



June 22, 2020

Mr. Dan Bott
VCS Environmental, Inc.
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675

SUBJECT: Energy Calculation Memorandum for the Carlsbad Beach Access Repair Project

Dear Mr. Bott;

Birdseye Planning Group (BPG) is pleased to submit this memorandum quantifying energy consumption associated with the construction of the Carlsbad Beach Access Repair Project. The information contained herein will support preparation of an Initial Study and Mitigated Negative Declaration (MND) that identifies project-specific impacts associated with construction and operation/maintenance of the proposed project. The proposed action is subject to a discretionary review process by the City of Carlsbad; thus, an Initial Study/MND is being prepared to demonstrate California Environmental Quality Act (CEQA) compliance.

Project Description

The Beach Access Repair Project will be constructed in two main phases to avoid the busy summer months between Memorial Day and Labor Day. Phased construction will also allow one southbound lane of traffic to remain open during the upper sidewalk widening improvements. During construction the southbound bike lane along Carlsbad Boulevard, from Pine Avenue to Maple Avenue, will need to be temporarily closed and bike traffic rerouted.

Phase 1 – Repair/Replace Upper Sidewalk, 2 Elevated Stairways and 1 Stairway on Grade. The first phase will occur in the fall/winter months (September thru January of 2021/2022) and involve repairing/replacing the upper sidewalk, replacing the Sycamore Avenue and Cherry Avenue stairway landings, and replacing the stairway at Tamarack Avenue. The upper sidewalk will also be widened and metal beam guardrail replaced with traffic bollards along Carlsbad Boulevard from Pine Avenue to Maple Avenue. During the Phase 1 construction, the westerly southbound lane of Carlsbad Boulevard (next to the bluff), from Pine Avenue to Maple Avenue will need to be temporarily shut down to accommodate construction of the upper sidewalk improvements.

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Demolition, removal and construction of the upper sidewalk and two elevated stairways will require the use of a large crane, material handlers, and long reach excavators as well as other specialized equipment.

Phase 2 – Repair Lower Sidewalk, Replace 2 Elevated Stairways and Modify Carlsbad Boulevard.

The second phase of construction will occur in the winter/spring months (January thru May 2022) and involve repairing the lower sidewalk and seawall, replacing the Maple Avenue and Hemlock Avenue stairway landings and modifying the median and bike/travel lane striping along Carlsbad Boulevard from Pine Avenue to Maple Avenue. During Phase 2, the easterly southbound lane of Carlsbad Boulevard (next to the median), from Pine Avenue to Maple Avenue, will be temporarily shut down to accommodate construction of the median modifications.

Demolition, removal and construction of the two elevated stairways and relocation of palm trees in the median will require the use of a large crane, material handlers, and long reach excavators as well as other specialized equipment.

Energy Calculations

Based on the scope and sequence of construction activities, daily emissions were conservatively estimated using the most intensive mix of equipment over the 180-day construction period extending from September 2021 to May 2022. The common method is to calculate fuel demand based on the six phases of construction defined in CalEEMod 2016.3.2; demolition, site preparation, grading, building construction, paving and painting (i.e., architectural coating). However, for the purpose of determining maximum daily air emissions and annual greenhouse gas (GHG) emissions, a single phase was used and incorporated the most intensive use of heavy equipment likely to occur during the construction cycle. These data were used to conservatively estimate gasoline and diesel fuel demand during construction using the most equipment intensive operation as the basis for the calculations. As referenced in the Air Quality/Greenhouse Gas Study, the most intensive portion of the construction would require the following equipment;

- Excavator, 158 horsepower at 0.38 load factor;
- Crane, 231 horsepower at 0.29 load factor;
- Off-Highway Truck, 402 horsepower at 0.38 load factor;
- Fork-Lift, 89 horsepower, 0.2 load factor;
- Generator Set, 84 horsepower, 0.74 load factor;
- Tractor/Loader/Backhoe, 97 horsepower, 0.37 horsepower; and
- Welder, 46 horsepower, 0.45 load factor.

Because this equipment mix would not be required daily throughout the duration of the project, calculations likely overestimate actual diesel fuel demand. During operation, emissions associated with maintenance trips are not expected to be greater than what occurs under existing conditions.

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While negligible operating emissions were quantified in the Air Quality/Greenhouse Gas Report, fuel demand for operation/maintenance of the improvements were not quantified.

The following tables show estimated gasoline demand for construction workers (Table 1) and construction equipment (Table 2). All fuel calculations are based on the total Carbon Dioxide Equivalent (CO₂e) value calculated for the building construction and vehicle miles traveled (VMT) using the California Emission Estimator Model (CalEEMod) version 2016.3.2. Data are reported in annual metric tons of CO₂e. Metric tons are converted to kilogram CO₂e and then divided by a conversion factor used by the U.S. Environmental Protection Agency to estimate gallons of gasoline (8.87) and diesel fuel (10.18) consumed based on carbon emissions.

Table 1 shows the gasoline demand for construction workers for work occurring in 2021 and 2022. Table 2 shows the diesel fuel demand for equipment operation in 2021 and 2022.

Table 1
Construction Worker Gasoline Demand

2021	CO ₂ E MT	Kg CO ₂ e	Gallons
Worker Fuel	14	14,000	1,578
2022			
Worker Fuel	16	16,000	1,803
Total			3,381

Table 2
Construction Equipment Diesel Demand

2021	CO ₂ E MT	Kg CO ₂ e	Gallons
Equipment Fuel	151	151,000	14,833
2022			
Equipment Fuel	181	181,000	17,779
Total			32,612

Please let me know if you have questions. You can reach me via e-mail at 760-712-2199 or via e-mail ryan@birdseyeplanninggroup.com.

Regards,



Ryan Birdseye
Principal

Addendum

This document contains information and data from a study that was prepared for a prior version of the proposed Project. The data contained within remains relevant and applicable to the proposed Project; however, may contain information that is no longer representative of the proposed Project. Please reference the Initial Study Mitigated Negative Declaration document for any information pertinent to the proposed Project description.