluated using conservative empirical emission factors selected based on a review of available studies (Ramboll, 2024).
Source: Attachment B.

CONCLUSIONS

The criteria air pollutant emissions during a thermal runaway event at the Project site would not cause or contribute to an exceedance of ambient air quality standards. In addition, the Project would not expose sensitive receptors to substantial concentrations of TACs from a thermal runaway event.

ATTACHMENT A
FIRE PROTECTION ENGINEERING AND UL 9540A INTERPRETATION REPORT
(CONFIDENTIAL)

ATTACHMENT B
THERMAL RUNAWAY EMISSION CALCULATIONS AND AERMOD INPUT PARAMETERS, ASSUMPTIONS, AND RESULTS

Table B-1. Battery Thermal Runaway Emissions

Data Source	Pollutant	Chemical Structure	Emission per Cell					Emissions from One Tray[3]	
			Measured (%)	Volume (L)[1]	Density[2] (kg/m^3)	Mass (g)	Emission factor (mg /kg of battery)	Mass (g)	Emission Rate (g/s)
Project-specific UL 9540A report	Carbon Monoxide	CO	10.881	10.15	1.165	11.82	3,953	1,324	0.7356
	Carbon Dioxide	CO2	27.107	25.29	1.84	46.59	15,575	5,218	2.8987
	Hydrogen	H2	50.148	46.79	0.084	3.92	1,311	439	0.2440
	Methane	CH4	6.428	6.00	0.67	4.00	1,337	448	0.2488
	Acetylene	C2H2	0.264	0.25	1.09	0.27	90	30	0.0167
	Ethylene	C2H4	3.283	3.06	1.26	3.87	1,294	434	0.2409
	Ethane	C2H6	1.1	1.03	1.26	1.29	432	145	0.0805
	Propene	C3H6	0.4	0.35	1.75	0.62	207	69	0.0385
	Propane	C3H8	0.125	0.12	1.83	0.21	71	24	0.0133
	--	C4 (Total)	0.19	0.18	--	--	--	--	--
	--	C5 (Total)	0.027	0.03	--	--	--	--	--
	--	C6 (Total)	0.005	0.00	--	--	--	--	--
	Benzene	C6H6	0.002	0.00	3.49	0.01	2.2	0.7	0.0004
	Toluene	C7H8	0.002	0.00	4.11	0.01	2.6	0.9	0.0005
	Dimethyl Carbonate	C3H6O3	0.055	0.05	3.74	0.19	64	21	0.0119
	Ethyl Methyl Carbonate	C4H8O3	0.004	0.00	4.33	0.02	5.4	1.8	0.0010
Literature Review[4]	Hydrogen Fluoride	HF	--	--	--	33.86	11,320	3,792	2.1067
	Hydrogen Chloride	HCL	--	--	--	7.70	2,575	863	0.4792
	Hydrogen Cyanide	HCN	--	--	--	3.75	1,253	420	0.2332

Notes:

L = liter; kg/m^3 = kilogram per cubic meter; g = gram; kg = kilogram; "--" = not applicable

[1] During UL 9540A cell-level testing, 93.3 liters of cell vent gases were released.

[2] Assumed normal temperature and pressure (temperature of 293.15 K and pressure of 101.325 kPa)

[3] The UL 9540A unit level testing forced six cells into thermal runaway, which resulted in propagation to a seventh cell; however, thermal runaway did not propagate beyond the seventh cell. The duration of the UL 9540A unit level testing was 2.5 hours. This analysis conservatively assumed every cell in a battery tray (112 cells) would be affected during a thermal runaway event (16 times the UL 9540A unit level testing result), representing a reasonable worst-case scenario.

[4] According to the UL 9540A report, toxic gases sometimes associated with lithium-ion batteries, such as Hydrogen Fluoride (HF), Hydrogen Chloride (HCL), and Hydrogen Cyanide (HCN) were not vented from the proposed battery cell during a thermal runaway event. For informational purpose, emissions of HF, HCL, and HCN were evaluated using conservative empirical emission factors selected based on a review of available studies (Ramboll, 2024).

Cubic meter per liter	0.001	Weight per cell (kg)	2.991
Grams per kilogram	1000	Battery cells per tray	112
Milligrams per gram	1000	Second per hour	3600
Duration (h)	0.5	This analysis conservatively assumed every cell in a battery tray (112 cells) would be affected during a thermal runaway event (16 times the UL 9540A unit level testing result), representing a reasonable worst-case scenario. Therefore, the amount of time required for a battery tray fire to burn itself out during the UL 9540A module level testing was used to estimate the emission rate.	

Source:

Fire Protection Engineering and UL 9540A Interpretation Report (UL 9540A report).

Ramboll. 2024. Offsite Consequence Analysis for Vistra Morro Bay Battery Energy Storage System (BESS) Project. March

Table B-2 Summary of AERMOD Model Parameters, Assumptions, and Results for BESS Thermal Runaway Event

AERMOD Model Parameters and Assumptions				
Source Type	**Units**	**Value**	**Notes**	
Modeled Source Type: Stack (point)				
Variable Emissions: None				
Release Height above Ground	meter	2.794	Approximate height of the top of the enclosure.	
Stack Diameter	meter	0.825	The stack diameter was assumed to be half the depth of the enclosure (0.825 meters) to account for potential deterioration of the thermal roof.	
Stack Temperature	Kelvin	900	Ramboll, 2024	
Stack Velocity	meter/second	0.207	The exit velocity is estimated based on the assumption that the total gas flow rate is equal to the flow rate required for 10 air changes per hour within the enclosure. (Ramboll, 2024)	
Emission Rate - CO	gram/second	0.736	Actual emission rate estimated based on UL 9540A report was used for the AERMOD run to estimate the maximum CO concentrations for the 1-hour and 8-hour averaging period.	
Emission Rate -Other	gram/second	1	A unit emission rate (1 g/s) was used for the AERMOD run to estimate the maximum concentrations of other pollutants for the 1-hour averaging period. The air dispersion results were then adjusted based on actual emission rates estimated for each pollutants based on the UL 9540A report. The scaling factors used to adjust the results were provided below.	
Scaling Factor - Benzene	unitless	0.0004	The scaling factor was applied to adjust the AERMOD dispersion results from the unit emission rate scenario to reflect the actual emission rates of each pollutant.	
Scaling Factor - Toluene	unitless	0.0005		
Scaling Factor - Hydrogen Fluoride	unitless	2.1067		
Scaling Factor - Hydrogen Chloride	unitless	0.4792		
Scaling Factor - Hydrogen Cyanide	unitless	0.2332		
AERMOD Model Results				
Pollutant	**Unit**	**Averaging Time**	**Concentration**	**Notes**
CO Concentration	µg/m^3	1-Hour	9.52	
	µg/m^3	8-Hour	1.88	
Maximum 1-hour concentration based on a unit emission rate of 1 g/s	µg/m^3	1-Hour	12.95	
Benzene Concentration	µg/m^3	1-Hour	0.005	
Toluene Concentration	µg/m^3	1-Hour	0.006	
Hydrogen Fluoride Concentration	µg/m^3	1-Hour	27.28	
Hydrogen Chloride Concentration	µg/m^3	1-Hour	6.21	
Hydrogen Cyanide Concentration	µg/m^3	1-Hour	3.02	

Sources:

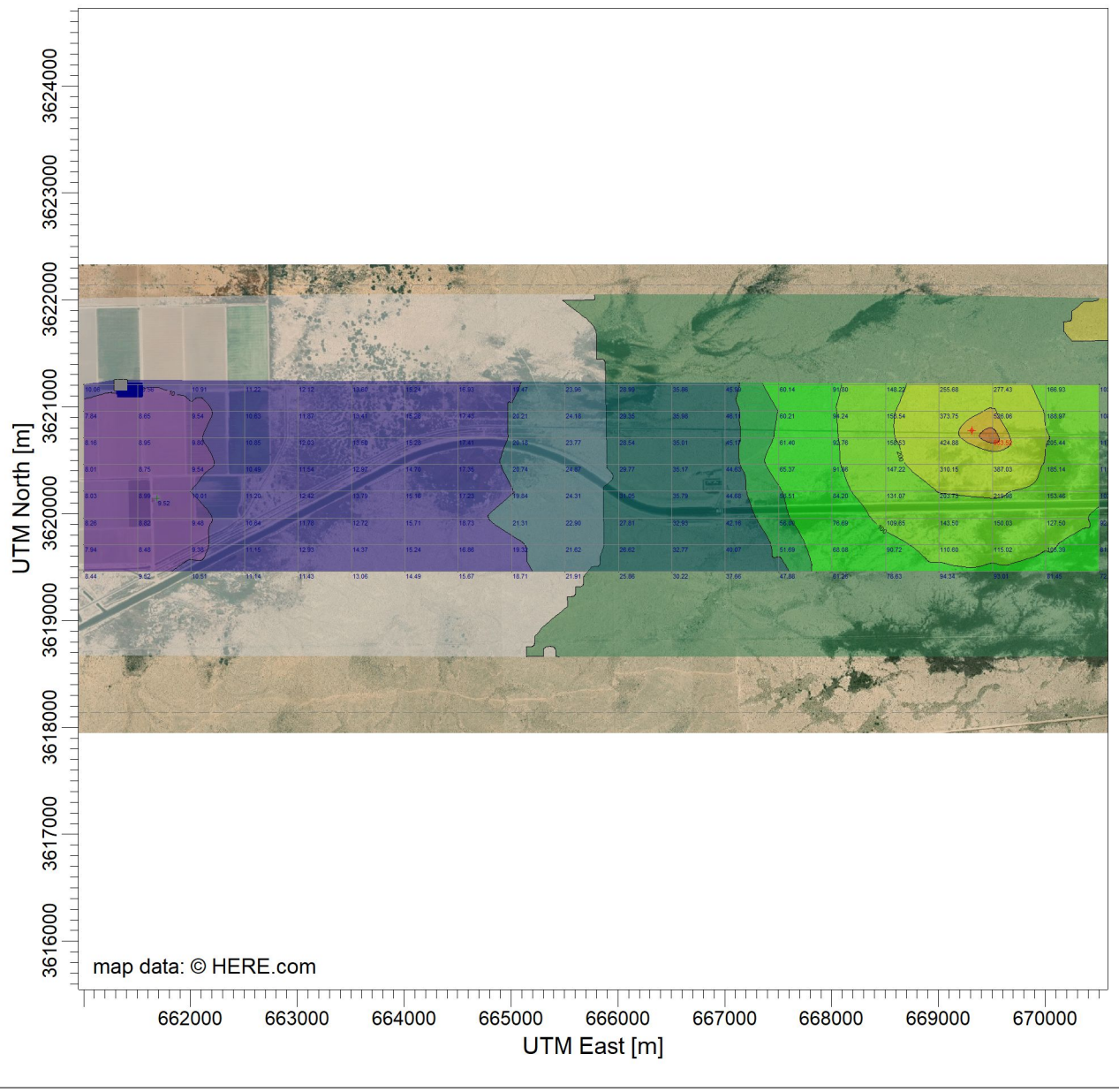
Supplier product specification sheet.

Fire Protection Engineering and UL 9540A Interpretation Report (UL 9540A report).

Ramboll. 2024. Offsite Consequence Analysis for Vistra Morro Bay Battery Energy Storage System (BESS) Project. March

PROJECT TITLE:

Perkins Renewable Energy Project
BESS - CO 1-HR



COMMENTS:

SOURCES:

1

RECEPTORS:

602

OUTPUT TYPE:

Concentration

MAX:

664 ug/m^3

COMPANY NAME:

Baseline Environmental Consulting

SCALE: 1:62,519

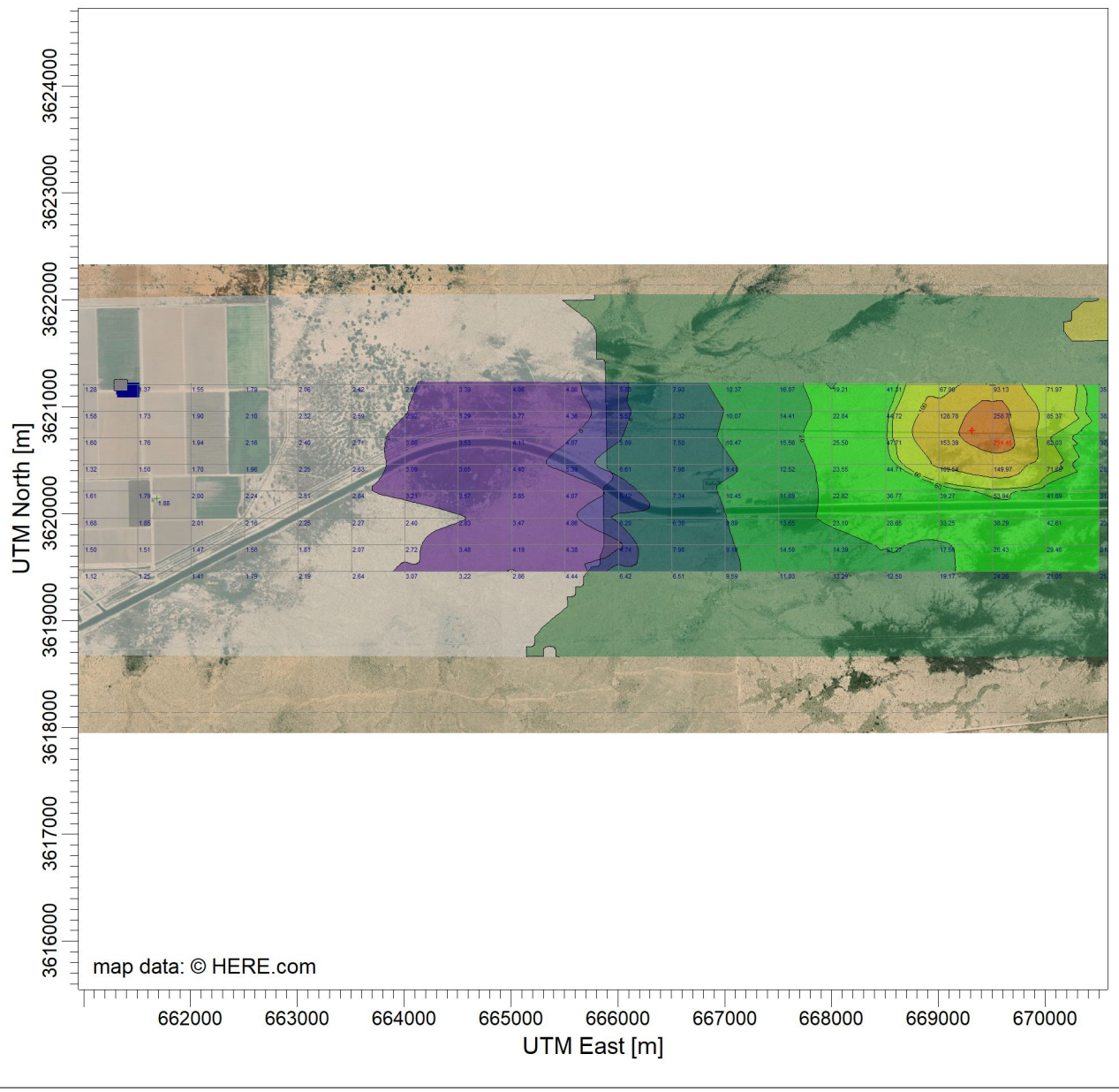
0 2 km

PROJECT NO.:

21215-07

PROJECT TITLE:

Perkins Renewable Energy Project
BESS - CO 8-HR



COMMENTS:

SOURCES:

1

RECEPTORS:

602

OUTPUT TYPE:

Concentration

MAX:

294 ug/m^3

COMPANY NAME:

Baseline Environmental Consulting

SCALE: 1:62,519

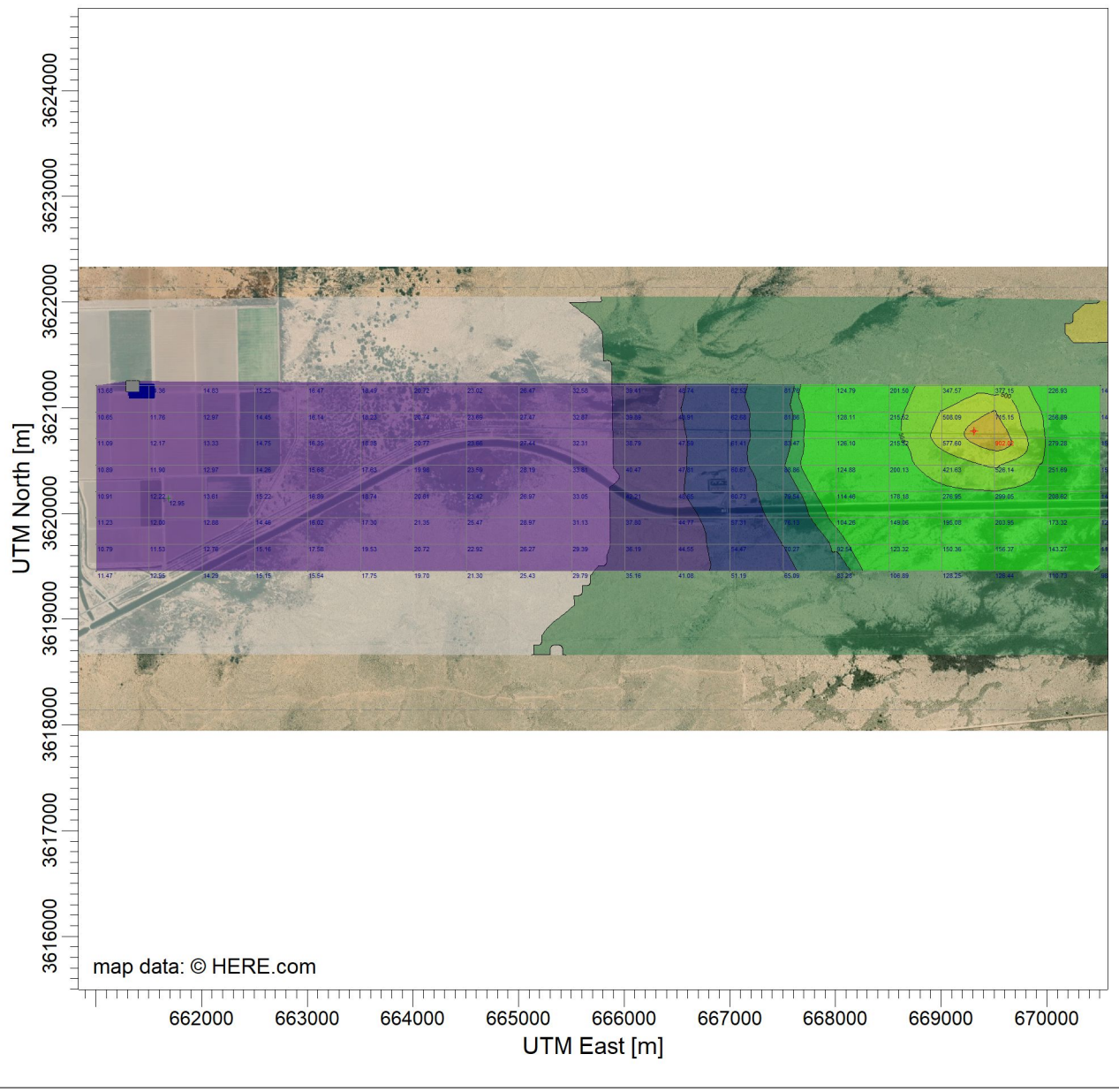
0 2 km

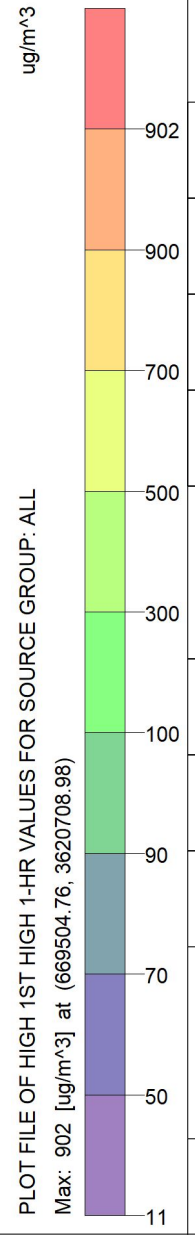
PROJECT NO.:

21215-07

PROJECT TITLE:

Perkins Renewable Energy Project
BESS - TACs





COMMENTS:

Concentrations based on unit emission rate (1 g/s)

SOURCES:

1

RECEPTORS:

602

OUTPUT TYPE:

Concentration

MAX:

902 ug/m^3

COMPANY NAME:

Baseline Environmental Consulting

SCALE: 1:63,210

0 2 km

PROJECT NO.:

21215-07

ATTACHMENT C
AERMOD FILES
(ELECTRONIC VERSION)

Attachment A.4 Imperial County Air Pollution Control District Emergency Backup Generator Permit Application

Docusign Envelope ID: 7B33EE56-764A-4B7B-AA5B-653D5B209184

150 S. 9th Street
El Centro, CA 92243
P. 442.265.1800
F. 442.265.1799

AIR POLLUTION CONTROL DISTRICT

APPLICATION FOR:

- ☐ Authority to Construct
- ☑ New
- ☐ Amendment
- ☑ Permit to Operate
- ☐ Transfer of Ownership
- ☐ Relocation
- ☐ Name Change
- ☐ Emission Credit Banking
- ☐ Change of Permit Conditions
- ☐ Equipment Modification or

***An application fee of $233.00 is due upon submission of an application for 2026. Cash not accepted.**

PERMIT NUMBER (if any) _____

Lines 1-8 are Permit Holders Information

1) Name of Applicant (Business): IP Perkins, LLC

2) Primary Contact for Business: Will Lutkewitte

3) Mailing Address: 9450 SW Gemini Drive PMB 68743

4) Title: Environmental & Permitting

5) City: Beaverton | State: OR | Zip Code: 97008

6) Business Phone: (510) 398-2547 | Primary Contact Cell Phone: (510) 343-9930 ext. 2063

7) Type of Organization (Corp., Government, Individual, etc.): Limited Liability Company

8) Email Address (Primary Contact): wlutkewitte@ipxpower.com

9) Physical Address: 9450 SW Gemini Drive PMB 68743, Beaverton, OR 97008

10) Contractor Name (if Applicable) _____ 11) Phone Number _____

12) Brief Description of Project/Activity: Emergency back-up LPG generator

13) Person in Charge at Location _____ 14) Title _____ 15) Phone Number _____

16) Anticipated Date of Construction _____ Start January 2030

17) Anticipated Life of Project 30 years Completion December 2059

18) Estimated Emissions

	Uncontrolled lbs/day	Controlled lbs/day
For largest single pollutant	0.6 NOx	0.6 NOx
Total for all emissions	1.1	1.1

19) Other Permits Have Been or Will be Obtained From: California Energy Commission and Bureau of Land Management

20) ☑ Plot plans, flow charts, calculations, equipment description and other information required by "List and Critieria" attached.

21) ☐ The information previously submitted with _____ is still valid and no changes have been made except as shown on attachment.

22) ☐ Request for confidential handling of attached.

23) ☑ Total pages attached _____

"I am familiar with the Rules and Regulations of the Imperial County Air Pollution Control District and I certify that the operation of the plant and/or equipment which is subject to the application will comply with said Rules and Regulations."

4/9/2026
Date

Signed by: Todd Johansen
687A099C752A4DE...
Signature of Responsible Person

OFFICE USE ONLY:

Date application submitted: _____ **Amount paid:** _____

Received by: _____ **Receipt Number:** _____

Staff Comments:

150 South Ninth Street
El Centro, CA 92243
(442) 265-1800

IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT

INTERNAL COMBUSTION ENGINE SUMMARY FORM

NOTICE

An application will not be processed unless ALL fields in "Section A" are complete.

Section A

Company/Agency: **IP Perkins LLC**	Phone Number:
Equipment Location: **Perkins Renewable Energy Project**	Existing Permit # (if any): **n/a**
Engine Manufacturer: **Power Solutions International**	Model Number: **PSI 8.8L T CAC**
Engine Serial Number: **tbd**	EPA/C.A.R.B. 12-character Engine Family Name: **NPSIB8.80EMT**
Manufacturer Date: **tbd**	Is unit equipped with a non-resettable hour meter? ☒ Yes ☐ No

Utilization of Engine

- ☐ Electrical Generator **150** Kw
- ☐ Compressor Driver _____ cfm
- ☐ Pump Driver _____ gpm
- ☐ Fire Pump
- ☐ Rental
- ☐ Portable
- ☒ Other **emergency backup pow**

Fuel Information

- ☐ Natural Gas
- ☐ Gasoline
- ☒ LPG
- ☐ Digester Gas
- ☐ Landfill Gas
- ☐ Diesel Oil

Air to Fuel Ratio _____

☐ Other _____

Engine Size (Manufacturers Rating) BHP@ **262** RPM

Operating Schedule

_____ Hr/Days _____ Days/Week

_____ Weeks/Year Maximum Operating Hours **100 hrs/yr** Hrs/Days

☒ Emergency Only (indicate hours operated for testing & maintenance)

Section B

Is this unit designed to be moved or carried from one location to another, or does it have wheels, skids,

☐ Yes (Portable) ☒ No (Stationary)

150 South Ninth Street
El Centro, CA 92243
(442) 265-1800

IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT

INTERNAL COMBUSTION ENGINE SUMMARY FORM

Section C

Engine Description — Number of Cylinders: _____

☐ Two Cycle or ☒ Four Cycle
☐ Lean Burn or ☐ Rich Burn
☐ Turbocharged ☐ Turbocharged/Aftercooled ☐ Naturally Aspirated

Sulfer Content of Disgester Gas, Landfill Gas or Diesel
N/A

Maximum Rated Fuel Consumption (Gas/Hr, Cu. Ft/Hr)
695 scf/hr

Average Load Percentage %

Energy Recovery From Exhaust ☐ Yes ☒ No If yes, please explain

Emission Control Device ☒ Yes ☐ No If yes, please explain
EMIT Model RE-1450-T

Emission Data:

POLLUTANT	EMISSION BEFORE CONTROL Gr/BHP PPM Lb/Day	EMISSION AFTER CONTROL Gr/BHP PPM Lb/Day
NMHC or TOC	na	0.2
NOx	na	0.6
CO	na	0.3
PM10	na	0
SOx	na	0

☒ Manufacturer Data ☐ Source Test Data

Section D

Stationary Engines Only

Stack Dimensions
Height Above Grade 8 Ft Height Above Building _____ Ft

Exhaust Cross Section
Diameter 4.7 In Width _____ In Length _____ In

Exhaust Temperature 1200 °F Direction of Stack Outlet ☐ Horizontal ☒ Vertical ☐ Other

End of the Stack ☒ Open ☐ Capped ☐ Flapper Valve

Stack Serves
☒ Only this equipment
☐ Other equipment also

Exhaust Flow 120.42 CFM
Total Flow Rate _____ CFM
Exhaust Pressure _____ CFM

Receptor Information. A receptor is a residence or business whose occupants could be exposed to toxic emissions from your facility.

Nearest offsite receptor residence
Distance to nearest offsite receptor 23,540 feet
Distance to nearest school grounds 63,900 feet

Susanne Heim
Name of preparer

April 7, 2026
Date

Perkins Project

Estimated Emissions

	Uncontrolled (lbs./day)	Controlled (lbs./day)
Largest single pollutatant	NA	0.6
Total for All emissions	NA	1.1

Internal Combustion Engine Emissions Summary
Power Solutions Int'l (PSI) 8800CAC (LPG)

Pollutant	Emissions before control (Gr/BHP PPM Lb/Day)	Emissions with control (lbs./day)
NMHC or TOC	NA	0.2
NOx	NA	0.6
CO	NA	0.3
PM10	NA	0.0
SOx	*	0.0

Daily Emissions

Max operation hours per day day	NOx (lbs./day)	VOC (lbs./day)	CO (lbs./day)	SOx (lbs./day	PM (lbs./day)	Total for all pollutants
1	0.00	0.00	0.00	0	0	0.00

Hourly Emissions

NOx (lbs./hr)	VOC (lbs./hr)	CO (lbs./hr)	SOx (lbs./hr)	PM (lbs./hr)
0.578	0.404	1.155	0	0

Note: Assuming 0.25 hr uncontrolled and 0.75 hr controlled for Tier 4 equipment. Except for PM,

Equipment Summary

Engine Information

Make/Model	Location	# of Units	Size (eKW)	Size (bhp)	Fuel
Power Solutions Int'l (PSI) 8800CAC (LPG) Emergency Generator Set	Step Up Station	1	150	262	LPG

Notes: eKW = electrical kilowatts; bhp = brake horsepower; LPG = liquified petroleum gas

Emissions Rates

			NOx Emission Factor (g/bhp-hr)		VOC Emission Factor (g/bhp-hr)		CO Emission Factor (g/bhp-hr)		SOx Emission Factor (g/bhp-hr)		PM Emission Factor (g/bhp-hr)				CH4 (g/bhp-hr)	
Emissions Factors Sour	Max Daily Hours	Max Annual Hours	Uncontrolled	Controlled	Uncontrolled	Controlled	Uncontrolled	Controlled	Uncontrolled	Controlled	Uncontrolled	Controlled	NH3 Controlled	CO2		N20
Spec Sheets	1	100	NA	1	NA	0.7	NA	2	NA	NA	NA	NA	NA	*	*	*

Notes: US EPA = United States Environmental Protection Agency; NOx = oxides of nitrogen; VOC = volatile organic compounds; CO = carbon monoxide; SOx = sulfur oxides; PM = particulate matter; NH3 = ammonia; CO2 = carbon dioxide; CH4 = methane; N2O = nitrous oxides; g/bhp-hr = grams per brake horsepower-hour

* The LPG engine has emission factors based on fuel flow rates as provided by the US EPA's 2023 Emission Factor for Greenhouse Gas Inventories. The engine fuel consumption at 100% rating is 695 ft3/hr (or 19.7 m3/hr).

Per Table A of Appendix A of SCAQMD's Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Threshold s, for Electric Generation, PM10 is 96% of Total PM and PM2.5 is 93.7% of Total PM



Power Generation

PERFORMANCE ASSURANCE CERTIFICATION

A Rolls-Royce solution

TESTING PROCEDURES

Prototype

We have been producing superior generator sets for more than six decades. Understanding the importance of reliable, cost-effective products, we have developed industry-leading test procedures to ensure we exceed this criteria. Our testing program confirms that our customers will receive products of the highest quality.

Our Performance Assurance Certification (PAC) certifies that every MTU generator set undergoes rigorous prototype testing including the following:

Prototype Test Procedures

- **Rated Load (NFPA 110)**
  All generator set models will produce the nameplate-rated load within the design tolerance of the generator set.
- **Extended-run Testing**
  All generator set prototypes have been subjected to extended run-time testing.
- **Transient Response Analysis (ISO 8528-5)**
  All new generator set models have undergone transient response analysis per ISO 8528-5.
- **Torsional Analysis**
  All generator set models have undergone torsional stress analysis.
- **Engine Cooling System**
  All generator set models will cool sufficiently within the ambient design conditions per each model.
- **Anticipatory Alarms and Shutdowns**
  The pre-alarms and alarms function appropriately to protect the generator set from any foreseen unnecessary failures.
- **Vibrational Analysis (ISO 8528-9)**
  All new generator set models have undergone vibration analysis to ensure that each engine-generator coupling is balanced and that there is no destructive resonant vibration.
- **Noise Analysis (ISO 8528-10)**
  All generator sets undergo airborne noise analysis using the enveloping surface method.

Prototype Test Standards

MTU generator sets are compliant with many different codes and standards. Our validation philosophy and performance are regularly reviewed to ensure continuity with these codes and standards: *UL2200, CSA, EPA, NFPA 99—Health Care Facilities, NFPA 70—National Electrical Code, NFPA 110—Standard for Emergency and Standby Power Systems, Department of Labor and Industry, NEMA MG 1—Motors and Generators, and MIL-STD-705-c.*

Factory Acceptance

Our factory testing is performed with the same extreme diligence and attention to detail that is given to the prototype testing process. Every MTU generator set receives a complete factory acceptance test that certifies and ensures the system will function in accordance to every specific application.

Test metering has an accuracy of 1.3% or better. This metering is calibrated a minimum of once per year and is directly traceable to the Bureau of Standards.

Factory acceptance testing procedures

- **Insulation Resistance Inspection** (301.1c)*
- **High Potential Test** (302.1b)*
- **Alternator Overspeed** (1 min.)*
- **Engine Inspection**
- **Generator Inspection**
- **Resistances Inspection** (401.1b)
  - Exciter Field Stator
  - Alternator Armatures
- **Mounting and Coupling Inspection**
- **Engine Fuel Oil System Inspection**
- **Engine Lube Oil System Inspection**
- **Engine Cooling System Inspection**
- **DC Charging System Inspection**
- **Circuit Breaker Inspection**
- **Anticipatory Alarms and Shutdowns Inspection** (505.2b, 515.1b, 515.2b)
- **Optional Equipment Inspection** (513.2a)
- **Load Test Inspection**
  - Full Nameplate-Rated Load
  - No-Load Inspection
  - MAX Load @ 1.0 P.F. (640.1d)
  - MAX Load @ 0.8 P.F.
  - Block Loads @ 0–25%, 0–50%, 0–75%, 0–100%
- **Phase Balance and Sequence Inspection** (507.1d, 508.1d, 516.1a)

** Performed by Alternator OEM*

OPTIONAL TESTING

Factory Acceptance

Extended-run factory acceptance testing

In some cases, extended-run testing may be requested. Unless specified otherwise, extended-run testing will be performed in the following manner:

- Full nameplate-rated load
- Standard readings taken every 15 or 30 minutes

Standard readings recorded during load test inspection

- Run Time
- AC Voltage
- AC Amperage
- kVA
- kWe
- Power Factor
- Frequency
- Exciter Field Voltage
- Exciter Field Current
- Lube Oil Pressure
- Engine Coolant Temperature
- Ambient Temperature

Witnessed factory acceptance testing

Witnessed factory tests must be scheduled and approved at least four weeks prior to the generator set's scheduled shipping date. Any requests for witnessed factory testing after this four-week period must be approved by the Regional Sales Manager and are subject to additional fees.

Witnessed extended-run factory acceptance testing

Witnessed extended-run tests must be scheduled and approved at least four weeks prior to the generator set's scheduled ship date. Any requests for witnessed extended-run testing after this four-week period must be approved by the Regional Sales Manager and are subject to additional fees.

Additional factory acceptance testing

Additional testing is available upon request. The following is a list of supplementary tests which can be performed on MTU generator sets. Non-standard testing is subject to additional charges.

Additional testing procedures

- **Start and Stop Test** (MIL-STD-705c 503.1c)
- **Remote Start and Stop Test** (MIL-STD-705c 503.2c)
- **Overspeed Protective Device Test** (MIL-STD-705c 505.2b)
- **Insulation Resistance Test** (MIL-STD-705c 301.1c)*
- **Open Circuit Saturation Curve Test** (MIL-STD-705c 410.1b)
- **Temperature Rise Test** (MIL-STD-705c 680.1c)
- **Frequency Range Adjust Test** (MIL-STD-705c 511.2c)
- **Low Oil Pressure Protective Device Test** (MIL-STD-705c 515.1b)
- **Over-temperature Protective Device Test** (MIL-STD-705c 515.2b)
- **Controls, Direction, and Rotation Test** (MIL-STD-705c 516.1a)
- **Frequency and Voltage Regulation, Stability, and Transient Response** (MIL-STD-705c 608.1b)
- **Voltage and Frequency Regulation** (MIL-STD-705c 614.1b)
- **Voltage Dip and Rise for Rated Load Test** (MIL-STD-705c 619.2c)
- **Regulator Range Test** (511.1d)
- **Maximum Power Test** (MIL-STD-705c 640.1d)
- **Fuel Consumption Test**
- **Vibration and Mechanical Balance Test** (ISO 8528-9)
- **Sound Test** (ISO 8528-10)

** Testing conducted by generator OEM*

Rolls-Royce Group
www.mtu-solutions.com

Subject to change. | Edition 02/20 | ENC 2020-02

CERTIFICATE OF COMPLIANCE

Certificate Number	AU3559
Report Reference	AU3559-20110603
Issue Date	2020-JULY-13
Issued to:	MTU America Inc 100 Power Dr Mankato MN 56001-4790
This certificate confirms that representative samples of	ENGINE GENERATORS See Addendum Page
	Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	UL 2200, Stationary Engine Generator Assemblies
Additional Information:	See the UL Online Certifications Directory at https://iq.ulprospector.com for additional information.

This *Certificate of Compliance* does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.

Bruce Mahrenholz, Director North American Certification Program

UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at http://ul.com/aboutul/locations/

CERTIFICATE OF COMPLIANCE

Certificate Number	AU3559
Report Reference	AU3559-20110603
Issue Date	2020-JULY-13

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Stationary engine generator assemblies for outdoor use and indoor use, Models:

Model Series G, followed by S or P, may be followed by two zeroes, followed by 130, 150, 175, 200, 235, 260, 300, 350, 355 or 400, followed by N, L, or V, followed by 6, followed by C or S, followed by R, P, J, N, G or D, followed by A, followed by S, followed by 0, followed by 98, followed by 3 or 4. May have additional prefix or suffix letters or numbers.

Models G, followed by G, followed by 06, 08, 10, or 12, followed by R or V, followed by K, followed by a three digit number. May have additional prefix or suffix letters or numbers.

Models 6, 8, 10, or 12, followed by R or V, followed by a four digit number, followed by G, followed by S, followed by a number ranging from 150 to 650. May have additional prefix or suffix letters or numbers.



Bruce Mahrenholz, Director North American Certification Program

UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at http://ul.com/aboutul/locations/

Prototype Test Summary (PTS)

A Rolls-Royce solution

Prototype testing is administered to validate the electrical and mechanical design integrity of the generator set. The results indicated below summarize testing performed on the prototype of the specified generator set model. This form of testing is only conducted on standard factory prototype generator sets. *Results may vary.*

GENERATOR SET MODEL(S):	***mtu*** 8V0110 GS150		
Rep. Prototype Model:	***mtu*** 8V0110 GS150	**Test Date:**	10/20/2020
kW:	150	**kVA:**	240
Voltage:	240	**Hz:**	60

ENGINE/GENERATOR

Engine Manufacturer:	PSI	**Engine Model:**	PSI 8.8L T CAC
Engine Fuel:	Natural Gas		
Generator Manufacturer:	Marathon	**Generator Model:**	431CSL6208
Voltage Regulator Model:	SE350	**PMG Equipped:**	☐ Yes ☒ No

OPTIONS

Enclosure Level:	Level 3	**Silencer:**	Unit Mounted – L3 system
Air Filtration:	Standard		

TEST SUMMARY

TEST	TEST RESULT
Transient Performance *Certifies that the engine generator-set model has undergone transient response analysis per ISO 8528-5*	**NFPA-110 One Step:** ☒ 100% ☐ Other. Specify: ____ % **Full Load Acceptance:** Voltage Dip: 42.1 % Recovery Time: 3.37 seconds Frequency Dip: 14.4 % Recovery Time: 3.69 seconds
Steady State Performance *Certifies that voltage deviation and harmonics are within acceptance tolerance range per ISO-8528-5 at full load*	**Frequency Regulation:** 0.22 +/- % Regulation Overall 60.27 Maximum Hz 60.01 Minimum Hz **Voltage Regulation:** 0.26 +/- % Regulation Overall 242.7 Maximum AC Volts 241.5 Minimum AC Volts
Torsional Analysis *Certifies that the generator set has undergone torsional stress analysis and is not subjected to torsional stresses that could be harmful to the unit*	☒ Complete
Cooling System *Certifies that all generator set models will cool sufficiently within the ambient design conditions per each model at referenced enclosure level*	48 °C (118.4 °F) Maximum Ambient Temperature 191 m^3/min (6.738 SCFM) Radiator Air Flow
Sound Data *Certifies that sound data is within the acceptable tolerance range per ISO 8528-10 at referenced enclosure level*	74.5 dBA @ 7 m (23 ft) at full rated load *The sound value is representative of the specified prototype at the time of testing and is subject to alteration due to technological advances. Please contact your **mtu** representative for the most recent enclosure and sound data.*
Vibrational Analysis *Certifies that new generator set models have undergone vibration analysis to ensure that each generator coupling is balanced and there is no destructive resonant vibration per ISO 8528-9*	☒ Complete

Subject to change. 2021-10

ROLLS-ROYCE SOLUTIONS AMERICA INC.

Two (2) Year / 3,000 Hour Basic Limited Warranty
Standby (3D) / Prime (3B) / Data Center Continuous Power (3F)

Rolls-Royce Solutions America Inc. ("RRSA") issues the following express Limited Warranty subject to the following terms, conditions, and limitations:

An original consumer ("Owner") who purchases an RRSA engine generator set ("Product") is entitled to coverage under this Limited Warranty. RRSA warrants to the Owner that the Product is free of defects in material and workmanship and will perform under normal use and service from valid start-up performed by RRSA. Any nonconformity to the foregoing is defined as a Warrantable Defect. This Limited Warranty applies to Product shipped by RRSA after January 1, 2014.

1. Disclaimers

LIMITATION OF WARRANTIES: THIS LIMITED WARRANTY IS GIVEN EXPRESSLY AND IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, FREEDOM FROM INFRINGEMENT OR THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, OR ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR USAGE OF TRADE. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS, OR WARRANTIES NOT SPECIFIED HEREIN.

THIS LIMITED WARRANTY, THE OBLIGATIONS OF RRSA AND THE RIGHTS AND REMEDIES OF THE OWNER SET FORTH IN THIS LIMITED WARRANTY ARE EXCLUSIVE AND ARE EXPRESSLY IN LIEU OF, AND THE OWNER HEREBY WAIVES AND RELEASES ALL OTHER OBLIGATIONS, WARRANTIES (INCLUDING WARRANTY AGAINST REDHIBITORY DEFECTS), REPRESENTATIONS OR LIABILITIES, EXPRESS OR IMPLIED, ARISING BY LAW IN CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY CLAIMS ARISING OUT OF, CONNECTED WITH OR RESULTING FROM THE PERFORMANCE OF THIS LIMITED WARRANTY OR FROM THE DESIGN, MANUFACTURE, SALE, REPAIR, LEASE OR USE OF THE PRODUCT, ANY COMPONENT THEREOF AND SERVICES DELIVERED OR RENDERED HEREUNDER OR OTHERWISE.

IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, ALLEGED NEGLIGENCE, OR OTHERWISE, SHALL RRSA BE SUBJECT TO LIABILITY FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION, DAMAGE TO THE PRODUCT, OR OTHER PROPERTY, COMMERCIAL LOSSES, LOST PROFITS, LOSS OF USE, INCONVENIENCE, LOSS OF TIME, COST OF CAPITAL, COST OF SUBSTITUTE EQUIPMENT, DOWNTIME, OR CLAIMS OF CUSTOMERS.

RRSA'S AGGREGATE TOTAL LIABILITY RELATING TO THE SYSTEM AND/OR PRODUCT UNDER THIS LIMITED WARRANTY OR UNDER ANY OTHER CLAIM (IN CONTRACT, TORT, OR OTHERWISE) MADE IN CONNECTION WITH THE SALE OR USAGE OF THE SYSTEM AND/OR PRODUCT IS LIMITED TO THE DOLLAR AMOUNT OF THE OWNER'S ORIGINAL PAYMENT MADE FOR THE SYSTEM AND/OR PRODUCT.

2. Limited Warranty Periods

Limited Warranty Period. The Limited Warranty Period for a Warrantable Defect in the Product is twenty-four (24) months after the first commissioning of the Product. In all cases, the Limited Warranty period will expire not later than thirty-six (36) months from the date of shipment from the RRSA Mankato, MN facility or after 3,000 operation hours, whichever occurs first.

Accessories Coverage Period. The Accessories Coverage Period for a Warrantable Defect in cords, receptacles, cord reels, gas flex pipes, housing lights, space heaters, and associated equipment ("Accessories") is twelve (12) months from the date of shipment from RRSA Mankato, MN facility.

RRSA warranty obligations under this Limited Warranty are contingent upon distributor completing the following:

A Rolls-Royce solution

(a) The RRSA warranty and the *Start-Up Validation and Pre-Inspection Form*. Return both to RRSA within sixty (60) days of the start-up date; and
(b) The engine registration form (when applicable). Return to the manufacturer as stated in the engine registration form instructions.

3. RRSA Responsibilities

If a Warrantable Defect is found during the Limited Warranty Period and/or the Accessories Coverage Period, and provided the Owner has complied with its obligations under Section 4, RRSA will, during normal working hours, through an RRSA authorized distributor, dealer, or service outlet, perform some or all of the following:

(a) Repair or replace, at the sole election of RRSA, the defective part with a new or remanufactured replacement part;
(b) Provide reasonable or customary labor needed to correct the Warrantable Defect;
(c) Provide technician travel time of 400 miles to and from the closest RRSA authorized distributor, dealer, or service outlet to the Product location;
(d) Part removal and re-installation, if necessary and as solely determined by RRSA.

The obligation to repair or replace defective parts by RRSA does not include responsibility for reimbursement of incidental or consequential costs. If RRSA repairs or replaces an Accessory, part, or Product under this Limited Warranty, the repaired or replaced Accessory, part, or Product assumes the unexpired portion of the warranty period remaining from the original Accessory, part, or Product. Repair or replacement of an Accessory, part, or Product will not extend the term of the original Limited Warranty Period or Accessories Coverage Period. Parts or Product replaced shall become the property of RRSA.

Failure of RRSA to enforce any of the terms or conditions stated herein shall not be construed as a waiver of such provision or of any other terms and conditions of this Limited Warranty.

4. Owner Responsibilities

During the Limited Warranty Period and Accessories Coverage Period, the Owner is responsible for, and RRSA will not reimburse for the following:

(a) Battery;
(b) Premium or overtime labor costs;
(c) Labor and material costs for Product removal and reinstallation;
(d) Any special access fees required to gain access to RRSA equipment, without limitation, training or safety policy requirement to gain access;
(e) Transportation costs or travel expenses related to delivery of the Product to the designated distributor, dealer, or service outlet;
(f) Incidental and consequential costs, damages, or administrative expenses of whatever nature;
(g) Non-Product repairs, vehicle damage, “downtime” expenses, cargo damage, fines, lost income, any business costs of any kind, Owner’s travel expenses, and other losses resulting from a Warrantable Defect;
(h) Shipping charges for replacement parts/Products in excess of those which are usual and customary; or
(i) Local taxes, if applicable.

In addition, Owner must:

(a) Operate, use, and maintain the Product in accordance with the applicable Owner’s manual and/or any other manuals specified by RRSA, including without limitation handling, inspection, servicing, or operating instructions;

(b) Promptly notify RRSA or its authorized representative of a Warrantable Defect and make the Product available for repair;
(c) Comply with RRSA or its authorized representative's reasonable directions regarding the timing, sequence, and location of warranty repairs and make the Product available for inspection;
(d) Perform all required maintenance and maintain and provide proof that all required maintenance has been performed;
(e) Use RRSA specified parts, components, and consumables;
(f) Promptly return to RRSA all parts replaced under this Limited Warranty;
(g) Comply with RRSA long term storage guidelines, if applicable, and maintain and provide proof of compliance;
(h) Routinely exercise the Product in accordance with operating instructions;
(i) Install the Product in accordance with the installation guide provided; and
(j) Reimburse RRSA for all costs incurred in providing warranty service where, following examination, the request or claim for warranty coverage proves to be unfounded or excluded, as well as all incidental costs including those incurred investigating the claim.

5. Limitations

RRSA is not responsible, and this Limited Warranty is not available under any circumstances, for any of the following:

(a) Failure of Owner to fulfill its obligations under Section 4;
(b) Failure of Owner to follow RRSA instructions for Product stored by Owner longer than 180 days from date of shipment from the RRSA Mankato, MN facility;
(c) Defects caused by adjustments made by Owner to the fuel system or governor system;
(d) Defects which were obvious or capable of being identified by reasonable inspection and were not reported to RRSA within a reasonable time;
(e) Rental equipment used during warranty work;
(f) Defects caused or potentially caused by service work performed by non-RRSA authorized service providers and/or the use of non-genuine RRSA parts;
(g) Defects resulting from natural wear and tear, external action, negligence, natural disasters, accidents, incorrect use, improper handling or storage, inadequate corrosion-proofing, incorrect assembly or installation, or modification of the Product;
(h) Defects resulting from abuse or neglect, including unauthorized modifications to the Product;
(i) Repair or any use or installation which RRSA, in its sole discretion, determines to be improper;
(j) Defects caused by incorrect maintenance;
(k) Defects resulting from Owner's delay in making the Product available after being notified of a potential problem or Owner's failure to take immediate measures to avoid or mitigate damage;
(l) Damage caused by shipping;
(m) Repair of parts sold by RRSA that are warranted directly to the Owner by the respective part's manufacturer;
(n) Misapplication of the Product;
(o) Diesel engine "wet stacking" due to lightly loaded diesel engines;
(p) Acts of nature or acts of God;
(q) Any failure, other than those resulting from a defect in material or factory workmanship of the Product;
(r) Use of the Product for purposes other than those for which it was intended, including without limitation use of the Product under extraordinary operating conditions not made known to RRSA in writing at the time of the order; or
(s) Material provided by or a design specified by the Owner.

6. Software Warranty. Where software is included in the Product, RRSA warrants to the Owner that 1) the software will be substantially free from material program errors and material defects in material and workmanship, and that 2) it shall

function substantially in accordance with RRSA specification at the time of dispatch from the RRSA manufacturing facility. RRSA does not warrant that the software is error-free or free from "bugs" as commonly categorized by the computer industry. RRSA shall, during the Limited Warranty Period, endeavor to remedy at its cost, in its sole discretion, by repair or replacement of any material program errors or material defects of which Owner has promptly notified RRSA. RRSA, at its option, may elect to provide the most current software at no cost, and in such case RRSA will not cover the cost to install the applicable updated software. RRSA shall have no obligation with respect to any nonconformities resulting from unauthorized modifications to the software or any Owner interfacing.

7. **Emissions Warranty.** The Product may be covered under an emissions warranty specified by the U.S. Environmental Protection Agency and/or the California Air Resources Board. The terms of the warranty, if applicable, may be accessed by following the link: https://www.mtu-solutions.com/eu/en/technical-information/emissions-warranty.html. Any such Emissions Warranty is incorporated herein by reference in its entirety to the extent and with the same force as if fully set forth herein. The Product, if certified, may only be certified to comply with the required country or region-specific emission regulations. Where applicable, the Product is only certified to those specific emission regulations/standards which are clearly stated in the respective RRSA defined technical specifications. IT IS THE OWNER'S SOLE RESPONSIBILITY TO ENSURE THAT THE EXPORT/IMPORT, INSTALLATION, AND USE OF THE PRODUCT(S) COMPLIES WITH THE APPLICABLE EMISSION REGULATIONS IN THE COUNTRY OR REGION WHERE THE PRODUCT(S) WILL BE USED.

8. The Owner is entitled to rectify the defect or to have it rectified by third parties only in urgent cases where operational safety is at risk or in order to prevent disproportionately extensive damage; provided that Owner has informed RRSA and obtained prior written consent from RRSA. In such cases, RRSA shall, in its sole discretion, reimburse the costs incurred by the Owner up to an amount equivalent to the costs RRSA would have incurred had it remedied the defect itself.

9. This Limited Warranty gives the Owner specific legal rights, and the Owner may also have other rights, which vary from state to state. Some states do not allow warranty duration limitations and/or certain exclusions or limitation of incidental or consequential damages. Therefore, the previously expressed exclusion(s) may not apply to Owner. If any one or more of the provisions contained in this Limited Warranty shall be invalid, illegal, or unenforceable in any respect, the validity, legality, or enforceability of the remaining provisions contained therein shall not in any way be affected or impaired thereby.

10. This Limited Warranty is governed by the laws of the State of Michigan without regard to its conflicts of law principles and excluding the United Nations Convention for the International Sale of Goods. Any and all disputes between the parties that may arise pursuant to the sale or use of the Product shall be heard and determined before an appropriate state of federal court located in Oakland County, Michigan. The Owner acknowledges that such court has the jurisdiction to interpret and enforce the provisions herein, and Owner waives any and all objections that it may have as to personal jurisdiction or venue in any of the above courts.

11. In order to obtain performance of an RRSA warranty obligation, the Owner should contact the nearest RRSA authorized distributor, dealer, or service outlet for instructions. To find the location of the nearest RRSA authorized distributor, dealer, or service outlet call +1 248-560-8000 or write to: Rolls-Royce Solutions America Inc. Warranty Department, 39525 MacKenzie Drive, Novi, MI 48377.

Power Solutions International, Inc.
201 Mittel Drive
Wood Dale, IL 60191
www.psiengines.com

0 Hour Non-Deteriorated Emissions Data for Permitting Customers

PSI EPA Engine Family XPSIB8.80EMT "X" denotes generic model year

PSI Engine Model Description PSI-8.8L Turbo Emergency Stationary

	8.8L Turbo LPG	8.8L Turbo NG
Displacement	8.8L	8.8L
Test Speed (rpm)	1800	1800
	g/KW-hr	**g/HP-hr**
BSCO	1.297	0.215
BSCO2	761.1	454.87
BSCH4	NA	0.048
BSTHC	0.028	NA
BSNMHC	NA	0.002
BSNOx	0.019	0.025
BSTHC+NOx	0.047	NA
BSNMHC+NOx	NA	NA
BSFC (kg/kw-hr)	0.253	0.211

Weighted compositie emissions from ISO 8178 D2 (LPG) & D1 (NG) test cycles
BSFC is the weighted composite fuel consumption over the emission test cycle
LPG Emission Data Units in g/KW-hr
NG Emission Data Units in g/HP-hr

SK36231A

For MTU GS150 LP

PREPARED FOR:
Interstate Power Systems

QUOTE: GCP-031121-1001

APPLICATION INFORMATION

Driver:	Engine
Make:	MTU
Model:	8.8L
Horsepower:	262
RPM:	1800
Compression Ratio:	10.0:1
Exhaust Flow Rate:	1176
Exhaust Temperature:	1200
Reference:	MTU Spec
Fuel:	Gas
Annual Operating Hours:	8760

EQUIPMENT

Housing	EAS-1450-0505F-2C4E
	14.5" Combo Housing, Critical Grade Silencer
	2 Element Capacity, Carbon Steel Construction
	5" Bottom Inlet, 5" End Outlet
Mounting	14.5" Wrap Around Bracket
Catalyst	RE-1450-T NSCR, Round 14.5"x3.5"
Elements Required	(2) Elements Required to meet Reductions
Minimum Exhaust Temp	1000*F

UNCONTROLLED EMISSIONS DATA

	g/bhp-hr
NOx:	N/A
CO:	N/A
THC:	N/A
NMHC:	N/A
NMNEHC:	N/A
HCHO:	N/A
Oxygen:	0.50%

POST CATALYST EMISSIONS DATA

	g/bhp-hr
NOx:	< 1.00
CO:	< 2.00
VOC:	< 0.70

Jason Martindale
Direct:505.592.1318
jmartindale@emittechnologies.com

PREPARED FOR:
Interstate Power Systems

QUOTE: GCP-031121-1001

ITEM #	*DESCRIPTION*	*QUANTITY*
1001-01	EAS-1450-0505F-2C4E Combo Housing	1
1001-02	14.5" Wrap Around Brackets	2
1001-03	RE-1450-T 14.5" NSCR Catalyst Element	2

WARRANTY

EMIT Technologies,Inc. warrants that the goods supplied will be free from defects in workmanship by EMIT Technologies, Inc. for a period of one (1) year from date of shipment. EMIT Technologies, Inc. will not be responsible for any defects which result from improper use, neglect, failure to properly maintain or which are attributable to defects, errors or omissions in any drawings, specifications, plans or descriptions, whether written or oral, supplied to EMIT Technologies, Inc. by Buyer.

Catalyst performance using an EMIT Air/Fuel ratio controller is dependent upon properly defined set-points, variable with engine and fuel gas composition. Air/fuel ratio controller performance is guaranteed, but not limited, to fuel gas with an HHV content of 1400 BTU/SCF.

Catalyst performance will be guaranteed for a period of 2 years from installation, or 17,000 operating hours, whichever comes first. The catalyst shall be operated with an automatic air/fuel ratio controller. The performance guarantee shall not cover the effects of excessive ash masking due to operation at low load, improper engine maintenance, or inappropriate lubrication oil. The performance guarantee shall not cover the effects of continuous engine misfires (cylinder or ignition) exposing the catalyst to excessive exothermic reaction temperatures.

Unless otherwise stated the exhaust temperature operating range at the converter inlet is 600°F minimum for oxidation catalyst and 750°F for NSCR catalyst and 1250°F maximum.

If a high temperature shut down switch is not installed, thermal deactivation of catalyst at temperatures above 1300 °F is not covered.

The catalyst conversion efficiencies (% reduction) will be guaranteed for engine loads of 50 to 100 percent.

Engine lubrication oil shall contain less than 0.6% ash (by weight) with a maximum allowable specific oil consumption of 0.01 gal/bhp-hr. The maximum ash loading on the catalyst shall be limited to 350 g/m3. Phosphorous and zinc additives are limited to 0.03% (by weight).

The catalyst must not be exposed to the following known poisoning agents, including: iron, nickel, sodium, chromium, arsenic, zinc, lead, phosphorous, silicon, potassium, magnesium, copper, tin, and mercury. Total poison concentrations in the gas are limited to 0.3 ppm.

Shipment - Promised shipping dates are approximate and are not guaranteed and are from the point of manufacture. EMIT Technologies,Inc. will not be liable for any loss, damage or delay in manufacture or delivery resulting from any cause beyond its control including, but not limited to a period equal to the time lost by reason of that delay. All products will be crated as per best practice to prevent any damage during shipment. Unless otherwise specified, Buyer will pay for any special packing and shipping requirements. Acceptance of goods by common carrier constitutes delivery to Buyer. EMIT Technologies,Inc. shall not be responsible for goods damaged or lost in transit.

PAYMENT TERMS AND ADVANCE PAYMENT REQUIREMENT

Terms: Credit is extended to purchaser for net 30 time period. If payment is not received in the net 30 timeframe, interest on the unpaid balance will accrue at a rate of 1.5% per month from the invoice date.

Advance Payment Requirement: Proposals with a project value of $100,000 or greater, and 60 days or greater time to completion, will require an advance payment of 30% of the total value. The advance payment will be invoiced to the customer upon receipt of the customer's purchase order. Advance payment is due 30 days after the date of the invoice. If payment is not received in the net 30 timeframe, interest on the unpaid balance will accrue at teh rate of 1.5% per month from the invoice date. Failure to pay this invoice may delay completion of the project outlined in this proposal.

Order Cancellation Terms: Upon cancellation of an order once submittal of a Purchase Order has occurred, the customer will pay a 25% restocking fee for Catalyst Housings, Catalyst Elements, and Air/Fuel Ratio Controllers; 50% restocking fee for Cooler Top Solutions,Exhaust System Accessories, and other Custom Built Products; 100% of all associated shipping costs incurred by EMIT; 100% of all project expenses incurred by EMIT for Field Services.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2022 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Power Solutions International, Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: NPSIB8.80EMT-009

Effective Date: 08/02/2021

Expiration Date: 12/31/2022

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 08/02/2021

Revision Date: N/A

Manufacturer: Power Solutions International, Inc.
Engine Family: NPSIB8.80EMT
Mobile/Stationary Certification Type: Stationary
Fuel : LPG/Propane
Natural Gas (CNG/LNG)
Emission Standards :
Stationary Part 1048
NMHC + NOx (g/kW-hr) : 2.7
HC + NOx (g/kW-hr) : 2.7
CO (g/kW-hr) : 4.4
Part 60 Subpart JJJJ Table 1
CO (g/Hp-hr) : 4.0
VOC (g/Hp-hr) : 1.0
NOx (g/Hp-hr) : 2.0
Emergency Use Only : Y

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

December 15, 2021

Mr. Mark Holt
Rolls-Royce Solutions America, Inc.
100 Power Dr.
Mankato, MN 56001

Dear Mark Holt,

The South Coast Air Quality Management District (South Coast AQMD) has extended Certified Equipment Permits (CEPs) to December 31, 2022 for the stationary emergency internal combustion (IC) engine models listed in the attached table. However, please be reminded that many of these certified diesel-fueled IC engines may not meet Rule 1470 requirements if installed at or near a sensitive receptor or near school grounds and, therefore, may require an aftertreatment system such as a diesel particulate filter in the exhaust stream.

Please note that the South Coast AQMD does not endorse or warrant any specific equipment or manufacturer. Modification of the equipment listed here will void this certification.

If you have additional questions or need further clarification on the CEP program, please feel free to contact CJ Chang at (909) 396-3293, cchang@aqmd.gov; or Susan Tsai at (909) 396-2529, stsai@aqmd.gov.

Sincerely,

David Ono
Senior Engineering Manager
Engineering and Permitting

DO:GI:ST:CC

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Certified ICE-Emergency Generators

Rolls-Royce Solutions America, Inc.

Engine Mfg.	Model	Engine Rating	Appl. No.
MTU America	10V1600G80S	752 BHP	578846
MTU America	18V2000G76S	1839 BHP	578847
Mercedes-Benz	OM 924 LA	197.1 BHP	580124
Mercedes-Benz	OM 926 LA	331.2 BHP	580125
MTU America	6R1600G70S	419 BHP	518630
MTU America	6R1600G80S	460 BHP	518631
MTU America	8V1600G70S	548 BHP	518632
MTU America	8V1600G80S	601 BHP	518633
MTU America	12V1600G70S	822 BHP	503822
MTU America	12V1600G80S	896 BHP	503820
MTU America	12V2000G45 TB/TD (R1238A37)	952 BHP	495350
MTU America	12V2000G85 TB/TD (R1238A37)	1086 BHP	495342
MTU America	16V2000G45 TB/TD (R1638A37)	1227 BHP	495344
MTU America	16V2000G85 TB/TD (R1638A37)	1354 BHP	495345
MTU America	G43D (20V-4000 G43 3D, 20V-4000 G83 3B)	3674 BHP	470538
MTU America	G83L (20V-4000 G83L)	4680 BHP	470536
MTU America	G83L (20V-4000 G83L, 20V-4000 G83 3D)	4036 BHP	470537
MTU America	T1238A36 (12V-4000 G83)	2561 BHP	470532
MTU America	T1238A36 (12V-4000 G83, 12V-4000 G43)	2328 BHP	470534
MTU America	T1638A36 (16V-4000 G83 3D)	3353 BHP	470533
MTU America	T1638A36 (16V-4000 G43 3D, 16V-4000 G83 3B)	3058 BHP	608239

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Certified ICE-Emergency Generators

Rolls-Royce Solutions America, Inc.

Engine Mfg.	Model	Engine Rating	Appl. No.
MTU America	12V2000G45TB	1045 BHP	551794
MTU America	12V2000G85TB	1194 BHP	608240
MTU America	16V2000G45TB	1354 BHP	551796
MTU America	16V2000G85TB	1495 BHP	551797
MTU America	16V4000G83L	3674 BHP	551792
MTU America	16V2000G86S	1839 BHP	608241
MTU America	10V1600G70S	685 BHP	602447
MTU America	12V4000G14S	2038 BHP	608244
MTU America	12V4000G24S	2328 BHP	608247
MTU America	12V4000G74S	2328 BHP	608248
MTU America	12V4000G84S	2561 BHP	608249
MTU America	16V4000G14S	2709 BHP	608250
MTU America	16V4000G24S	3058 BHP	608251
MTU America	20V4000G64S	3674 BHP	608253
MTU America	20V4000G44S	4036 BHP	608260
MTU America	16V4000G74S	3058 BHP	608263
MTU America	20V4000G94S	4680 BHP	608264
MTU America	20V4000G74S	4036 BHP	608265
MTU America	20V4000G24S	3674 BHP	608267
MTU America	20V4000G14S	3339 BHP	608268
MTU America	16V4000G84S	3353 BHP	608269
MTU America	16V4000G94S	3674 BHP	608270

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Certified ICE-Emergency Generators

Rolls-Royce Solutions America, Inc.

Engine Mfg.	Model	Engine Rating	Appl. No.
Power Solutions Int'l (PSI)	8800CAC (LPG)	230.12 BHP	629447
Power Solutions Int'l (PSI)	8800CAC (Nat Gas)	261.47 BHP	629474
Rolls-Royce	20V4000G94S	4680 BHP	630151
Rolls-Royce	20V4000G74S	4036 BHP	630155
Rolls-Royce	16V4000G74S	3058 BHP	630156
Rolls-Royce	20V4000G44S	4036 BHP	630157
Rolls-Royce	20V4000G24S	3674 BHP	630159
Rolls-Royce	20V4000G14S	3339 BHP	630162
Rolls-Royce	18V2000G76S	1839 BHP	630163
Rolls-Royce	16V4000G94S	3674 BHP	630164
Rolls-Royce	16V4000G84S	3353 BHP	630165
Rolls-Royce	16V4000G74S	3058 BHP	630166
Rolls-Royce	16V4000G24S	3058 BHP	630167
Rolls-Royce	16V4000G14S	2709 BHP	630168
Rolls-Royce	16V2000G86S	1839 BHP	630169
Rolls-Royce	12V4000G74S	2328 BHP	630170
Rolls-Royce	12V4000G24S	2328 BHP	630171
Rolls-Royce	12V4000G14S	2038 BHP	630172
Rolls-Royce	10V1600G80S	752 BHP	630215
Rolls-Royce	10V1600G70S	685 BHP	630216
Rolls-Royce	12V1600G80S	896 BHP	630223
Rolls-Royce	12V1600G70S	822 BHP	630225
Rolls-Royce	12V4000G84S	2561 BHP	608227

Rolls-Royce Solutions America Inc.

39525 MacKenzie Dr.
Novi, MI 48377, USA
T +1 248 560 8000

660 Bettis Academy Rd.
Graniteville, SC 29829, USA
T +1 803 663 8831

100 Power Dr.
Mankato, MN 56001, USA
T +1 507 625 7973

09/03/2021

The attached South Coast Air Quality Management District Certified Equipment Permits (CEP) are for the Power Solutions International (PSI) PSI 8.8 L TCAC engine used in the Rolls-Royce Solutions America Inc. Genset model No. 8V0110 GS150. The PSI engine model No. in the SCAQMD permits is 8800CAC. This is the 8.8 L TCAC engine; However, the PSI US EPA certificate of conformity application uses the model No. 8800CAC and therefore this is the model No. information which must be provided in the SCAQMD CEP.

SCAQMD now requires separate permits for the same engine if the power ratings are different therefore there are two permits for the PSI engine model No. 8800 CAC (8.8 L TCAC). One if for the engine using natural gas (NG) fuel and the other permit if for the engine running on liquid propane gas (LPG).

Mark Holt

Emissions Expert
Rolls-Royce Solutions America Inc..
100 Power Drive
Mankato, MN 56001

South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178

Application or CEP No.
629447
Page 1

CERTIFIED EQUIPMENT PERMIT (CEP)
(NOT A PERMIT TO CONSTRUCT OR OPERATE)

Granted on August 25, 2021

ID 180910

Legal Owner or Operator:
Rolls-Royce Solutions America, Inc.
39525 MacKenzie Dr.
Novi, MI 48377
Attn: Mark Holt

Equipment Location: SAME AS ABOVE

The equipment described below and as shown on the approved plans and specifications are subject to the special condition or conditions listed.

Equipment Description

Internal Combustion Engine, Power Solutions International (PSI), Model No. 8800CAC, LPG-Fueled, 8-Cylinder, Turbocharged and Aftercooled, Rated at 230.12 BHP, Equipped with Air/Fuel Ratio Controller and Three-Way Catalyst, Driving an Emergency Electrical Generator.

Manufacturer Condition

1. **This Certified Equipment Permit (CEP) is not a Permit to Construct or Operate.** The person constructing, installing or operating the equipment at each specific site shall obtain all necessary permit(s) to construct and permit(s) to operate and comply with any other District rules and regulations including the requirements of Regulation XIII.

End User Conditions

1. Operation of this equipment shall be in compliance with all data and specifications submitted with the application under which this permit was issued, unless otherwise noted below.

2. This equipment shall be properly maintained and kept in good operating condition at all times.

3. This engine shall be fired with LPG only.

ORIGINAL

CERTIFIED EQUIPMENT PERMIT (CEP)
(NOT A PERMIT TO CONSTRUCT OR OPERATE)

4. The engine shall not be operated unless its exhaust is vented to the non-selective catalytic reduction unit which is in full operation and which is in good operating condition at all times.

5. The engine shall not be operated without the use of an air-to-fuel ratio controller which shall be maintained and kept in proper operating condition at all times.

6. This engine shall not be operated more than 200 hours in any one year, which includes no more than 50 hours in any one year and no more than 4.2 hours in any one month for maintenance and testing purposes

7. An operational non-resettable totalizing timer shall be installed and maintained to indicate the engine elapsed operating time.

8. The operation of this engine beyond 50 hours per year allotted for engine maintenance and testing shall be allowed only during emergencies resulting in an interruption of service of the primary power supply or during stage II or III electrical emergencies declared by the electrical grid operator. This engine may be used as part of an interruptible electric service program.

9. The operator shall maintain accurate maintenance records of the date of catalyst cleaning or replacement, oxygen sensor replacement, and their associated total hour reading on the non-resettable totalizing time meter, to determine the engine elapsed operating time, and records of engine tune-ups.

10. The operator shall keep a log of engine operations documenting the total time the engine is operated each month and specific reason for operation as:

    A. Emergency use.
    B. Maintenance and testing.
    C. Other (describe the reason for operating).

    In addition, each time the engine is manually started, the log shall include the date of operation, the specific reason for operation, and the totalizing hour meter reading (in hours and tenths of hours) at the beginning and end of operation.

11. On or before January 15th of each year, the operator shall record in the engine operating log the following:

    A. The total hours of operation for the previous calendar year, and
    B. The total hours of engine operation for maintenance and testing for the previous calendar year.

CERTIFIED EQUIPMENT PERMIT (CEP)
(NOT A PERMIT TO CONSTRUCT OR OPERATE)

Engine operating log shall be retained on site for a minimum of five calendar years and shall be made available to the Executive Officer or representative upon request.

12. This engine shall comply with the NMHC, NOx, CO, and PM emission limits to be determined at the time of issuance of the end-user permit.

13. Sulfur content of LPG fuel supplied to the engine shall not exceed 40 ppm by volume measured over a 4-hour average period.

14. This engine shall be operated in compliance with all applicable requirements of the Code of Federal Regulations Title 40 Part 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engine.

Please notify CJ Chang at (909) 396-3293 (cchang@aqmd.gov) when South Coast AQMD information packets are needed or if you have any questions concerning the Certification/Registration Program.

This Certified Equipment Permit is based on the plans, specifications, and data submitted as it pertains to the release of air contaminants and control measures to reduce air contaminants. No approval or opinion concerning safety and other factors in design, construction or operation of the equipment is expressed or implied.

This Certified Equipment Permit will become invalid if this application is cancelled. THIS PERMIT SHALL EXPIRE ON December 31, 2021 unless an extension is granted by the Executive Officer.

By _____

GEORGE ILLES
Supervising Air Quality Engineer

ORIGINAL

CERTIFIED EQUIPMENT PERMIT (CEP)
(NOT A PERMIT TO CONSTRUCT OR OPERATE)

Engine operating log shall be retained on site for a minimum of five calendar years and shall be made available to the Executive Officer or representative upon request.

12. This engine shall comply with the NMHC, NOx, CO, and PM emission limits to be determined at the time of issuance of the end-user permit.

13. Sulfur content of natural gas fuel supplied to the engine shall not exceed 16 ppm by volume.

14. This engine shall be operated in compliance with all applicable requirements of the Code of Federal Regulations Title 40 Part 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engine.

Please notify CJ Chang at (909) 396-3293 (cchang@aqmd.gov) when South Coast AQMD information packets are needed or if you have any questions concerning the Certification/Registration Program.

This Certified Equipment Permit is based on the plans, specifications, and data submitted as it pertains to the release of air contaminants and control measures to reduce air contaminants. No approval or opinion concerning safety and other factors in design, construction or operation of the equipment is expressed or implied.

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By _____

GEORGE ILLES
Supervising Air Quality Engineer

ORIGINAL

MTU ONSITE ENERGY GS150 LP VAPOR GENERATOR
GENERATOR: 130 kW, 130kVA, 541 amps, 1800 RPM
VOLTAGE: 120/240v 1 phase
ENGINE: PSI 8.8, LP Vapor, EPA Certified

Selected Features Included:
Steel Sub Base, Battery Cables, Battery Rack, Flex Fuel Connector, Oil Drain Extension, Lube Oil and Anti-freeze
Electronic Isochronous Governor + / - .25%
UL2200 Listed, Prototype Tested, Factory Tested
130 Degree Rise Standby Alternator, Permanent Magnet
2 Year / 3,000 Hour Standby Limited Warranty

CONTROL PANEL: Basler DGC-1510 Control Panel
The expanded Digital Genset Controller utilizes microprocessor based technology to provide a versatile system for genset control, protection, monitoring and event logging. 4 Relay Board.

ENCLOSURE: Level 2 Sound Attenuated Weatherproof Enclosure includes bolt together sheet metal enclosure constructed with 14-gauge material, lockable hinged doors, keyed alike, a fixed storm proof air intake louver and expanded metal air discharge, muffler support brackets and exhaust piping allowing the muffler to be mounted internally, including rain cap. 79 dBA at 23'.

COOLING SYSTEM: Unit Mounted Radiator, 50 Degree Rise

CIRCUIT BREAKER: Square D, 80% rated, LSI, 2-400 Amps

BATTERY: Lead Acid Battery, Acid Resistant Steel Rack

BLOCK HEATER: 2,000 Watts, Mounted and Wired, Isolation Valves

VIBRATION ISOLATION: Neoprene Vibration Pads, Integral Vibration Isolation

BATTERY CHARGER: 12v, 6 Amps, mounted and wired

MUFFLER: Critical Grade Muffler Mounted Inside Enclosure

MISC: One Owner's Manual, Standard Color ANSI Gray

CONTROL EQUIPMENT

Catalyst Housing
Model: EAS-1200-0404F-2C4E
Manufacturer: EMIT Technologies, Inc
Element Size: Round 12" x 3.5"
Housing Type: 2 Element Capacity
Catalyst Installation: Accessible Housing
Construction: 10 gauge Carbon Steel
Sample Ports: 6 (0.5" NPT)
Inlet Connections: 4" Flat Face Flange
Outlet Connections: 4" Flat Face Flange
Configuration: Side In / End Out
Silencer: Integrated
Silencer Grade: Critical
Insertion Loss: 25-30 dBA
Catalyst Element
Model: RE-1200-T
Catalyst Type: NSCR, Standard Precious Group Metals
Substrate Type: BRAZED
Manufacturer: EMIT Technologies, Inc
Element Quantity: 1
Element Size: Round 12" x 3.5"

Gas Generator Set

mtu 8V0110 GS150

150 kWe/60 Hz/Standby/208 - 600V

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V	380V †
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
Natural Gas (NG)							
Amps	625	625	520	451	226	180	285
kW/kVA	150/150	150/150	150/187.5	150/187.5	150/187.5	150/187.5	150/187.5
Liquid Propane (LP)							
Amps	542	542	451	391	195	156	247
kW/kVA	130/130	130/130	130/162.5	130/162.5	130/162.5	130/162.5	130/162.5
NG and LP							
skVA@30% voltage Dip	196	187	296	296	394	315	282
Generator model	431PSL6224	431CSL6206	431PSL6202	431PSL6202	431PSL6202	431CSL6240	431PSL6204
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	4 LEAD	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE	12 LEAD WYE

† UL 2200 offered

Note: This unit is available with a dual fuel configuration.

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2018 IBC certification
  - OSHPD pre-approval
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- PSI 8.8L TCAC engine
  - 8.8 liter displacement
  - 4-cycle
- 3-way catalyst
- Optional fuels: LP liquid and dual fuel
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery rack and cables
- Flexible exhaust connection
- Liquid cooled, ball bearing turbcharger
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult your local ***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	8.8L TCAC
Type	4-cycle
Aspiration	turbocharged, intercooled
Arrangement	8-V
Displacement: L (in^3)	8.8 (535)
Bore: cm (in)	11.05 (4.35)
Stroke: cm (in)	11.43 (4.5)
Compression ratio	10:1
Rated rpm	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	195.0 (261.5)
Maximum power (LP): kWm (bhp)	171.6 (230.1)
Steady state frequency band	± 0.75%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	9.0 (2.38)
Engine jacket water capacity: L (gal)	13.4 (3.5)
System coolant capacity: L (gal)	25.5 (6.7)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel inlet - vaporous supply

Fuel supply connection size	2” NPT
Fuel supply pressure: mm H_20 (in. H_20)	178–279 (7–11)

Fuel inlet - liquid supply

Fuel supply connection size	#6 (3/8”) female SAE 45° flare
Maximum fuel supply pressure: kPa (PSI)	2,150 (312)

Fuel consumption (NG-1000 BTU/ft^3 / LP-2500 BTU/ft^3)

	NG	LPG
At 100% of power rating: m^3/hr (ft^3/hr)	56.2 (1,986)	19.7 (695)
At 75% of power rating: m^3/hr (ft^3/hr)	43.9 (1,549)	15.1 (534)
At 50% of power rating: m^3/hr (ft^3/hr)	31.8 (1,121)	11.0 (389)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	48 (118.4)*
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	125 (33.0)
Heat rejection to coolant: kW (BTUM)	88.3 (5,021)
Heat radiated to ambient: kW (BTUM)	41.1 (2,337)
Heat rejected to charge air cooler: kW (BTUM)	13.8 (782)
Fan power: kW (hp)	11.9 (16.0)

* Installation of gravity exhaust louvers reduces the ambient capacity of the cooling system by an additional 3 °C (5.5 °F).

Air requirements

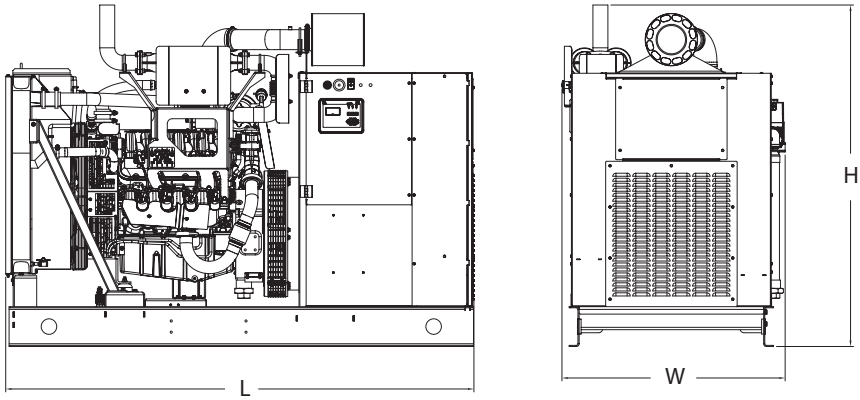
	NG and LPG
Aspirating: *m^3/min (SCFM)	10.33 (365)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	229.8 (8,115)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	211.6 (7,473)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	649 (1,200)
Gas volume at stack temperature: m^3/min (CFM)	33.3 (1,176)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10.2 (41)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
[redacted]		

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load (NG)	Standby full load (LP)
[redacted]		

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	N/A	0.22
Liquid propane	0.035	0.95

— All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor

Subject to change. | 231262 | 2021-05

Digital Generator Set Controller Data Sheet

MGC-1500 Series

The MGC-1500 Series controllers include the following models which are described throughout this document.*

— MGC-1510
— MGC-1520

MGC Series Generator Set Controllers are rugged, reliable, and easy-to-use digital generator set control systems. The MGC-1500 Series is perfectly focused, combining rugged construction and microprocessor technology to offer a product that will hold up to almost any environment and is flexible enough to meet your application's needs.



PRODUCT HIGHLIGHTS

— Three-phase generator metering
— Engine metering
— Generator set control
— Engine and generator protection
— BESTCOMS*Plus*®
  - Windows®-based software for optional remote operation (Software can be downloaded at www.mtu-solutions.com)
  - Programming and setup software
  - Intuitive and powerful
  - Remote control and monitoring
  - Programmable logic
  - USB communications
— Suitable for rental generator sets with high/low sensing, single or three phase override, wye/delta/grounded delta configurable, and alternate frequency override (50/60 Hz)
— Resistive sender inputs for oil pressure and coolant temperature
— Multilingual capability
— SAE J1939 Engine Control Unit (ECU) communications (Refer to *Configuration Options*)
— Remote annunciation with RDP-110
— Event recording (up to 30 events in non-volatile memory)
— Extremely rugged, fully potted design
— Seven programmable contact inputs with Input 1 programmed to recognize an emergency stop
— Start, run, and prestart relays with four programmable outputs
— UL recognized, CSA certified, CE approved
— IP56 rating per IEC 60529
— NFPA-110 compatible
— Microprocessor based
— Complete system metering
— Expandable to meet customer needs

* Please refer to the last page of this data sheet for available MGC-1500 series configuration options. The MGC Series Controller Comparison Data Sheet is a available as a reference for all MGC series configuraton options..

DIAGRAM

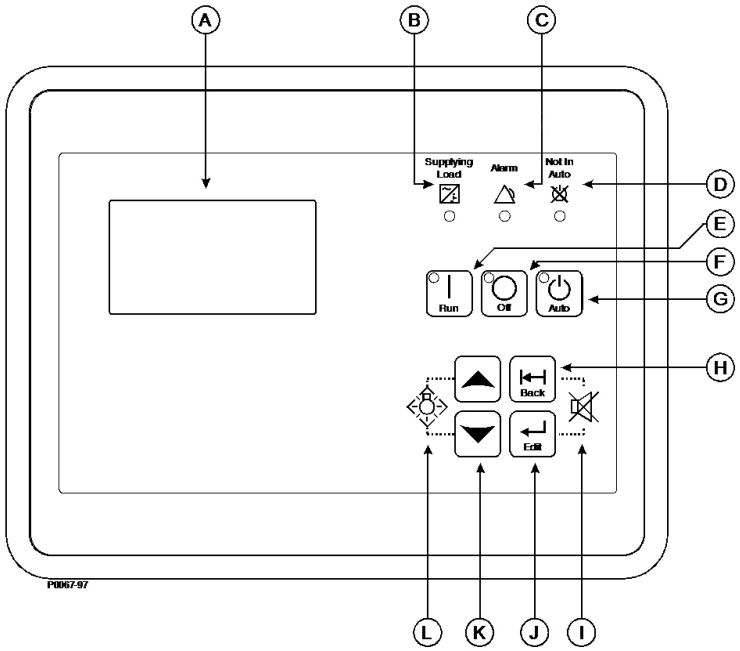


Figure 1: Front Panel Descriptions

A. Liquid crystal display
B. Supplying load indicator
C. Alarm indicator
D. Not in auto indicator
E. Run pushbutton and mode indicator
F. Off pushbutton and mode indicator
G. Auto pushbutton and mode indicator
H. Back pushbutton
I. Alarm silence pushbutton combination
J. Edit pushbutton
K. Arrow pushbuttons
L. Lamp test pushbutton combination

FUNCTIONS

Generator set protection

Generator ANSI codes
- Overvoltage (59)
- Overfrequency (81O)
- Voltage phase imbalance (47)
- Undervoltage (27)
- Underfrequency (81U)
- Overcurrent (50)

All generator set protection features are programmable as alarms, pre-alarms, status, or not used.

Alarms (shutdowns)
- Low oil pressure
- High coolant temperature
- Low coolant temperature
- Overspeed
- Overcrank
- Coolant temp sender fail (non-ECU engines)
- Oil pressure sender fail (non-ECU engines)
- Emergency stop
- Critical low fuel level (refer to *Configuration Options*)

Pre-alarms (warnings)
- Low oil pressure
- Low coolant temperature
- Weak battery voltage
- Low fuel level
- High fuel level
- High coolant temperature
- Battery overvoltage

All alarms and pre-alarms can be enabled or disabled via the BESTCOMSPlus® PC software or the front panel.
Additional custom alarms and pre-alarms are available upon request.

FUNCTIONS, continued

Generator set metering
— Generator parameters include voltage, current, real power (watts), apparent power (VA), and power factor. The view can be programmed to display up to 20 parameters using the scrolling and time delay feature.
— Engine parameters include oil pressure, coolant temperature, RPM, battery voltage, fuel level, engine runtime, and various SAE J1939 supported parameters.

Engine control
— Cranking control: cycle or continuous (quantity and duration fully programmable)
— Engine cooldown: smart cooldown function saves time and fuel
— Successful start counter: counts and records successful engine starts
— Timers:
  - Engine cooldown timer
  - Engine maintenance timer
  - Pre-alarm time delays for weak/low battery voltage
  - Alarm time delay for overspeed
  - Alarm time delay for sender failure
  - Arming time delays after crank disconnect:
    - Low oil pressure
    - High coolant temperature
  - Pre-crank delay
  - Continuous or cycle cranking time delay
  - Programmable logic timers

Event recording
The MGC-1500 Series has an event recorder that provides a record of alarms, pre-alarms, engine starts, engine runtime loaded, engine runtime unloaded, last run date, and many other events that are all date and time stamped to help the user determine the cause and effect of issues related to the generator set. Contains up to 30 event records each retaining numerous occurrences in memory. Time, date, and engine hour detail are available for the most current 30 occurrences within each event record.

Transfer switch control (Mains failure)
(Refer to *Configuration Options*)
The MGC-1500 Series has the ability to detect a mains failure via a single- or three-phase bus input. A mains failure is established when any one of the following conditions are met:
— Any phase of bus voltage falls below the dead bus threshold
— Any phase of bus voltage is unstable due to overvoltage or undervoltage
— Any phase of bus voltage is unstable due to overfrequency or underfrequency

When conditions are met, the MGC-1500 Series will start the generator set and, when ready, will send generator and mains breaker commands to apply power to the load from the generator set. The MGC-1500 Series implements open or closed breaker transitions to and from the mains. When the mains returns and is considered stable, the MGC-1500 Series will transfer the load back to the mains and stop the engine.

USB port
The USB communication port can be used with BESTCOMS*Plus*® software to quickly configure an MGC-1500 Series with the desired settings or retrieve metering values and event log records.

Programmable logic
The MGC-1500 Series offers a very powerful, yet easy-to-use, programmable logic scheme, BESTlogic™*Plus,* for custom programming of the various inputs, outputs, alarms, and pre-alarms. It allows these elements to be integrated into a complete logic scheme so that the user can meet even the most complex specification. The Programmable logic control includes the selection of logic gates and timers with drag-and-drop technology to make it fast and simple.

Remote display panel annunciation
(Refer to *Configuration Options*)
The MGC-1500 Series can communicate to a remote display panel, Model RDP-110. This requires only two wires to annunciate many of the alarms and pre-alarms required by NFPA-110 Level I and II. External power is required.

SAE J1939 communications
(Refer to *Configuration Options*)
SAE J1939 CANBus communications allows the MGC-1500 Series to communicate with the ECU to gather critical engine information like oil pressure, engine coolant temperature, RPM, battery voltage, and much more. By utilizing the ECU, the addition of analog engine senders is no longer required. This can save substantial money for the installer. It also eliminates any errors or discrepancies between the ECU data and the data displayed on the MGC-1500 Series that may be present due to analog sender inaccuracies or incompatibility. An additional benefit is access to the ECU's diagnostic troubleshooting codes (DTCs). The DTCs provide information about the engine's operating conditions and communicate these via SAE J1939 to the MGC-1500 Series, eliminating the need for hand-held service tools to diagnose simple engine issues.

SPECIFICATIONS

Operating power
- Nominal: 12 or 24 VDC
- Range: 6 to 32 VDC
- Power consumption:
  - Sleep mode: 4.5 W
  - Normal operational mode: 6.5 W - Run mode, LCD heater off, three relays energized
  - Maximum operational mode: 14 W - Run mode, LCD heater on, seven relays energized
  - Battery ride-through: Withstands cranking ride-through down to 0 V for 50 ms (typical)

Current sensing (5 Amp CT inputs)
- Continuous rating: 0.1 to 5.0 Aac
- One second rating: 25 Aac
- Burden: 1 VA

Voltage sensing
- Range: 12 to 576 V rms, line-to-line
- Frequency range: 10 to 72 Hz
- Burden: 1 VA
- One second rating: 720 V rms

Contact sensing/input contacts
Contact sensing inputs include one emergency stop input and seven programmable inputs. The emergency stop input accepts normally closed, dry contacts. The remote emergency stop is limited to 75 ft. standard. Extended runs are available with an optional relay. All programmable inputs accept normally open, dry contacts. The factory may utilize up to three of these inputs.

Engine system inputs
- Fuel level sensing resistance range: 5 to 250 Ω nominal
- Coolant temperature sensing resistance range: 5 to 2,750 Ω nominal
- Oil pressure sensing resistance range: 5 to 250 Ω nominal
- Engine speed sensing:
  - Magnetic pickup or CANBus
    - Magnetic pickup voltage range: 3 to 35 V peak (6 to 70 V peak to peak)
    - Magnetic pickup frequency range: 32 to 10,000 Hz

Output contacts
- (7) total outputs: (3) 5 A @ 28 VDC and (4) 2 A @ 28 VDC
- The factory utilizes the following on each generator set which can be reprogrammed as needed:
  - (3) 5 A @ 28 VDC for Pre-start, Start, and Run
  - (4) 2 A @ 28 VDC for general purpose

Metering
Generator voltage (rms)
- Metering range: 12 to 576 VAC (direct measurement), up to 9,999 VAC (with appropriate voltage transformer)
- Accuracy: ±1% of programmed rated voltage or ±2 VAC (subject to accuracy of voltage transformer when used)

Generator current (rms)
- Generator current is measured at the secondary windings of 5 A CTs.
- Metering range: 0 to 5,000 Aac
- CT primary range: 1-5,000 Aac, in primary increments of 1 Aac
- Accuracy: ±3% of programmed rated current or ±3 Aac (subject to accuracy of CTs)

Generator frequency
- Metering range: 10 to 72 Hz
- Accuracy: ±0.25% or 0.05 Hz

Apparent power
- Indicates total kVA and individual line kVA (four-wire, line-to-neutral or three-wire, line-to-line)
- Accuracy: ±5% of the full-scale indication or ±4 kVA

Power factor
- Metering range: 0.2 leading to 0.2 lagging
- Accuracy: ±0.02

Real power
- Indicates total kW and individual line kW (four-wire, line-to-neutral or three-wire, line-to-line)
- Accuracy: ±5% of the full-scale indication or ±4 kW

Oil pressure
- Metering range: 0 to 150 psi or 0 to 1,034 kPa
- Accuracy: ±3% of actual indication or ±2 psi or ±12 kPa (subject to accuracy of sender)

Coolant temperature
- Metering range: 0 °C to 204 °C (32 °F to 410 °F)
- Accuracy: ±3% or actual indication or ±2° (subject to accuracy of sender).

Fuel level
- Metering range: 0 to 100%
- Accuracy: ±3% (subject to accuracy of sender)

Battery voltage
- Metering range: 6 to 32 VDC
- Accuracy: ±3% of actual indication or ±0.2 VDC

Engine RPM
- Metering range: 0 to 4,500 rpm
- Accuracy: ±2% of actual indication or ±2 rpm

Engine run time
- Engine run time is retained in non-volatile memory
- Metering range: 0 to 99,999 h; update interval: 6 min
- Accuracy: ±1% of actual indication or ±12 min

SPECIFICATIONS, continued

Metering, continued

Maintenance timer
- Maintenance timer indicates the time remaining until generator set service is due. Value is retained in non-volatile memory.
- Metering range: 0 to 5,000 h; update interval: 6 min
- Accuracy: ±1% or actual indication or ±12 min

Generator protection functions

Overvoltage (59) and undervoltage (27)
- Pickup range: 70 to 576 VAC
- Activation delay range: 0 to 30 s

Overfrequency (81O) and underfrequency (81U)
- Pickup range: 45 to 66 Hz
- Pickup increment: 0.1 Hz
- Activation delay range: 0 to 30 s

Phase imbalance (47)
- Pickup range: 5 to 100 VAC
- Pickup increment: 1 VAC
- Activation delay range: 0 to 30 s
- Activation delay increment: 0.1 s

Overcurrent (51)
- Pickup range: 0.18 to 1.18 Aac (1 A current sensing)
- Time dial range: 0 to 7,200 s (fixed time curve)

Environmental
- Temperature
  - Operating: -40 °C to 70 °C (-40 °F to 158 °F)
  - Storage: -40 °C to 85 °C (-40 °F to 185 °F)
- Humidity: IEC 68-2-38
- Salt fog: ASTM B 17-73, IEC 68-2-11 (tested while operational)
- Ingress protection: IEC IP54 for front panel
- Shock: 15 G in three perpendicular planes
- Vibration: swept over the following ranges for 12 sweeps in each of three mutually perpendicular planes with each 15-minute sweep.
  - 5 to 29 to 5 Hz at 1.5 G peak for 5 min
  - 29 to 52 to 29 Hz at 0.036” DECS-A for 2.5 min
  - 52 to 500 to 52 Hz at 5 G peak for 7.5 min

Agency approvals
- UL/CSA approvals: “cURus” approved to UL 6200 and CSA C22.2 No.14
- NFPA Compliance: complies with NFPA Standard 110, standard for emergency and standby power
- CE Marked: complies with applicable EC directives

ADDITIONAL SPECIFICATIONS

Battery backup for real time clock
The MGC-1500 Series provides a real-time clock with capacitor backup that is capable of operating the clock for up to 24 hours after power is removed from the controller. As the capacitor nears depletion, an internal backup battery takes over and maintains timekeeping. The battery will maintain the clock for approximately 10 years, depending on conditions. The battery is not replaceable. The clock is used by the events recorder function to timestamp events, and the exercise timer is used to start and stop the generator set when the exercise feature is utilized.

Breaker management
The MGC-1500 Series is capable of controlling the generator breaker and the mains breaker. The status of the breakers is determined by using BESTlogic™Plus programmable logic to set up the GENBRK and MAINSBRK logic blocks. These logic blocks have outputs that can be configured to energize an output contact and control a breaker, as well as inputs for breaker control and status. The MGC-1500 Series will attempt to close a breaker only after verifying that it can be closed. If the breaker cannot be closed, the close request will be ignored. Only one breaker can be closed at a time. Synchronization is required before closing the breaker to a live bus. Closure to a dead bus can be performed after meeting dead bus threshold and timing requirements set by the user.

OPTIONAL ACCESSORIES

(Refer to *Configuration Options*)

Contact Expansion Module 2020 (CEM-2020)

The CEM-2020 is a remote device that provides additional MGC-1500 Series contact inputs and outputs, giving the user flexibility to use the same model MGC-1500 Series generator set controller for simple functions or more complicated applications that require contact functionality or duplication of contacts for remote annunciation. Its features include:

- **10 Contact Inputs:** the CEM-2020 provides 10 programmable contact inputs with the same functionality as the contact inputs on the MGC-1500 Series.
- **24 Contact Outputs:** the CEM-2020 provides 24 Form C programmable output contacts with the same functionality as the output contacts on the MGC-1500 Series. The output ratings of the Form C contacts are:

Output No.	Rating (Cont.)	Additional Information
5-16	1 A @ 30 VDC	This is a gold flash contact for low current circuits.
17-28	4 A @ 30 VDC	

Table 1: Output Ratings Form C Contacts

- **Communications via CANBus:** the CEM-2020 communicates to the MGC-1500 Series via SAE J1939 CANBus communications and allows the user to program the functionality of these inputs and outputs in the BESTCOMSPlus® software.
- The user can add labels for the inputs and outputs that appear in BESTCOMS®Plus, on the front panel, and in programmable logic. All the functionality can be assigned to these inputs and outputs as if they were an integrated part of the MGC-1500 Series. The CEM-2020 module has all of the environmental ratings of the MGC-1500 Series, including a model for UL Class1 Div2 applications. The CEM-2020 terminals accept a maximum wire size of 12 AWG, while the chassis ground requires 12 AWG wire. Flexibility is one of the benefits of the MGC-1500 Series, and this add-on module enhances that benefit even further.

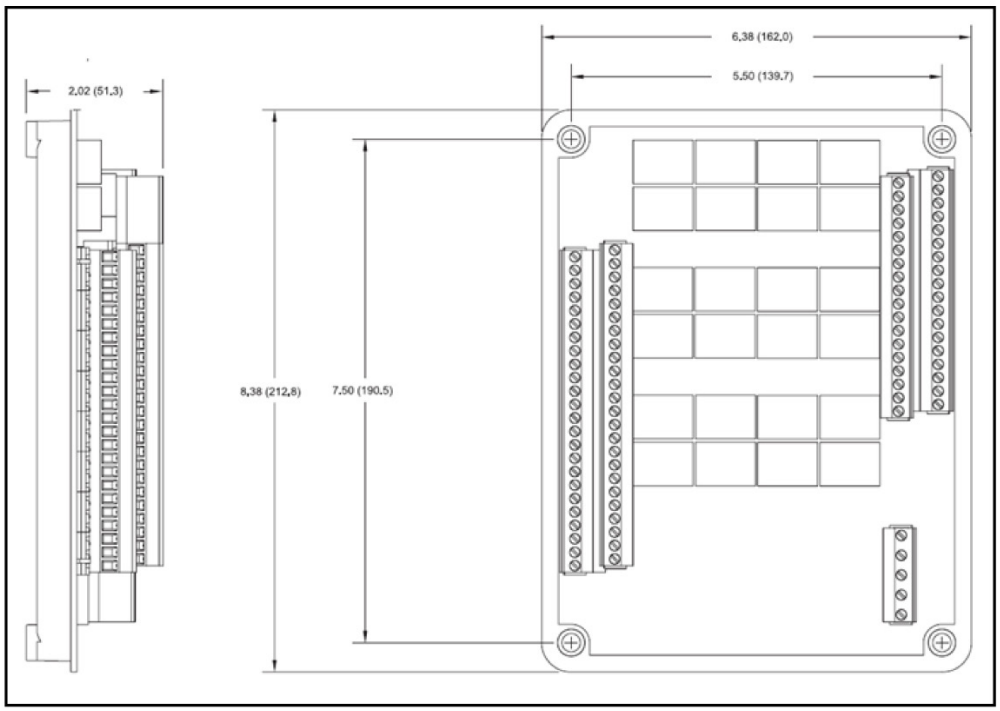


Figure 2: CEM-2020 Overall Dimensions

CONFIGURATION OPTIONS

Generator protection

	MGC-1510	MGC-1520
Standard		
Phase Imbalance (47)	X	X
Overcurrent (50)	X	X
Overvoltage (59)	X	X
Undervoltage (27)	X	X
Underfrequency (81U)	X	X
Overfrequency (81O)	X	X
Reverse Power (32)		
Loss of Excitation (40Q)		
Enhanced		
Overcurrent (51)		
Vector Shift (78)		
Rate of Change of Frequency (81R)		
Ground Fault		

Note: Numbers in parentheses above are ANSI standard device numbers denoting which features the controllers support.

Inputs

	MGC-1510	MGC-1520
Controller		
Digital	7	7
Analog (Dedicated)	3	-
Analog	-	-
CEM		
Digital	-	10
AEM		
Analog	-	-
TC	-	-
RTD	-	-

Outputs

	MGC-1510	MGC-1520
Controller		
Digital Form A, 30 Amp	-	-
Digital Form A, 5 Amp	3	3
Digital Form A, 2 Amp	4	4
Analog	-	-
CEM		
Digital Form C, 4 Amp	-	12
Digital Form C, 1 Amp	-	12
AEM		
Analog	-	-
External to Controllers (CEM)		
Digital Form C, 10 Amp (Interposing Relay)	-	10

Communication

	MGC-1510	MGC-1520
ModBus RTU (RS-485)		
ModBus TCP-IP		
RDP-110	X	X
CANBus		X
Modem Interface (RS-232)		
Ethernet		

Metering

	MGC-1510	MGC-1520
Bus 1 Voltage		
Single Phase	X	X
Three Phase	X	X
Bus 2 Voltage		
Single Phase		
Three Phase		
Current Transformers		
Generator	3	3
Auxiliary	-	-

Subject to change. | WT00032339 | 2020-07

LC-50

Integrated gas mixer, throttle body, and programmable speed control/ actuator



- Integrated, bi-directional actuator and programmable speed control
- Suitable for gaseous engines
- OEM configurable
- Venturi mixer has superior mixing with no moving parts
- Eliminates external linkages
- Reduces total engine assembly costs
- Optional positioner mode
- Five sizes available
- Optional air/fuel ratio trim valve
- Sealed ball-bearing throttle body design
- Optional external throttle position switch

APPLICATION

The LC-50 is designed for use on gaseous fueled industrial engines between 5 and 100 kW (7 and 134 hp). The throttle and venturi sizes are between 24 and 50 mm. Applications include power generation, refrigeration units, pumps, irrigation, and mobile industrial.

The mixer can be used with propane and natural gas and requires a zero pressure regulator. The throttle body incorporates the proven Woodward LCS speed control, which operates the throttle plate. The LC-50 can be programmed via the RS-232 port of a PC/laptop to a variety of configurations, as follows:

- isochronous speed control
- droop
- auxiliary input
- dual dynamics
- adjustable ramp time
- self-tuning
- overspeed/underspeed protection
- remote speed setting
- three speed select
- error relay driver

DESCRIPTION

The LC-50 provides a building block approach to total engine management. This modular design consists of a die-cast aluminum throttle body, mixer, plus a fully programmable integrated digital speed control and bi-directional actuator.

This unique design includes a venturi style annular ring mixer with no moving parts for superior mixing. The throttle body incorporates a corrosion-protected, plated steel shaft, plate, and a sealed ball-bearing design for durability and long life. An internal throttle return spring is standard to close the throttle in the event of power failure.

The LC-50 modular design reduces total engine assembly cost, eliminates external linkages, lowers inventory and part number proliferation. The programmable controller offers security to your configuration.

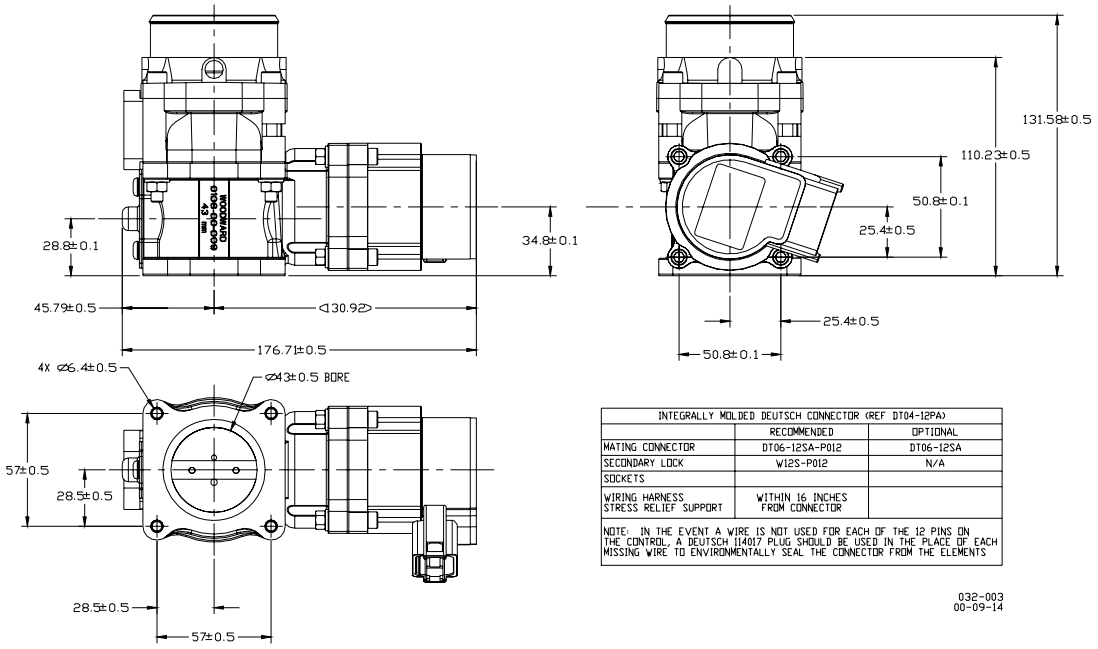
The LC-50 is compatible with Woodward's venturi-style mixer and other brands of gas mixers using suitable adapters (see LCS product specification 03225 for actuator details and operating parameters).

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80522-1519
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Distributors & Service
Woodward has an international network of distributors and service facilities. For your nearest representative, call the Fort Collins plant or see the Worldwide Directory on our website.

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Rockford IL, USA
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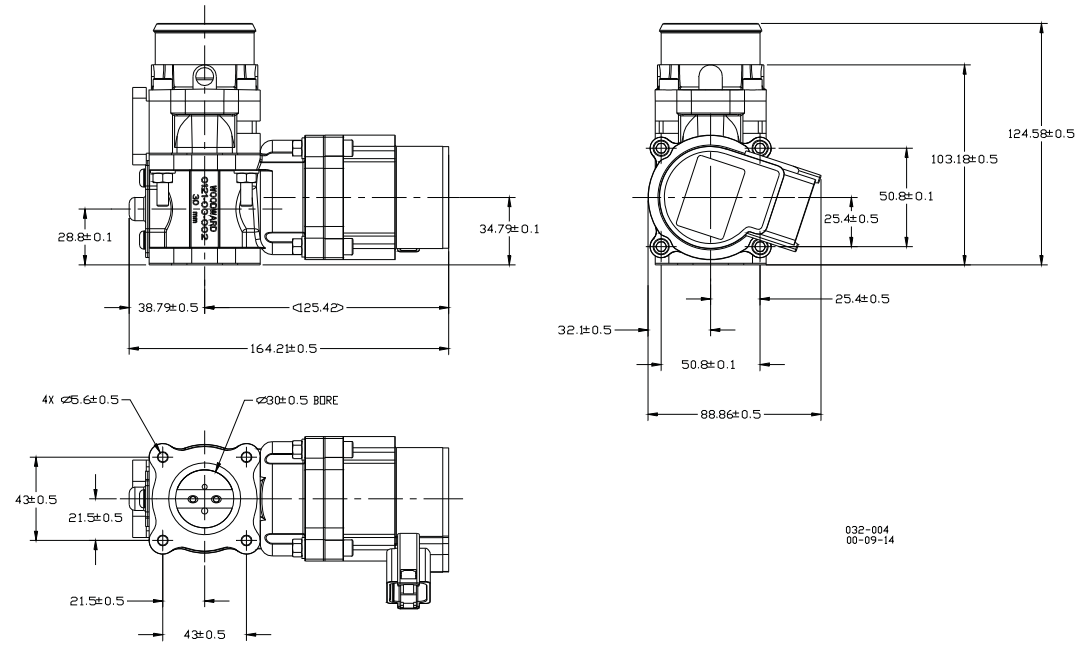
www.woodward.com



INTEGRALLY MOLDED DEUTSCH CONNECTOR (REF DT04-12PA)		
	RECOMMENDED	OPTIONAL
MATING CONNECTOR	DT06-12SA-P012	DT06-12SA
SECONDARY LOCK	W12S-P012	N/A
SOCKETS		
WIRING HARNESS STRESS RELIEF SUPPORT	WITHIN 16 INCHES FROM CONNECTOR	
NOTE: IN THE EVENT A WIRE IS NOT USED FOR EACH OF THE 12 PINS ON THE CONTROL, A DEUTSCH 114017 PLUG SHOULD BE USED IN THE PLACE OF EACH MISSING WIRE TO ENVIRONMENTALLY SEAL THE CONNECTOR FROM THE ELEMENTS		

032-003
00-09-14

Representative Drawing of 43 mm LC-50
(Do not use for construction)



032-004
00-09-14

Representative Drawing of 30 mm LC-50
(Do not use for construction)

Technical Manual 26135

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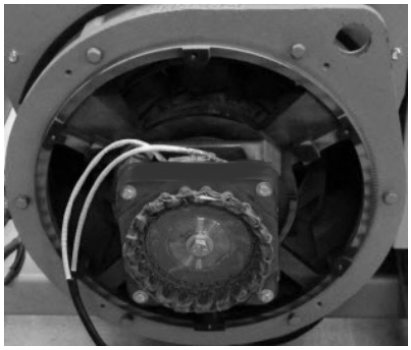
For more information contact:

Generator System Data Sheet

Permanent Magnet Generator (PMG)

DESCRIPTION

A permanent magnet generator (PMG) is standard on 450 kW and larger units and is available as an optional accessory on most units smaller than 450 kW. The PMG is an improved method of supplying power to the voltage regulator and adds distinct advantages over the alternative shunt type power supply.



FEATURES

Improved transient response

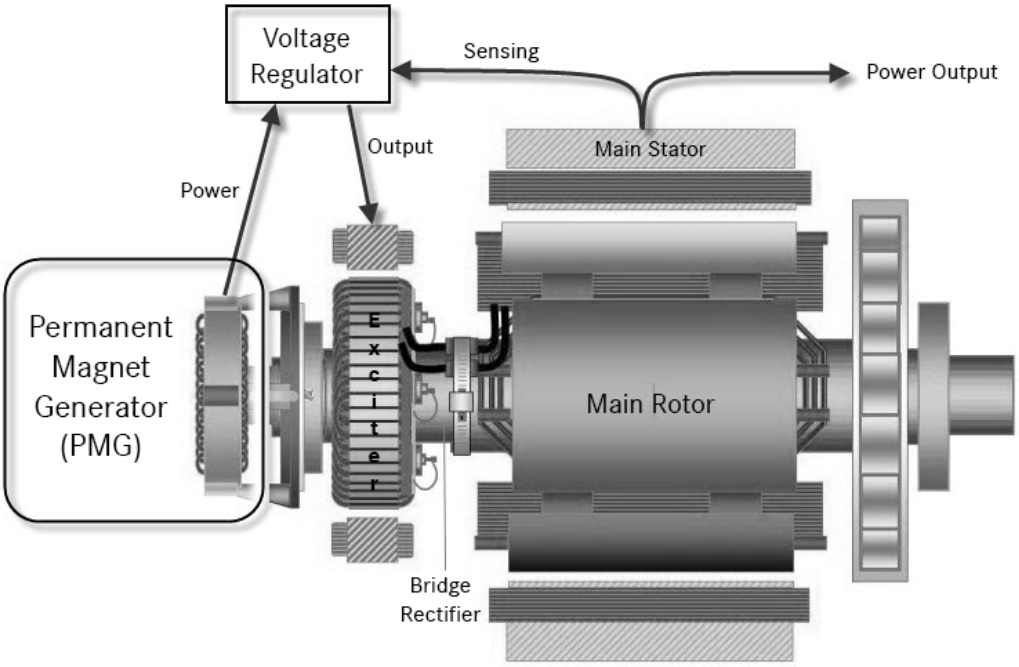
When a generator is subject to a large step load, the generator's terminal voltage experiences a sudden voltage dip. With a shunt style regulator, reduced voltage means the regulator's ability to increase excitation is reduced and voltage recovery will take longer. Power from a PMG is only dependent on the speed of rotation so voltage regulator power, and therefore excitation power, is not compromised during a load step.

300% short circuit capability

The PMG enables the generator to provide up to 300% short circuit current for 10 seconds. This is important when a fault occurs to ensure current continues to flow long enough for downstream breakers to trip and clear the fault. When a fault occurs with a shunt type regulator, the sudden drop in voltage indicates the regulator has no power to increase excitation to keep current flowing. Without current flow, the downstream breakers may not trip.

Resistant to the effects of harmonics

A PMG is also beneficial in applications with harmonic producing loads. When rectifier-type loads are present and cause voltage wave form notching, the disrupted voltage wave form can affect voltage regulator operation on shunt powered regulators. Unlike a shunt regulator, the PMG supplies the regulator with a power source which is isolated from the electrical system.



Generator Equipped with PMG

EXCITATION SYSTEM COMPARISON CHART

	AREP	Permanent Magnet Generator (PMG)
Motor starting capability	High	High
Short circuit current capability	300% at 60 Hz	300% at 60 Hz
Susceptibility to non-linear loads	Minimum	Minimum
Number of components	Minimum	Maximum
Retrofitability	No	Yes
Generator length	Minimum	Maximum
Stator design	Special	Standard with PM attachment
Voltage buildup	Uses residual magnetism and permanent magnet inserts on some frames	Positive from permanent magnets

Subject to change. | WT00037948 | 2020-07

marathon® Generators



DVR® 2400
DIGITAL VOLTAGE REGULATOR

NEW FEATURES
- USB 2.0 access through front panel
- Euro style connector for low voltage connections
- Event Logging
- PMG voltage metering
- Polarity configuration for external inputs
- Configurable cut-in and cut-out frequencies
- Retain/reset configuration of remote adjust

FOUR DIGIT HMI DISPLAY
From intial setup to monitoring regulator status, this display provides innovative, fast and easy setup.

REGULATION MODES
Single and Three phase (AVR), Manual Field Current Regulation (FCR), Reactive Power Regulation (VAR) and Power Factor Regulation (PF). All modes compatible with control by external devices.

GENERATOR SOFT START
Controlled increase to rated voltage limits overshoot during voltage build-up in AVR modes.

TRUE RMS VOLTAGE SENSING - SINGLE OR THREE PHASE
Directly sense 100 to 600 Volts at 50/60 Hz. Circuitry senses true RMS voltage for superior regulation.

SINGLE PHASE POWER METERING

FRAME SIZE SPECIFIC PID SELECTION
Simply select the appropriate frame size and your gains are set.

ROBUST GENERATOR PROTECTION FEATURES
9 different Alarm and Shutdown protection features, many are customizable for your application including:
- Field Over & Under Excitation
- Instantaneous Field Over Current
- Generator Over & Under Voltage
- Generator Voltage Imbalance
- Generator Loss of Sensing

REGAL®

DVR®2400 DIGITAL VOLTAGE REGULATOR

SPECIFICATIONS

Voltage Regulation - 0.25% over load range at rated power factor and constant generator frequency.

Output Power - 100 Vdc, 4.0 Adc continuous rating and 190 Vdc, 7.5 Adc forcing capability for one minute.

Exciter Field DC Resistance - 18 to 25Ω Range

Remote Voltage Adjustment - ±30% of nominal via analog input, ±15% via external contacts.

Input Power - 180 to 240 Vac, 250 to 300 Hz PMG power supply

Regulator Sensing - 100 to 600 Vac, 50/60 Hz, 1-phase/3phase

Operating Temperature - From -40˚C to +70˚C (-40˚F to + 158˚F)

Storage Temperature - From -40˚ C to +85˚C (-40˚F to +185˚F)

Ingress Protection - IP52 (front side mounted in conduit box along with swing cover); IP10 (rear side with protective cover)

Shock - 20G in 3 perpendicular planes

Vibration - 2.5G at 5 to 26 Hz; 0.050" double amplitude (27 to 52 Hz); 7G at 53 to 500 Hz

Weight - 3.5 lb. (1361 g)

Humidity Testing - Per MIL-STD-705B, Method 711-D

Salt Fog Testing - Per MIL-STD-810E

EMI Compatibility

Immunity

Meets EN 61000-6-2: 2005 Electromagnetic compatibility (EMC) -Part 6-2: Generic standards- immunity for industrial environments.

Emission

- Meets EN 61000-6-4: 2007 Electromagnetic compatibility (EMC) - Part 6-4: Generic Standards - emmission standard for industrial environments

EMI Compatibility Tests

Immunity

- Electrostatic Discharge (ESD): IEC 61000-4-2
- Radiated RF: IEC 61000-4-3
- Electrical Fast Transient (EFT) /Burst: IEC 61000-4-4
- Conducted RF: IEC 61000-4-6
- Power Frequency and Magnetic Field: IEC 61000-4-8

Emission

- Radiated RF: EN 61000-6-4: 2007, 30 MHz to 1000 MHz

marathon® Generators

Regal Beloit America, Inc.
100 East Randolph Street
Wausau, WI 54402-8003
PH: 715-675-3359

www.marathonelectric.com

APPLICATION CONSIDERATIONS

The proper selection and application of power generation products and components, including the related area of product safety, is the responsibility of the customer. Operating and performance requirements and potential associated issues will vary appreciably depending upon the use and application of such products and components. The scope of the technical and application information included in this publication is necessarily limited. Unusual operating environments and conditions, lubrication requirements, loading supports, and other factors can materially affect the application and operating results of the products and components and the customer should carefully review its requirements. Any technical advice or review furnished by Regal Beloit America, Inc. and/or its affiliates ("Regal") with respect to the use of products and components is given in good faith and without charge, and Regal assumes no obligation or liability for the advice given, or results obtained, all such advice and review being given and accepted at customer's risk.

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REGAL®

MAGNAPLUS®

MARATHON ELECTRIC
SYNCHRONOUS AC GENERATOR
TYPICAL SUBMITTAL DATA

Basic Model: **431CSL6202/431PSL6202** Date: **6/15/17**

Kilowatt ratings at	**1800 RPM**		**60 Hertz**			**12 Leads**		
kW (kVA)	**3 Phase**		**0.8 Power Factor**			**Dripproof or Open Enclosure**		
	Class B	**Class F**				**Class H**		
Voltage*	**80º C ⓘ Continuous**	**90º C ⓘ Lloyds**	**95º C ⓘ ABS**	**105º C † British Standard**	**105º C ⓘ Continuous**	**130º C ⓘ Standby**	**125º C † British Standard**	**125º C ⓘ Continuous**	**150º C ⓘ Standby**
240/480	125 (156)	131 (164)	135 (169)	142 (178)	142 (178)	155 (194)	145 (181)	151 (189)	160 (200)
230/460	125 (156)	132 (165)	136 (170)	143 (179)	143 (179)	155 (194)	145 (181)	152 (190)	160 (200)
220/440	125 (156)	132 (165)	136 (170)	143 (179)	143 (179)	153 (191)	145 (181)	151 (189)	160 (200)
208/416	125 (156)	130 (163)	133 (166)	140 (175)	140 (175)	151 (189)	141 (176)	147 (184)	155 (194)
190/380	115 (144)	120 (150)	123 (154)	130 (163)	130 (163)	140 (175)	132 (165)	135 (169)	145 (181)

ⓘ *Rise by resistance method, Mil-Std-705, Method 680.1b.* † *Rating per BS 5000.*

Submittal Data: 240/480 Volts*, 194 kVA, 1800 RPM, 60 Hz, 3 Phase

Mil-Std-705B Method	**Description**	**Value**
301.1b	Insulation Resistance	> 1.5 Meg
302.1a	High Potential Test	
	Main Stator	2000 Volts
	Main Rotor	1500 Volts
	Exciter Stator	1500 Volts
	Exciter Rotor	1500 Volts
	PMG Stator	1500 Volts**
401.1a	Stator Resistance, Line to Line	
	High Wye Connection	0.0718 Ohms
	Rotor Resistance	0.598 Ohms
	Exciter Stator	18.5 Ohms
	Exciter Rotor	0.116 Ohms
	PMG Stator	2.1 Ohms**
410.1a	No Load Exciter Field Amps at 480 Volts Line to Line	0.6 A DC
420.1a	Short Circuit Ratio	0.405
421.1a	Xd Synchronous Reactance	3.195 pu
422.1a	X2 Negative Sequence Reactance	0.268 pu
423.1a	X0 Zero Sequence Reactance	0.05 pu
425.1a	X'd Transient Reactance	0.19 pu
426.1a	X"d Subtransient Reactance	0.182 pu
--	Xq Quadrature Synchronous Reactance	1.478 pu
427.1a	T'd Transient Short Circuit Time Constant	0.048 sec.
428.1a	T"d Subtransient Short Circuit Time Constant	0.005 sec.
430.1a	T'do Transient Open Circuit Time Constant	1.34 sec.
432.1a	Ta Short Circuit Time Constant of Armature Winding	0.014 sec.

Mil-Std-705B Method	**Description**	**Value**
505.3b	Overspeed	2250 RPM
507.1c	Phase Sequence CCW-ODE	ABC
508.1c	Voltage Balance, L-L or L-N	0.2%
601.4a	L-L Harmonic Maximum - Total (Distortion Factor)	5.0%
601.4a	L-L Harmonic Maximum - Single	3.0%
601.1c	Deviation Factor	5.0%
---	TIF (1960 Weightings)	<50
652.1a	Shaft Current	< 0.1 ma
652.1a	Main Stator Capacitance to Ground	0.015 mfd
	Additional Prototype Mil-Std Methods are Available on Request.	
--	Generator Frame	431
--	Type‡, Brushless	
--	Insulation	Class H
--	Coupling - Single Bearing	Flexible
--	Amortisseur Windings	Full
--	Cooling Air Volume	1280 CFM
--	Exciter	Rotating
--	Voltage Regulator	SE350***
--	Voltage Regulation	1%***
--	Sensing	1 Phase***

* Voltage refers to wye (star) connection, unless otherwise specified.

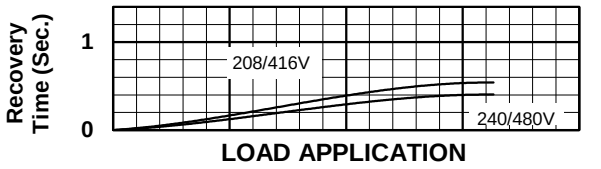
**Not supplied as standard equipment.

***DVR®2000E+ voltage regulator supplied with PMG option. DVR®2000E+ voltage regulation 1/4%, 1 or 3 Phase sensing.

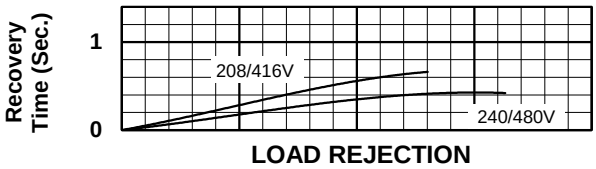
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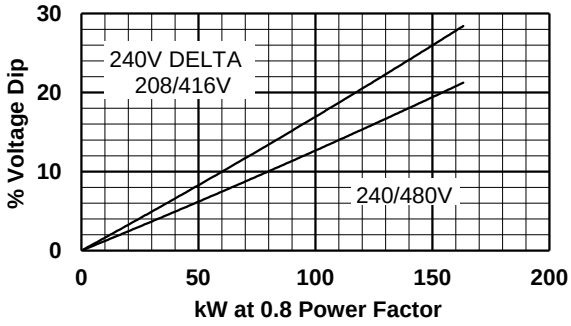
60 HERTZ

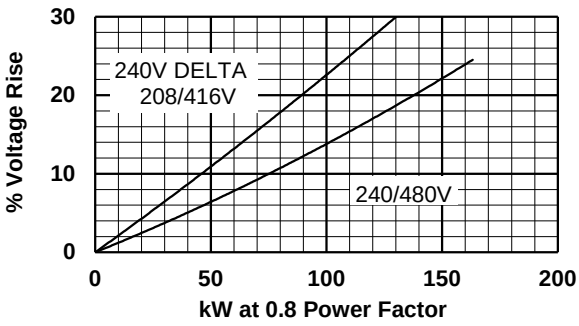


LOAD APPLICATION

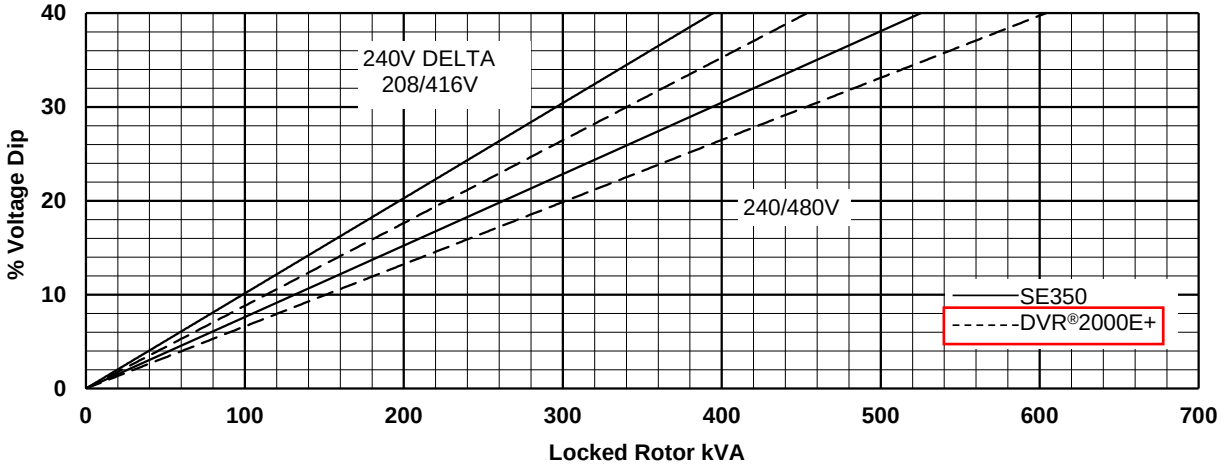


LOAD REJECTION

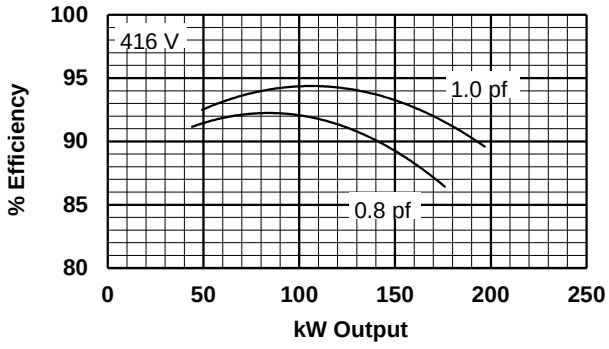


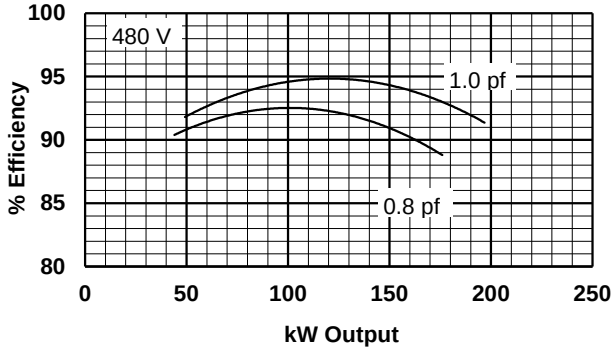


TYPICAL MOTOR STARTING CHARACTERISTICS



TYPICAL GENERATOR EFFICIENCY





Voltage refers to wye (star) connection, unless otherwise specified.

www.marathonelectric.com

Product data sheet
Characteristics

LDL36400U33X
PowerPact L Circuit Breaker,Micrologic3.3S,400A,3P,600V,14kA



Main

Product or component type	Circuit breaker
Range of product	PowerPact L
Trip unit technology	Electronic standard Micrologic 3.3 S LSI
Breaking capacity code	D

Complementary

Protection technology	Current limiter
Line Rated Current	400 A
Poles description	3P
Breaking capacity	18 kA at 480 V AC 25 kA at 240 V AC 14 kA at 600 V AC
System Voltage	600 V AC
[Ics] rated service short-circuit breaking capacity	80 %
Mounting mode	Unit mount
Electrical connection	Lugs load Lugs line
AWG gauge	AWG 2/0...500 kcmil (aluminium/copper) 2
Terminal identifier	AL600LS52K3
Height	11.3 in
Width	5.5 in
Depth	6.61 in

Environment

Product certifications	UL listed NMX

Disclaimer: This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications

	CCC CSA CE

Ordering and shipping details

Category	01116 - L ELEC TRIP UNIT MOUNT BREAKER/SW
Discount Schedule	DE2
GTIN	00785901954354
Nbr. of units in pkg.	1
Package weight(Lbs)	15
Returnability	Y
Country of origin	US

Offer Sustainability

Sustainable offer status	Green Premium product
RoHS (date code: YYWW)	Compliant - since 1132 - Schneider Electric declaration of conformity Schneider Electric declaration of conformity
REACh	Reference not containing SVHC above the threshold Reference not containing SVHC above the threshold
Product environmental profile	Available
Product end of life instructions	Available

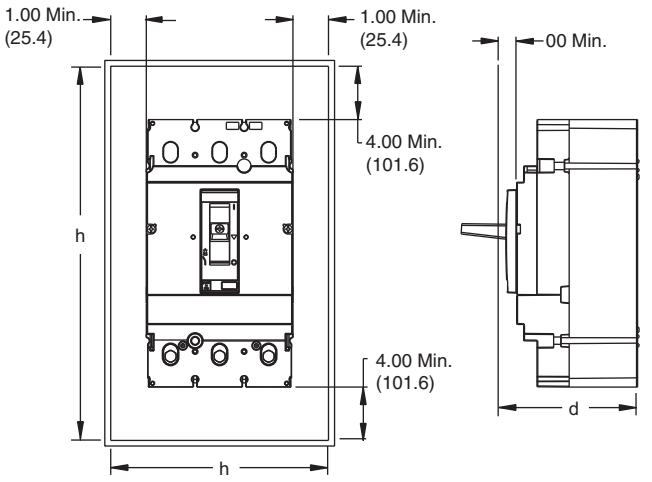
Contractual warranty

Warranty period	18 months

Circuit Breaker Enclosures and Enclosure Accessories

- Square D™ brand circuit breaker enclosures are UL Listed/CSA Certified and are suitable for use as service entrance equipment, except as footnoted.
- The short circuit rating of an enclosed circuit breaker is equal to the rating of the circuit breaker installed, except as footnoted.
- Circuit breakers are ordered and shipped separately for field installation.

Table 113: Minimum Enclosure Dimensions



Circuit Breaker	Amperage	Enclosure Dimensions (h x w x d)	
		Standard (80%)	100% Rated
HD/HG /HJ/HL	15–150 A	15.6 x 6.12 x 3.49 in. (396 x 155 x 89 mm)	15.6 x 6.12 x 3.49 in. (396 x 155 x 89 mm)
HR		18.13 x 8.63 x 4.13 in. (461 x 219 x 105 mm)	62 x 22.5 x 14 in. (1575 x 572 x 356 mm)
JD/JG/ JJ/JL[1]	150–250 A	18.72 x 6.12 x 3.49 in. (476 x 155 x 89 mm)	18.72 x 6.12 x 3.49 in. (476 x 155 x 89 mm)
JR		28.5 x 12.38 x 5.38 in. (724 x 314 x 137 mm)	62 x 22.5 x 14 in. (1575 x 572 x 356 mm)
LD/LG/ LJ/LL	250–600 A	35.48 x 12.00 x 4.45 in. 901 x 305 x 113 mm)	35.48 x 12.00 x 4.45 in. (901 x 305 x 113 mm)
LR		40.5 x 13.75 x 4.33 in. (1030 x 350 x 110 mm)	40.5 x 13.75 x 4.33 in. (1030 x 350 x 110 mm)

1 Minimum enclosure insulation required if circuit breaker side < 4.13 in. (105 mm) from metal.

Table 114: Circuit Breaker Enclosure Catalog Numbers

Circuit Breaker			Enclosure Cat. No.				
Cat. No. Prefix	Rating	Poles	NEMA 1 Flush	NEMA 1 Surface	NEMA 3R[1]	NEMA 4, 4X, 5, 3, 3R Stainless Steel	NEMA 12/3R, 5 (Without Knockouts)[2]
HDL,HGL,HJL,HLL	15–150 A	2, 3	J250F	J250S	J250R	J250DS	J250AWK
JDL,JGL,JJL,JLL	150–250 A	2, 3					
HDL	15–100 A	3	—	HD100S[3, 4, 5]	—	—	—
JDL	150–250 A	3	—	JD250S[3, 5, 6]	—	—	—

1 Enclosures with NRB or RB suffix have provisions for 3/4 in. through 2-1/2 in. bolt-on hubs in top endwall. Enclosures with R suffix have blank endwalls and require field cut opening.

2 Suitable for rainproof NEMA 3R application by removing drain screw from bottom endwall.

3 Copper wire only.

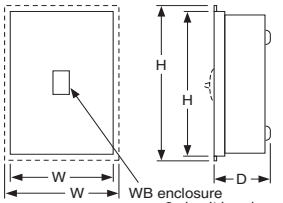
4 Maximum short circuit current rating is 25 kA, 240 Vac.

5 Order service ground kit PKOGTA2 if required.

6 Maximum short circuit current rating is 18 kA, 480 Vac.

Table 115: Dimensions

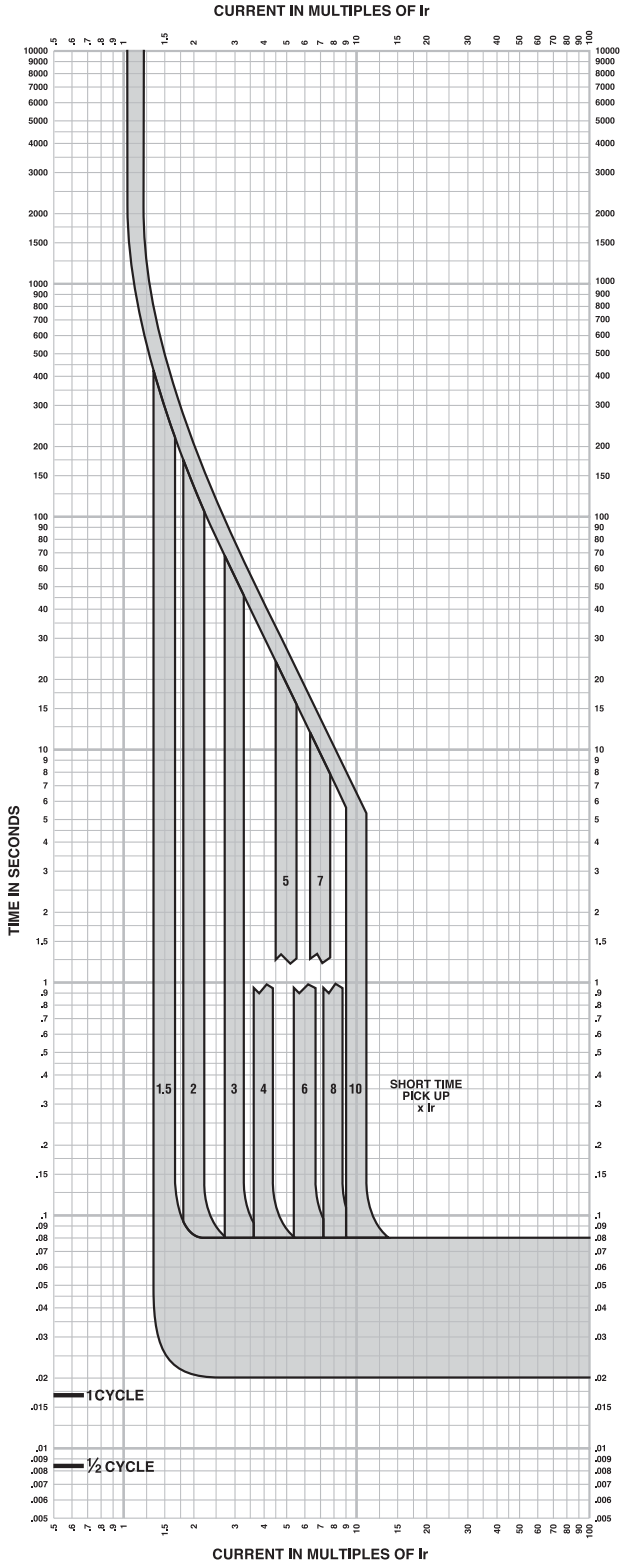
Cat. No.	Approximate Dimension						
	Series	H		W		D	
HD100S	A01	17.00 in.	431.8 mm	7.90 in.	200.7 mm	4.75 in.	120.7 mm
J250F	A01	32.40 in.	823 mm	15.40 in.	391 mm	6.00 in.	152 mm
J250S	A01	31.36 in.	797 mm	14.36 in.	365 mm	6.00 in.	152 mm
J250R	A01	31.05 in.	789 mm	14.47 in.	368 mm	6.28 in.	160 mm
J250DS	A01	32.26 in.	819 mm	9.72 in.	247 mm	7.94 in.	202 mm
J250AWK	A01	32.26 in.	819 mm	9.72 in.	247 mm	7.94 in.	202 mm



NEMA Type 1

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Figure 117: Micrologic 3.3S and 3.3S-W Electronic Trip Unit Long Time/Short Time Trip Curve



MICROLOGIC™ ELECTRONIC TRIP UNITS
Micrologic™ 3.3S and 3.3S-W
Long Time/Short Time Trip Curve
250A, 400A L-Frame

The time-current curve information is to be used for application and coordination purposes only.

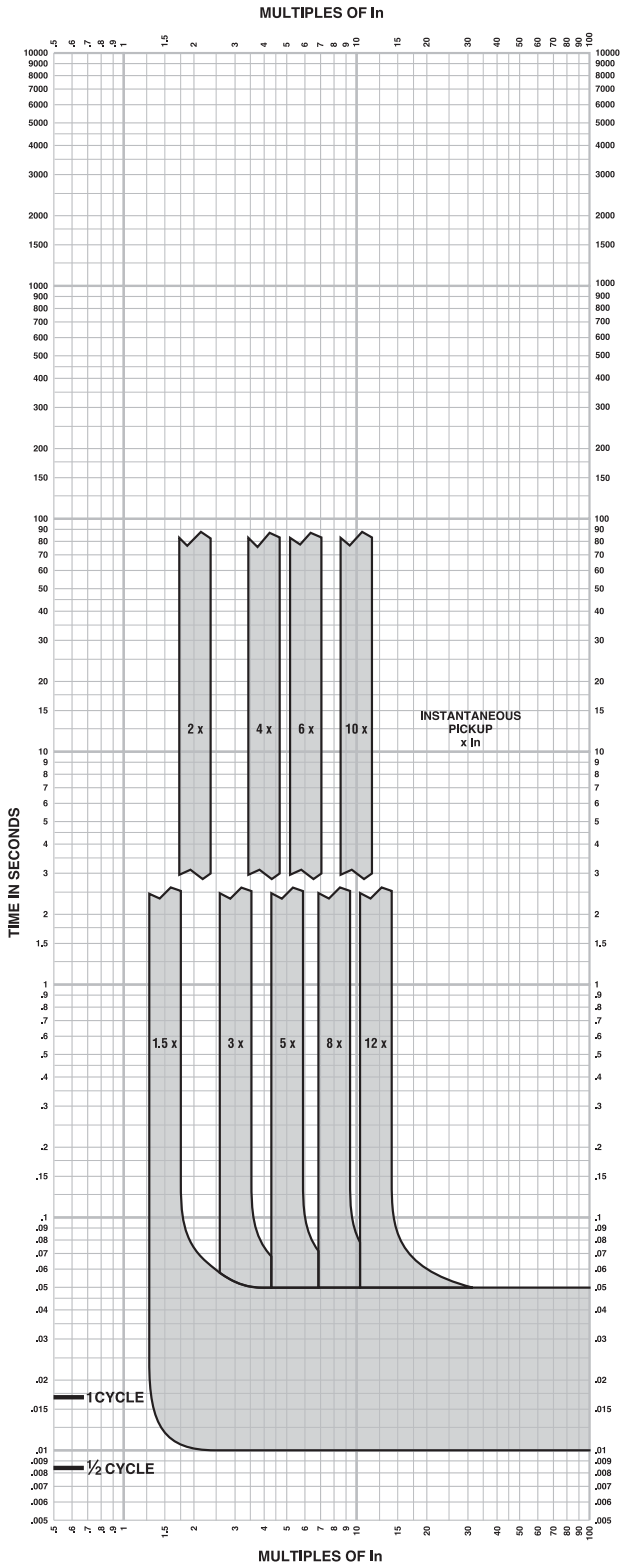
Notes:

1. There is a thermal-imaging effect that can act to shorten the long-time delay. The thermal imaging effect comes into play if a current above the long-time delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in a shorter time than normal. The amount of time delay reduction is inverse to the amount of time that has elapsed since the previous overload. Approximately 20 minutes is required between overloads to completely reset thermal-imaging.
2. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.

Curves apply from -35ºC to +70ºC (-31ºF to +158ºF) ambient temperature.

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Figure 119: Micrologic 3.3, 3.3-W, 3.3S, 3.3S-W, 5.3A, 5.3A-W, 5.3E, 5.3E-W, 6.3A, 6.3A-W, 6.3E, and 6.3E-W Electronic Trip Unit Instantaneous Trip Curve



MICROLOGIC™ ELECTRONIC TRIP UNITS
Micrologic™ 3.3, 3.3-W, 3.3S, 3.3S-W, 5.3A, 5.3A-W, 5.3E, 5.3E-W, 6.3A, 6.3A-W, 6.3E, and 6.3E-W
Instantaneous Trip Curve
400A L-Frame

The time-current curve information is to be used for application and coordination purposes only.

Notes:

1. There is a thermal-imaging effect that can act to shorten the long-time delay. The thermal imaging effect comes into play if a current above the long-time delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in a shorter time than normal. The amount of time delay reduction is inverse to the amount of time that has elapsed since the previous overload. Approximately 20 minutes is required between overloads to completely reset thermal-imaging.
2. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.
3. In = Maximum dial setting of Ir.
   400A L-Frame: In = 400A = Max Ir setting

Curves apply from -35ºC to +70ºC (-31ºF to +158ºF) ambient temperature.

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Circuit Breaker Enclosure Data Sheet - Gas

150 kW Standby

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 8V0110 GS150 circuit breakers. The dimensional drawings will govern and should be referenced for installation.

430 FRAME ENCLOSURE

- Enclosure supplied with all 430 frame alternator applications.
- Right side primary breaker shown. Left side primary breaker optional.
- Reference Figure 2 and Table 2 for breaker mounting positions.

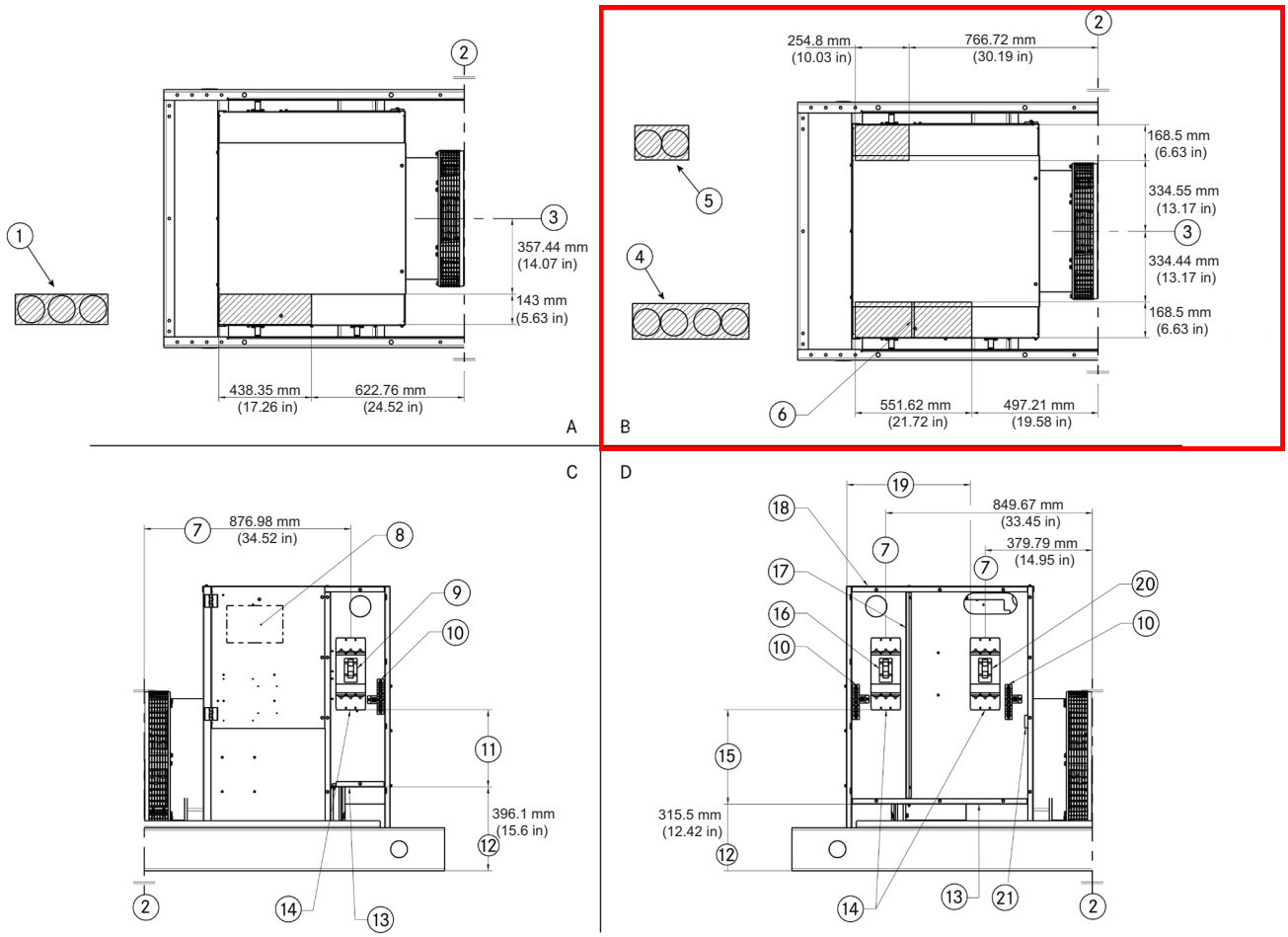


Figure 1: 430 Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail (enclosure door not shown)
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Three conduit maximum
2. Rear face of flywheel housing
3. Generator centerline
4. Four conduit maximum (primary breaker side)
5. Two conduit maximum (opposite primary breaker)
6. Second breaker divider wall
7. Breaker centerline
8. Optional control panel location
9. Optional second/third breaker
10. Neutral ASM (torque to 275 in-lbs)
11. Dimension B
12. Add 205 mm (8.08 in) for bases with integrated single wall fuel tank
13. Bottom entry conduit area
14. Customer connect end (recommended torque on label)
15. Dimension A
16. Optional second breaker
17. Divider wall included with second breaker
18. Top entry conduit area
19. Dimension C
20. Primary breaker
21. Equipment ground terminal (torque to 275 in-lbs)

A Rolls-Royce solution

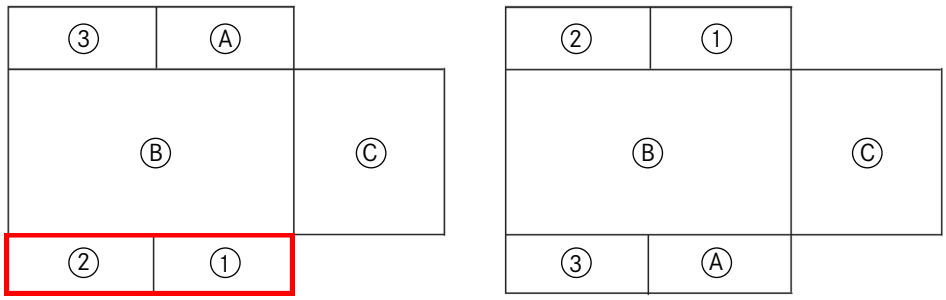
Circuit Breaker Enclosure Data Sheet - Gas
150 kW Standby

Available Circuit Breakers		Enclosure Data					
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Bending Space[1] Dimension B mm (in)	Wire Gutter Space[1,2] Dimension C mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	532 (20.93)	451 (17.76)	602 (23.69)	1	2.5
J-Frame	175	(1) 4-4/0	518 (20.37)	437 (17.2)	602 (23.69)	1	2.5
J-Frame	200-250	(1) 3/0-350	518 (20.37)	437 (17.2)	602 (23.69)	1	3
L-Frame 100%	300-400	(2) 2/0-500	443 (17.44)	362 (14.27)	584 (23)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	443 (17.44)	362 (14.27)	584 (23)	2	3.5
M/P-Frame	250-800	(3) 250-500	407 (16.01)	N/A	451 (17.74)	3	3.5

(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for single breaker applications
(3) Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 1: 430 Frame Enclosure Data



Top View - Right Side Breaker **Top View - Left Side Breaker**

Figure 2: 430 Frame Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1 (Primary)
2. Position 2
3. Position 3

Breaker Frame		
Position 1 (Primary)	Position 2	Position 3
H/J/L	-	-
H/J/L	H/J/L	-
H/J/L	H/J/L	H/J/L
P/M	-	-
P/M	H/J	-
PP/MM	H/J	H/J/L
P/M	P/M	L

Table 2: 430 Frame Breaker Mounting Positions

N/A = Not Available

Subject to change. | WT00053956 | 2021-04

Starting System Data Sheet

Commercial Battery

Extra ruggedness and resistance to vibration, heat, chemicals, and physical abuse are built into every commercial battery provided with an ***mtu*** generator set. The battery design features the latest in power storage technology for lead-acid batteries, as well as incorporates proven designs developed with the most experience in the business.

PRODUCT FEATURES

- **Case Design:** Tough, high-impact reinforced polypropylene case is heat sealed under extreme pressure to withstand heavy commercial service usage. This helps to prevent electrolyte leakage, improves reliability, and reduces breakage.
- **Internal Design:** Full-frame power path grids avoid sharp wires protruding through separators and directs the power straight to the lug for low resistance and higher cranking amps.
- **Terminals:** Standard terminals are solidly built preventing porosity, corrosion, black post, and harmful acid leaks.
- **Power Density:** Extra heavy-duty batteries deliver more cranking amps per pound.
- **Maintenance:** The battery uses pure de-mineralized electrolytes for reduced water loss, reduced gassing, longer battery life, and low maintenance.
- **Reliability:** Narrow ribs reduce separator corrosion to protect against shorts while deep-pocket envelopes dramatically improve reliability and extend service life.
- **Quality:** Over 250 quality control checks, combined with computer-aided design technology, provide a tough, durable battery in each commercial battery provided with an ***mtu*** generator set.

						Overall Dimension			
BCI Group Size	Terminal Type	*mtu* Part Number	Volt	Cranking Performance CCA (Cold Cranking Amps) -18° C / 0° F	Reserve Capacity	Length mm (in)	Width mm (in)	Height mm (in)	Weight (Wet) kg (lbs)
24	Post	SUA102538	12	650	115	273 (10.75)	171 (6.75)	229 (9)	18.1 (40)
31	Post	SUA120299	12	950	175	330 (13)	171 (6.75)	241 (9.5)	25.7 (56.5)
4D	Post	SUA102493	12	1,050	290	527 (20.75)	216 (8.5)	258 (10.125)	45.2 (99.5)
8D	Post	SUA102492	12	1,400	430	527 (20.75)	279 (11)	254 (10)	59.3 (130.5)

Subject to change. | WT00037987 | 2021-09

Water Heater Data Sheet

TPS Series

DESCRIPTION

The TPS engine preheater is designed to preheat diesel and gas engines in generator set applications. Simple to install and very lightweight, the TPS engine preheater features a built-in thermostat and heats engines with up to 12 L displacement. Thermosiphon circulation of the coolant delivers heat throughout the entire engine.

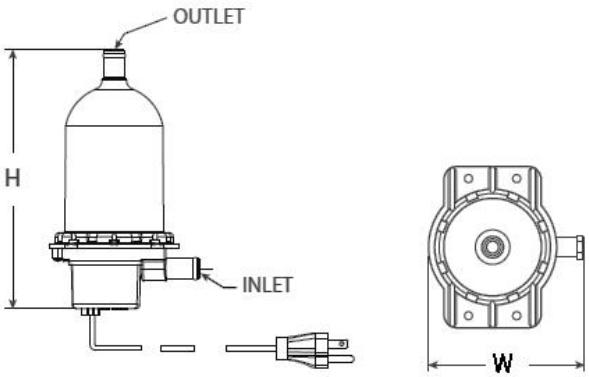


CERTIFICATIONS AND STANDARDS

— c-UL-us Listed
— CE Compliant

SPECIFICATIONS

Height:	200 mm (7.9 in)
Width:	117 mm (4.6 in)
Weight:	771 g (1.7 lb)
Heating fluid:	Engine coolant (50% glycol/50% water)
Power:	0.5, 1, 1.5, 1.8, and 2 kW
Voltage range:	120 to 240 V
Tank material:	Polyphenylene sulfide (PPS)
Heating element:	Incoloy 800
Enclosure:	IP41
Fluid capacity:	416 cm^3 (0.11 gal)
Max pressure:	6.2 bar (90 psi)
Inlet / outlet:	15.9 mm (0.625 in)
Thermostat range:	
On	38 °C (100 °F)
Off	49 °C (120 °F)

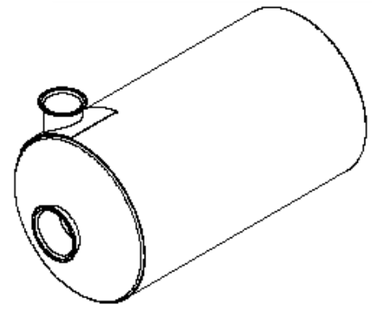


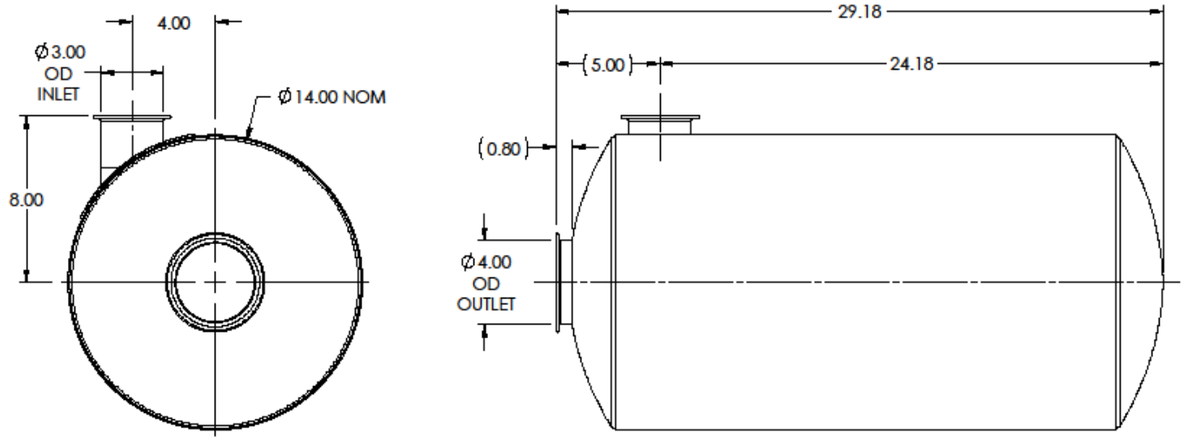
Model Number	*mtu* Part Number	Watts	Volts	Phase	Hz	Amps
TPS051GT10-000	SUA90366	500	120	1	60	4.2
TPS101GT10-000	SUA52746	1,000	120	1	60	8.4
TPS151GT10-000	SUA52748	1,500	120	1	60	12.5
TPS181GT10-000	SUA52750	1,800	120	1	60	15
TPS202GT10-000	SUA52751	2,000	240	1	60	8.3

Subject to change. | WT00032343 | 2021-04

A Rolls-Royce solution

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Reference Information:

Manufacturer: Philips & Temro
Model: CPJS-04X-90013905

Dimensions and Weights on Drawings are in Inches/Pounds.

ENGINE SPECIFIC INFORMATION	
ENGINE:	FORD 6.8L NG/LPG
DISPLACEMENT (IN³):	415
FLOW (CFM):	785
TEMP (°F):	1200/1260
BACK PRESSURE (H2O):	81.5"

REV	DATE	BY	COMMENTS
1	12/14/2011	JVC	RELEASED FOR CUSTOMER APPROVAL
2	1/5/2012	JVC	REVISED INLET WAS 3.50 OD & OAL WAS 23.00

CUSTOMER MTU — FINISH HIGH TEMP BLACK PAINT — WEIGHT 69.50

CS CONSTRUCTION
GAS FLOW FULLY INSULATED INTERNAL

PHILLIPS & TEMRO Industries

DRAWN BY	JVC	DRAWING DATE	12/14/2011
CHECKED BY	—	CHECKED DATE	—
ENG CHECK BY	—	ENG CHECK DATE	—
APD CHECK BY	—	APD CHECK DATE	—
SHT	3 OF 3	DESCRIPTION	S-E SB03-SB04 Ø14.00 29.18 OAL F:24.18 ---
SAP NUMBER	DWG NO	SAP QTY	SEE PO
REFERENCE	MTU - 101740	MATERIAL	SEE BOM
SCALE	1:5	DRAWING/PART NUMBER	CPJS-04X-90013905
REV	2		

a	0x			12-01-13	Klassen	kost
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Buchst. Rev.Ltr.	Kommt vor Frequency	Änderung/Revision	Auftrags-Nr. Rev.Not.No.	Datum Date	Name	Gepr. Check

Oberflächenangaben nach MTN5033 Surface Specification per MTN5033	Allgemeine Fertigungsvorschriften nach MMN 332 Production Specification per MMN 332	-- / --	Masse/Mass kg 154.945 / Format/Size A3
Verwendbar für Typ Applicable to Model	WORD / Datum Date / Name	Benennung/Title	ABGASSCHALLDAEMPFER EXHAUST SILENCER INSULATED FORD 6.8L
Projekt-/Auftrags-Nr. Project/Order No.	Bearb. Drawn / 12-01-13 / Klassen		
Ref.-Nr./Ref.No. Emissions_ID	Gepr. Checked / 12-01-13 / Kost		
Bei Fremdteil/Kaufteil dürfen alle techn. Änderungen am Lieferumfang nur nach unserer vorherigen Genehmigung vorgenommen werden. Techn. modifications to third party or purchased parts require our prior permission.	Norm Stndr. / 12-01-13 / Halbert		
	Abt. Dept. / OAN / Halbert		
mtu onsite energy — MTU Friedrichshafen GmbH		Zeichnungs-Nr./Drawing No. SUA101740	Blatt/Sheet 1 von/of 1

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T-348-0108

Air Filter Data Sheet

DESCRIPTION

Air filters offer engine protection and minimal downtime during normal maintenance. The air filters on ***mtu*** generator sets are easy to install, durable, and reliable.



FEATURES

- Designed to withstand severe intake pulsation and high humidity
- Sturdy, self-supporting, one-piece construction
- Lightweight and compact

SPECIFICATIONS

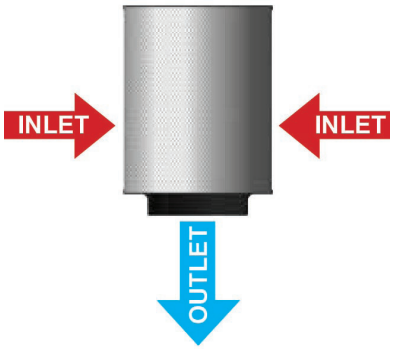
mtu Part #	Airflow @ Inches of Water Restriction (refer to *Airflow Diagrams* below)			Weight	Maximum Temp	
	m^3/min (SCFM) @ 4 in. H_2O	m^3/min (SCFM) @ 6 in. H_2O	m^3/min (SCFM) @ 8 in. H_2O	kg (lb)	Continuous °C (°F)	Intermittent °C (°F)
SUA106417	4.3 (150)	5.1 (180)	6.1 (215)	1 (2.2)	83 (180)	105 (220)
SUA90069	43.9 (1,550)	52 (1,836)	60 (2,118)	3.6 (8)	83 (180)	105 (220)
SUA86885	13.7 (485)	17.6 (620)	21.5 (760)	2.6 (5.8)	83 (180)	105 (220)
SUA77166	3.8 (135)	4.6 (163)	5.3 (190)	1.3 (2.9)	N/A	N/A
SUA40198	3.1 (112)	4.1 (145)	4.8 (170)	0.64 (1.4)	83 (180)	105 (220)
XG3012100019	23.5 (830)	31.43 (1,110)	36.67 (1,295)	1.45 (3.2)	83 (180)	105 (220)
XG2112100001 XG2512100002	9.63 (340)	13.03 (460)	15.85 (560)	1.59 (3.5)	N/A	N/A

mtu Part #	Dimensions (refer to *Dimension Diagrams* on next page)				Minimum Removal Clearance
	Body Length (D) mm (in)	Body Diameter (A) mm (in)	Outlet Length (F) mm (in)	Outlet Diameter (C) mm (in)	mm (in)
SUA106417	127 (5)	216 (8.5)	35 (1.38)	76 (3)	38.1 (1.5)
SUA90069	400 (15.75)	318 (12.5)	48 (1.89)	198 (7.8)	38.1 (1.5)
SUA86885	279 (11)	318 (12.5)	35 (1.38)	127 (5)	38.1 (1.5)
SUA77166	172 (6.75)	216 (8.5)	27 (1.08)	75 (2.96)	38.1 (1.5)
SUA40198	102 (4)	216 (8.5)	35 (1.38)	64 (2.5)	38.1 (1.5)
XG3012100019	381 (15)	318 (12.5)	35 (1.38)	152 (6)	38.1 (1.5)
XG2112100001 XG2512100002	267 (10.5)	267 (10.5)	35 (1.38)	102 (4)	38.1 (1.5)

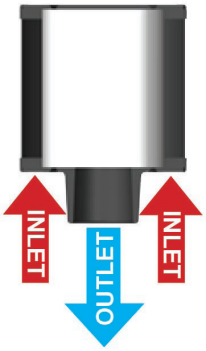
N/A = Not Available

A Rolls-Royce solution

AIRFLOW DIAGRAMS



Airflow Diagram: SUA90069, XG3012100019

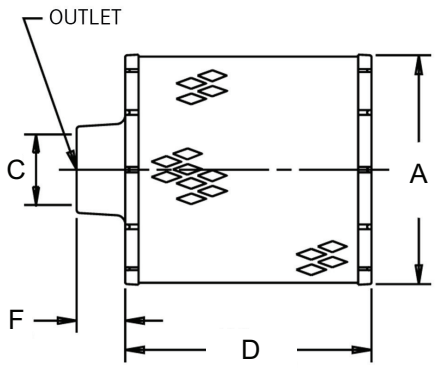


Airflow Diagram: SUA106417, SUA86885, SUA77166, SUA40198

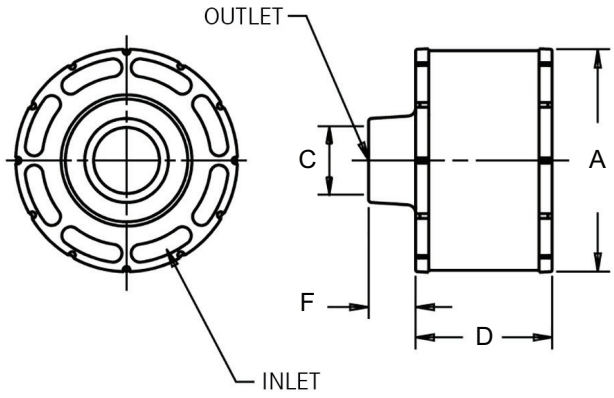


Airflow Diagram: XG2112100001, XG2512100002

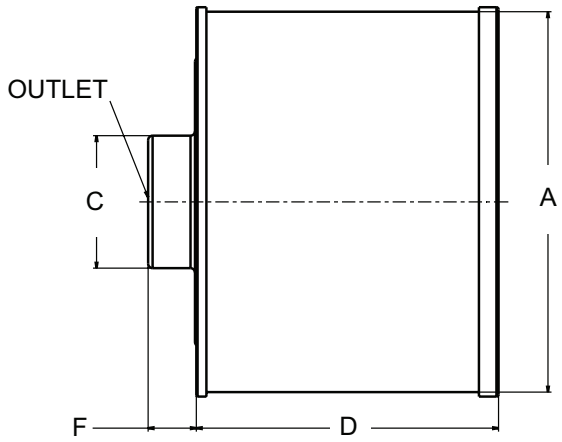
DIMENSION DIAGRAMS



Dimension Diagram: SUA90069, XG3012100019



Dimension Diagram: SUA106417, SUA86885, SUA40198



Dimension Diagram: SUA77166, XG2112100001, XG2512100002

Subject to change | WT00037879 | 2021-09

Isolator Pad Data Sheet

DESCRIPTION

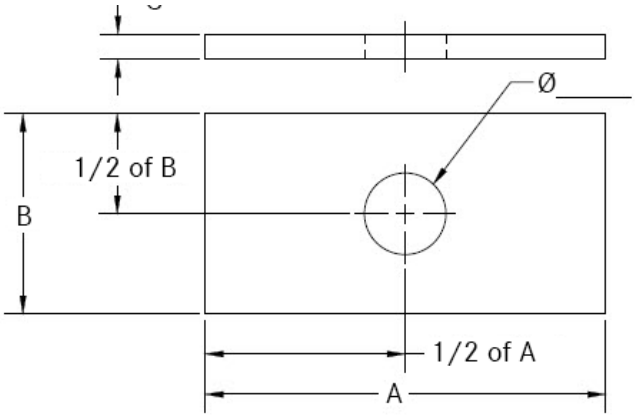
These square-molded, neoprene pads can be used to compensate for inconsistencies in the mounting surface between the generator set base frame and the installation surface, or between the sub-base fuel tank and the installation surface, if applicable. They can be easily cut to any desired shape and can be used in multiple layers to increase deflection.

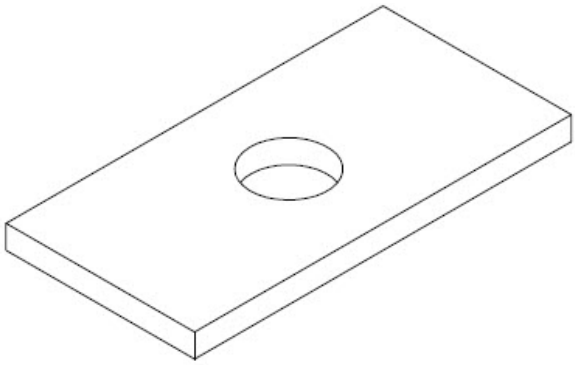
NEOPRENE TYPICAL PHYSICAL PROPERTIES

Hardness:	40A-90A
Tensile Strength:	500
Elongation:	200
Tear Value:	50
Thermal Conductivity (K Factor):	0.30

Heat Resistance @ 100 °C (212 °F) after 70 Hours:

Change in Hardness:	10
Change in Tensile:	-16%
Change in Elongation:	-60%
Compression Set:	50%
Lowest Working Temperature:	-40 °C (-40 °F)
Highest Working Temperature:	90.6 °C (195 °F)

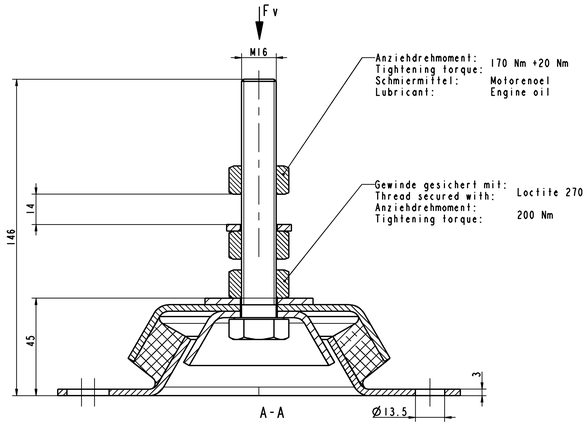


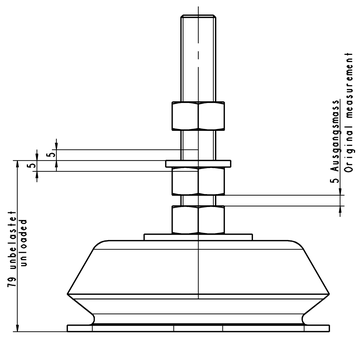


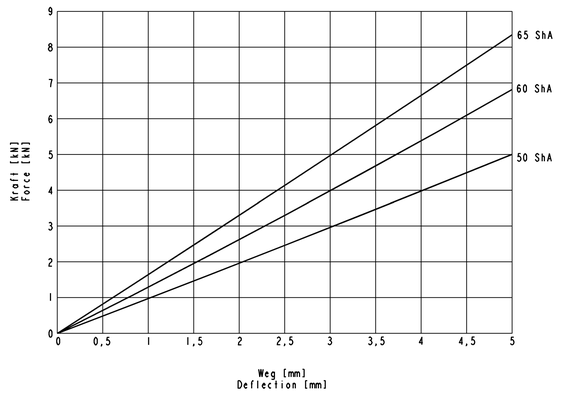
mtu Part Number	Dim. A mm (in)	Dim. B mm (in)	Dim. C mm (in)	Hole Diameter mm (in)	Durometer
SUA46904	101.6 (4)	50.8 (2)	6.35 (0.25)	20.638 (0.813)	50
SUA46905	152.4 (6)	50.8 (2)	6.35 (0.25)	20.638 (0.813)	50
SUA46906	254 (10)	50.8 (2)	6.35 (0.25)	20.638 (0.813)	50
SUA46907	457.2 (18)	63.5 (2.5)	6.35 (0.25)	20.638 (0.813)	50
SUA46908	457.2 (18)	76.2 (3)	6.35 (0.25)	20.638 (0.813)	50
SUA46909	457.2 (18)	457.2 (18)	6.35 (0.25)	Not Required	50
SUA63015	203.2 (8)	76.2 (3)	6.35 (0.25)	20.638 (0.813)	50
SUA77843	101.6 (4)	50.8 (2)	19.05 (0.75)	20.638 (0.813)	60
SUA86147	457.2 (18)	76.2 (3)	6.35 (0.25)	20.638 (0.813)	70
SUA95672	304.8 (12)	50.8 (2)	6.35 (0.25)	20.638 (0.813)	50
SUA102408	457.2 (18)	76.2 (3)	6.35 (0.25)	26 (1.024)	50
X54599100330	381 (15)	76.2 (3)	6.35 (0.25)	22.225 (0.875)	50

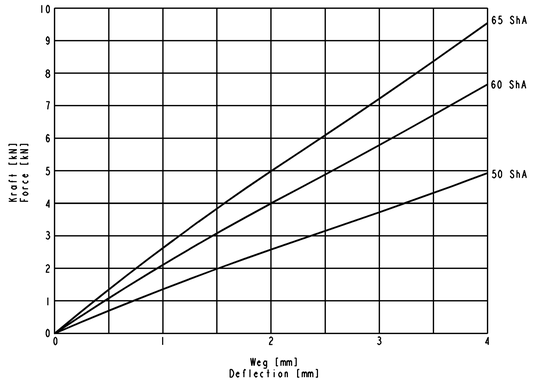
Subject to change. | WT00038043 | 2021-10

a1



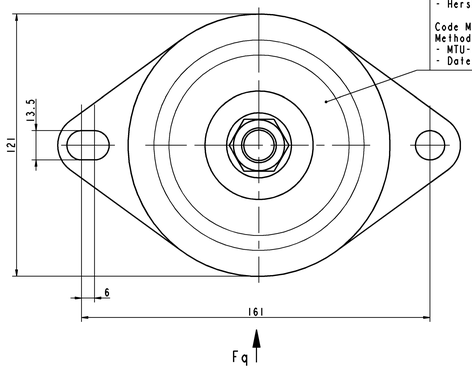




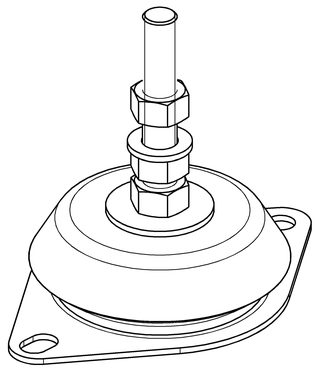


maximal zulaessiger Federweg: 4mm
Maximum permitted resilient tolerance:
maximal zulaessige Belastung: siehe Kennlinie
Maximum permitted load: see reference line

MTU-Sachnummer MTU-Part number	Sachnummer Lieferant Supplier Part No.	Shore Haerte Shore hardness	Daempfungsgrad Damping ratio	Federsteifigkeit Fv Resilient stiffness Fv
X57523100036	10004401	50 Sh A	0,04	1,0 kN/mm ±20%
X57523100037	10004402	60 Sh A	0,05	1,3 kN/mm ±20%
X57523100039	10004403	65 Sh A	0,06	1,6 kN/mm ±20%



MTU-Sachnummer MTU-Part number	Zylinderzahl No. of cylinders	Shore Haerte Shore hardness	statische Einfederung Static resilient deflection
X57523100039	12V	65 Sh A	2,5 [mm]
X57523100037	10V	60 Sh A	2,8 [mm]
X57523100037	8V	60 Sh A	2,4 [mm]
X57523100036	6R	50 Sh A	3,1 [mm]



X57523100036 (50 ShA)

FEDERWEG-PRUEFVORSCHRIFT

Belastungsrichtung:	Druck Fv
Pruefhaufigkeit:	einmalig pro Charge
Pruefvorrichtung:	
Messtemperatur:	Raumtemperatur
Vorlast:	500 N
Anzahl Setzzyklen:	2
Setzgeschwindigkeit:	20mm/min
Setzbelastung bis:	4kN
Pruefgeschwindigkeit:	20mm/min
1. Kraftmessung:	
2. Wegmessung:	
3. Steifigkeitsmessung:	C=0,8-1,2kN/mm zwischen 1-3mm

X57523100036 (50 ShA)

RESILIENT TOLERANCE - TEST SPECIFICATION

Load direction:	pressure Fv
Test frequency:	once per lot
Test device:	
Measuring temperature:	ambient temperature
Pre-load:	500 N
Number of creep cycles:	2
Creep rate:	20mm/min
Creep load up to:	4kN
Test rate:	20mm/min
1. Measurement - Force:	
2. Measurement - Deflection:	
3. Measurement - Rigidity:	C=0,8-1,2kN/mm between 1-3mm

X57523100037 (60 ShA)

FEDERWEG-PRUEFVORSCHRIFT

Belastungsrichtung:	Druck Fv
Pruefhaufigkeit:	einmalig pro Charge
Pruefvorrichtung:	
Messtemperatur:	Raumtemperatur
Vorlast:	500 N
Anzahl Setzzyklen:	2
Setzgeschwindigkeit:	20mm/min
Setzbelastung bis:	5,5kN
Pruefgeschwindigkeit:	20mm/min
1. Kraftmessung:	
2. Wegmessung:	
3. Steifigkeitsmessung:	C=1,05-1,6kN/mm zwischen 1-3mm

X57523100037 (60 ShA)

RESILIENT TOLERANCE - TEST SPECIFICATION

Load direction:	pressure Fv
Test frequency:	once per lot
Test device:	
Measuring temperature:	ambient temperature
Pre-load:	500 N
Number of creep cycles:	2
Creep rate:	20mm/min
Creep load up to:	5,5kN
Test rate:	20mm/min
1. Measurement - Force:	
2. Measurement - Deflection:	
3. Measurement - Rigidity:	C=1,05-1,6kN/mm between 1-3mm

X57523100039 (65 ShA)

FEDERWEG-PRUEFVORSCHRIFT

Belastungsrichtung:	Druck Fv
Pruefhaufigkeit:	einmalig pro Charge
Pruefvorrichtung:	
Messtemperatur:	Raumtemperatur
Vorlast:	500 N
Anzahl Setzzyklen:	2
Setzgeschwindigkeit:	20mm/min
Setzbelastung bis:	6,5kN
Pruefgeschwindigkeit:	20mm/min
1. Kraftmessung:	
2. Wegmessung:	
3. Steifigkeitsmessung:	C=1,3-1,9kN/mm zwischen 1-3mm

X57523100039 (65 ShA)

RESILIENT TOLERANCE - TEST SPECIFICATION

Load direction:	pressure Fv
Test frequency:	once per lot
Test device:	
Measuring temperature:	ambient temperature
Pre-load:	500 N
Number of creep cycles:	2
Creep rate:	20mm/min
Creep load up to:	6,5kN
Test rate:	20mm/min
1. Measurement - Force:	
2. Measurement - Deflection:	
3. Measurement - Rigidity:	C=1,3-1,9kN/mm between 1-3mm

Lieferant
Supplier GMT GmbH

Diese Zeichnung darf ohne Zustimmung der
Fa. GMT GmbH
keinem Dritten zugaenglich gemacht werden oder
in anderer Weise missbraeuchlich verwendet werden.

This drawing is not to be disclosed to a third party
or used for any other purpose without the express
consent of Fa. GMT GmbH

MTN5168

Oberflaechenschutz Stahlteile:
Surface Protection Steelparts:
MTV5025, Schichtdicke: 10 bis/to 12 µm Cr(VI) frei/free
Layer thickness:

Lieferung und Altersueberwachung nach MTV 5005
Shelf Life Monitoring in compliance with MTV 5005

MTV5025								
MTV5005								
MTN5168			a	1	Kennlinie radial hinzugefügt	57974	14.09.2009	sabala
MTN5077						49043	04.12.2008	zimmerma
*Aufgeführte Normen Relevant Standards	Passmass fit	Messg. in Operation Mes.	Bestst. Mon.Ltr.	Kennl. vor Frequency	Aenderung/Revision	Aenderungs-Nr. Revision Notice No.	Datum Date	Name	Gepr. Check.

Zeichnungsänderungen gegenüber Vorgänger
Drawing changes compared to predecessor

Oberflaechenangaben nach MTN5033
Surface Specification per MTN5033
Allgemeine Fertigungsvorschriften nach MAN 332
Production Specification per MAN 332
MTI

Benennung/Title /
DAEMPFUNGSLAGER
RUBBER MOUNT

Pro/E	Datum/Date	Name
Konstr.	10.12.2008	Zimmerma
Gepr.		
Checked	12.12.2008	Zarell
Norm.		
Stadt.	11.12.2008	Haas
Appl.		
Dept.	TRA	Dr.Barreck

Massstab Scale 1:1
Masse/Mass kg 1.334
Formatklasse A0

Werkstoff Material

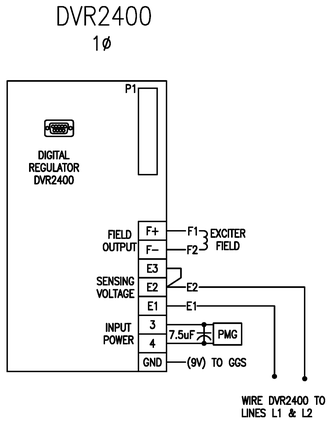
Bezeichnung, Modell, Gesamt Semifinished Product, Pattern, Die

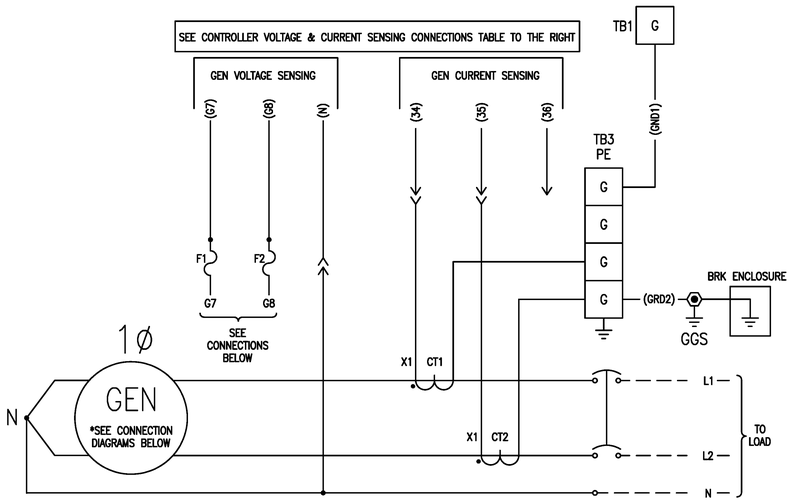
Zeichnungs-Nr./Drawing No. XZ57523100035
Blatt Sheet 1v.1

MTU Friedrichshafen GmbH

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DVR2400 P1 CONNECTOR		
Terminal	**Name**	**Description**
P1-1	IB1	Generator Phase B CT - terminal 1
P1-2	IB2	Generator Phase B CT - terminal 2
P1-3	A_L	Auxiliary current loop (DVR2500 only)
P1-4	AU+	Auxiliary input positive
P1-5	AU-	Auxiliary input negative
P1-6	EXC	Excitation disable contact input (active closed)
P1-7	UP	UP contact input (active closed)
P1-8	DN	DOWN contact input (active closed)
P1-9	DRP	Droop disable contact input (active closed)
P1-10	QRP	VAR/PF mode disable (active closed)
P1-11	DG	Digital ground
P1-12	NO	Contact output normally open
P1-13	COM	Contact output common
P1-14	NC	Contact output normally closed



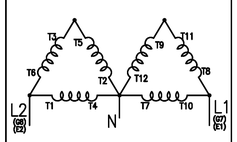


CONTROLLER VOLTAGE & CURRENT SENSING CONNECTIONS

NCP	MGC & PIN #		
	TB1	1500	2000	3000
WIRE #	G7	45	41	86
	G8	43	39	88
	G9	41	37	90
	N	40	35	91
	34	38	69	1
	35	36	72	3
	36	34	75	5

DOUBLE DELTA 1ø

HZ	L-L	L-LO
60	240	120
	277	139
50	200	100
	220	110
	240	120



Änderungsbeschreibung/Description of revision		kommt vor/Frequency	
INITIAL RELEASE			
Buchst./Rev.Ltr.	Änderungs-Nr./Revision Notice No.	Bearbeitungsstatus/Lifecycle	
-.1	PR062671	Released	

Allgemeintoleranzen / General Tolerances ISO 2768-mK		Massstab/Scale	Masse/Mass kg Format/Size
Toleranz / Tolerancing ISO 8015	Maße / Size ISO 14405		---- A
Ausführung u. Lieferung / Tech. Characteristics ----	Oberflächenangaben nach MTN0033 / Surface Specification per MTN0033	Werkstoff / Material ----------	
Oberflächenschutz / Surface Protection ----			
Verwendbar für/ Typ / Applicable to Model ----	Allgemeine Fertigungsvorschriften nach MAN 332 / Production Specification per MAN 332	Halbzeug,Modell,Gesenk / Semi-Finished Product, Pattern,Die ----	
Projekt-/Auftrags-Nr. / Project-/Order No. ----		Material-Nr./Material-No.	
Referenz-Nr./Ref.No. ----	Emission ID ----	block kzw 12.10.2020 ---- ----	XZG25K0000014

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	Datum/Date	Name
ACAD		
Erstellt/ Created	06.10.2020	groenke do
Gepr./ Checked	06.10.2020	groenke do
Norm. / Norm.	12.10.2020	carsten id
Gen. freig./ Released	12.10.2020	carsten id

Benennung/Title AO Arrongement

ARRANGEMENT DRAWING
1GEN GENERATOR
ELECTRICAL SYSTEM DRAWING

Zeichnungs-Nr./Drawing No. CAD06787700

Beschreibung/Description ----

Blatt/Sheet 1/1

Eigentümer/Owner: Fa. | Vervielf. in Zeichnung zum

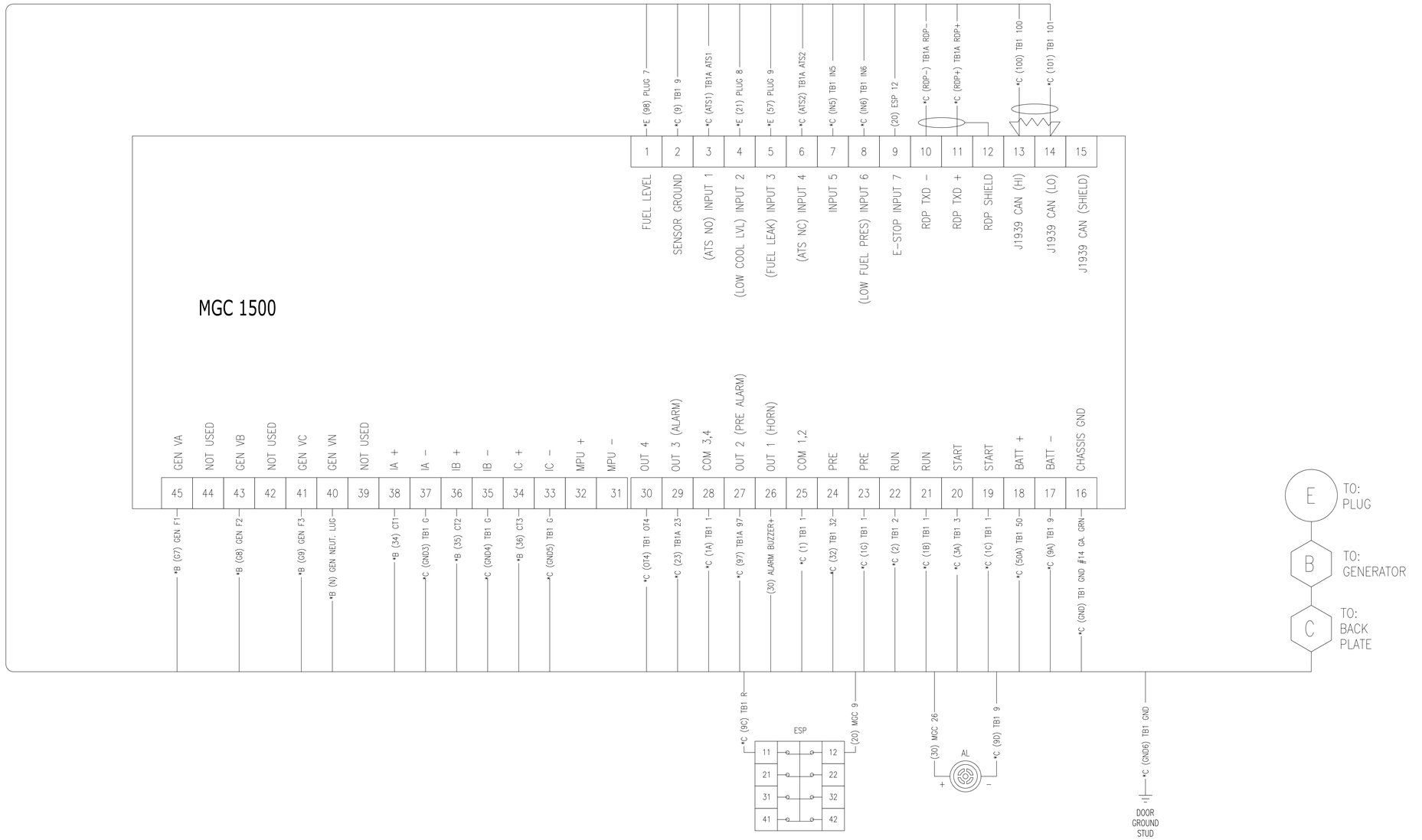
NOTES:

1. WIRE NUMBERS ARE IN PARENTHESIS.
2. SHORT DASHED LINES (- - - - - -) INDICATE CUSTOMER CONNECTION OR OPTIONAL EQUIPMENT.

LEGEND

AL	ALARM BUZZER
BPS	BACK PLATE STUD
DGS	DOOR GROUND STUD
ESP	EMERGENCY STOP BUTTON
F1	5A ATO FUSE MGC CONTROLLER
F2	25A ATO FUSE PANEL
F3	20A ATO FUSE ECU
GGS	GENERATOR GROUND STUD
LWL	LOW WATER LEVEL PROBE
MGC	MTU GENERATOR CONTROLLER
R1	120 OHM ⅛ 1% RESISTOR
TB1	TERMINAL BLOCK 1 (PANEL BACK)
TB1A	TERMINAL BLOCK 1A (PANEL BACK)

*X (X) XXX X	
*X	DESTINATION
(X)	WIRE NUMBER
XXX	DESTINATION
X	DESTINATION TERMINAL



Aenderungsbeschreibung/Description of revision	kommt vor/Frequency
INITIAL RELEASE	

Buchst./Rev.Ltr.	Aenderungs-Nr./Revision Notice No.	Bearbeitungsstatus/Lifecycle
–.1	PR062671	Released

Passmass Fit / Abmass in Deviation µm

Allgemeintoleranzen / General Tolerances ISO 2768-mK
Tolerierung / Tolerancing ISO 8015
Auslieferung to Lieferung ----
Tech. Characteristics
Oberflächenschutz ----
Surface Protection
Verwendbar fuer TYP Applicable to Model ----
Projekt-/Auftrags-Nr. Project/Order No. ----
Referenz-Nr./Ref.No. ----
Masse / Size ISO 14405
Oberflächenangaben nach MTN5033
Surface Specification per MTN5033
Allgemeine Fertigungsvorschriften nach MAN 332
Production Specification per MAN 332
Emission ID block levi 12.10.2020 ----

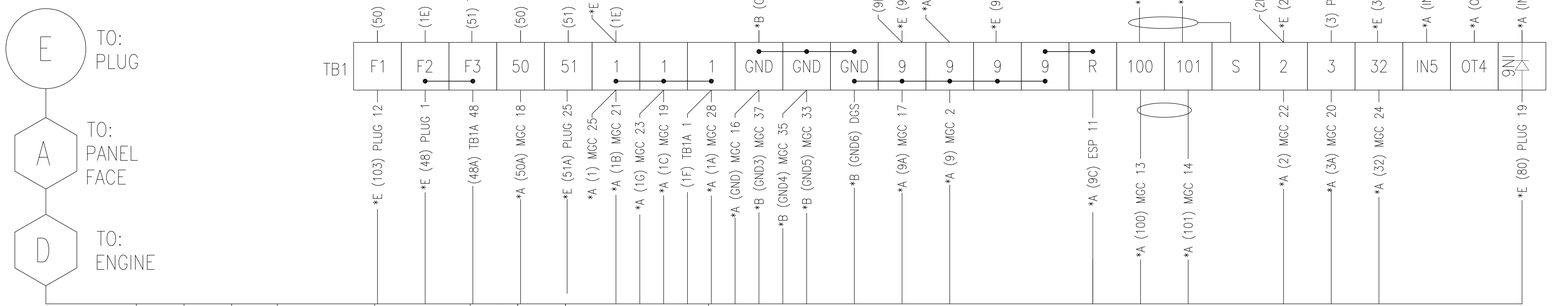
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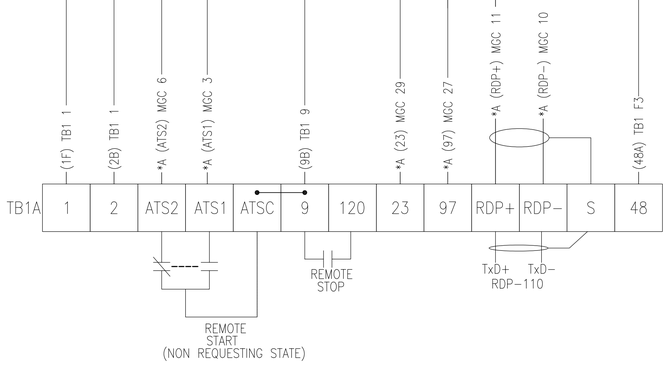
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Ersteller Drawn		08.10.2020	groenke do
Gepr. Check		08.10.2020	groenke do
Norm. Appr.		12.10.2020	carsten jd
Freigabe Released		12.10.2020	carsten jd

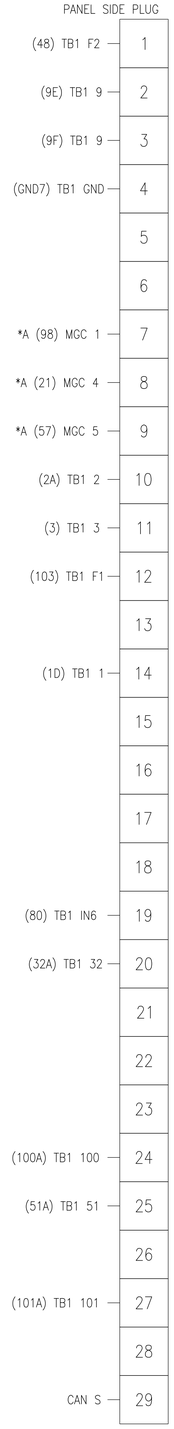
Massstab/Scale ----
Masse/Mass ---- kg
Format/Size A
Werkstoff Material ----
Halbzeug,Modell,Gesenk Semifinished Product, Pattern,Die ----
Material-Nr./Material-No. XZG25K0000015
Benennung/Title AO Arrangement ----
ARRANGEMENT DRAWING
1GEN MGC 1500 CONTROL PANEL
ELECTRICAL SYSTEM DRAWING
Zeichnungs-Nr./Drawing No. CAD06787711
Beschreibung/Description ----
Blatt Sheet 1/3

onsite energy

MGC 1500







NOTES:

1. WIRE NUMBERS ARE IN PARENTHESIS.
2. SHORT DASHED LINES (------) INDICATE CUSTOMER CONNECTION OR OPTIONAL EQUIPMENT.

LEGEND

AL	ALARM BUZZER
BPS	BACK PLATE STUD
DGS	DOOR GROUND STUD
ESP	EMERGENCY STOP BUTTON
F1	5A ATO FUSE MGC CONTROLLER
F2	25A ATO FUSE PANEL
F3	20A ATO FUSE ECU
GGS	GENERATOR GROUND STUD
LWL	LOW WATER LEVEL PROBE
MGC	MTU GENERATOR CONTROLLER
R1	120 OHM ⅛ 1% RESISTOR
TB1	TERMINAL BLOCK 1 (PANEL BACK)
TB1A	TERMINAL BLOCK 1A (PANEL BACK)

*X (X) XXX X	
*X	DESTINATION
(X)	WIRE NUMBER
XXX	DESTINATION
X	DESTINATION TERMINAL

AC CUSTOMER CONNECT

SEE PAGE 3 FOR TERMINAL DESIGNATION

Allgemeintoleranzen / General Tolerances ISO 2768-mK

Toleranzing / Toleranzing ISO 8015 — Ausführung u. Lieferung Tech. Charakteristics: ____ — Oberflächenschutz Surface Protection: ____ — Versendbar fuer Typ Applicable to Model: ____ — Projekt-/Auftrags-Nr. Project/Order No.: ____ — Referenz-Nr./Ref.No.: ____ — Emission ID: ____

Masse / Size ISO 14405 — Oberflächenangaben nach MTNDG33 / Surface Specification per MTNDG33 — Allgemeine Fertigungsvorschriften nach MAN 332 / Production Specification per MAN 332

Massstab/Scale: ____ — Masse/Mass: ____ kg — Format/Size: A

Werkstoff / Material: ____ — Hilfszeug,Modell,Gesenk / Semifinished Product, Pattern,Die: ____

Material-Nr./Material-No.: block kevi 17.10.2020 — XZG25K0000015

Benennung/Title: AO Arrangement — ____

ARRANGEMENT DRAWING
1GEN MGC 1500 CONTROL PANEL
ELECTRICAL SYSTEM DRAWING

ACAD	Datum/Date	Name
Ersteller Drawn	08.10.2020	groenke do
Geprüft Checked	08.10.2020	groenke do
Norm Std	12.10.2020	carsten jd
Gen. Checked	12.10.2020	carsten jd

Zeichnungs-Nr./Drawing No.: CAD06787712 — Blatt Sheet: 2/3

Beschreibung/Description: ____

Aenderungsbeschreibung/Description of revision: **INITIAL RELEASE** — kommt vor/Frequency

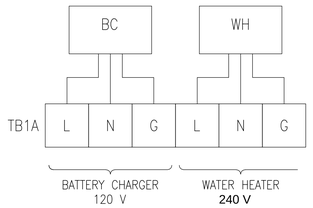
Buchst./Rev.Ltr.	Aenderungs-Nr./Revision Notice No.	Bearbeitungsstatus/Lifecycle
–.1	PR062671	Released

Passmass Fit — Abmass in Genotion um

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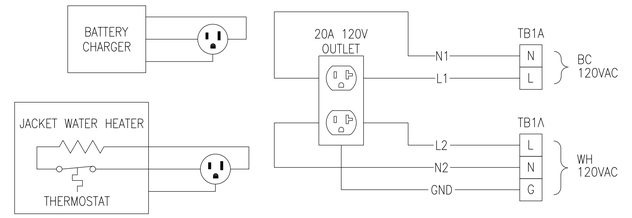
AC OPTIONS

NO DISTRUBUTION PANEL



CUSTOMER CONNECTION

RECEPTACLE OPTIONS



NOTES:

1. WIRE NUMBERS ARE IN PARENTHESIS.
2. SHORT DASHED LINES (------) INDICATE CUSTOMER CONNECTION OR OPTIONAL EQUIPMENT.

LEGEND

AL	ALARM BUZZER
BPS	BACK PLATE STUD
DGS	DOOR GROUND STUD
ESP	EMERGENCY STOP BUTTON
F1	5A ATO FUSE MGC CONTROLLER
F2	25A ATO FUSE PANEL
F3	20A ATO FUSE ECU
GGS	GENERATOR GROUND STUD
LWL	LOW WATER LEVEL PROBE
MGC	MTU GENERATOR CONTROLLER
R1	120 OHM ⅛ 1% RESISTOR
TB1	TERMINAL BLOCK 1 (PANEL BACK)
TB1A	TERMINAL BLOCK 1A (PANEL BACK)

*X	(X)	XXX	X
*X	DESTINATION		
(X)	WIRE NUMBER		
XXX	DESTINATION		
X	DESTINATION TERMINAL		

Allgemeintoleranzen / General Tolerances ISO 2768-mK

Toleranzring / Tolerancing ISO 8015

Ausführung u. Lieferung Tech. Charakteristics ----

Oberflächenschutz Surface Protection ----

Versendbar fuer Typ Applicable to Model ----

Projekt-/Auftrags-Nr. Project/Order No. ----

Referenz-Nr./Ref.No. ----

Emission ID ----

Masse / Size ISO 14405

Oberflächenangaben nach MTNDG33 Surface Specification per MTNDG33

Allgemeine Fertigungsvorschriften nach MAN 332 Production Specification per MAN 332

block kevl 17.10.2019 ---- ----

Massstab/Scale

Masse/Mass ---- kg

Format/Size A

Werkstoff Material ----------

Holzzeug,Modell,Gesenk Semi-finished Product, Pattern,Die ----

Material-Nr./Material-No. XZG25K0000015

Benennung/Title AO Arrangement ----

ARRANGEMENT DRAWING
1GEN MGC 1500 CONTROL PANEL
ELECTRICAL SYSTEM DRAWING

ACAD	Datum/Date	Name
Ersteller Drawn	08.10.2020	groenke do
Geprüft Checked	08.10.2020	groenke do
Norm Std.	12.10.2020	corsten jd
Gen. Checked	12.10.2020	corsten jd

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Aenderungsbeschreibung/Description of revision
INITIAL RELEASE

kommt vor/Frequency

Buchst./Rev.Ltr. –.2

Aenderungs-Nr./Revision Notice No. PR062671

Bearbeitungsstatus/Lifecycle Released

Passmass Fit | Abmass in Deviation µm

Zeichnungs-Nr./Drawing No. CAD06787713

Beschreibung/Description ----

Blatt Sheet 3/3

ENGINE SIDE PLUG

1 (48) #12 AWG
2 (9) #12 AWG
3 (9H) #12 AWG
4 (GND) #12 AWG
5
6
7
8 (21) #16 AWG
9
10 (2) #16 AWG
11 (3) #18 AWG
12 (103) #16 AWG
13
14 (1) #16 AWG
15
16
17
18
19 (80) #18 AWG
20 (32) #20 AWG
21 (SP1) #18 AWG
22 (SP2) #18 AWG
23 (SP3) #18 AWG
24 (100) #20 AWG
25
26
27 (101) #20 AWG
28
29 (S) #22 AWG

(9) BLK
RADIATOR
LOW WATER LEVEL PROBE
(21) WHT
RED

#16 AWG

SPARE 1
SPARE 2
SPARE 3

(GD1)

(48) PLUG 1
#12 AWG
SM
SOL
#2/0 GA.
BATTERY 12VDC
#2/0 GA.

(GND) PLUG 4

SEE NOTE #5
RED
BATTERY CHARGER
BLACK
ENGINE GND

14-PIN FUEL HARNESS CONNECTOR

A (2A)
B (2B)
C (2C) (2C)
D (2D) (2D)
E (2E) (2E)
F (9A) (9A)
G (9B)
H (9C) (9C)
J (9D) (9D)
K (9E) (9E)
L (54)
M (55) (55)
N (56) (9A)
P (80) (80)

16-PIN ECU HARNESS CONNECTOR

A (32)
B (54)
C (55)
D
E
F (3)
G
H (56)
J
K
L
M
N (100)
P (101)
R
S (9G)

LP GAS RELAY

(2C) 86 LPR 85 (55)
(2D) 30 87 (155)

DUNGS VALVE LP VAPOR

3 2
LPS1 LPS2
1
M 3 GND 1 2

F 3 GND 1 2
(2E) (9D) (9C) (155)
LP VALVE DIN PLUG

FPS
DUNGS PRESSURE SWITCH
M 3 GND 1 2

F 3 GND 1 2
(80) (9E)
PRESSURE SWITCH DIN PLUG

SINGLE FUEL LP GAS

Allgemeintoleranzen / General Tolerances ISO 2768-mK		Massstab/Scale	Masse/Mass kg: ---- Format/Size: A
Toleranzng / Tolerancing ISO 8015	Masse / Size ISO 14405		
Ausführung u. Lieferung / Tech. Characteristics: ----	Oberflächenangaben nach MTN5033	Werkstoff / Material: ----------	
Oberflächenschutz / Surface Protection: ----	Surface Specification per MTN5033		
Verwendbar fuer Typ / Applicable to Model: ----	Allgemeine Fertigungsvorschriften nach MAN 332	Halbzeug,Modell,Gesenk / Semifinished Product, Pattern,Die: ----	
Projekt-/Auftrags-Nr. / Project/Order No.: ----	Production Specification per MAN 332	Material-Nr./Material-No.	
Referenz-Nr./Ref.No.: ---- Emission ID: ----	black kevl 12.10.2020	XZG25K0000020	
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Passmass Fit / Nonpass in Deviation gem	Aenderungs-Nr./Revision Notice No.	Bearbeitungsstatus/Lifecycle	Zeichnungs-Nr./Drawing No. CAD06790337 Blatt/Sheet 2/5
	Buchst./Rev.Ltr. -.1 PR062671	Released	Beschreibung/Description ----

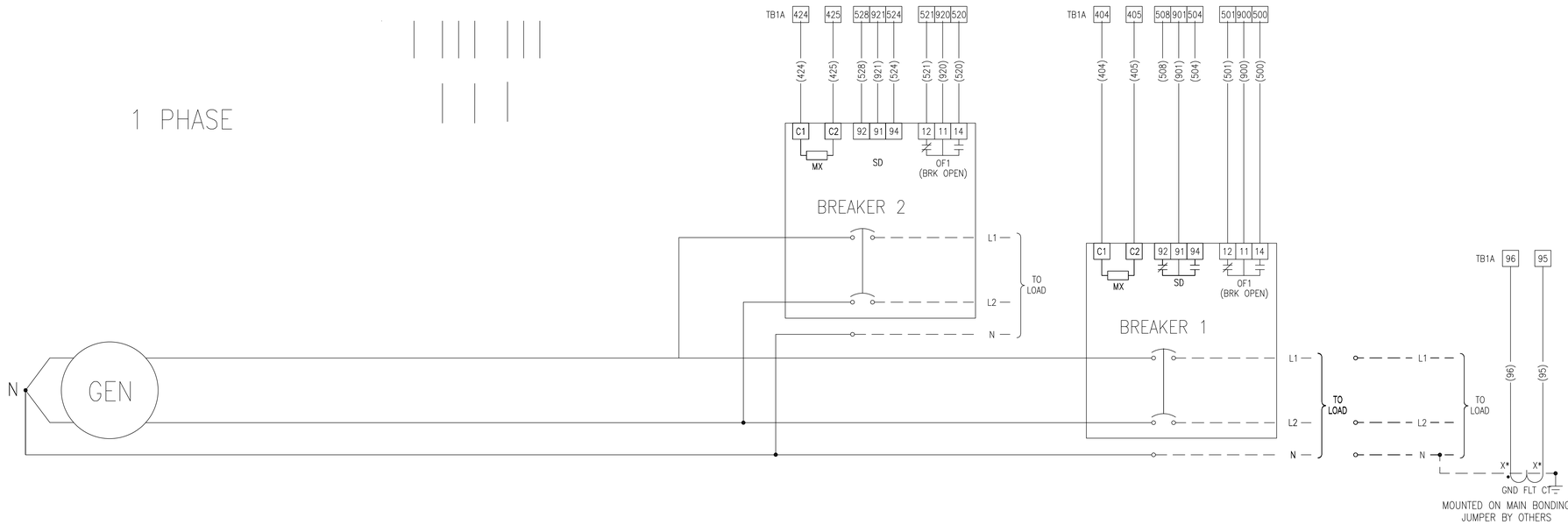
Aenderungsbeschreibung/Description of revision: INITIAL RELEASE — kommt vor/Frequency

NOTE:

X* X*

OUTLET BOX

1 PHASE



Allgemeintoleranzen / General Tolerances ISO 2768-mK		Massstab/Scale	Masse/Mass kg Format/Size
Tolerierung / Toleroncing ISO 8015	Masse / Size ISO 14405		---- A
Ausfuehrung u. Lieferung / Tech. Characteristics ----	Oberflaechenangaben nach MTND033	Werkstoff / Material ----------	
Oberflaechenschutz / Surface Protection ----	Surface Specification per MTND033		
Verwendbar fuer Typ / Applicable to Model ----	Allgemeine Fertigungsvorschriften nach MAN 332	Holzzeug,Modell,Gesenk / Semifinished Product, ----	
Projekt-/Auftrags-Nr. / Project/Order No. ----	Production Specification per MAN 332	Pattern,Die	
Referenz-Nr./Ref.No. ----	Emission ID ----	Material-Nr./Material-No. block kevi 17.10.2020 ---- ---	XZG25K0000013

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	ACAD	Datum/Date	Name
Benennung/Title AO Arrangement ----	Ersteller Created	09.10.2020	groenke do
ARRANGEMENT DRAWING 1GEN BREAKERS ELECTRICAL SYSTEM DRAWING	Pruefer Checked	09.10.2020	groenke do
	Norm. Std.	12.10.2020	carsten jd
	Gen. Checked	12.10.2020	carsten jd

Aenderungsbeschreibung/Description of revision	kommt vor/Frequency
INITIAL RELEASE	

Buchst./Rev.Ltr	Aenderungs-Nr./Revision Notice No.	Bearbeitungsstatus/Lifecycle
–.1	PR062671	Released

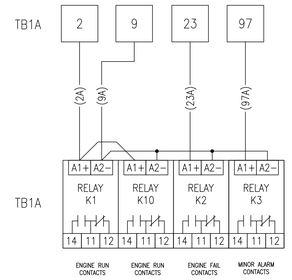
Passmass Fit / Abmass in Deviation um

onsite energy	Zeichnungs-Nr./Drawing No.	CAD06787676
	Beschreibung/Description ----	Blatt Sheet 1/1

LEGEND:

D1	DIODE
D2	DIODE
F4	FUSE ATO 3A
F5	FUSE ATO 3A
TB1	TERMINAL BLOCK 1
TB1A	TERMINAL BLOCK 1A

4 RELAY OPTION



T

T -

Allgemeintoleranzen / General Tolerances ISO 2768-mK		Massstab/Scale	Masse/Mass kg Format/Size
Toleranzring / Tolerancing ISO 8015	Masse / Size ISO 14405		---- A
Ausführung u. Lieferung Tech. Charakteristics ----	Oberflächenangaben nach MTN0033 Surface Specification per MTN0033	Werkstoff Material ----------	
Oberflächenschutz Surface Protection ----			
Verwendbar fuer Typ Applicable to Model ----	Allgemeine Fertigungsvorschriften nach MAN 332 Production Specification per MAN 332	Holzzeug,Modell,Gesenk Semifinished Product, Pattern,Die ----	
Projekt-/Auftrags-Nr. Project/Order No. ----		Material-Nr./Material-No.	
Referenz-Nr./Ref.No. ---- Emission ID ----	block levi 17.10.2019 ---- ---	XZG25K0000019	

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ACAD	Datum/Date	Name
Ersteller Draw.	08.10.2020	groenke do
Geprüft Check.	08.10.2020	groenke do
Normen Std.	12.10.2020	carsten jd
Gen. Checked	12.10.2020	carsten jd

Benennung/Title AO Arrangement

ARRANGEMENT DRAWING
1GEN OPTIONS
ELECTRICAL SYSTEM DRAWING

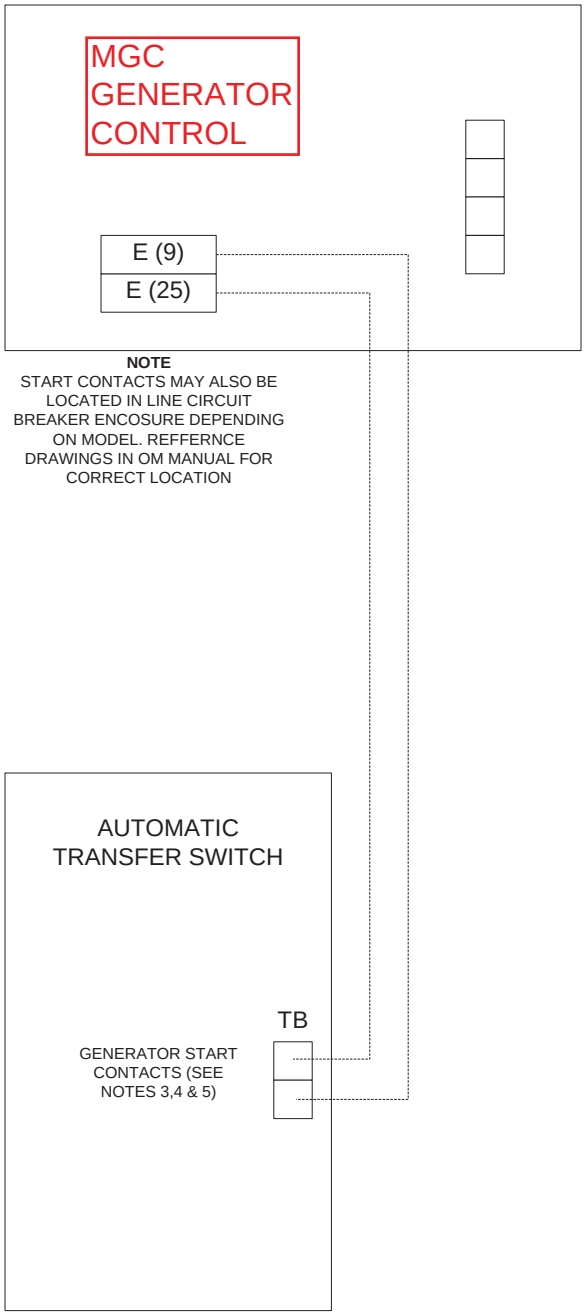
Aenderungsbeschreibung/Description of revision		kommt vor/Frequency
INITIAL RELEASE		
Buchst./Rev.Ltr.	Aenderungs-Nr./Revision Notice No.	Bearbeitungsstatus/Lifecycle
-.1	PR062671	Released

Passmass Fit | Konzept in Gestaltung Lim

Zeichnungs-Nr./Drawing No. CAD06790329

Beschreibung/Description ----

Blatt Sheet 1/2



NOTES:

1. For multiple transfer switches, daisy chain the contact for generator start.

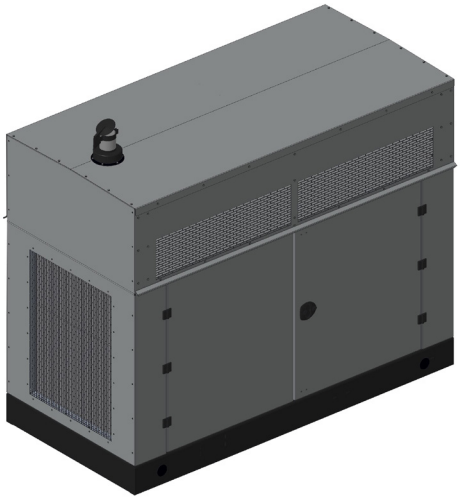
2. ATS control Interconnect wiring. Two stranded copper wires required:
0- 700 Feet -20 Gauge
700- 1125 Feet – 18 Gauge

3. For contact landing locations in transfer switch refer to the wiring drawing included with the transfer switch.

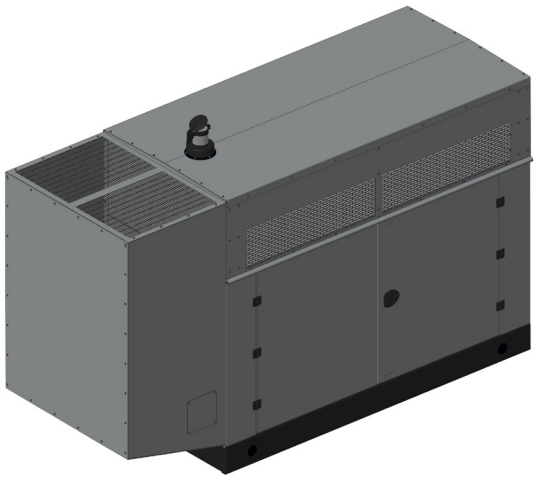
BASIC INTERCONNECT DRAWING FOR MGC CONTROL WITH TRANSFER SWITCH

Enclosure and Sound Data Sheet - Gas, Open Field

60 Hz: 150 kW Standby



Level 1 Enclosure (pictured)



Level 3 Enclosure (pictured)

Enclosure Level Identification	
Level 1	Skid-mounted weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 130 mph wind load rating. Enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Level 1 enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed on enclosure walls.
Level 3	Level 2 enclosure with air exhaust scoop including UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation.
Level 3 Plus	Level 3 enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam on enclosure walls and ceiling.

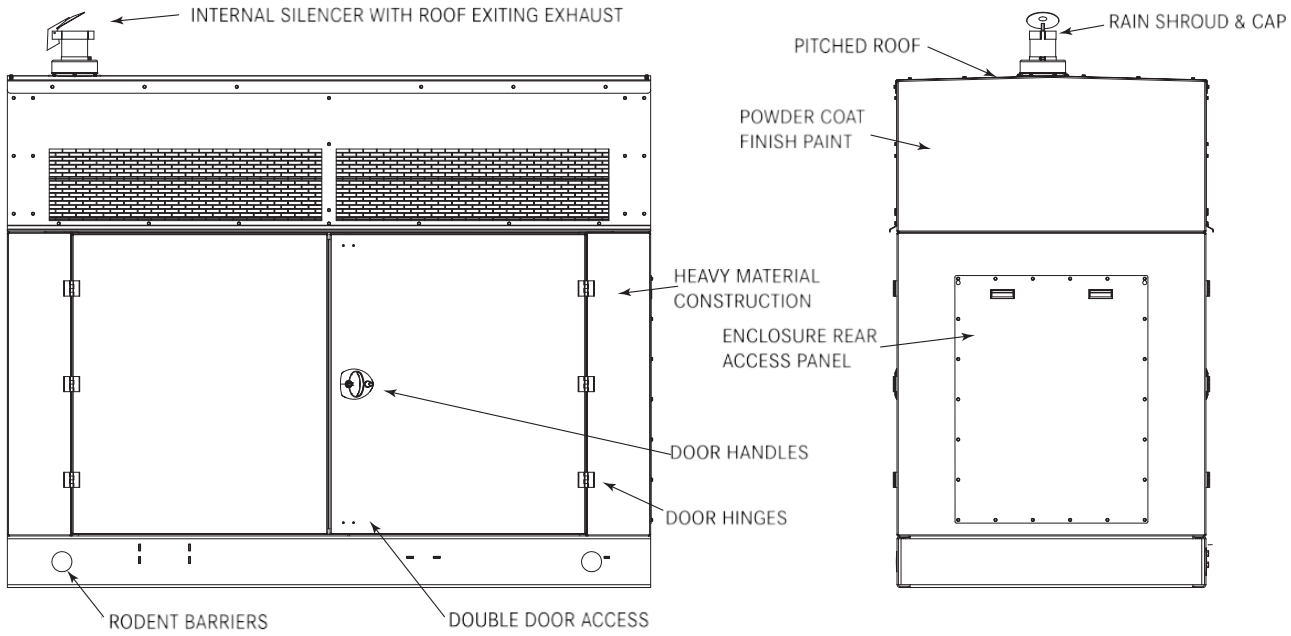
CERTIFICATIONS AND STANDARDS

- UL 2200
- CE Marking Provided
- CSA C22.2 No. 100
- CSA C22.2 No. 14

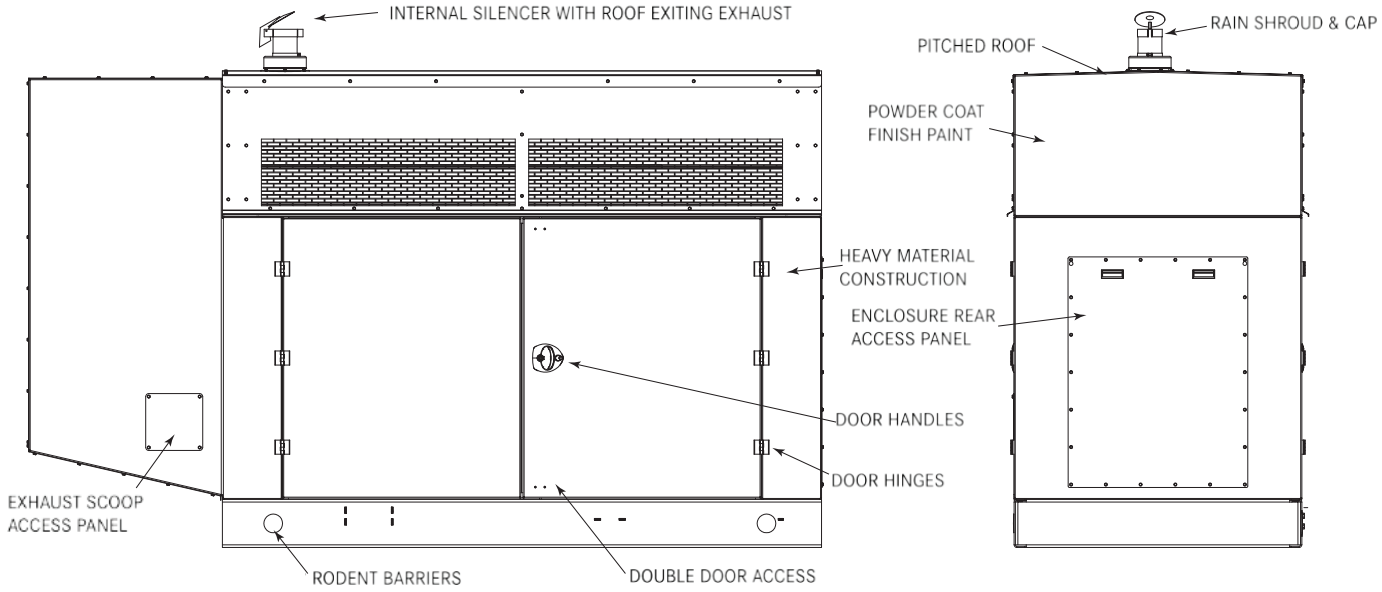
STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 130 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud
- Rain cap
- Rodent barriers
- Exhaust scoop access panel and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer (Hospital Grade)
  - Insulated silencer
  - Stainless steel flexible exhaust connections (where applicable)

Enclosure and Sound Data Sheet - Gas, Open Field
60 Hz: 150 kW Standby



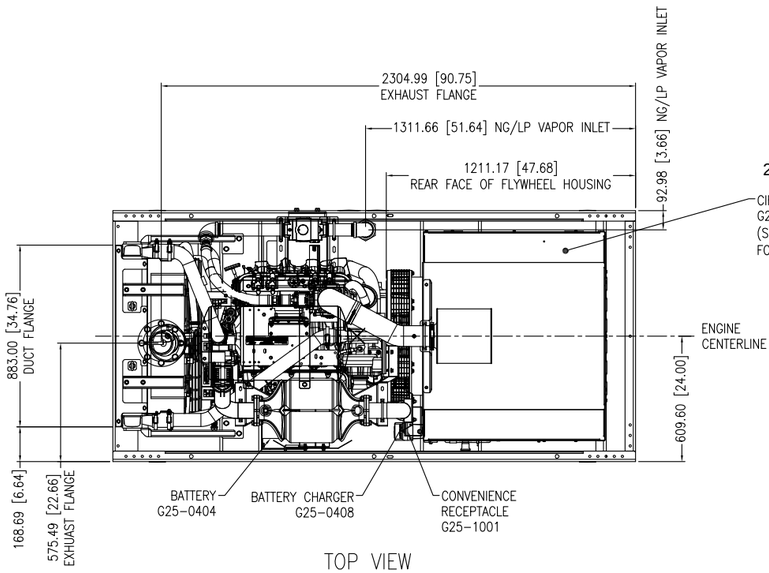
Level 1 Enclosure (pictured)



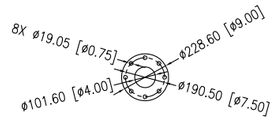
Level 3 Enclosure (pictured)

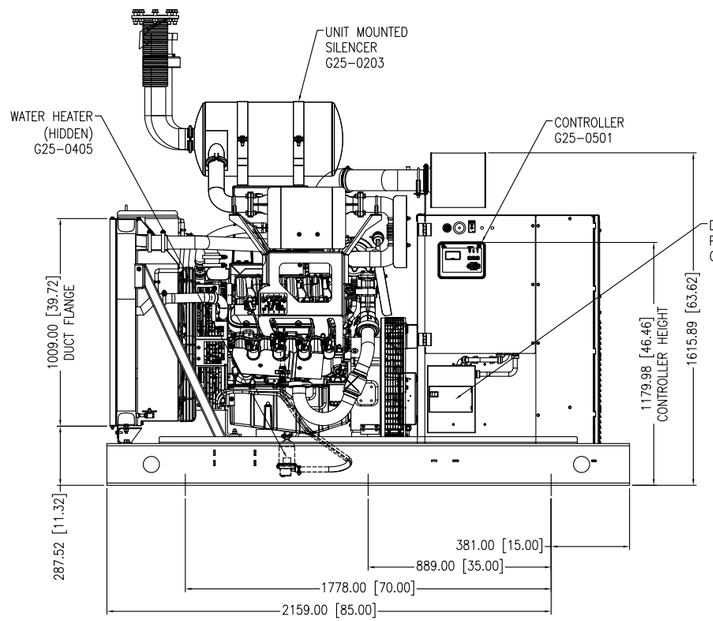
OPTIONAL FEATURES

- Door restraints
- LED light package
- Enclosure space heater
- Motorized intake louvers
- 190 mph wind rating
- Distribution panel
- Gravity exhaust louvers
- For other custom options, please consult factory.



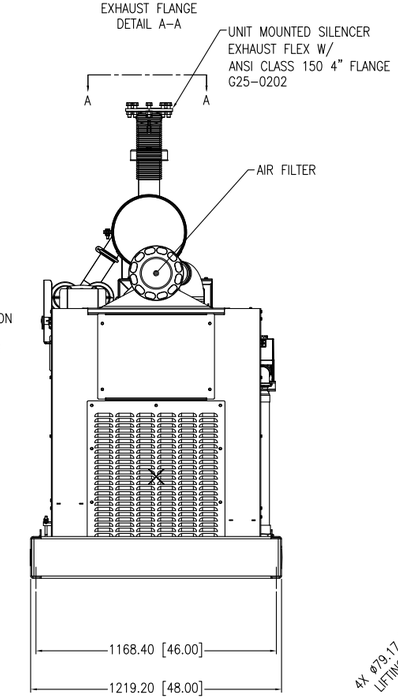
TOP VIEW



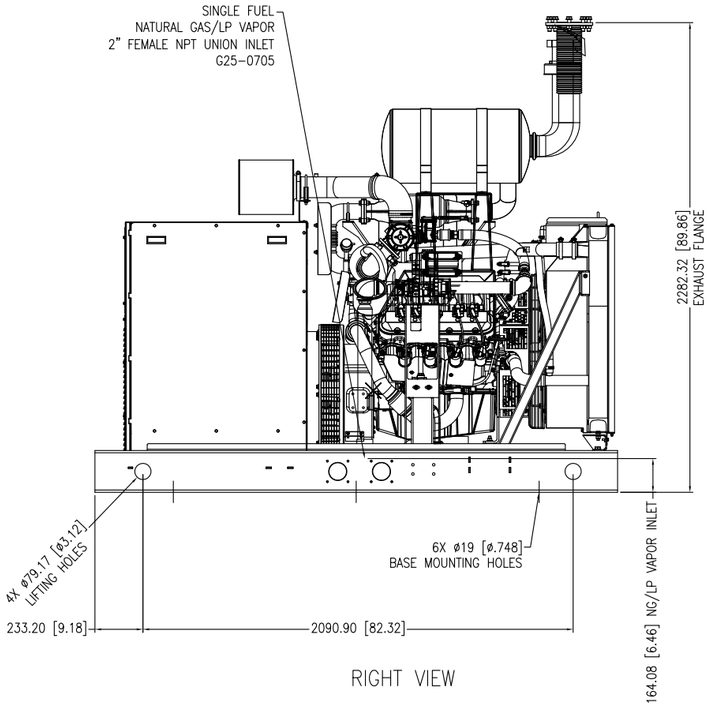


LEFT VIEW

EXHAUST FLANGE
DETAIL A-A



REAR VIEW



RIGHT VIEW

REVISION	DATE	DESCRIPTION

A Rolls-Royce solution

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APPLICABLE MODELS:
MTU 8V0110 GS150

THIRD ANGLE PROJECTION

DRAWN TO SCALE
DIMENSIONS: MM [INCH]

DATE CREATED: 2020-12-12

DIMENSIONAL LAYOUT

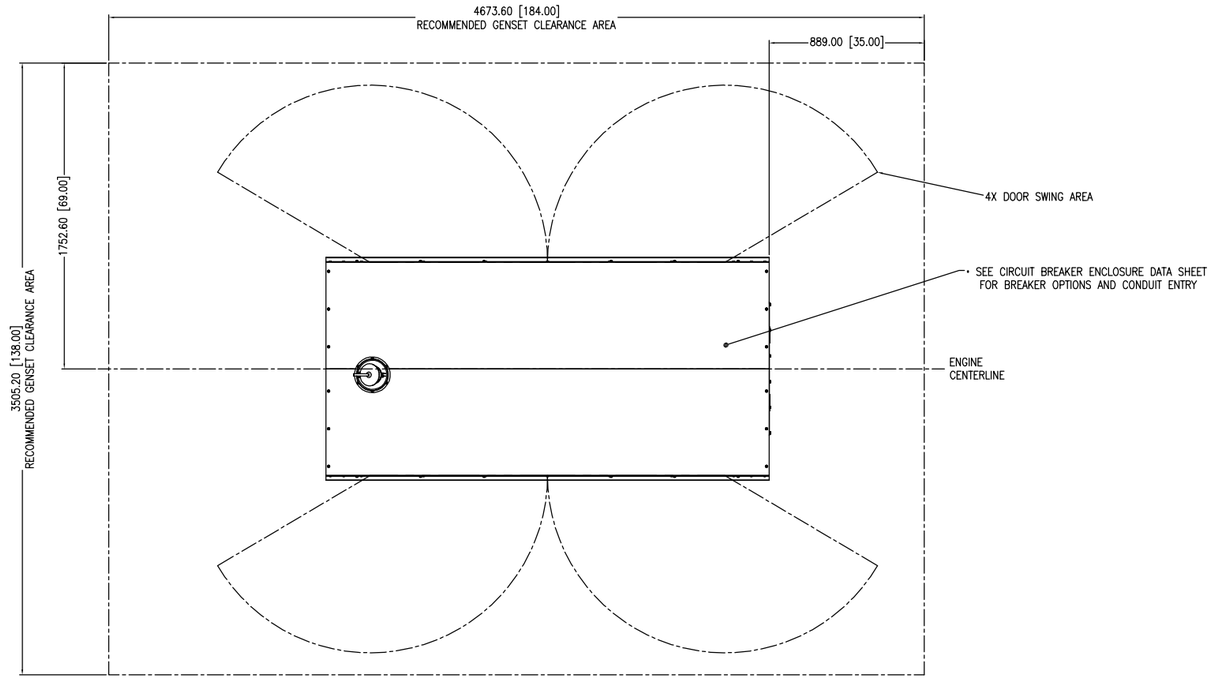
DESCRIPTION: 150 kW Genset, Housed Base

ENGINE: PSI 8.8LT CAC

WEIGHT (MIN-MAX): 1540-1820 KG 3400-4000 LB

DRAWING NUMBER: XZG2500100034

SHEET: 1 of 2

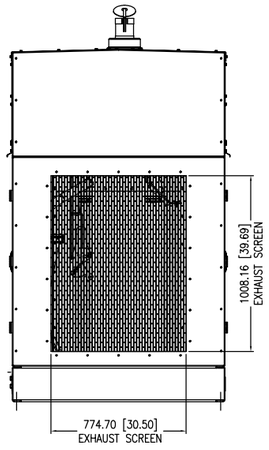


TOP VIEW

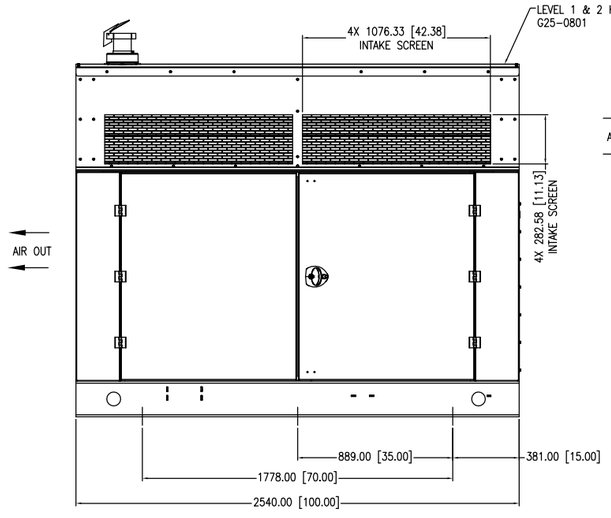
DRAWING OPTIONS 150kW PSI 8.8LT CAC			SELECTED OPTIONS
Group	Drawing Code	Description	
Housing Options, Exterior	G25-0801	Level 1 & 2 Housing	✓
	G25-0802	Level 3 Housing	
	G25-0803	Air Exhaust Gravity Louver	
Housing Options, Interior	G25-0901	Air Intake Motorized Louver	
	G25-0902	Interior Housing Lights	
	G25-0903	Space Heater	

Reference the Drawing Options table and within the Layer Properties turn on/off the Drawing Codes that may or may not apply to your configuration.

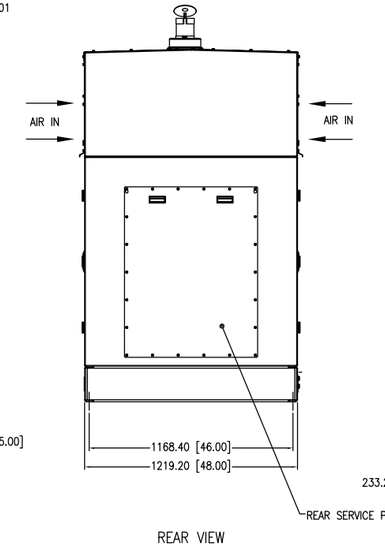
Note: Some options may not be referenced. Only options which visibly change the drawing are selectable



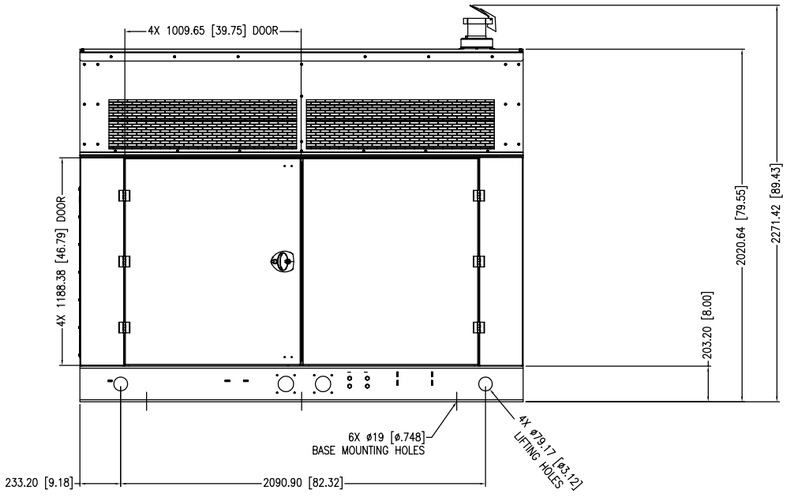
FRONT VIEW



LEFT VIEW



REAR VIEW



RIGHT VIEW

REVISION	DATE	DESCRIPTION

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A Rolls-Royce solution

APPLICABLE MODELS:
MTU 8V0110 GS150

THIRD ANGLE PROJECTION

DRAWN TO SCALE
DIMENSIONS: MM [INCH]

DATE CREATED: 2021-02-26

DIMENSIONAL LAYOUT

DESCRIPTION: 150 kW Genset Housing

ENGINE: PSI 8.8LT CAC

WEIGHT (MIN-MAX): 2040-2500 KG 4500-5500 LB

DRAWING NUMBER: XZG2500100035

SHEET: 1 of 1