UPDATED GEOTECHNICAL EVALUATION

FOR

WEST OAKS PROJECT – 11.8± ACRE SITE
APN'S 212-110-01, -02, -03, -04, -05, -06, -07, -08 AND 212-040-26
CITY OF CARLSBAD, SAN DIEGO COUNTY, CALIFORNIA

PREPARED FOR

INTEGRAL COMMUNITIES
2235 ENCINITAS BOULEVARD, SUITE 216
ENCINITAS, CALIFORNIA 92024

PREPARED BY

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PROJECT NO. 0934-CR3 JULY 28, 2017

GEOTEK

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July 28, 2017
Project No. 0934-CR3

Integral Communities
2235 Encinitas Boulevard, Suite 216
Encinitas, California 92024

Attention: Mr. Greg Waite

Subject: Updated Geotechnical Evaluation
West Oaks Project – 7.5± Acre Site
Assessor Parcel Numbers (APN) 212-110-01, -02, -03, -04, -05, -06, -07, -08 and 212-040-26
City of Carlsbad, San Diego County, California

Dear Mr. Waite:

We are pleased to provide the results of our updated geotechnical evaluation for the subject site located in the City of Carlsbad, County of San Diego, California. This report was prepared in response to the City of Carlsbad 2nd Review Comments (June 8, 2017), and presents a discussion of our evaluation and provides preliminary geotechnical recommendations for earthwork, foundation design, and construction. In our opinion, site development appears feasible from a geotechnical viewpoint provided that the recommendations included herein are incorporated into the design and construction phases of site development.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to call our office.

Respectfully submitted,
GeoTek, Inc.

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1. PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to complete an updated evaluation of the existing geotechnical conditions of the project site in general. Services provided for this study included the following:

- Research and review of available geologic/geotechnical data and general information pertinent to the site,
- Site reconnaissance,
- Review of four exploratory hollow-stem auger borings and eight exploratory trenches on-site,
- Collection of a bulk soil sample of the on-site materials for R-Value testing,
- Laboratory testing of the soil sample collected from the site,
- Review and evaluation of site seismicity, and
- Compilation of this geotechnical report which presents our recommendations for site development.

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

2.1 SITE DESCRIPTION

The subject site is located along West Oaks Way, west of the intersection of Palomar Oaks Way and just south of Palomar Airport Road in the City of Carlsbad, San Diego County, California (see Figure 1). The West Oaks project site is comprised of nine parcels of land, totaling approximately 11.8 acres.

The project site has previously mostly been rough graded under the purview of Southern California Soil and Testing, Inc. (SCS&T, 1988d), and currently consists of four vacant sheet-graded pads on both sides of West Oaks Way. The western-most parcel has not been previously graded. This area is currently covered with thick vegetation. West Oaks Way is paved and some underground and above ground improvements are present. Existing, known underground site improvements include sewer main lines that are under some graded pad areas, along with water and gas lines beneath the street. Underground dry utilities are also likely present, as utility boxes were noted along the paved street alignment. Above ground improvements include power lines, as well as a couple of retaining walls.

There are a couple of interior site slopes as well as perimeter slope areas. The highest interior slope, located between the first and second pads to the east side of the site, is on the order of roughly eight feet high. Gradient of this slope appears to be roughly 2:1 (H:V). Perimeter site slopes are located along the southern edge of the property, and appear to be both natural and man-made. Gradients of these slopes generally appear to be shallower than 2:1. Natural slope areas also ascend from the site to the south, locally at gradients steeper than 2:1.

An active drainage is located along the northern edge of the site and directs storm water to the west. Overall, the project site area is irregular in shape and consists of relatively flat terrain (see Figure 2) with surface drainage generally directed toward the west. Total relief across the site, excluding some perimeter slope areas, is roughly 25 feet.

2.2 SITE BACKGROUND

Based on review of a geotechnical report attained from the City of Carlsbad, the subject site was rough graded by October of 1988, as reported by Southern California Soil and Testing, Inc. (SCS&T), 1988d. Backfill testing for underground improvements is reported on in February of 1989, also by SCST (1989b).

As indicated above and based on review of geotechnical reports reviewed for the subject site, the West Oaks property was rough graded by October of 1988. According to a report that documents the rough grading (SCS&T, 1988d), engineered fills on the order of at least four feet underlie the site, with maximum depths of fill on the order of up to roughly 10 feet in the area of Lot 1 (eastern-most site lot). Also, according to the referenced report, a stabilization fill was constructed along the southern edge of Lot 1 and extending west to a portion of Lot 2. This stabilization fill "…was constructed to retain a small area of landslide debris on the eastern portion of Lot 1 and the colluvial deposits on Lots 1 and 2." (SCS&T, 1988d). The report documenting site rough grading also includes pertinent site geotechnical information regarding limits of remedial removals; locations of preserved trees; location of a mapped in-active fault line; in-place density test locations and removal bottom elevations.

Other pertinent site details of note described in the referenced report by SCS&T (1988d), indicate that the previously recommended (SCS&T, 1988a) eight feet overexcavation beneath proposed building pads was not accomplished, as no building plans were available at the time of rough grading. In addition, a building pad cap of "… three feet of nondetrimentally expansive soils" was recommended to be placed on the pads. "Nondetrimentally expansive soils are defined as soil with an expansive index of less than 50…", according to SCS&T (1988a). Other information attained from the SCS&T reports is incorporated into the appropriate sections of the evaluation.

2.3 PROPOSED DEVELOPMENT

It is our understanding that currently proposed site improvements possibly include numerous townhome structures, up to three stories in height, with associated parking and driveway areas. Structural loads are anticipated to be typical for this type of construction.

Based on the *Preliminary Grading Plan & Tentative Map* prepared by Fuscoe Engineering and with a plot date of March 22, 2017, a bridge crossing connecting West Oaks Way to Palomar Airport Road is proposed in the area of the western-most site lot. Development plans for bridge construction have not yet been provided to GeoTek for review, but conceptually this bridge appears feasible from a geotechnical perspective. When bridge plans become available, GeoTek can review and provide additional design recommendations for the bridge under a separate evaluation.

A biofiltration BMP for partial stormwater retention is also proposed just north of the paved parking lot (Lot 4). This also would be feasible from a geotechnical perspective.

If site development differs from above, the recommendations included in this report should be subject to further review and evaluation. Site development plans should be reviewed by GeoTek when they become available. Additional geotechnical field exploration, analyses and recommendations may be necessary upon review of site development plans.

3. FIELD EXPLORATION AND LABORATORY TESTING

3.1 FIELD EXPLORATION

A recent site reconnaissance was completed by a GeoTek representative to confirm the site conditions reported in the referenced reports. Field exploration was initially conducted on October 31, 2012 (site reconnaissance and surface soil sampling), and then on December 7 and December 11, 2012 and consisted of excavating four exploratory hollow-stem auger borings, to a maximum depth of approximately 46.5 feet. Additionally, our field exploration consisted of excavating eight trenches to depths of up to roughly 10.5 feet. The approximate locations of the exploratory excavations are shown on the Exploratory Excavation Location Map (Figure 3). Logs of the excavations are included in Appendix A. GeoTek collected relatively undisturbed and bulk samples of on-site soil materials from the excavations during the field exploration and recent site reconnaissance.

3.2 LABORATORY TESTING

Laboratory testing was performed on selected relatively undisturbed and bulk soil samples collected during the field exploration. The purpose of the laboratory testing was to confirm the field classification of the soil materials encountered and to evaluate the soils physical properties for use in the engineering design and analysis. Results of the previous and current laboratory testing program along with a brief description and relevant information regarding testing procedures are included in Appendix B.

4. GEOLOGIC AND SOILS CONDITIONS

4.1 REGIONAL SETTING

The subject property is situated in the Peninsular Ranges geomorphic province. The Peninsular Ranges province is one of the largest geomorphic units in western North America. Basically, it extends roughly 975 miles from the north and extends from the Transverse Ranges geomorphic province to the tip of Baja California, from north to south. This province varies in width from about 30 to 100 miles. It is bounded on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province.

The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks. Three major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zone trend northwest-southeast and are found in the near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province.

The subject site area has been regionally mapped by Tan and Kennedy (1996) to be underlain by alluvium and Tertiary-age Santiago Formation sedimentary bedrock.

4.2 GENERAL SOIL/GEOLOGIC CONDITIONS

A brief description of the earth materials encountered below the site and within the area of anticipated construction is presented in the following section. Based on our field exploration, the area of anticipated improvements is mostly underlain by fill soils which are in turn locally underlain by alluvium, and then sedimentary bedrock material.

4.2.1 Fill Soils

Based on our field exploration and review of the referenced report by SCS&T (1988d), fill materials underlie the property to varying depths, ranging from approximately four to ten feet across most of the reported site areas. Fill materials were encountered to an approximate maximum depth of ten feet within the exploratory borings and trenches excavated by GeoTek (see log for boring B-1 and trench T-1 in Appendix A). The fill soil materials observed in this firm's excavations were predominantly observed to consist of clayey to silty sand. The fill materials encountered were generally medium dense and moist to very moist. As observed in test pits excavated as part of the current evaluation (see logs in Appendix A), fill soils observed in the upper ±2 feet of the ground surface generally appeared to be relatively loose/soft, most likely as a result of repeated wetting (expansion) and drying (shrinkage) of these materials since original placement some ±28 years ago. Bioturbation also likely has contributed to this condition. These near-surface fill soils are not considered suitable to support structural site improvements in their current condition.

According to the results of the laboratory testing performed on samples of the fill soils, the materials tested indicated a "low" to "medium" expansion potential when tested and classified in accordance with ASTM D 4829. The test results are shown in Appendix B.

4.2.2 Alluvium

Alluvium, varying in composition predominantly from clayey sand to silty clay, was encountered beneath the fill in all of our exploratory excavations (see logs in Appendix A). This alluvial material predominantly appeared to be medium dense and/or stiff to very stiff, and is generally considered suitable in its current condition to support anticipated site improvements.

4.2.3 Bedrock

Sedimentary bedrock assigned to the Santiago Formation (Tan and Kennedy, 1996) was locally encountered below the fill soils and/or alluvium on the project site in GeoTek's investigation (see logs in Appendix A). The sedimentary bedrock materials encountered generally consisted of interbedded siltstone, claystone and sandstone.

4.3 SURFACE AND GROUNDWATER

4.3.1 Surface Water

If encountered during the earthwork construction, surface water on this site is the result of precipitation or surface run-off from surrounding sites. Overall area drainage in the area is variable, and most commonly directed toward the street (West Oaks Way), storm drain inlets or the drainage that runs along the northern edge of the property. Provisions for surface drainage will need to be accounted for by the project civil engineer.

4.3.2 Groundwater

Groundwater was encountered in almost all of our exploratory excavations. The groundwater was as shallow as seven bgs in the area of our Boring B-3. The groundwater encountered on the site is generally shallowest toward the western portions of the property (see logs in Appendix A and Figure 3 for locations). Relatively shallow groundwater was anticipated at the site, based on review of previous geotechnical reports completed for the subject property (including by Action Geotechnical Consultants, Inc., 1987, and SCS&T, 1988a). Perched groundwater or localized seepage can occur due to variations in rainfall, irrigation practices, and other factors not evident at the time of this investigation. The relatively shallow groundwater condition across the subject site should be taken into account by project planners.

4.4 FAULTING AND SEISMICITY

The geologic structure of the entire southern California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The site is in a seismically active region. No active or potentially active fault is known to exist at this site nor is the site situated within an *"Alquist-Priolo"* Earthquake Fault Zone. The subject property is not located within a State of California Seismic Hazard Zone for liquefaction or earthquake induced landsliding (area not yet mapped).

4.4.1 Seismic Design Parameters

The site is located at approximately latitude: 33.1201°N and longitude: -117.2926°W. Site spectral accelerations (Ss and S1), for 0.2 and 1.0 second periods for a Class "D" site, were determined from the USGS Website, Earthquake Hazards Program, U.S. Seismic Design Maps for Risk-Targeted Maximum Considered Earthquake (MCE$_R$) Ground Motion Response Accelerations for the Conterminous 48 States by Latitude/Longitude. The results are presented in the following table:

SITE SEISMIC PARAMETERS	
Mapped 0.2 sec Period Spectral Acceleration, S_S	1.092g
Mapped 1.0 sec Period Spectral Acceleration, S_1	0.421g
Site Coefficient for Site Class "D", F_a	1.0
Site Coefficient for Site Class "D", F_v	1.5
Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, S_{MS}	1.161g
Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, S_{M1}	0.664g
5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, S_{DS}	0.774g
5% Damped Design Spectral Response Acceleration Parameter at 1 second, S_{D1}	0.443g

4.5 LIQUEFACTION AND SEISMICALLY INDUCED SETTLEMENT

Liquefaction describes a phenomenon in which cyclic stresses, produced by earthquake-induced ground motion, create excess pore pressures in relatively cohesionless soils. These soils may thereby acquire a high degree of mobility, which can lead to lateral movement, sliding, consolidation and settlement of loose sediments, sand boils and other damaging deformations. This phenomenon occurs only below the water table, but, after liquefaction has developed, the effects can propagate upward into overlying non-saturated soil as excess pore water dissipates.

The factors known to influence liquefaction potential include soil type and grain size, relative density, groundwater level, confining pressures, and both intensity and duration of ground shaking. In general, materials that are susceptible to liquefaction are loose, saturated granular soils having low fines content under low confining pressures.

Based on our exploratory excavations, an encountered groundwater depth of seven feet was used in our analysis. The soil profiles identified within B-2 and B-3 was also used. A mean magnitude weighted (Mw) seismic event of 6.68 was obtained using the USGS deaggregation web application based on a 2% exceedance in 50 years and was incorporated into the analysis. A PGA_M value of 0.459 was obtained from the USGS website and incorporated the 2010 ASCE 7 (with March 2013 errata) Provisions. GeoTek has re-evaluated the liquefaction potential of the on-site soils with the above updated values to represent site accelerations using the computer program LiquefyPro Version 5.

The results of the analyses indicated that portions of the soils within borings B-2 and B-3 are potentially susceptible to soil liquefaction during the design-level earthquake. A seismic-induced total settlement ranging from about 1.5 to 2.5 inches is estimated with an estimated differential seismic-induced settlement of about 0.75 to 1.25 inches over a 40-foot span. These magnitudes of estimated seismic-induced settlements are within limits recommended within SP-117A where structural mitigation is possible. Therefore, it is our opinion that deep ground improvement is not warranted. Surface manifestation (i.e. sand boils) is not anticipated should liquefaction occur. The results of the liquefaction analyses are presented within Appendix C.

4.6 OTHER SEISMIC HAZARDS

Evidence of ancient landslides or slope instabilities at this site was not observed during our investigation. Thus, the potential for landslides is considered negligible. Mitigation of an area of landslide debris previously identified just south of Lots 1 and 2 at the site (SCS&T, 1988a) is reported to have been subsequently removed/stabilized by SCS&T (1988d).

The potential for secondary seismic hazards such as a seiche or tsunami is considered negligible due to site elevation and distance to an open body of water.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL

Development of the site appears feasible from a geotechnical viewpoint. Specific recommendations for site development cannot be provided at the present time, since site development plans are not available. The following sections present general recommendations only. More specific geotechnical recommendations for site development can be provided when site development plans are available for review and may be dependent on some additional field exploration. The following recommendations should be incorporated into the design and construction phases of development.

5.2 EARTHWORK CONSIDERATIONS

Earthwork and grading should be performed in accordance with the applicable grading ordinances of the City of Carlsbad and/or County of San Diego, the 2016 California Building Code (CBC), and recommendations contained in this report. Site grading plans should be reviewed by this office when they become available. Additional recommendations will likely be offered subsequent to review of these plans.

5.2.1 Site Clearing and Preparation

In areas of planned grading or improvements, the site should be cleared of existing improvements, vegetation, roots, trash and debris, and properly disposed of offsite. Voids resulting from razing any improvements should be replaced with engineered fill materials with expansion characteristics similar to the on-site materials.

5.2.2 Removals

As a minimum, the upper two feet of existing fill soils should be completely removed within the structural grading limits. Exposed conditions should be observed and tested by a representative of GeoTek at that time to confirm suitable existing engineered fill soils are present prior to fill placement. Additional removals may be recommended if bedrock or unsuitable materials are exposed. Structural elements (i.e. footings for the proposed building structures) should be underlain by a minimum of six feet of engineered fill, or a minimum of eight feet from finish grade elevations, whichever is deeper. Removals should extend down and away from foundation elements at a 1:1 projection, to the recommended removal depth.

Development plans should be reviewed by this firm when available. Recommendations for the anticipated various site structures may differ depending on the loading conditions imposed by the buildings. Depending on actual field conditions encountered during grading, locally deeper areas of removal may be recommended. The bottom of all removals should be scarified to a minimum depth of eight inches, brought to above optimum moisture content, and then recompacted to minimum project standards prior to fill placement. The bottoms of remedial excavations should be observed by a GeoTek representative prior to scarification.

5.2.3 Fills

The on-site soils are considered suitable for reuse as engineered fill provided they are free from vegetation, debris and other deleterious material. The undercut areas should be brought to final subgrade elevations with fill materials that are placed and compacted in general accordance with minimum project standards. Fill materials should be placed at above optimum moisture content and should be compacted to a minimum relative compaction of 90% as determined by ASTM Test Method D 1557. Additional recommendations pertaining to fill placement is presented in Appendix D.

Any proposed cut or fill slopes will need to be further evaluated when site development plans become available. Fill slopes constructed at gradients of 2:1, in accordance with code requirements, are anticipated to be both grossly and surficially stable.

5.2.4 Excavation Characteristics

Excavation in the on-site soil materials is expected to be easy using heavy-duty grading equipment in good operating conditions.

All temporary excavations for grading purposes and installation of underground utilities should be constructed in accordance with local and Cal-OSHA guidelines. Temporary excavations within the on-site materials should be stable at 1:1 (H:V) inclinations for cuts less than five feet in height.

5.2.5 Shrinkage and Subsidence

Several factors will impact earthwork balancing on the site, including shrinkage, bulking, subsidence, trench spoil from utilities and footing excavations, as well as the accuracy of topography.

Shrinkage, bulking and subsidence are primarily dependent upon the degree of compactive effort achieved during construction. For planning purposes, a shrinkage factor of 0 to 5 percent may be considered for the materials requiring removal and/or recompaction. Site balance areas should be available in order to adjust project grades, depending on actual field conditions at the conclusion of site earthwork construction. Subsidence and bulking are not considered to be significant factors with the underlying materials within the vicinity of the anticipated construction.

5.2.6 Trench Excavations and Backfill

Temporary excavations within the on-site materials should be stable at 1:1 inclinations for short durations during construction, and where cuts do not exceed 10 feet in height. Temporary cuts to a maximum height of 4 feet can be excavated vertically.

Trench excavations should conform to Cal-OSHA regulations. The contractor should have a competent person, per OSHA requirements, on site during construction to observe conditions and to make the appropriate recommendations.

Utility trench backfill should be compacted to at least 90% relative compaction (as determined per ASTM D 1557). Under-slab trenches should also be compacted to project specifications. Where applicable, based on jurisdictional requirements, the top 12 inches of backfill below subgrade for road pavements should be compacted to at least 95 percent relative compaction. On-site materials may not be suitable for use as bedding material, but should be suitable as backfill provided particles larger than 6± inches are removed.
Compaction should be achieved with a mechanical compaction device. Ponding or jetting of trench backfill is not recommended. If backfill soils have dried out, they should be thoroughly moisture conditioned prior to placement in trenches

5.3 DESIGN RECOMMENDATIONS

5.3.1 Foundation Design Criteria

Foundation design criteria for a conventional foundation system, in general conformance with the 2016 CBC, are presented below. These are typical design criteria and are not intended to supersede the design by the structural engineer.

Based on the test results of Expansion Index testing presented in the referenced reports and the results of our testing, the on-site soils near subgrade may be classified as having expansion potential ranging from “low” ($21 \leq EI \leq 50$) to “medium” ($51<EI\leq90$) in accordance with ASTM

D 4829. Additional testing should be performed during grading to further evaluate the expansion potential and plasticity index.

A summary of our foundation design recommendations is presented in the table below:

DESIGN RECOMMENDATIONS FOR CONVENTIONALLY REINFORCED FOUNDATIONS		
DESIGN PARAMETER	**"Low" Expansion Potential**	**"Medium" Expansion Potential**
Minimum Exterior Footing Depth (inches below lowest adjacent grade)	One-Story – 12 Two/Three-Story – 18	One-Story – 18 Two/Three-Story – 18
Minimum Interior Footing Depth (inches below lowest adjacent grade)	One-Story – 12 Two/Three-Story – 18	One-Story – 12 Two/Three-Story – 18
Minimum Foundation Width (Inches)*	Supporting One Floor – 12 Supporting Two Floors – 15 Supporting Three Floors - 18	Supporting One Floor – 12 Supporting Two Floors – 15 Supporting Three Floors - 18
Minimum Slab Thickness (inches)	4	4
Minimum Slab Reinforcing	No. 3 rebar 18-inches on-center, each way, placed in middle 1/3 of slab thickness	No. 3 rebar 12-inches on-center, each way, placed in middle 1/3 of slab thickness
Minimum Footing Reinforcement	Two No. 4 Reinforcing Bars, one top and one bottom	Four No. 4 Reinforcing Bars, two top and two bottom
Effective Plasticity Index (assumed)**	20	25
Presaturation of Subgrade Soil (Percent of Optimum)	Minimum 110% to a depth of 12 inches	Minimum 120% to a depth of 12 inches

*Code minimums per Table 1809.7 of the 2016 CBC should be complied with.
**Effective Plasticity Index should be verified during lot rough grading, since no prior testing was performed.

It should be noted that the above recommendations are based on soil support characteristics only. The structural engineer should design the slab and beam reinforcement based on actual loading conditions. If desired, recommendations for post-tensioned foundations can be provided.

The following additional criteria for design of foundations are presented:

- An allowable bearing capacity of 1,500 pounds per square foot (psf) may be used for design of continuous and perimeter footings 12 inches deep and 12 inches wide, and pad footings 24 inches square and 12 inches deep. This value may be increased by 250 pounds per square foot for each additional 12 inches in depth and 100 pounds per square foot for each additional 12 inches in width to a maximum value of 2,500 psf.

The passive earth pressure may be computed as an equivalent fluid having a density of 250 psf per foot of depth, to a maximum earth pressure of 2,500 psf for footings founded on engineered fill. A coefficient of friction between soil and concrete of 0.25 may be used with dead load forces. The upper one foot of soil below the adjacent grade should not be used in calculating passive pressure. When combining passive and frictional resistance, the passive pressure component should also be reduced by one-third.

The above values may be increased as allowed by Code to resist short-term transient loads (e.g. seismic and wind loads).

- A grade beam, 12 inches wide, should be utilized across large opening or garage entrances. The base of the grade beam should be at the same elevation as the bottom of the adjoining footings (minimum 12 inches in depth).

- A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these are provided in the 2015 California Green Building Standards Code (CALGreen) Section 4.505.2, the 2016 CBC Section 1907.1, ACI 360R-10 and ACI 203.2R-06.

  It should be realized that the effectiveness of the vapor retarding membrane can be adversely impacted as a result of construction related punctures (e.g. stake penetrations, tears, punctures from walking on the vapor retarder placed atop the underlying aggregate layer, etc.). These occurrences should be limited as much as possible during construction. Thicker membranes are generally more resistant to accidental puncture than thinner ones. Products specifically designed for use as moisture/vapor retarders may also be more puncture resistant. Although the CBC specifies a six mil vapor retarder membrane, it is GeoTek's opinion that a minimum 10 mil thick membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional.

  Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and environmental conditions. Ultimately, the vapor retarding system should be comprised of suitable elements to limited migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties (i.e. thickness, composition, strength, and permeability) to achieve the desired performance level. Consideration should be given to consulting with an individual processing specific expertise in this area for additional evaluation.

Moisture retarders can reduce, but not eliminate moisture vapor rise from the underlying soils up through the slab. Moisture retarder systems should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Concrete Institute, ASTM and California Building Code requirements and guidelines.

GeoTek does not practice in the field of moisture vapor transmission evaluation/mitigation, since that practice is not a geotechnical discipline. Therefore, we recommend that a qualified person, such as the flooring contractor, structural engineer, architect, and/or other experts specializing in moisture control within the building be consulted to evaluate the general and specific moisture vapor transmission paths and associated potential impact on the proposed construction. That person (or persons) should provide recommendations relative to the slab moisture and vapor retarder systems and for mitigation of potential adverse impact of moisture vapor transmission on various components of the structures, as deemed appropriate. In addition, the recommendations in this report and our services in general are not intended to address mold prevention; since we, along with geotechnical consultants in general, do not practice in the area of mold prevention. If specific recommendations addressing potential mold issues are desired, then a professional mold prevention consultant should be contacted.

Miscellaneous Foundation Recommendations

- Isolated exterior footings should be tied back to the main foundation system in two orthogonal directions with either reinforced grade-beams and/or continuous footing, to provide a more rigid and monolithic shallow foundation system.

- To minimize moisture penetration beneath the slab on grade areas, utility trenches should be backfilled with lean concrete or concrete slurry where they intercept the perimeter footing or thickened slab edge.

- Soils from the footing excavations should not be placed in the slab-on-grade areas unless properly compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement.

- Under-slab utility trenches should be compacted to project specifications. Compaction should be achieved with a mechanical compaction device. If backfill soils have dried out, they should be thoroughly moisture conditioned prior to placement in trenches.

- Utility trench excavations should be shored or laid back in accordance with applicable CAL/OSHA standards.

- On-site materials may not be suitable for use as bedding material, but will be suitable as backfill. Jetting of native soils will not be acceptable.

Foundation Set Backs

Where applicable, the following setbacks should apply to all foundations. Any improvements not conforming to these setbacks may be subject to lateral movements and/or differential settlements:

- The outside bottom edge of all footings should be set back a minimum of H/3 (where H is the slope height) from the face of any descending slope. The setback should be at least seven feet and need not exceed 40 feet.

- The bottom of all footings for structures near retaining walls should be deepened so as to extend below a 1:1 projection upward from the bottom inside edge of the wall stem.

- The bottom of any existing foundations for structures should be deepened so as to extend below a 1:1 projection upward from the bottom of the nearest excavation.

5.3.2 Soil Corrosivity

The soil resistivity at this site was tested in the laboratory on a sample collected during the field exploration. The results of the testing indicate that the soil sample was considered "severely corrosive" to "corrosive" to buried ferrous metals in accordance with current standards commonly used by corrosion engineers. These characteristics are considered typical of soils commonly found in southern California. Consideration should be given to consulting with a corrosion engineer.

5.3.3 Soil Sulfate Content

The sulfate content was determined in the laboratory for a representative on-site soil sample. The results indicate that the water-soluble sulfate range is less than 0.1 percent by weight, which is considered "not applicable" (i.e. negligible) as per Table 4.2.1 of ACI 318. Based upon the test results, no special concrete mix design is required by Code for sulfate attack resistance. Additional testing should be completed as part of precise site grading. Final concrete mix design should be bore on these results.

5.3.4 Import Soils

Import soils should have expansion characteristics similar to the on-site soils. GeoTek also recommends that, as a minimum, proposed import soils be tested for soluble sulfate content. GeoTek should be notified a minimum of 72 hours of potential import sources so that appropriate sampling and laboratory testing can be performed.

5.3.5 Preliminary Pavement Design

Preliminary pavement design recommendations are based on sampling and R-Value testing of the street subgrade soils and Traffic Index (TI) values for local and collector streets in accordance with City of Carlsbad Supplemental Standard No. GS-17, *Structural Section of Streets and Alleys*. Based on the *Preliminary Grading Plan* prepared by Fuscoe Engineering and with a plot date of March 22, 2017, asphaltic concrete (AC) is proposed.

GeoTek recently obtained one near surface soil samples from along the alignments of the interior streets within the subject tract for R-Value testing. The testing (by others) indicated an R-Value of 5 or less. A copy of the laboratory testing results is included in Appendix B.

The table below provides the street area, associated TI and the recommended minimum pavement section for the subject project.

Location	Assigned Traffic Index (TI)	Design R-Value	Recommended Minimum Section - Asphaltic Concrete/Aggregate Base (inches)
Local Streets	5.0	5 or less	5.0/6.0
Collectors	6.0	5 or less	5.0/10.0

The pavement sections are subject to the review and approval by the City of Carlsbad. Performance of the pavement sections will ultimately be based largely on construction methods, traffic loading and subgrade performance.

All pavement installation, including preparation and compaction of subgrade and base material and placement and rolling of asphaltic concrete, should be done in accordance with the City of Carlsbad specifications, and under the observation and testing of GeoTek and a City inspector where required.

The aggregate base should consist of crushed rock with an R-Value and gradation in accordance with Crushed Aggregate Base per the “Greenbook." Minimum compaction requirements should be 95 percent for subgrade and 95 percent for aggregate base, as per ASTM D 1557 (modified proctor). Jurisdictional minimum compaction requirements in excess of the aforementioned minimums may govern. The upper 12 inches of subgrade should be moisture-conditioned to at least the optimum moisture content.

5.3.6 Concrete Flatwork

Exterior Concrete Slabs, Sidewalks and Driveways

Exterior concrete slabs, sidewalks and driveways should be designed using a four inch minimum thickness. No specific reinforcement is required due to the non-structural nature. However, the use of some reinforcement should be considered. Recommendations can be provided upon request. Some shrinkage and cracking of the concrete should be anticipated as a result of typical mix designs and curing practices commonly utilized in residential construction.

Sidewalks and driveways may be under the jurisdiction of the governing agency. If so, jurisdictional design and construction criteria would apply, if more restrictive than the recommendations presented herein.

Subgrade soils, classified as having "low" to "medium" expansion potential, should be pre-moistened prior to placing concrete. The subgrade soils below exterior slabs, sidewalks, driveways, etc. at the subject site should be pre-saturated to a minimum of 120% of optimum moisture content to a depth of 12 inches.

While most distress of flatwork related to the effects of expansive soils is cosmetic in nature, it can be aesthetically unpleasing and undesirable. Concrete flatwork related recommendations in addition to the above minimums can be provided if additional measures intended to reduce the potential effects of expansive soils are desired.

All concrete installation, including preparation and compaction of subgrade, should be done in accordance with the City of Carlsbad/County of San Diego specifications, and under the observation and testing of GeoTek and a City Inspector, if necessary.

Concrete Performance

Concrete cracks should be expected. These cracks can vary from sizes that are essentially unnoticeable to more than 1/8 inch in width. Most cracks in concrete, while unsightly, do not significantly impact long-term performance. While it is possible to take measures (proper concrete mix, placement, curing, control joints, reinforcement, etc.) to reduce the extent and size of cracks that occur, some cracking will occur despite the best efforts to minimize it. Concrete can also undergo chemical processes that are dependent on a wide range of variables, which are difficult, at best, to control. Concrete, while seemingly a stable material, is also subject to internal expansion and contraction due to external changes over time.

One of the simplest means to control cracking is to provide weakened control joints for cracking to occur along. These do not prevent cracks from developing; they simply provide a relief point for the stresses that develop. These joints are a widely accepted means to control cracks but are not always effective. Control joints are more effective the more closely spaced they are. GeoTek suggests that control joints be placed in two directions and located a distance apart roughly equal to 24 to 36 times the slab thickness.

Exterior concrete flatwork (patios, walkways, driveways, etc.) is often some of the most visible aspects of site development. They are typically given the least level of quality control, being considered "non-structural" components. We suggest that the same standards of care be applied to these features as to the structure itself.

5.4 POST CONSTRUCTION CONSIDERATIONS

5.4.1 Landscape Maintenance and Planting

Water has been shown to weaken the inherent strength of soil, and slope stability is significantly reduced by overly wet conditions. Positive surface drainage away from graded slopes should be maintained and only the amount of irrigation necessary to sustain plant life should be provided for planted slopes. Controlling surface drainage and runoff, and maintaining a suitable vegetation cover can minimize erosion. Plants selected for landscaping should be lightweight, deep-rooted types that require little water and are capable of surviving the prevailing climate.

Overwatering should be avoided. The soils should be maintained in a solid to semi-solid state as defined by the materials Atterberg Limits. Care should be taken when adding soil amendments to avoid excessive watering. Leaching as a method of soil preparation prior to planting is not recommended. An abatement program to control ground-burrowing rodents should be implemented and maintained. This is critical as burrowing rodents can decreased the long-term performance of slopes.

It is common for planting to be placed adjacent to structures in planter or lawn areas. This will result in the introduction of water into the ground adjacent to the foundation. This type of landscaping should be avoided. If used, then extreme care should be exercised with regard to the irrigation and drainage in these areas.

5.4.2 Drainage

The need to maintain proper surface drainage and subsurface systems cannot be overly emphasized. Positive site drainage should be maintained at all times. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and not allowed to pond or seep into the ground. Pad drainage should be directed toward approved area(s) and not be blocked by other improvements.

It is the owner's responsibility to maintain and clean drainage devices on or contiguous to their lot. In order to be effective, maintenance should be conducted on a regular and routine schedule and necessary corrections made prior to each rainy season.

5.5 PLAN REVIEW AND CONSTRUCTION OBSERVATIONS

We recommend that site grading, geotechnical related project specifications, pool, and foundation plans be reviewed by this office prior to construction to check for conformance with the recommendations of this report. We also recommend that GeoTek representatives be present during site grading and foundation construction to check for proper implementation of the geotechnical recommendations. The owner/developer should verify that GeoTek representatives perform at least the following duties:

- Observe site clearing and grubbing operations for proper removal of all unsuitable materials.
- Observe and test bottom of removals prior to fill placement.
- Evaluate the suitability of on-site and import materials for fill placement, and collect soil samples for laboratory testing where necessary.
- Observe the fill for uniformity during placement, including utility trenches.
- Perform field density testing of the fill materials.
- Observe and probe foundation excavations to confirm suitability of bearing materials.

If requested, a construction observation and compaction report can be provided by GeoTek, which can comply with the requirements of the governmental agencies having jurisdiction over the project. We recommend that these agencies be notified prior to commencement of construction so that necessary grading permits can be obtained.

6. INTENT

It is the intent of this report to aid in the design and construction of the proposed development. Implementation of the advice presented in Section 5 of this report is intended to reduce risk associated with construction projects. The professional opinions and geotechnical advice contained in this report are not intended to imply total performance of the project or guarantee that unusual or variable conditions will not be discovered during or after construction.

The scope of our evaluation is limited to the boundaries of the subject residential development. This review does not and should in no way be construed to encompass any areas beyond the specific area of the proposed construction as indicated to us by the client. Further, no evaluation of any existing site improvements is included. The scope is based on our understanding of the project and the client's needs, our fee estimate (P-0701617) dated

July 12, 2017 and geotechnical engineering standards normally used on similar projects in this region.

7. LIMITATIONS

The materials observed on the project site appear to be representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during site construction. Site conditions may vary due to seasonal changes or other factors. GeoTek, Inc. assumes no responsibility or liability for work, testing or recommendations performed or provided by others.

Since our recommendations are based on the site conditions observed and encountered, and laboratory testing, our conclusion and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty is expressed or implied. Standards of practice are subject to change with time.

8. SELECTED REFERENCES

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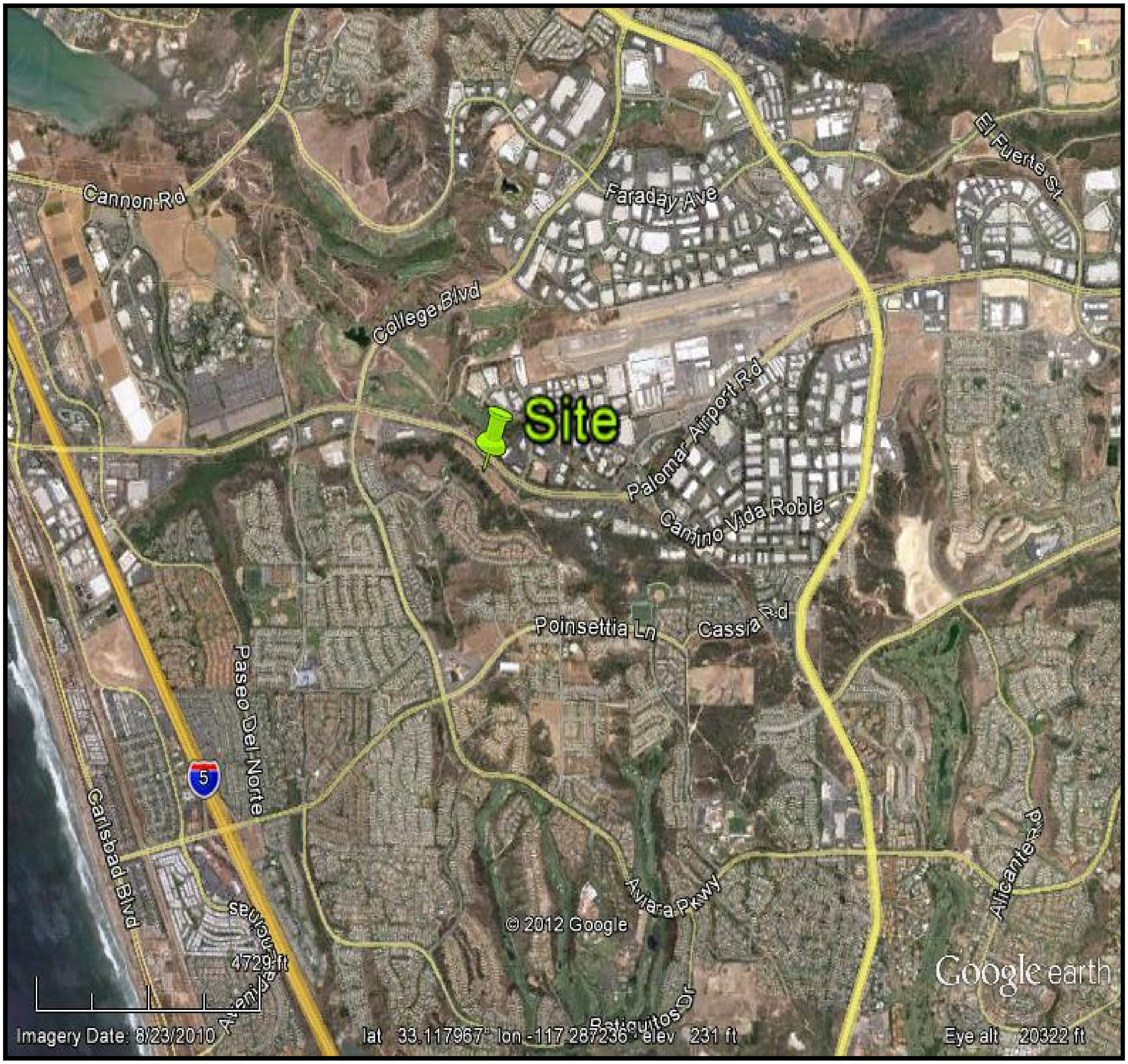

Integral Communities
Palomar Oaks II
APN's 212-110-01, -02, -03, -04, -05, -06, -07, -08 and 212-040-26
City of Carlsbad, San Diego County, California
GeoTek Project No. 0934-CR3

N

Figure 1

Site Location Map

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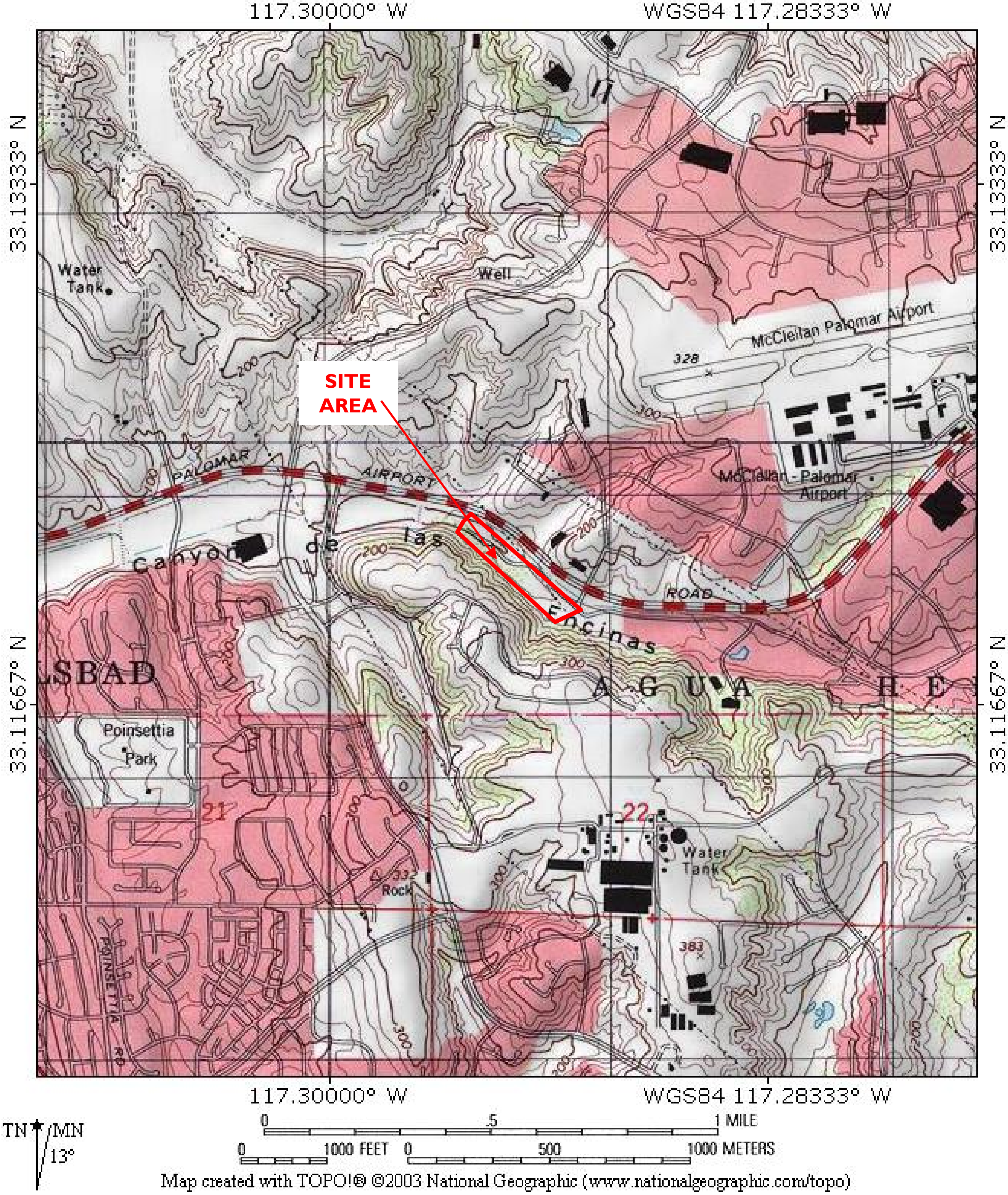

Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)

Integral Communities
Palomar Oaks II
APN's 212-110-01, -02, -03, -04, -05, -06, -07, -08 and 212-040-26
City of Carlsbad
San Diego County, California
GeoTek Project No. 0934-CR3

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Modified from USGS 7.5 Topographic Map

Figure 2

General Site Topography Map

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LEGEND

T-8	▬	**Approximate Location of Exploratory Trench**
B-4	●	**Approximate Location of Exploratory Boring**

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APN's 212-110-01, -02, -03, -04, -05, -06, -07, -08 and 212-040-26
City of Carlsbad, County of San Diego, California
GeoTek Project No. 0934-CR3

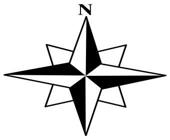

Figure 3

Exploratory Excavation Location Map

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APPENDIX A

EXCAVATION LOGS

West Oaks Project
City of Carlsbad, San Diego County, California
Project No. 0934-CR3

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A - FIELD TESTING AND SAMPLING PROCEDURES

The Standard Penetration Test (SPT)

The SPT is performed in accordance with ASTM Test Method D 1586. The SPT sampler is typically driven into the ground 12 or 18 inches with a 140-pound hammer free falling from a height of 30 inches. Blow counts are recorded for every 6 inches of penetration as indicated on the log of boring. The split-barrel sampler has an external diameter of 2 inches and an unlined internal diameter of 1-3/8 inches. The samples of earth materials collected in the sampler are typically classified in the field, bagged, sealed and transported to the laboratory for further testing.

The Modified Split-Barrel Sampler (Ring)

The ring sampler is driven into the ground in accordance with ASTM Test Method D 3550. The sampler, with an external diameter of 3.0 inches, is lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sampler is typically driven into the ground 12 or 18 inches with a 140-pound hammer free falling from a height of 30 inches. Blow counts are recorded for every 6 inches of penetration as indicated on the log of boring. The samples are removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

Bulk Samples (Large)

These samples are normally large bags of earth materials over 20 pounds in weight collected from the field by means of hand digging or exploratory cuttings.

Bulk Samples (Small)

These are plastic bag samples which are normally airtight and contain less than 5 pounds in weight of earth materials collected from the field by means of hand digging or exploratory cuttings. These samples are primarily used for determining natural moisture content and classification indices.

B – BORING/TRENCH LOG LEGEND

The following abbreviations and symbols often appear in the classification and description of soil and rock on the logs of borings/trenches:

SOILS

USCS	Unified Soil Classification System
f-c	Fine to coarse
f-m	Fine to medium

GEOLOGIC

B: Attitudes	Bedding: strike/dip
J: Attitudes	Joint: strike/dip
C: Contact line	
………..	Dashed line denotes USCS material change
———	Solid Line denotes unit / formational change
━━━	Thick solid line denotes end of boring/trench

(Additional denotations and symbols are provided on the log of borings/trenches)

GeoTek, Inc.
LOG OF EXPLORATORY BORING

CLIENT: Integral Communities
PROJECT NAME: West Oaks, Carlsbad
PROJECT NO.: 0934-CR3
LOCATION: See Boring Location Map
DRILLER: Pacific Drilling
DRILL METHOD: 8" Hollow Stem
HAMMER: Auto 140#/30"
LOGGED BY: EL
OPERATOR: Gordy
RIG TYPE: CME 75
DATE: 12/7/2012

BORING NO.: B-1

Depth (ft)	SAMPLES Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing Water Content (%)	Dry Density (pcf)	Others
	☒			SM	**Artificial fill:** Clayey silty SAND, light brown, mottled, moist, medium dense			
5	■	8 10 15	B1-5'		SAME	15.1	113.0	
10	■	4 9 11	B1-10'	SC	**Alluvium:** Silty clayey SAND, dark brown, mottled, moist, medium dense	17.4	107.0	Fines content = 27%
15	■	4 8 12	B1-15'	CL	Silty CLAY, dark gray brown, moist to very moist, stiff to very stiff	18.1	110.2	
20 ▽	■	3 6 6	B1-20'	CL	becomes brown, mottled, very moist, groundwater encountered @ 20'	20.5	105.2	HC
25	■	4 7 8	B1-25'		SAME	24.3	103.5	HC
30	■	6 8 9	B1-30'	CL	Silty sandy CLAY, medium brown, mottled, very moist, stiff, some pieces of siltstone	23.7	103.5	

LEGEND

Sample type: ■ ---Ring ▨ ---SPT ⧄ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ▽ ---Water Table

Lab testing:
AL = Atterberg Limits
EI = Expansion Index
SA = Sieve Analysis
RV = R-Value Test
SR = Sulfate/Resisitivity Test
SH = Shear Test
HC= Consolidation
MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Integral Communities	**DRILLER:**	Pacific Drilling	**LOGGED BY:**	EL
PROJECT NAME:	West Oaks - Carlsbad	**DRILL METHOD:**	8" Hollow Stem	**OPERATOR:**	Gordy
PROJECT NO.:	0934-CR3	**HAMMER:**	Auto 140#/30"	**RIG TYPE:**	CME 75
LOCATION:	See Boring Location Map			**DATE:**	12/7/2012

BORING NO.: B-1 (continued)

Depth (ft)	SAMPLES Sample Type	 Blows/ 6 in	 Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing Water Content (%)	 Dry Density (pcf)	 Others
30					**continued:**	23.7	103.5	
35	■	7 11 20	B4-35'	ML	**Bedrock:** Sandy clayey SILTSTONE, gray, mottled, moist	21.6	105.6	
40	■	8 9 10	B4-40'		SAME			
					BORING TERMINATED AT 41.5 FEET Groundwater encountered at 20 feet below existing ground surface. Boring backfilled with soil cuttings and capped with bentonite chips.			
45								
50								
55								
60								

LEGEND

Sample type: ■ ---Ring ▮ ---SPT ◸ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ▽ ---Water Table

Lab testing:

AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test
SR = Sulfate/Resisitivity Test	SH = Shear Test	HC= Consolidation	MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Integral Communities	**DRILLER:**	Pacific Drilling	**LOGGED BY:**	NW
PROJECT NAME:	West Oaks, Carlsbad	**DRILL METHOD:**	8" Hollow Stem	**OPERATOR:**	Gordy
PROJECT NO.:	0934-CR3	**HAMMER:**	Auto 140#/30"	**RIG TYPE:**	CME 75
LOCATION:	See Boring Location Map			**DATE:**	12/7/2012

Depth (ft)	SAMPLES			USCS Symbol	**BORING NO.: B-2**	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number		**MATERIAL DESCRIPTION AND COMMENTS**	Water Content (%)	Dry Density (pcf)	Others
	☒			SC	**Artificial fill:** Silty clayey SAND, lt. brown, mottled, dry to moist, loose to med. dense			MD, EI, SR
5	■	8 8 10	B1-5'		**Alluvium:** Silty clayey SAND, brown orange mottled, moist	17.8	106.6	
▽					Groundwater encountered			
10	■	4 5 7	B1-10'	CL	Sandy CLAY, gray, wet, firm to stiff,	23.7	98.8	HC
15	■	3 8 2	B1-15'	SP	Silty SAND, light brown/olive, moist, loose	20.7	106.5	Fines content = 16% HC
20	■	6 11 14	B1-20'	CL	**Highly weathered bedrock:** Sandy silty CLAY, mottled gray, silty sandstone, very moist, very stiff	19.9	107.6	
25	■	6 11 11	B1-25'		becomes stiff to very stiff	24.5	99.2	HC
					BORING TERMINATED AT 26.5 FEET			
					Groundwater encountered at seven (7) feet below existing ground surface. Boring backfilled with soil cuttings and capped with bentonite chips.			
30								

LEGEND

Sample type: ■ ---Ring ▮ ---SPT ⧄ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ▽ ---Water Table

Lab testing:

AL = Atterberg Limits
EI = Expansion Index
SA = Sieve Analysis
RV = R-Value Test
SR = Sulfate/Resisitivity Test
SH = Shear Test
HC= Consolidation
MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY BORING

CLIENT: Integral Communities
PROJECT NAME: West Oaks, Carlsbad
PROJECT NO.: 0934-CR3
LOCATION: See Boring Location Map
DRILLER: Pacific Drilling
DRILL METHOD: 8" Hollow Stem
HAMMER: Auto 140#/30"
LOGGED BY: EL
OPERATOR: Gordy
RIG TYPE: CME 75
DATE: 12/7/2012

	SAMPLES				BORING NO.: B-3	Laboratory Testing		
Depth (ft)	Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Water Content (%)	Dry Density (pcf)	Others
	☒			CL	**Artificial fill:** Silty sandy CLAY, mottled light brown, dry to moist, soft to firm			MD, EI, SR
5 ▽	■	5 8 9	B1-5'	CL	**Alluvium:** Silty sandy CLAY, light brown to gray, moist, firm to stiff @ 7 bgs Groundwater encountered	18.2	107.1	HC
10	■	7 9 13	B1-10'		Silty CLAY, medium to dark gray brown, moist, stiff	21.5	105.5	HC
15	■	6 11 12	B1-15'		becomes very stiff	19.4	108.6	
20	■	11 9 12	B1-20'		SAME, silty sand lense, yellow brown, sand is saturated	20.0	105.4	Fines content = 46%
25	■	7 13 17	B1-25'	SM	Silty SAND, yellow brown, saturated, medium dense	17.9	113.2	
30	▮	3 5 6		SC	Silty clayey SAND, mottled gray, brown and green, SPT sample, medium dense			

LEGEND

Sample type: ■ ---Ring ▮ ---SPT ⧄ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ▽ ---Water Table

Lab testing:
AL = Atterberg Limits
SR = Sulfate/Resisitivity Test
EI = Expansion Index
SH = Shear Test
SA = Sieve Analysis
HC= Consolidation
RV = R-Value Test
MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY BORING

CLIENT: Integral Communities
PROJECT NAME: West Oaks - Carlsbad
PROJECT NO.: 0934-CR3
LOCATION: See Boring Location Map

DRILLER: Pacific Drilling
DRILL METHOD: 8" Hollow Stem
HAMMER: Auto 140#/30"

LOGGED BY: EL
OPERATOR: Gordy
RIG TYPE: CME 75
DATE: 12/7/2012

BORING NO.: B-3 (continued)

	SAMPLES					Laboratory Testing		
Depth (ft)	Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Water Content (%)	Dry Density (pcf)	Others
30					**continued:**			
35	▮	5 6 6	B4-35'	CL	**Highly weathered bedrock:** Sandy silty CLAYSTONE, mottled yel. brn., moist to very moist, stiff			
					BORING TERMINATED AT 36.5 FEET Groundwater encountered at seven (7) feet below existing ground surface. Boring backfilled with soil cuttings and capped with bentonite chips.			
40								
45								
50								
55								
60								

LEGEND

Sample type: ■ ---Ring ▮ ---SPT ◩ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ▽ ---Water Table

Lab testing:

AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test
SR = Sulfate/Resisitivity Test	SH = Shear Test	HC= Consolidation	MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY BORING

CLIENT: Integral Communities
PROJECT NAME: West Oaks, Carlsbad
PROJECT NO.: 0934-CR3
LOCATION: See Boring Location Map
DRILLER: Pacific Drilling
DRILL METHOD: 8" Hollow Stem
HAMMER: Auto 140#/30"
LOGGED BY: NW
OPERATOR: Gordy
RIG TYPE: CME 75
DATE: 12/7/2012

Depth (ft)	SAMPLES Sample Type	 Blows/ 6 in	 Sample Number	USCS Symbol	**BORING NO.: B-4** **MATERIAL DESCRIPTION AND COMMENTS**	Laboratory Testing Water Content (%)	 Dry Density (pcf)	 Others
	☒			SC	**Artificial fill:** Silty Clayey SAND, olive brown, dry to moist, loose to medium dense			MD, EI, SR
5	▮	5 8 8	B1-5'	SM	**Alluvium:** Clayey silty SAND, gray, moist, medium dense	19.4	105.7	
▽					@7 Groundwater encountered			
10								
15	▮	5 11 11	B1-15'	SM	Silty SAND, orange and grey, moist, medium dense	19.6	108.9	Fines content = 22%
20								
25	▮	5 6 8	B1-25'	CL	Silty sandy CLAY, light brown, wet, occasional gravel clast, firm to stiff	23.3	102.6	
30								

LEGEND

Sample type: ■ ---Ring ▮ ---SPT ◿ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ▽ ---Water Table

Lab testing:
AL = Atterberg Limits
EI = Expansion Index
SA = Sieve Analysis
RV = R-Value Test
SR = Sulfate/Resisitivity Test
SH = Shear Test
HC= Consolidation
MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Integral Communities	**DRILLER:**	Pacific Drilling	**LOGGED BY:**	EL
PROJECT NAME:	West Oaks - Carlsbad	**DRILL METHOD:**	8" Hollow Stem	**OPERATOR:**	Gordy
PROJECT NO.:	0934-CR3	**HAMMER:**	Auto 140#/30"	**RIG TYPE:**	CME 75
LOCATION:	See Boring Location Map			**DATE:**	12/7/2012

	SAMPLES				**BORING NO.: B-4 (continued)**	Laboratory Testing		
Depth (ft)	Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	**MATERIAL DESCRIPTION AND COMMENTS**	Water Content (%)	Dry Density (pcf)	Others
30					**continued:**			
35	■	5 5 8	B4-35'	CL	**Highly weathered bedrock:** Sandy silty CLAY, mottled olive green and grey, wet, firm to stiff	27.8	96.7	
40								
45	■		B4-40'		SAME, no recovery			
					BORING TERMINATED AT 46.5 FEET Groundwater encountered at seven (7) feet below existing ground surface. Boring backfilled with soil cuttings and capped with bentonite chips.			
50								
55								
60								

LEGEND

Sample type: ■ ---Ring ▮ ---SPT ◪ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ▽ ---Water Table

Lab testing:

AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test
SR = Sulfate/Resisitivity Test	SH = Shear Test	HC= Consolidation	MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.: 0934-CR3
LOGGED BY: NW
PROJECT NAME: West Oaks, Carlsbad
EQUIPMENT: Backhoe
CLIENT: Integral Communities
DATE: 12/11/2012
LOCATION: See Trench Location Map

Depth (ft)	SAMPLES		USCS Symbol	TRENCH NO.: T-1 MATERIAL DESCRIPTION AND COMMENTS	Field Testing		Laboratory Testing
	Sample Type	Sample Number			Water Content (%)	Dry Density (pcf)	Others
				~~Artificial Fill Soils:~~			
			SC	Clayey SAND (SC), light brown, mottled, moist, medium dense			
	☒	T1-1			8.4		
	☒	T1-2			12.7		
5							
10				TRENCH TERMINATED AT 10 FEET			
				No groundwater encountered. No caving. Backfilled with trench spoils.			
15							

LEGEND

Sample Type: ■ --- Ring Sample ☒ --- Bulk Sample ▽ ---Water Table

Laboratory Testing:
AL = Atterberg Limits
EI = Expansion Index
MD = Maximum Density
SA = Sieve Analysis
SR = Sulfate/Resistivity Test
SH = Shear Testing
RV = R-Value Test
CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.: 0934-CR3
LOGGED BY: NW
PROJECT NAME: West Oaks, Carlsbad
EQUIPMENT: Backhoe
CLIENT: Integral Communities
DATE: 12/11/2012
LOCATION: See Trench Location Map

TRENCH NO.: T-2

Depth (ft)	SAMPLES		USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Field Testing		Laboratory Testing
	Sample Type	Sample Number			Water Content (%)	Dry Density (pcf)	Others
				~~**Artificial Fill Soils:**~~			
			SC	Clayey SAND (SC), light brown, mottled, moist, medium dense			
	☒	T2-1			10.1		
	☒	T2-2			12.6		
				TRENCH TERMINATED AT 4 FEET			
5				No groundwater encountered. No caving. Backfilled with trench spoils.			
10							
15							

LEGEND

Sample Type: ▨ --- Ring Sample ☒ --- Bulk Sample ∇ ---Water Table

Laboratory Testing:
AL = Atterberg Limits
EI = Expansion Index
MD = Maximum Density
SA = Sieve Analysis
SR = Sulfate/Resistivity Test
SH = Shear Testing
RV = R-Value Test
CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.: 0934-CR3
PROJECT NAME: West Oaks, Carlsbad
CLIENT: Integral Communities
LOCATION: See Trench Location Map
LOGGED BY: NW
EQUIPMENT: Backhoe
DATE: 12/11/2012

	SAMPLES			TRENCH NO.: T-3	Field Testing		Laboratory Testing
Depth (ft)	Sample Type	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Water Content (%)	Dry Density (pcf)	Others
			SC	**~~Artificial Fill Soils:~~** Clayey SAND (SC), light brown mottled, moist, medium dense			
	☒	T3-1			10.3		
	☒	T3-2			13.4		
5				**~~Alluvium:~~** Clayey SAND, light brown mottled, moist to saturated with depth, medium dense			
▽ 10				@10', Groundwater encountered			
				TRENCH TERMINATED AT 10.5 FEET Groundwater encountered at 10 feet below existing ground surface. No caving. Backfilled with trench spoils.			
15							

LEGEND

Sample Type: ▩ --- Ring Sample ☒ --- Bulk Sample ▽ ---Water Table

Laboratory Testing:

AL = Atterberg Limits
EI = Expansion Index
MD = Maximum Density
SA = Sieve Analysis
SR = Sulfate/Resistivity Test
SH = Shear Testing
RV = R-Value Test
CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.: 0934-CR3
PROJECT NAME: West Oaks, Carlsbad
CLIENT: Integral Communities
LOCATION: See Trench Location Map
LOGGED BY: NW
EQUIPMENT: Backhoe
DATE: 12/11/2012

Depth (ft)	SAMPLES		USCS Symbol	TRENCH NO.: T-4 MATERIAL DESCRIPTION AND COMMENTS	Field Testing		Laboratory Testing
	Sample Type	Sample Number			Water Content (%)	Dry Density (pcf)	Others
			SC	**~~Artificial Fill Soils:~~** Clayey SAND (SC), light brown mottled, moist, medium dense			
	☒	T4-1			16.1		
	☒	T4-2			15.7		
5				**~~Alluvium:~~** Clayey SAND, light brown mottled, moist to saturated with depth, medium dense			
▽				@ 8.5' Groundwater encountered			
10				TRENCH TERMINATED AT 10 FEET Groundwater encountered at 8.5 feet below existing ground surface. No caving. Backfilled with trench spoils.			
15							

LEGEND

Sample Type: ▨ --- Ring Sample ☒ --- Bulk Sample ▽ ---Water Table

Laboratory Testing:
AL = Atterberg Limits
EI = Expansion Index
MD = Maximum Density
SA = Sieve Analysis
SR = Sulfate/Resistivity Test
SH = Shear Testing
RV = R-Value Test
CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.: 0934-CR3
LOGGED BY: NW
PROJECT NAME: West Oaks, Carlsbad
EQUIPMENT: Backhoe
CLIENT: Integral Communities
DATE: 12/11/2012
LOCATION: See Trench Location Map

Depth (ft)	SAMPLES		USCS Symbol	TRENCH NO.: T-5	Field Testing		Laboratory Testing
	Sample Type	Sample Number		MATERIAL DESCRIPTION AND COMMENTS	Water Content (%)	Dry Density (pcf)	Others
				~~Artificial Fill Soils:~~			
			SC	Clayey SAND (SC), light brown mottled, moist, medium dense			
	☒	T5-1			8.3		
	☒	T5-2			13.1		
5				**~~Alluvium:~~**			
				Clayey SAND, light brown mottled, moist to saturated with depth, medium dense			
▽				@ 7' Groundwater encountered			
				TRENCH TERMINATED AT 8 FEET			
				Groundwater encountered at seven (7) feet below existing ground surface. No caving. Backfilled with trench spoils.			
10							
15							

LEGEND

Sample Type: ■ --- Ring Sample ☒ --- Bulk Sample ▽ ---Water Table

Laboratory Testing:
AL = Atterberg Limits
EI = Expansion Index
MD = Maximum Density
SA = Sieve Analysis
SR = Sulfate/Resistivity Test
SH = Shear Testing
RV = R-Value Test
CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.: 0934-CR3
PROJECT NAME: West Oaks, Carlsbad
CLIENT: Integral Communities
LOCATION: See Trench Location Map
LOGGED BY: NW
EQUIPMENT: Backhoe
DATE: 12/11/2012

TRENCH NO.: T-6

Depth (ft)	SAMPLES		USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Field Testing		Laboratory Testing
	Sample Type	Sample Number			Water Content (%)	Dry Density (pcf)	Others
			SC	**Artificial Fill Soils:** Clayey SAND (SC), light brown mottled, moist, medium dense			
	☒	T6-1			11.0		
	☒	T6-2			15.7		
5				**Alluvium:** Clayey SAND, light brown mottled, moist to saturated with depth, medium dense @7' Groundwater encountered			
▽							
10				TRENCH TERMINATED AT 10 FEET Groundwater encountered at seven (7) feet below existing ground surface. No caving. Backfilled with trench spoils.			
15							

LEGEND

Sample Type: ■ --- Ring Sample ☒ --- Bulk Sample ▽ ---Water Table

Laboratory Testing:
AL = Atterberg Limits
EI = Expansion Index
MD = Maximum Density
SA = Sieve Analysis
SR = Sulfate/Resistivity Test
SH = Shear Testing
RV = R-Value Test
CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.: 0934-CR3
LOGGED BY: NW
PROJECT NAME: West Oaks, Carlsbad
EQUIPMENT: Backhoe
CLIENT: Integral Communities
DATE: 12/11/2012
LOCATION: See Trench Location Map

Depth (ft)	SAMPLES		USCS Symbol	**TRENCH NO.: T-7**	Field Testing		Laboratory Testing
	Sample Type	Sample Number		**MATERIAL DESCRIPTION AND COMMENTS**	Water Content (%)	Dry Density (pcf)	Others
				Artificial Fill Soils:			
			SC	Clayey SAND (SC), light brown mottled, moist, medium dense			
	☒	T7-1			14.3		
	☒	T7-2			13.2		
5				**Alluvium:**			
				Clayey SAND, light brown mottled, moist to saturated with depth, medium dense			
▽				@ 7.5' Groundwater encountered			
				TRENCH TERMINATED AT 8 FEET			
				Groundwater encountered at 7.5 feet below existing ground surface.			
10				No caving. Backfilled with trench spoils.			
15							

LEGEND

Sample Type: ■ --- Ring Sample ☒ --- Bulk Sample ▽ ---Water Table

Laboratory Testing:
AL = Atterberg Limits
EI = Expansion Index
MD = Maximum Density
SA = Sieve Analysis
SR = Sulfate/Resistivity Test
SH = Shear Testing
RV = R-Value Test
CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.: 0934-CR3
LOGGED BY: NW
PROJECT NAME: West Oaks, Carlsbad
EQUIPMENT: Backhoe
CLIENT: Integral Communities
DATE: 12/11/2012
LOCATION: See Trench Location Map

Depth (ft)	SAMPLES Sample Type	 Sample Number	USCS Symbol	**TRENCH NO.: T-8** **MATERIAL DESCRIPTION AND COMMENTS**	Field Testing Water Content (%)	 Dry Density (pcf)	Laboratory Testing Others
				~~Artificial Fill Soils:~~			
			SC	Clayey SAND (SC), light brown mottled, moist, medium dense			
	☒	T8-1			9.7		
	☒	T8-2		**~~Alluvium:~~** Clayey SAND, light brown mottled, moist to saturated with depth, medium dense	11.1		
5							
▽				@8.5' Groundwater encountered			
10				TRENCH TERMINATED AT 10 FEET Groundwater encountered at 8.5 feet below existing ground surface. No caving. Backfilled with trench spoils.			
15							

LEGEND

Sample Type: ▨ --- Ring Sample ☒ --- Bulk Sample ▽ ---Water Table

Laboratory Testing:

AL = Atterberg Limits
EI = Expansion Index
MD = Maximum Density
SA = Sieve Analysis
SR = Sulfate/Resistivity Test
SH = Shear Testing
RV = R-Value Test
CO = Consolidation

APPENDIX B

LABORATORY TEST RESULTS

West Oaks Project
City of Carlsbad, San Diego County, California
Project No. 0934-CR3

GEOTEK

SUMMARY OF LABORATORY TESTING

Classification

Soils were classified visually in general accordance to the Unified Soil Classification System (ASTM Test Method D 2487). The soil classifications are shown on the log of borings/trenches in Appendix A.

In Situ Moisture Content and Unit Weight

The field moisture content was measured in the laboratory on selected samples collected during the field investigation in general accordance with ASTM Test Method D 2216. The field moisture content is determined as a percentage of the dry unit weight. The dry density was determined in the laboratory on selected ring samples. The results are shown on the logs of exploratory borings and test pits in Appendix A.

Expansion Index

Expansion Index testing was performed on a soil sample. Testing was performed in general accordance with ASTM Test Method D 4829. The result is included herein.

Moisture-Density Relationship

Laboratory testing was performed on samples collected during the subsurface exploration. The laboratory maximum dry density and optimum moisture content for the soil types was determined in general accordance with test method ASTM Test Procedure D 1557. The results are included herein.

Particle Size Analysis

Sieve analyses were performed on selected samples of the site soils in general accordance with ASTM Test Method D 422. The results of this testing is presented on the logs in Appendix A.

Sulfate Content

Analysis to determine the water-soluble sulfate content was performed by others in accordance with California Test No. 417. The results of the testing are included herein.

Resistivity and pH

A representative soil sample was tested by others for resistivity and pH in general accordance with California Test 643. The results of the testing are included herein.

Chloride Content

Testing to determine chloride content of site soils was performed by others in general accordance with California Test No. 422. The results of the testing are included herein.

Consolidation

Consolidation testing was performed on a selected sample of the site soils in general accordance with ASTM Test Method D 2435. The results of this testing are presented herein.

R-Value

R-Value testing was performed by others on a bulk sample collected during the recent site reconnaissance in accordance with CT 301. The results of the testing are included herein.

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EXPANSION INDEX TEST

(ASTM D4829)

Client: Integral Communities

Project Number: 0934-CR3

Project Location: West Oaks Way Project

Tested/ Checked By: DI Lab No Corona

Date Tested: 12/21/2012

Sample Source: B-2 @ 0-5'

Sample Description: Clayey Sand

Ring #:_______ Ring Dia. : 4.01" Ring Ht.1"

Loading weight: 5516. grams

DENSITY DETERMINATION

A	Weight of compacted sample & ring (gm)	749.3
B	Weight of ring (gm)	363.7
C	Net weight of sample (gm)	385.6
D	Wet Density, lb / ft3 (C*0.3016)	116.5
E	Dry Density, lb / ft3 (D/1.F)	**105.2**

SATURATION DETERMINATION

F	Moisture Content, %	10.7
G	Specific Gravity, assumed	2.7
H	Unit Wt. of Water @ 20 °C, (pcf)	62.3
I	% Saturation	**48**

READINGS

DATE	TIME	READING	
12/21/2012	9:05	0.1410	Initial
12/21/2012	9:15	0.1410	10 min/Dry
12/21/2012	9:16	0.1450	1 min/Wet
12/21/2012	9:21	0.1610	5 min/Wet
12/21/2012	13:45	0.2150	Random
12/24/2012	5:15	0.2200	Final

FINAL MOISTURE

Weight of wet sample & tare	Weight of dry sample & tare	Tare	% Moisture
581.6	497.4	154.8	**24.6%**

EXPANSION INDEX = 79

PLATE EI-1

GEOTEK

EXPANSION INDEX TEST

(ASTM D4829)

Client: Integral Communities

Project Number: 0934-CR3

Project Location: West Oaks Way Project

Tested/ Checked By: DI Lab No Corona

Date Tested: 12/21/2012

Sample Source: B-3 @ 0-5'

Sample Description: Clayey Sand

Ring #:______ Ring Dia. : 4.01" Ring Ht.1"

Loading weight: 5516. grams

DENSITY DETERMINATION

A	Weight of compacted sample & ring (gm)	760.5
B	Weight of ring (gm)	365.8
C	Net weight of sample (gm)	394.7
D	Wet Density, lb / ft3 (C*0.3016)	119.2
E	Dry Density, lb / ft3 (D/1.F)	**107.8**

SATURATION DETERMINATION

F	Moisture Content, %	10.6
G	Specific Gravity, assumed	2.7
H	Unit Wt. of Water @ 20 °C, (pcf)	62.3
I	% Saturation	**51**

READINGS			
DATE	TIME	READING	
12/21/2012	6:25	0.1730	Initial
12/21/2012	6:35	0.1730	10 min/Dry
12/21/2012	6:36	0.1790	1 min/Wet
12/21/2012	6:41	0.1880	5 min/Wet
12/21/2012	13:45	0.2240	Random
12/24/2012	5:15	0.2280	Final

FINAL MOISTURE			
Weight of wet sample & tare	Weight of dry sample & tare	Tare	% Moisture
578.4	505.1	151.2	**20.7%**

EXPANSION INDEX = 55

PLATE EI-2

GEOTEK

EXPANSION INDEX TEST

(ASTM D4829)

Client: Integral Communities

Project Number: 0934-CR3

Project Location: West Oaks Way Project

Tested/ Checked By: DI Lab No Corona

Date Tested: 12/21/2012

Sample Source: B-4 @ 0-5'

Sample Description: Clayey Sand

Ring #:______ Ring Dia. : 4.01" Ring Ht.1"

Loading weight: 5516. grams

DENSITY DETERMINATION

A	Weight of compacted sample & ring (gm)	759.2
B	Weight of ring (gm)	363.8
C	Net weight of sample (gm)	395.4
D	Wet Density, lb / ft3 (C*0.3016)	119.4
E	Dry Density, lb / ft3 (D/1.F)	**108.6**

SATURATION DETERMINATION

F	Moisture Content, %	10.0
G	Specific Gravity, assumed	2.7
H	Unit Wt. of Water @ 20 °C, (pcf)	62.3
I	% Saturation	**49**

READINGS

DATE	TIME	READING	
12/21/2012	7:43	0.1070	Initial
12/21/2012	7:53	0.1070	10 min/Dry
12/21/2012	7:54	0.1100	1 min/Wet
12/21/2012	7:59	0.1200	5 min/Wet
12/21/2012	13:45	0.1480	Random
12/24/2012	5:15	0.1510	Final

FINAL MOISTURE

Weight of wet sample & tare	Weight of dry sample & tare	Tare	% Moisture
581.1	509.8	153.6	**20.0%**

EXPANSION INDEX = 44

PLATE EI-3

GEOTEK

EXPANSION INDEX TEST

(ASTM D4829)

Client: Integral Communities

Project Number: 0934-CR3

Project Location: West Oaks Way Project

Tested/ Checked By: DI Lab No Corona

Date Tested: 10/31/2012

Sample Source: HA-1 & HA-2 @ 0-5'

Sample Description: Clayey Sand

Ring #:______ Ring Dia. : 4.01" Ring Ht.1"

Loading weight: 5516. grams

DENSITY DETERMINATION

A	Weight of compacted sample & ring (gm)	749.9
B	Weight of ring (gm)	363.9
C	Net weight of sample (gm)	386.0
D	Wet Density, lb / ft3 (C*0.3016)	116.6
E	Dry Density, lb / ft3 (D/1.F)	**104.5**

SATURATION DETERMINATION

F	Moisture Content, %	11.5
G	Specific Gravity, assumed	2.7
H	Unit Wt. of Water @ 20 °C, (pcf)	62.3
I	% Saturation	**51**

READINGS

DATE	TIME	READING	
10/31/2012	14:20	0.1610	Initial
10/31/2012	14:30	0.1610	10 min/Dry
10/31/2012	14:31	0.1620	1 min/Wet
10/31/2012	14:36	0.1690	5 min/Wet
10/31/2012	15:20	0.1810	Random
11/1/2012	8:45	0.1860	Final

FINAL MOISTURE

Weight of wet sample & tare	Weight of dry sample & tare	Tare	% Moisture
568.4	498.3	155.2	**20.4%**

EXPANSION INDEX = 25

PLATE EI-4

GEOTEK

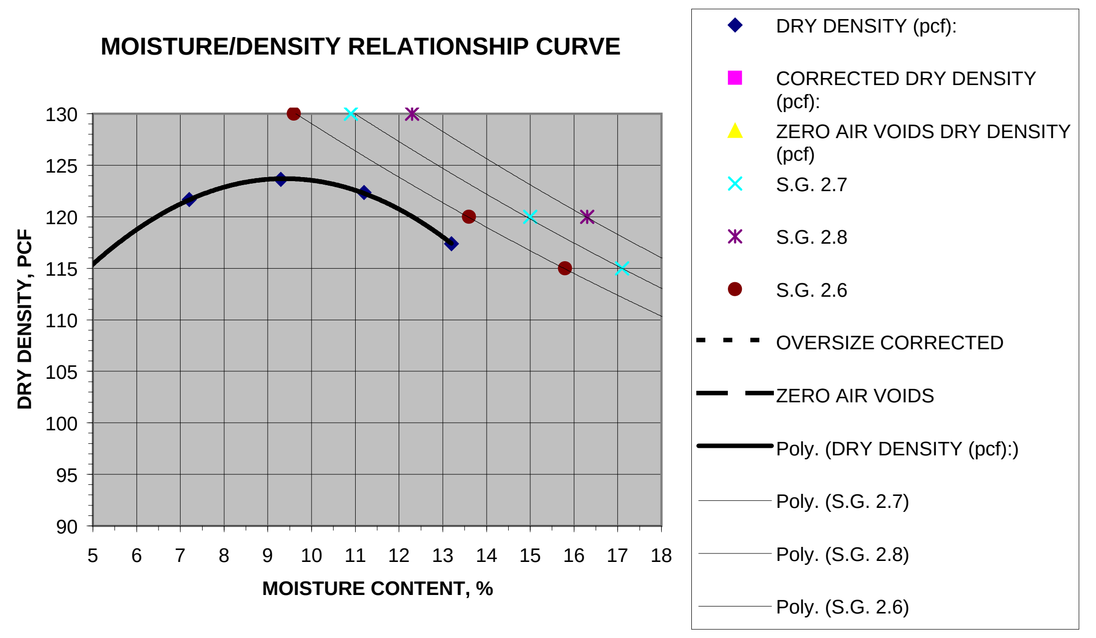
MOISTURE/DENSITY RELATIONSHIP

Client: Integral Communities
Project: West Oaks Way
Location: Carlsbad
Material Type: Dark Brown Clayey Sand
Material Supplier: N/A
Material Source: N/A
Sample Location: B - 2
@ 0 - 5'
Sampled By: EL
Received By: N/A
Tested By: DI
Reviewed By: N/A

Job No.: 0934-CR3
Lab No.: Corona

Date Sampled: 7-Dec-12
Date Received: 8-Dec-12
Date Tested: 14-Dec-12
Date Reviewed: 31-Dec-12

Test Procedure: ASTM 1557 **Method:** A
Oversized Material (%): 0.0 **Correction Required:** ☐ yes ☒ no



MOISTURE DENSITY RELATIONSHIP VALUES

Maximum Dry Density, pcf 124.0 **@ Optimum Moisture, %** 10.0
Corrected Maximum Dry Density, pcf **@ Optimum Moisture, %**

MATERIAL DESCRIPTION

Grain Size Distribution:

	% Gravel (retained on No. 4)
	% Sand (Passing No. 4, Retained on No. 200)
	% Silt and Clay (Passing No. 200)

Atterberg Limits:

	Liquid Limit, %
	Plastic Limit, %
	Plasticity Index, %

Classification:

Unified Soils Classification: SC
AASHTO Soils Classification:

Plate MD-1

GEOTEK

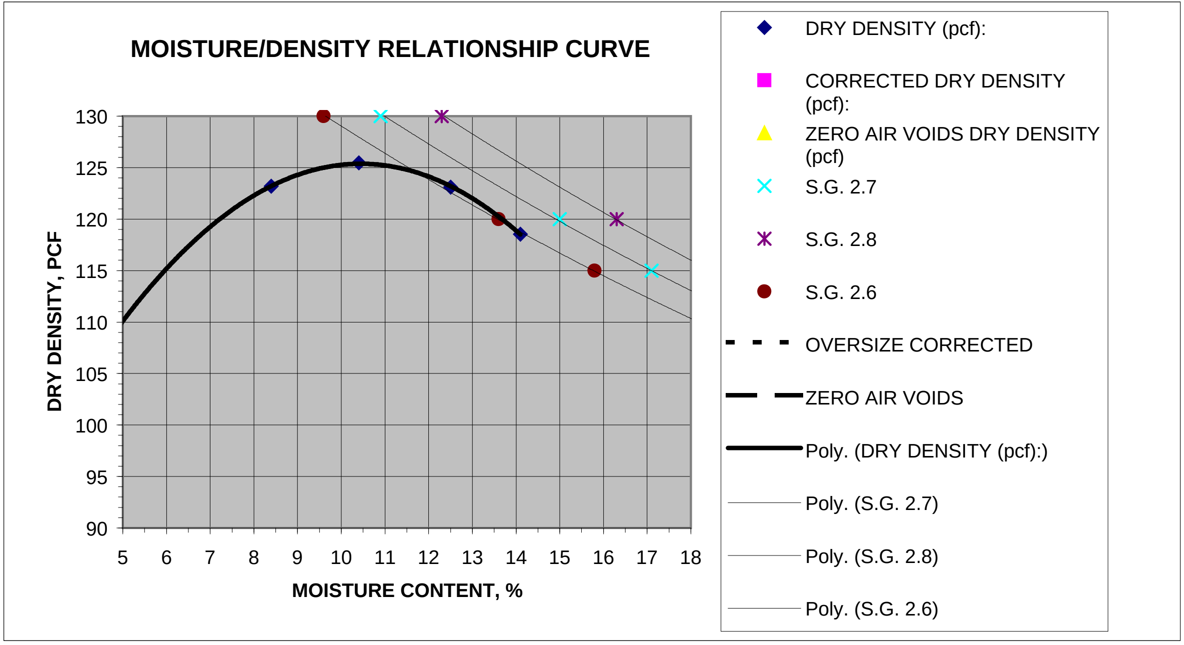
MOISTURE/DENSITY RELATIONSHIP

Client: Integral Communities
Project: West Oaks Way
Location: Carlsbad
Material Type: Gray Brown Clayey Sand
Material Supplier: N/A
Material Source: N/A
Sample Location: B - 3
@ 0 - 5'
Sampled By: EHL
Received By: N/A
Tested By: DI
Reviewed By: N/A

Job No.: 0934-CR3
Lab No.: Corona

Date Sampled: 7-Dec-12
Date Received: 8-Dec-12
Date Tested: 14-Dec-12
Date Reviewed: 31-Dec-12

Test Procedure: ASTM 1557 **Method:** A
Oversized Material (%): 0.0 **Correction Required:** ☐ yes ☒ no



MOISTURE DENSITY RELATIONSHIP VALUES

Maximum Dry Density, pcf	125.5	**@ Optimum Moisture, %**	11.0
Corrected Maximum Dry Density, pcf		**@ Optimum Moisture, %**	

MATERIAL DESCRIPTION

Grain Size Distribution:

	% Gravel (retained on No. 4)
	% Sand (Passing No. 4, Retained on No. 200)
	% Silt and Clay (Passing No. 200)

Atterberg Limits:

	Liquid Limit, %
	Plastic Limit, %
	Plasticity Index, %

Classification:

Unified Soils Classification: SC
AASHTO Soils Classification:

Plate MD-2

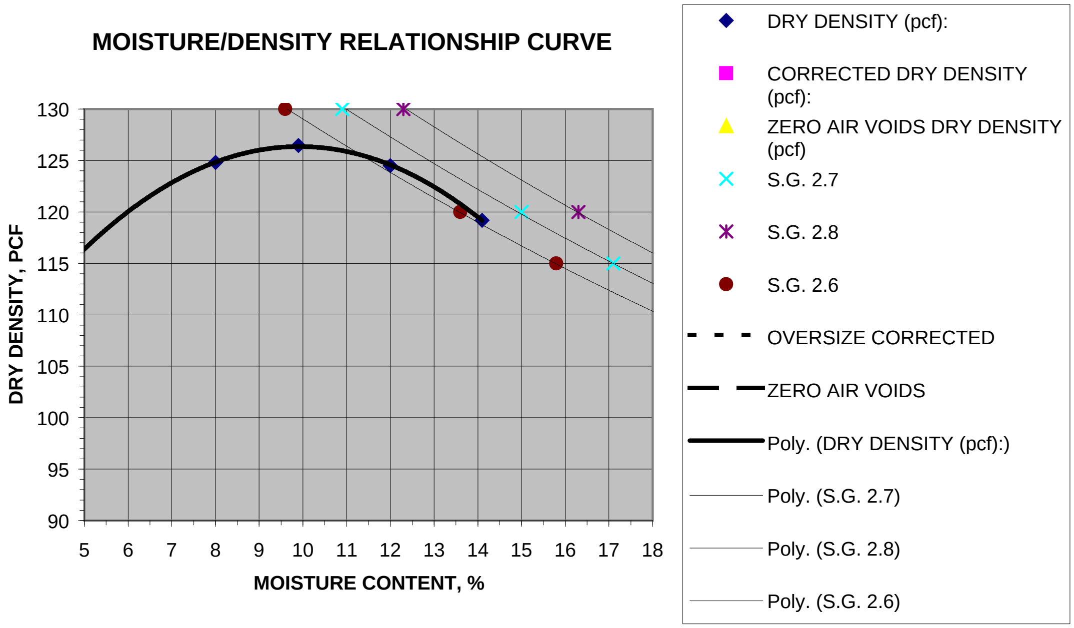
MOISTURE/DENSITY RELATIONSHIP

Client: Integral Communities
Project: West Oaks Way
Location: Carlsbad
Material Type: Dark Brown Clayey Sand
Material Supplier: N/A
Material Source: N/A
Sample Location: B - 4
@ 0 - 5'
Sampled By: EHL
Received By: N/A
Tested By: DI
Reviewed By: N/A

Job No.: 0934-CR3
Lab No.: Corona

Date Sampled: 7-Dec-12
Date Received: 8-Dec-12
Date Tested: 15-Dec-12
Date Reviewed: 31-Dec-12

Test Procedure: ASTM 1557 **Method:** A
Oversized Material (%): 0.0 **Correction Required:** ☐ yes ☒ no



MOISTURE DENSITY RELATIONSHIP VALUES

Maximum Dry Density, pcf 126.5 @ **Optimum Moisture, %** 10.5
Corrected Maximum Dry Density, pcf @ **Optimum Moisture, %**

MATERIAL DESCRIPTION

Grain Size Distribution:

	% Gravel (retained on No. 4)
	% Sand (Passing No. 4, Retained on No. 200)
	% Silt and Clay (Passing No. 200)

Atterberg Limits:

	Liquid Limit, %
	Plastic Limit, %
	Plasticity Index, %

Classification:

Unified Soils Classification: SC
AASHTO Soils Classification:

Plate MD-3

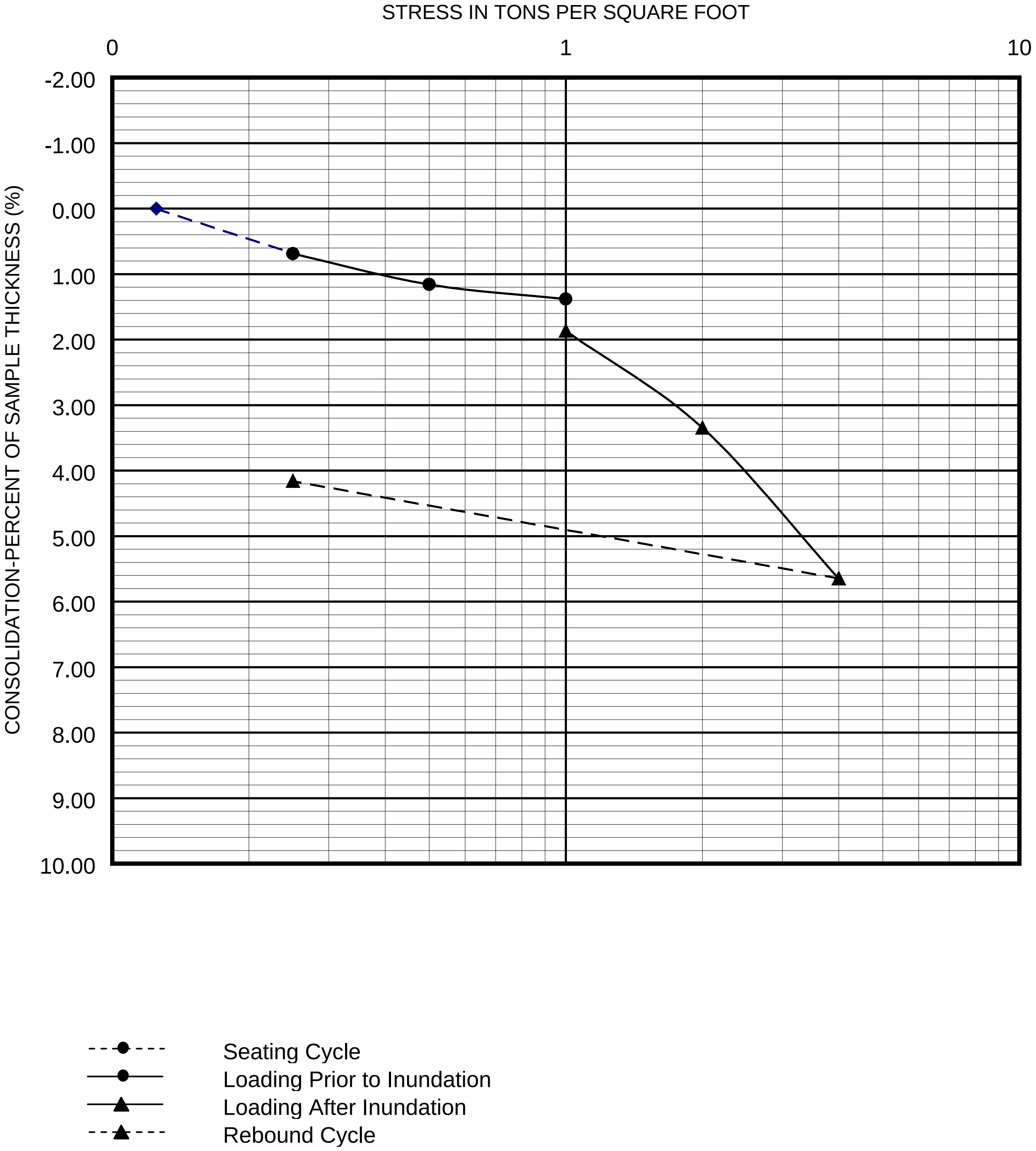
Cal Land Engineering, Inc.
dba Quartech Consultants
Geotechnical, Environmental, and Civil Engineering

For: GeoTek, Inc.
W.O.: 0934 - CR3
Client: Integral
Project: West Oaks
PO # 2862

Date: January 2, 2013
QCI Project No.: 12-167-12d
Summarized by: ABK

Corrosivity Test Results

Sample ID	Depth (Feet)	pH CT-532 (643)	Chloride CT-422 (ppm)	Sulfate CT-417 (% By Weight)	Resistivity CT-532 (643) (ohm-cm)
B - 2	0 - 5	8.07	105	0.0740	860
B - 3	0 - 5	7.95	90	0.0945	960
B - 4	0 - 5	8.18	116	0.0980	1,100



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435

GEOTEK

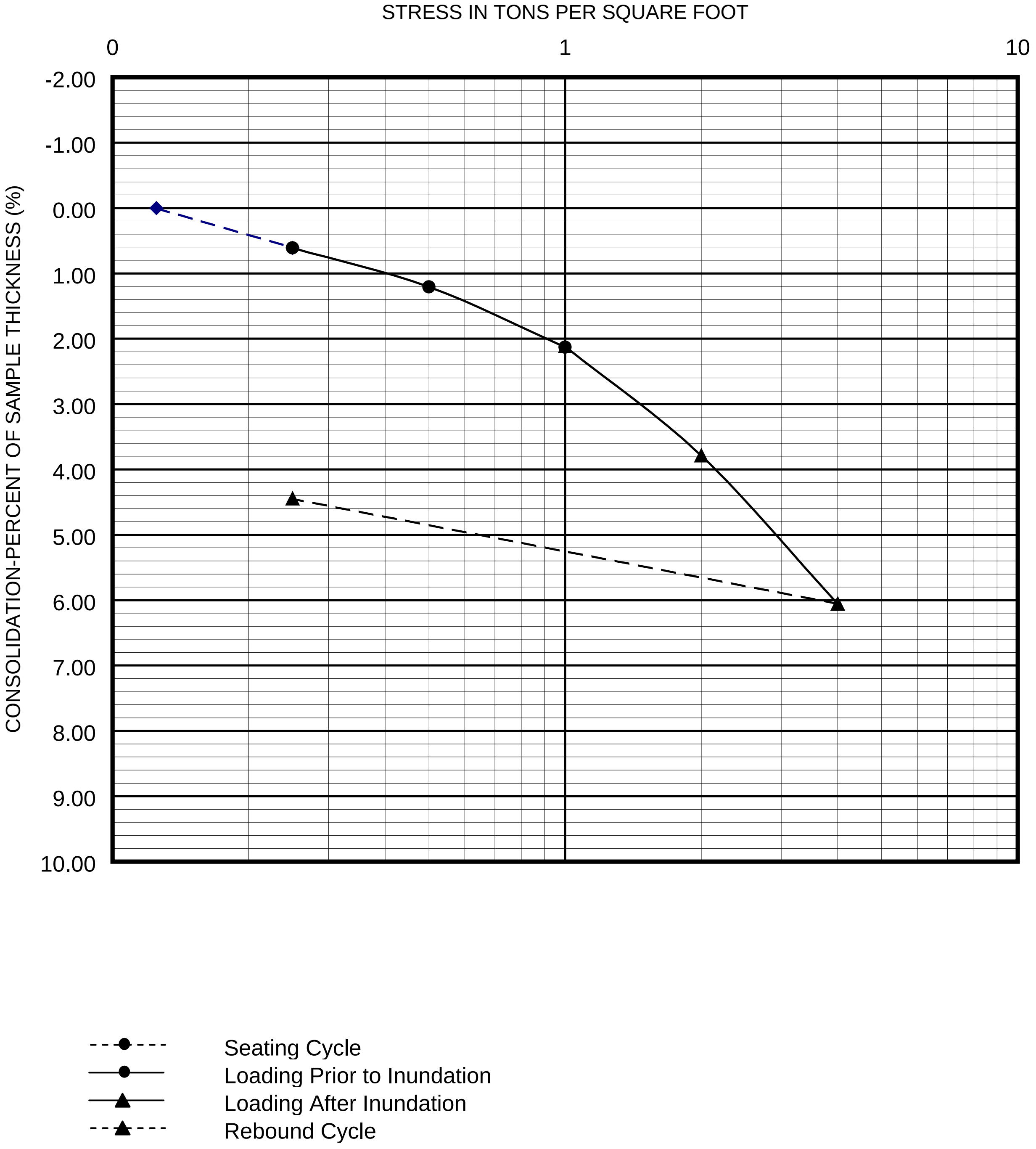
CHECKED BY: RAR	Lab: RIV
PROJECT NO.: 0934-CR3	Date: 12/12

CONSOLIDATION REPORT

Sample: B-1 @ 20'

Integral Communities
Carlsbad

Plate C-1



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435

GEOTEK

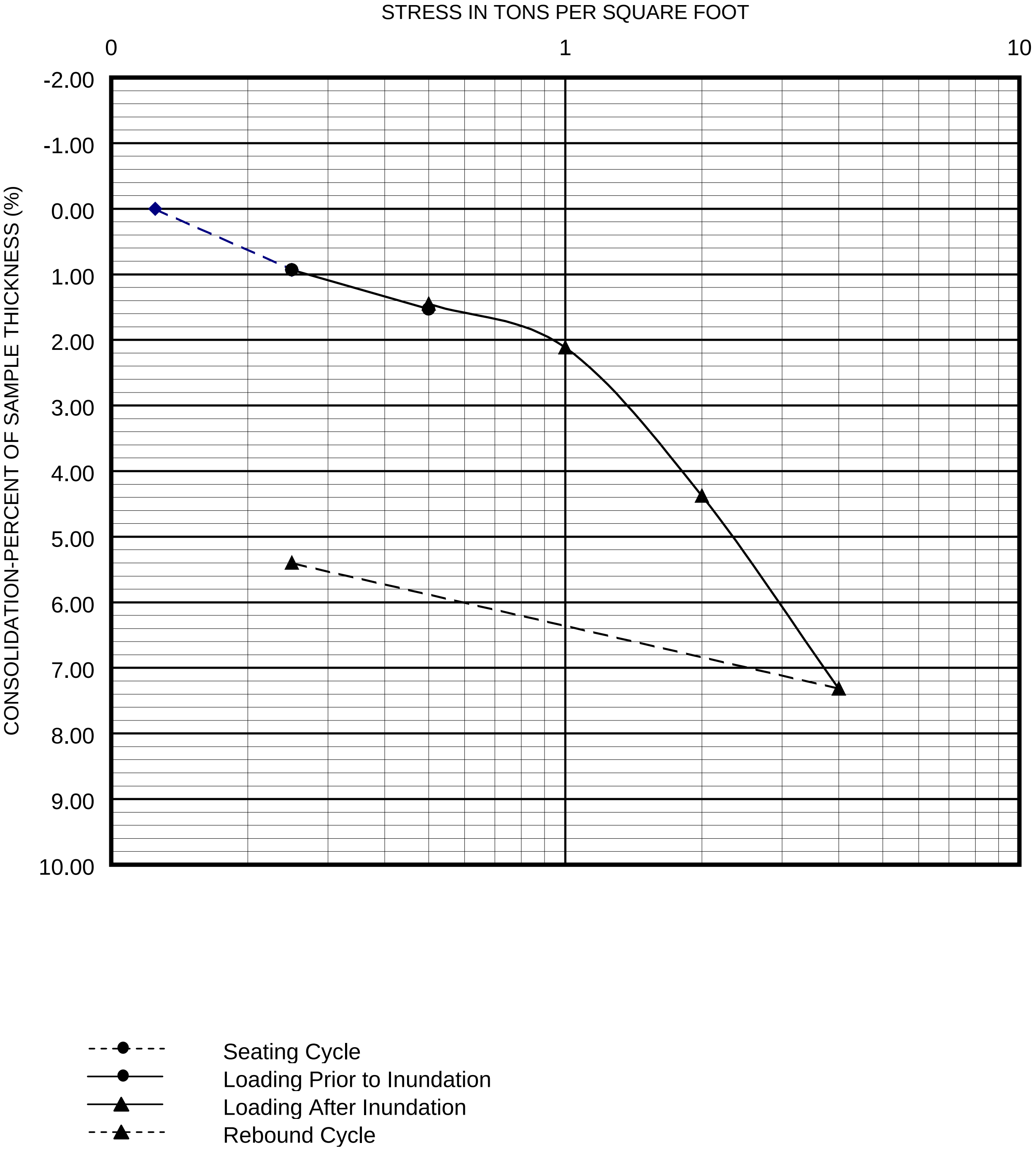
CONSOLIDATION REPORT

Sample: B-1 @ 25'

Integral Communities
Carlsbad

Plate C-2

CHECKED BY: RAR	Lab: RIV
PROJECT NO.: 0934-CR3	Date: 12/12



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435

GEOTEK

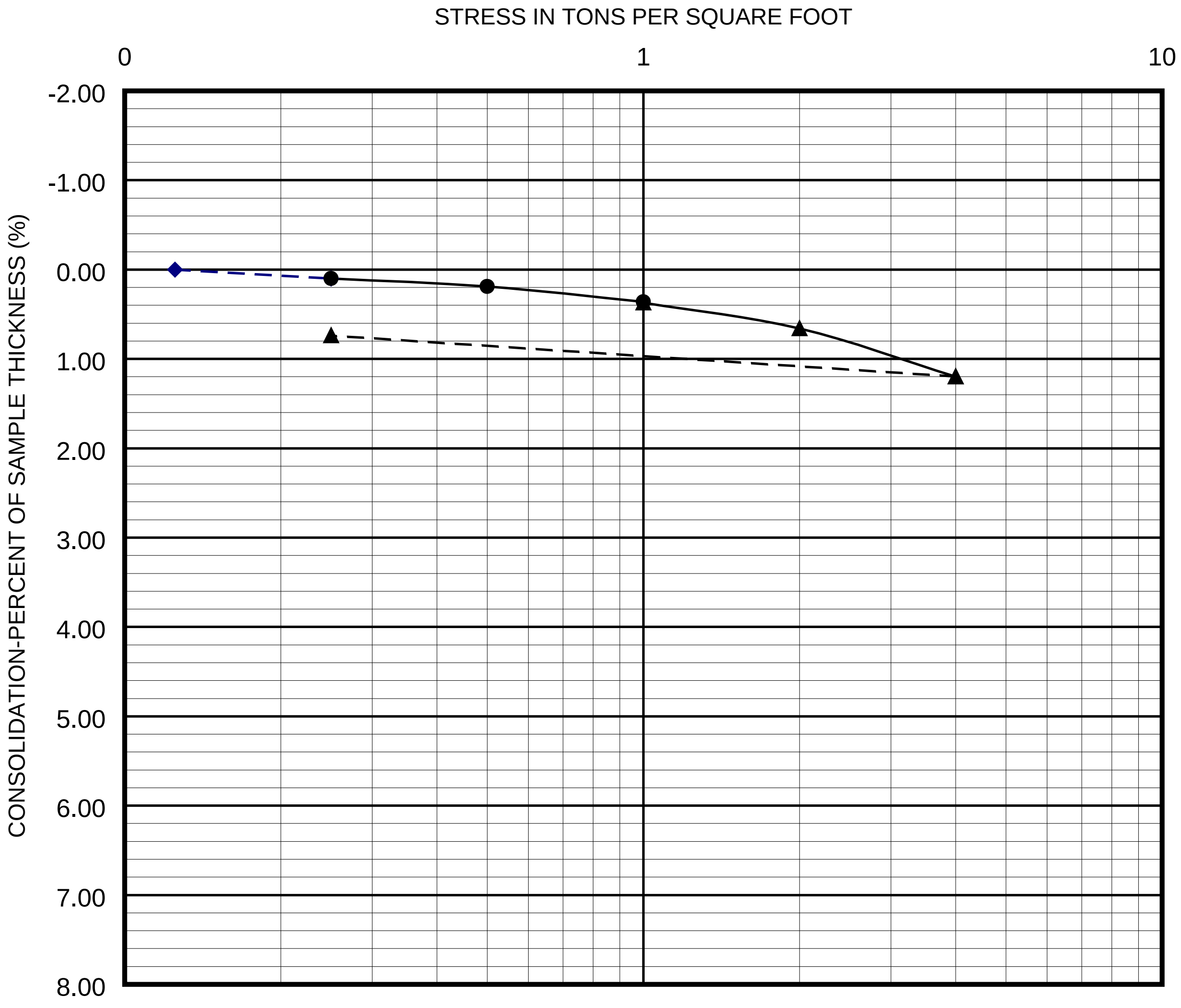
CONSOLIDATION REPORT

Sample: B-2 @ 10'

Integral Communities
Carlsbad

Plate C-3

CHECKED BY: RAR
Lab: RIV
PROJECT NO.: 0934-CR3
Date: 12/12



- - -●- - - Seating Cycle
—●— Loading Prior to Inundation
—▲— Loading After Inundation
- - -▲- - - Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435

GEOTEK

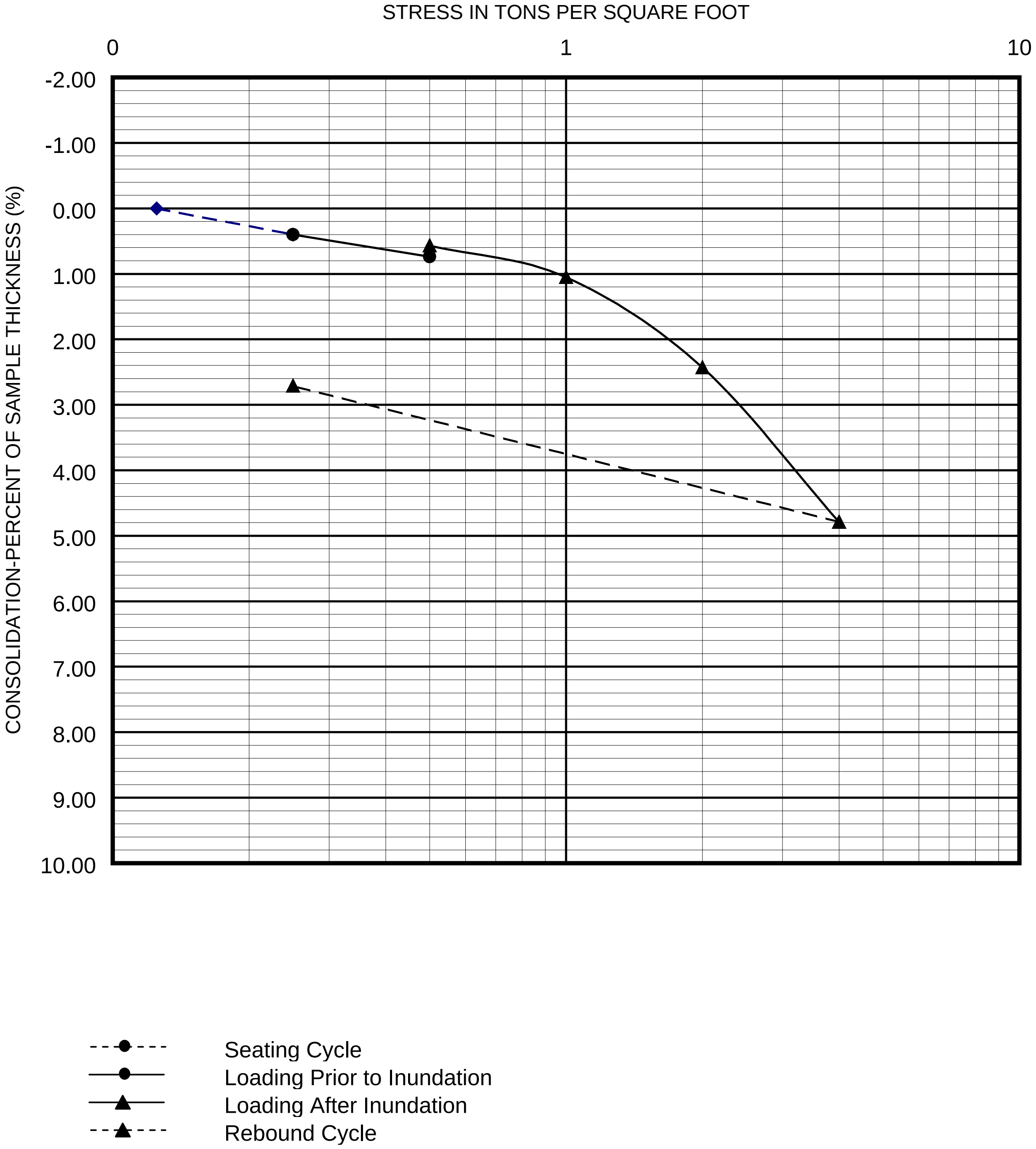
CONSOLIDATION REPORT

Sample: B-2 @ 15'

Integral Communities
Carlsbad

Plate C-4

CHECKED BY: RAR	Lab: RIV
PROJECT NO.: 0934-CR3	Date: 12/12



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435

GEOTEK

CHECKED BY: RAR | Lab: RIV

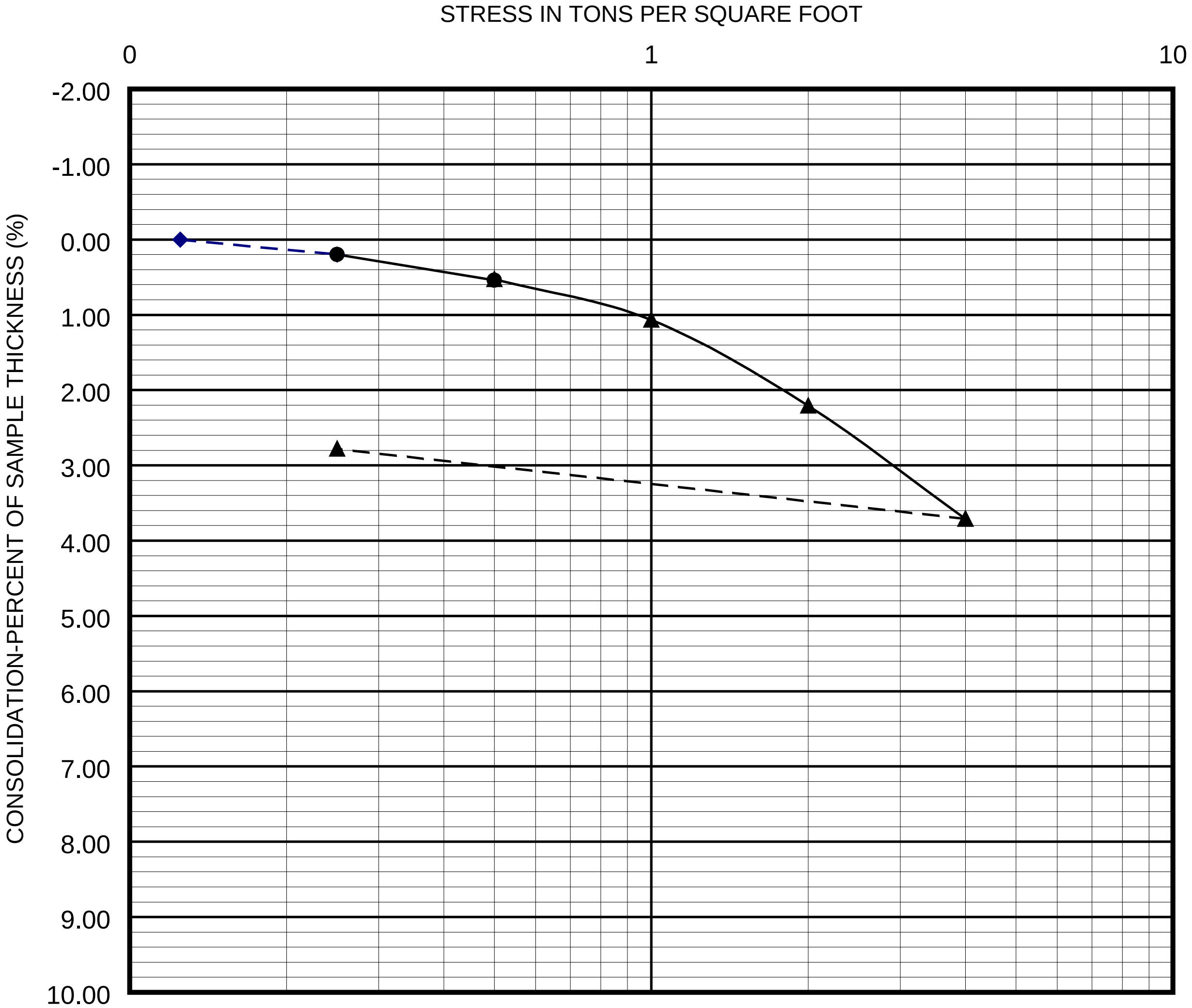
PROJECT NO.: 0934-CR3 | Date: 12/12

CONSOLIDATION REPORT

Sample: B-3 @ 10'

Integral Communities
Carlsbad

Plate C-5



- - -●- - - Seating Cycle
—●— Loading Prior to Inundation
—▲— Loading After Inundation
- - -▲- - - Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435

GEOTEK

CONSOLIDATION REPORT

Sample: B-4 @ 15'

Integral Communities
Carlsbad

Plate C-6

CHECKED BY: RAR	Lab: RIV
PROJECT NO.: 0934-CR3	Date: 12/12

- ANALYSIS
- DESIGN

LaBelle • Marvin

PROFESSIONAL PAVEMENT ENGINEERING

A CALIFORNIA CORPORATION

- SOILS, ASPHALT TECHNOLOGY

July 24, 2017

Ms. Anna Scott
GeoTek Inc.
1548 North Maple Street
Corona, California 92880

Project No. 42629

Dear Ms. Scott:

Laboratory testing of the bulk soil sample delivered to our laboratory on 7/18/2017 has been completed.

Reference: W.O. # 0934-CR3
Project: Integral Communities, West Oaks Project
Sample: General R-Value

Data sheets and graphical presentations are transmitted herewith for your use and information. Any untested portion of the samples will be retained for a period of sixty (60) days prior to disposal. The opportunity to be of service is appreciated, and should you have any questions, kindly call.

Very truly yours,

STEVEN R. MARVIN
NO. 30659

Steven R. Marvin
RCE 30659

SRM:tw
Enclosures

2700 S. GRAND AVENUE • SANTA ANA, CA 92705-5404 • (714) 546-3468 • FAX (714) 546-5841
INFO@LABELLEMARVIN.COM

LaBelle Marvin

R - VALUE DATA SHEET

PROJECT No. 42629
DATE: 7/24/2017

BORING NO. General R-Value
Integral Communities, West Oaks Project
W.O.# 0934-CR3

SAMPLE DESCRIPTION: Brown Sandy Clay

. . . .

R-VALUE TESTING DATA | CA TEST 301

Item	a	b	c
Mold Number	9		
Water added, grams	200		
Initial Test Water, %	30.8		
Compact Gage Pressure,psi	40		
Exudation Pressure, psi	367		
Height Sample, Inches	2.67		
Gross Weight Mold, grams	2759		
Tare Weight Mold, grams	1775		
Sample Wet Weight, grams	984		
Expansion, Inches x 10exp-4	32		
Stability 2,000 lbs (160psi)	57 / 139		
Turns Displacement	3.83		
R-Value Uncorrected	9		
R-Value Corrected	10		
Dry Density, pcf	85.4		

DESIGN CALCULATION DATA

Traffic Index Assumed:	4.0		
G.E. by Stability	0.92		
G. E. by Expansion	1.07		

Equilibrium R-Value	**5 or less** by EXUDATION

Examined & Checked: 7 /24/ 17

REMARKS:

Gf = 1.25

Sample Exuded
@ 367 psi.

C 30659
STEVEN R. MARVIN

Steven R. Marvin, RCE 30659

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.

APPENDIX C

LIQUEFACTION ANALYSES

West Oaks Project
City of Carlsbad, San Diego County, California
Project No. 0934-CR3

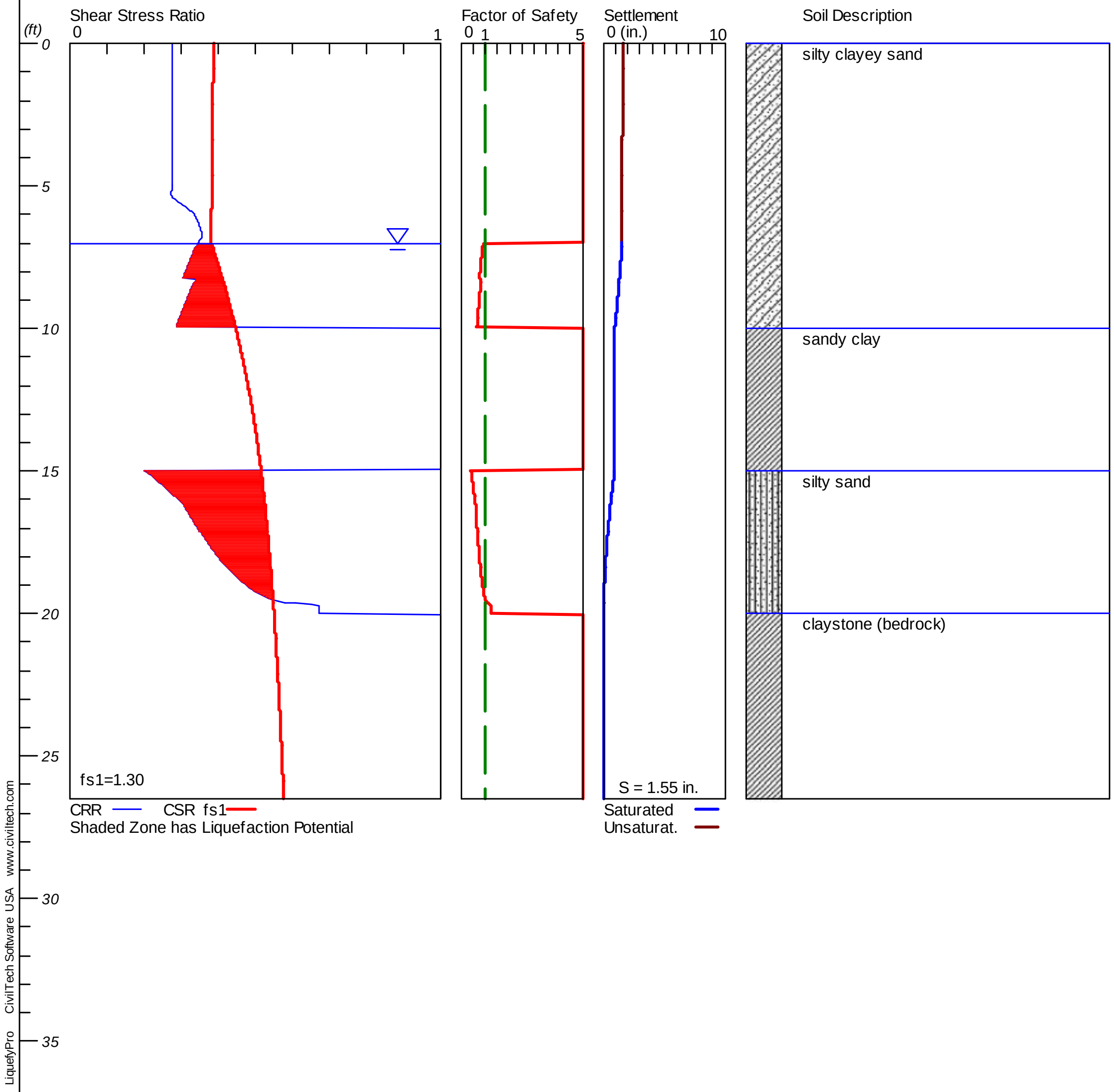
GEOTEK

LIQUEFACTION ANALYSIS

0934-CR3 West Oaks Project

Hole No.=B-2 Water Depth=7 ft

Magnitude=6.68
Acceleration=0.459g



GeoTek

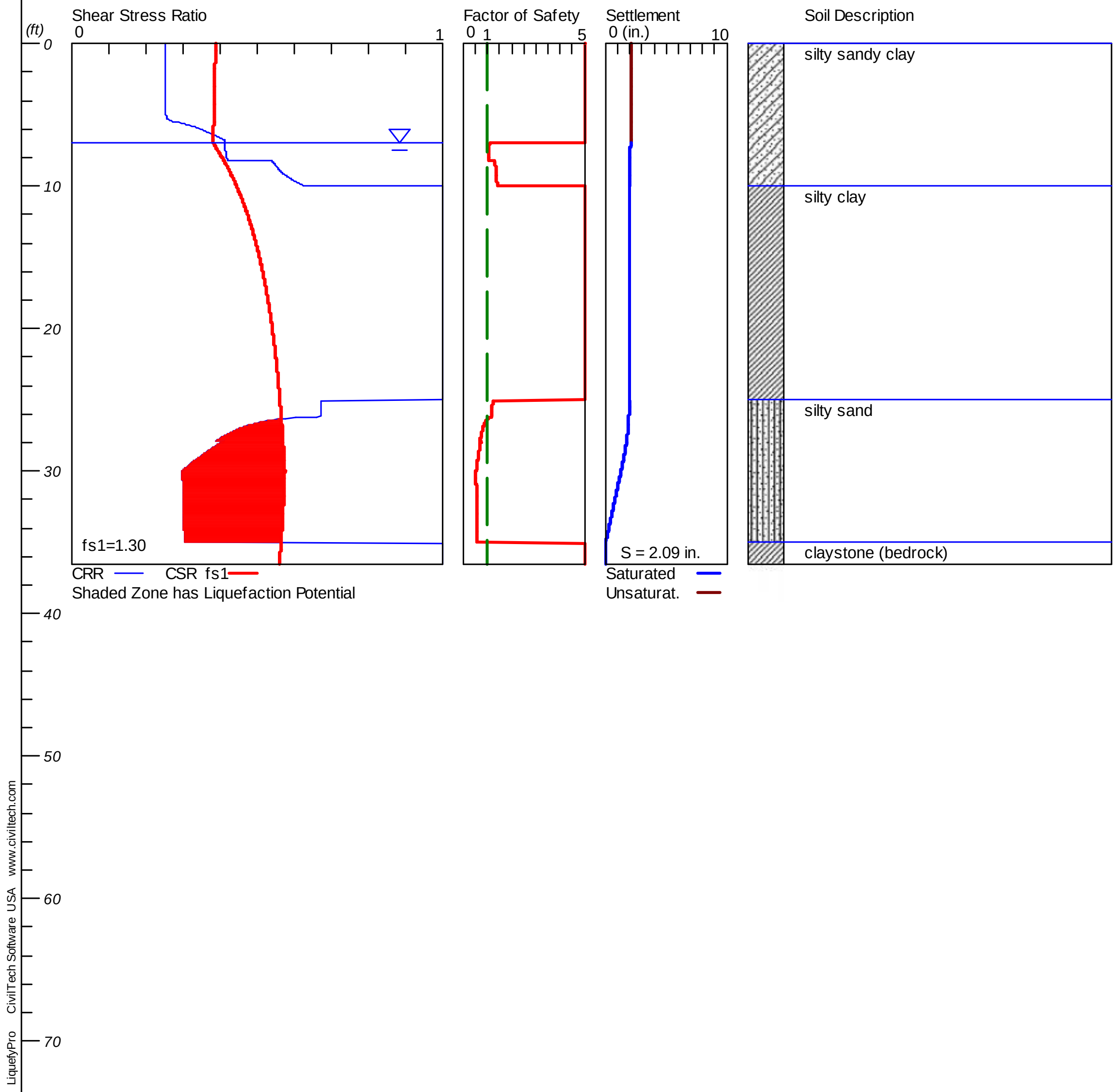
Carlsbad, California

LIQUEFACTION ANALYSIS

0934-CR3 West Oaks Project

Hole No.=B-3   Water Depth=7 ft

Magnitude=6.68
Acceleration=0.459g



GeoTek

Carlsbad, California

APPENDIX D

GENERAL GRADING GUIDELINES

West Oaks Project
City of Carlsbad, San Diego County, California
Project No. 0934-CR3

GEOTEK

GENERAL GRADING GUIDELINES

Guidelines presented herein are intended to address general construction procedures for earthwork construction. Specific situations and conditions often arise which cannot reasonably be discussed in general guidelines, when anticipated these are discussed in the text of the report. Often unanticipated conditions are encountered which may necessitate modification or changes to these guidelines. It is our hope that these will assist the contractor to more efficiently complete the project by providing a reasonable understanding of the procedures that would be expected during earthwork and the testing and observation used to evaluate those procedures.

General

Grading should be performed to at least the minimum requirements of governing agencies, Chapters 18 and 33 of the Uniform Building Code, CBC (2010) and the guidelines presented below.

Preconstruction Meeting

A preconstruction meeting should be held prior to site earthwork. Any questions the contractor has regarding our recommendations, general site conditions, apparent discrepancies between reported and actual conditions and/or differences in procedures the contractor intends to use should be brought up at that meeting. The contractor (including the main onsite representative) should review our report and these guidelines in advance of the meeting. Any comments the contractor may have regarding these guidelines should be brought up at that meeting.

Grading Observation and Testing

1. Observation of the fill placement should be provided by our representative during grading. Verbal communication during the course of each day will be used to inform the contractor of test results. The contractor should receive a copy of the "Daily Field Report" indicating results of field density tests that day. If our representative does not provide the contractor with these reports, our office should be notified.
2. Testing and observation procedures are, by their nature, specific to the work or area observed and location of the tests taken, variability may occur in other locations. The contractor is responsible for the uniformity of the grading operations; our observations and test results are intended to evaluate the contractor's overall level of efforts during grading. The contractor's personnel are the only individuals participating in all aspect of site work. Compaction testing and observation should not be considered as relieving the contractor's responsibility to properly compact the fill.
3. Cleanouts, processed ground to receive fill, key excavations, and subdrains should be observed by our representative prior to placing any fill. It will be the contractor's responsibility to notify our representative or office when such areas are ready for observation.
4. Density tests may be made on the surface material to receive fill, as considered warranted by this firm.

5. In general, density tests would be made at maximum intervals of two feet of fill height or every 1,000 cubic yards of fill placed. Criteria will vary depending on soil conditions and size of the fill. More frequent testing may be performed. In any case, an adequate number of field density tests should be made to evaluate the required compaction and moisture content is generally being obtained.
6. Laboratory testing to support field test procedures will be performed, as considered warranted, based on conditions encountered (e.g. change of material sources, types, etc.) Every effort will be made to process samples in the laboratory as quickly as possible and in progress construction projects are our first priority. However, laboratory workloads may cause in delays and some soils may require a **minimum of 48 to 72 hours to complete test procedures**. Whenever possible, our representative(s) should be informed in advance of operational changes that might result in different source areas for materials.
7. Procedures for testing of fill slopes are as follows:
   a) Density tests should be taken periodically during grading on the flat surface of the fill, three to five feet horizontally from the face of the slope.
   b) If a method other than over building and cutting back to the compacted core is to be employed, slope compaction testing during construction should include testing the outer six inches to three feet in the slope face to determine if the required compaction is being achieved.
8. Finish grade testing of slopes and pad surfaces should be performed after construction is complete.

Site Clearing

1. All vegetation, and other deleterious materials, should be removed from the site. If material is not immediately removed from the site it should be stockpiled in a designated area(s) well outside of all current work areas and delineated with flagging or other means. Site clearing should be performed in advance of any grading in a specific area.
2. Efforts should be made by the contractor to remove all organic or other deleterious material from the fill, as even the most diligent efforts may result in the incorporation of some materials. This is especially important when grading is occurring near the natural grade. All equipment operators should be aware of these efforts. Laborers may be required as root pickers.
3. Nonorganic debris or concrete may be placed in deeper fill areas provided the procedures used are observed and found acceptable by our representative. Typical procedures are similar to those indicated on Plate G-4.

Treatment of Existing Ground

1. Following site clearing, all surficial deposits of alluvium and colluvium as well as weathered or creep effected bedrock, should be removed (see Plates G-1, G-2 and G-3) unless otherwise specifically indicated in the text of this report.

2. In some cases, removal may be recommended to a specified depth (e.g. flat sites where partial alluvial removals may be sufficient). The contractor should not exceed these depths unless directed otherwise by our representative.
3. Groundwater existing in alluvial areas may make excavation difficult. Deeper removals than indicated in the text of the report may be necessary due to saturation during winter months.
4. Subsequent to removals, the natural ground should be processed to a depth of six inches, moistened to near optimum moisture conditions and compacted to fill standards.
5. Exploratory back hoe or dozer trenches still remaining after site removal should be excavated and filled with compacted fill if they can be located.

Subdrainage

1. Subdrainage systems should be provided in canyon bottoms prior to placing fill, and behind buttress and stabilization fills and in other areas indicated in the report. Subdrains should conform to schematic diagrams G-1 and G-5, and be acceptable to our representative.
2. For canyon subdrains, runs less than 500 feet may use six-inch pipe. Typically, runs in excess of 500 feet should have the lower end as eight-inch minimum.
3. Filter material should be clean, 1/2 to 1-inch gravel wrapped in a suitable filter fabric. Class 2 permeable filter material per California Department of Transportation Standards tested by this office to verify its suitability, may be used without filter fabric. A sample of the material should be provided to the Soils Engineer by the contractor at least two working days before it is delivered to the site. The filter should be clean with a wide range of sizes.
4. Approximate delineation of anticipated subdrain locations may be offered at 40-scale plan review stage. During grading, this office would evaluate the necessity of placing additional drains.
5. All subdrainage systems should be observed by our representative during construction and prior to covering with compacted fill.
6. Subdrains should outlet into storm drains where possible. Outlets should be located and protected. The need for backflow preventers should be assessed during construction.
7. Consideration should be given to having subdrains located by the project surveyors.

Fill Placement

1. Unless otherwise indicated, all site soil and bedrock may be reused for compacted fill; however, some special processing or handling may be required (see text of report).
2. Material used in the compacting process should be evenly spread, moisture conditioned, processed, and compacted in thin lifts six (6) to eight (8) inches in compacted thickness to obtain a uniformly dense layer. The fill should be placed and compacted on a nearly horizontal plane, unless otherwise found acceptable by our representative.
3. If the moisture content or relative density varies from that recommended by this firm, the contractor should rework the fill until it is in accordance with the following:

a) Moisture content of the fill should be at or above optimum moisture. Moisture should be evenly distributed without wet and dry pockets. Pre-watering of cut or removal areas should be considered in addition to watering during fill placement, particularly in clay or dry surficial soils. The ability of the contractor to obtain the proper moisture content will control production rates.

b) Each six-inch layer should be compacted to at least 90 percent of the maximum dry density in compliance with the testing method specified by the controlling governmental agency. In most cases, the testing method is ASTM Test Designation D 1557.

4. Rock fragments less than eight inches in diameter may be utilized in the fill, provided:
   a) They are not placed in concentrated pockets;
   b) There is a sufficient percentage of fine-grained material to surround the rocks;
   c) The distribution of the rocks is observed by, and acceptable to, our representative.
5. Rocks exceeding eight (8) inches in diameter should be taken off site, broken into smaller fragments, or placed in accordance with recommendations of this firm in areas designated suitable for rock disposal (see Plate G-4). On projects where significant large quantities of oversized materials are anticipated, alternate guidelines for placement may be included. If significant oversize materials are encountered during construction, these guidelines should be requested.
6. In clay soil, dry or large chunks or blocks are common. If in excess of eight (8) inches minimum dimension, then they are considered as oversized. Sheepsfoot compactors or other suitable methods should be used to break up blocks. When dry, they should be moisture conditioned to provide a uniform condition with the surrounding fill.

Slope Construction

1. The contractor should obtain a minimum relative compaction of 90 percent out to the finished slope face of fill slopes. This may be achieved by either overbuilding the slope and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment.
2. Slopes trimmed to the compacted core should be overbuilt by at least three (3) feet with compaction efforts out to the edge of the false slope. Failure to properly compact the outer edge results in trimming not exposing the compacted core and additional compaction after trimming may be necessary.
3. If fill slopes are built "at grade" using direct compaction methods, then the slope construction should be performed so that a constant gradient is maintained throughout construction. Soil should not be "spilled" over the slope face nor should slopes be "pushed out" to obtain grades. Compaction equipment should compact each lift along the immediate top of slope. Slopes should be back rolled or otherwise compacted at approximately every 4 feet vertically as the slope is built.
4. Corners and bends in slopes should have special attention during construction as these are the most difficult areas to obtain proper compaction.

5. Cut slopes should be cut to the finished surface. Excessive undercutting and smoothing of the face with fill may necessitate stabilization.

Keyways, Buttress and Stabilization Fills

Keyways are needed to provide support for fill slope and various corrective procedures.

1. Side-hill fills should have an equipment-width key at their toe excavated through all surficial soil and into competent material and tilted back into the hill (Plates G-2, G-3). As the fill is elevated, it should be benched through surficial soil and slopewash, and into competent bedrock or other material deemed suitable by our representatives (See Plates G-1, G-2, and G-3).
2. Fill over cut slopes should be constructed in the following manner:
    a) All surficial soils and weathered rock materials should be removed at the cut-fill interface.
    b) A key at least one and one-half (1.5) equipment width wide (or as needed for compaction), and tipped at least one (1) foot into slope, should be excavated into competent materials and observed by our representative.
    c) The cut portion of the slope should be excavated prior to fill placement to evaluate if stabilization is necessary. The contractor should be responsible for any additional earthwork created by placing fill prior to cut excavation. (see Plate G-3 for schematic details.)
3. Daylight cut lots above descending natural slopes may require removal and replacement of the outer portion of the lot. A schematic diagram for this condition is presented on Plate G-2.
4. A basal key is needed for fill slopes extending over natural slopes. A schematic diagram for this condition is presented on Plate G-2.
5. All fill slopes should be provided with a key unless within the body of a larger overall fill mass. Please refer to Plate G-3 for specific guidelines.

Anticipated buttress and stabilization fills are discussed in the text of the report. The need to stabilize other proposed cut slopes will be evaluated during construction. Plate G-5 shows a schematic of buttress construction.

1. All backcuts should be excavated at gradients of 1:1 or flatter. The backcut configuration should be determined based on the design, exposed conditions, and need to maintain a minimum fill width and provide working room for the equipment.
2. On longer slopes, backcuts and keyways should be excavated in maximum 250 feet long segments. The specific configurations will be determined during construction.
3. All keys should be a minimum of two (2) feet deep at the toe and slope toward the heel at least one foot or two (2%) percent, whichever is greater.
4. Subdrains are to be placed for all stabilization slopes exceeding 10 feet in height. Lower slopes are subject to review. Drains may be required. Guidelines for subdrains are presented on Plate G-5.

5. Benching of backcuts during fill placement is required.

Lot Capping

1. When practical, the upper three (3) feet of material placed below finish grade should be comprised of the least expansive material available. Preferably, highly and very highly expansive materials should not be used. We will attempt to offer advise based on visual evaluations of the materials during grading, but it must be realized that laboratory testing is needed to evaluate the expansive potential of soil. Minimally, this testing takes two (2) to four (4) days to complete.
2. Transition lots (cut and fill) both per plan and those created by remedial grading (e.g. lots above stabilization fills, along daylight lines, above natural slopes, etc.) should be capped with a minimum three foot thick compacted fill blanket.
3. Cut pads should be observed by our representative(s) to evaluate the need for overexcavation and replacement with fill. This may be necessary to reduce water infiltration into highly fractured bedrock or other permeable zones, and/or due to differing expansive potential of materials beneath a structure. The overexcavation should be at least three feet. Deeper overexcavation may be recommended in some cases.

ROCK PLACEMENT AND ROCK FILL GUIDELINES

It is anticipated that large quantities of oversize material would be generated during grading. It's likely that such materials may require special handling for burial. Although alternatives may be developed in the field, the following methods of rock disposal are recommended on a preliminary basis.

Limited Larger Rock

When materials encountered are principally soil with limited quantities of larger rock fragments or boulders, placement in windrows is recommended. The following procedures should be applied:

1. Oversize rock (greater than 8 inches) should be placed in windrows.
    a) Windrows are rows of single file rocks placed to avoid nesting or clusters of rock.
    b) Each adjacent rock should be approximately the same size (within ~one foot in diameter).
    c) The maximum rock size allowed in windrows is four feet
2. A minimum vertical distance of three feet between lifts should be maintained. Also, the windrows should be offset from lift to lift. Rock windrows should not be closer than 15 feet to the face of fill slopes and sufficient space must be maintained for proper slope construction (see Plate G-4).
3. Rocks greater than eight inches in diameter should not be placed within seven feet of the finished subgrade for a roadway or pads and should be held below the depth of the lowest utility. This will allow easier trenching for utility lines.

4. Rocks greater than four feet in diameter should be broken down, if possible, or they may be placed in a dozer trench. Each trench should be excavated into the compacted fill a minimum of one foot deeper than the largest diameter of rock.
   a) The rock should be placed in the trench and granular fill materials (SE>30) should be flooded into the trench to fill voids around the rock.
   b) The over size rock trenches should be no closer together than 15 feet from any slope face.
   c) Trenches at higher elevation should be staggered and there should be a minimum of four feet of compacted fill between the top of the one trench and the bottom of the next higher trench.
   d) It would be necessary to verify 90 percent relative compaction in these pits. A 24 to 72 hour delay to allow for water dissipation should be anticipated prior to additional fill placement.

Structural Rock Fills

If the materials generated for placement in structural fills contains a significant percentage of material more than six (6) inches in one dimension, then placement using conventional soil fill methods with isolated windrows would not be feasible. In such cases the following could be considered:

1. Mixes of large rock or boulders may be placed as rock fill. They should be below the depth of all utilities both on pads and in roadways and below any proposed swimming pools or other excavations. If these fills are placed within seven (7) feet of finished grade, they may effect foundation design.
2. Rock fills are required to be placed in horizontal layers that should **not exceed two feet in thickness, or the maximum rock size present, which ever is less**. All rocks exceeding two feet should be broken down to a smaller size, windrowed (see above), or disposed of in non-structural fill areas. Localized larger rock up to 3 feet in largest dimension may be placed in rock fill as follows:
   a) individual rocks are placed in a given lift so as to be roughly 50% exposed above the typical surface of the fill ,
   b) loaded rock trucks or alternate compactors are worked around the rock on all sides to the satisfaction of the soil engineer,
   c) the portion of the rock above grade is covered with a second lift.
3. Material placed in each lift should be well graded. No unfilled spaces (voids) should be permitted in the rock fill.

Compaction Procedures

Compaction of rock fills is largely procedural. The following procedures have been found to generally produce satisfactory compaction.

1. Provisions for routing of construction traffic over the fill should be implemented.

   a) Placement should be by rock trucks crossing the lift being placed and dumping at its edge.
   b) The trucks should be routed so that each pass across the fill is via a different path and that all areas are uniformly traversed.
   c) The dumped piles should be knocked down and spread by a large dozer (D-8 or larger suggested). (Water should be applied before and during spreading.)

2. Rock fill should be generously watered (sluiced)
   a) Water should be applied by water trucks to the:
      i) dump piles,
      ii) front face of the lift being placed and,
      iii) surface of the fill prior to compaction.
   b) No material should be placed without adequate water.
   c) The number of water trucks and water supply should be sufficient to provide constant water.
   d) Rock fill placement should be suspended when water trucks are unavailable:
      i) for more than 5 minutes straight, or,
      ii) for more than 10 minutes/hour.

3. In addition to the truck pattern and at the discretion of the soil engineer, large, rubber tired compactors may be required.
   a) The need for this equipment will depend largely on the ability of the operators to provide complete and uniform coverage by wheel rolling with the trucks.
   b) Other large compactors will also be considered by the soil engineer provided that required compaction is achieved.

4. Placement and compaction of the rock fill is largely procedural. Observation by trenching should be made to check:
   a) the general segregation of rock size,
   b) for any unfilled spaces between the large blocks, and
   c) the matrix compaction and moisture content.

5. Test fills may be required to evaluate relative compaction of finer grained zones or as deemed appropriate by the soil engineer.
   a) A lift should be constructed by the methods proposed, as proposed

6. Frequency of the test trenching is to be at the discretion of the soil engineer. Control areas may be used to evaluate the contractors procedures.

7. A minimum horizontal distance of 15 feet should be maintained from the face of the rock fill and any finish slope face. At least the outer 15 feet should be built of conventional fill materials.

Piping Potential and Filter Blankets

Where conventional fill is placed over rock fill, the potential for piping (migration) of the fine grained material from the conventional fill into rock fills will need to be addressed.

The potential for particle migration is related to the grain size comparisons of the materials present and in contact with each other. Provided that 15 percent of the finer soil is larger than the effective pore size of the coarse soil, then particle migration is substantially mitigated. This can be accomplished with a well-graded matrix material for the rock fill and a zone of fill similar to the matrix above it. The specific gradation of the fill materials placed during grading must be known to evaluate the need for any type of filter that may be necessary to cap the rock fills. This, unfortunately, can only be accurately determined during construction.

In the event that poorly graded matrix is used in the rock fills, properly graded filter blankets 2 to 3 feet thick separating rock fills and conventional fill may be needed. As an alternative, use of two layers of filter fabric (Mirafi 700 x or equivalent) could be employed on top of the rock fill. In order to mitigate excess puncturing, the surface of the rock fill should be well broken down and smoothed prior to placing the filter fabric. The first layer of the fabric may then be placed and covered with relatively permeable fill material (with respect to overlying material) 1 to 2 feet thick. The relative permeable material should be compacted to fill standards. The second layer of fabric should be placed and conventional fill placement continued.

Subdrainage

Rock fill areas should be tied to a subdrainage system. If conventional fill is placed that separates the rock from the main canyon subdrain, then a secondary system should be installed. A system consisting of an adequately graded base (3 to 4 percent to the lower side) with a collector system and outlets may suffice.

Additionally, at approximately every 25 foot vertical interval, a collector system with outlets should be placed at the interface of the rock fill and the conventional fill blanketing a fill slope

Monitoring

Depending upon the depth of the rock fill and other factors, monitoring for settlement of the fill areas may be needed following completion of grading. Typically, if rock fill depths exceed 40 feet, monitoring would be recommend prior to construction of any settlement sensitive improvements. Delays of 3 to 6 months or longer can be expected prior to the start of construction.

UTILITY TRENCH CONSTRUCTION AND BACKFILL

Utility trench excavation and backfill is the contractors responsibility. The geotechnical consultant typically provides periodic observation and testing of these operations. While efforts are made to make sufficient observations and tests to verify that the contractors' methods and procedures are adequate to achieve proper compaction, it is typically impractical to observe all backfill procedures. As such, it is critical that the contractor use consistent backfill procedures.

Compaction methods vary for trench compaction and experience indicates many methods can be successful. However, procedures that "worked" on previous projects may or may not prove effective on a given site. The contractor(s) should outline the procedures proposed, so that we may discuss them **prior** to construction. We will offer comments based on our knowledge of site conditions and experience.

1. Utility trench backfill in slopes, structural areas, in streets and beneath flat work or hardscape should be brought to at least optimum moisture and compacted to at least 90 percent of the laboratory standard. Soil should be moisture conditioned prior to placing in the trench.
2. Flooding and jetting are not typically recommended or acceptable for native soils. Flooding or jetting may be used with select sand having a Sand Equivalent (SE) of 30 or higher. This is typically limited to the following uses:
    a) shallow (12 + inches) under slab interior trenches and,
    b) as bedding in pipe zone.

   The water should be allowed to dissipate prior to pouring slabs or completing trench compaction.
3. Care should be taken not to place soils at high moisture content within the upper three feet of the trench backfill in street areas, as overly wet soils may impact subgrade preparation. Moisture may be reduced to 2% below optimum moisture in areas to be paved within the upper three feet below sub grade.
4. Sand backfill should not be allowed in exterior trenches adjacent to and within an area extending below a 1:1 projection from the outside bottom edge of a footing, unless it is similar to the surrounding soil.
5. Trench compaction testing is generally at the discretion of the geotechnical consultant. Testing frequency will be based on trench depth and the contractors procedures. A probing rod would be used to assess the consistency of compaction between tested areas and untested areas. If zones are found that are considered less compact than other areas, this would be brought to the contractors attention.

JOB SAFETY

General

Personnel safety is a primary concern on all job sites. The following summaries are safety considerations for use by all our employees on multi-employer construction sites. On ground personnel are at highest risk of injury and possible fatality on grading construction projects. The company recognizes that construction activities will vary on each site and that job site safety is the contractor's responsibility. However, it is, imperative that all personnel be safety conscious to avoid accidents and potential injury.

In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of our field personnel on grading and construction projects.

1. Safety Meetings: Our field personnel are directed to attend the contractor's regularly scheduled safety meetings.
2. Safety Vests: Safety vests are provided for and are to be worn by our personnel while on the job site.
3. Safety Flags: Safety flags are provided to our field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

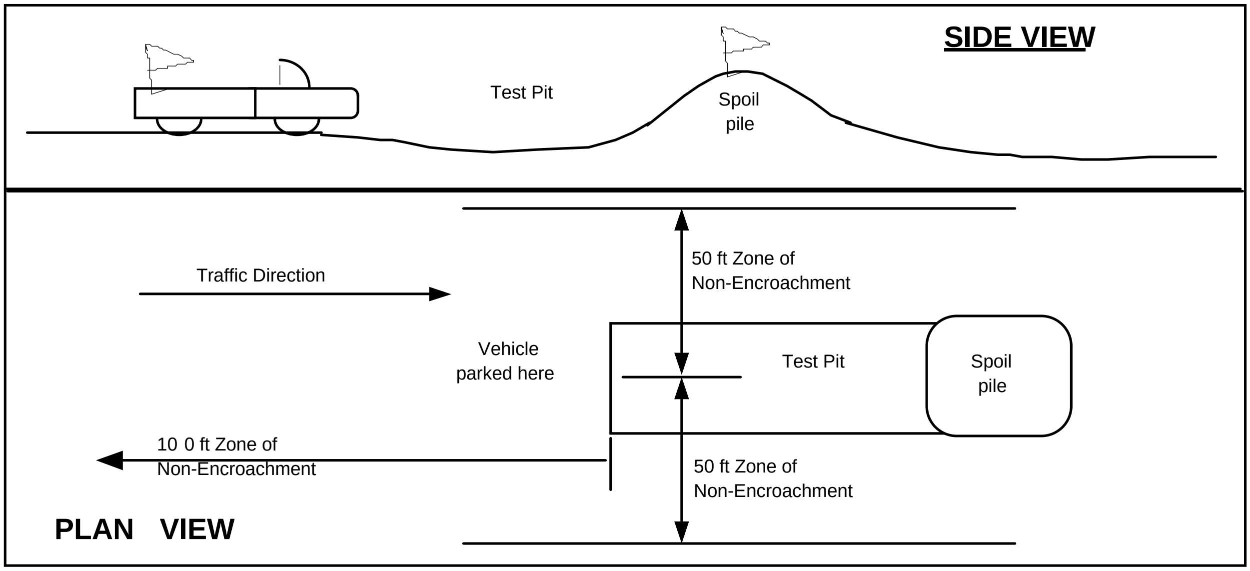
Test Pits Location, Orientation and Clearance

The technician is responsible for selecting test pit locations. The primary concern is the technician's safety. However, it is necessary to take sufficient tests at various locations to obtain a representative sampling of the fill. As such, efforts will be made to coordinate locations with the grading contractors authorized representatives (e.g. dump man, operator, supervisor, grade checker, etc.), and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractors authorized representative should direct excavation of the pit and safety during the test period. Again, safety is the paramount concern.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates that the fill be maintained in a drivable condition. Alternatively, the contractor may opt to park a piece of equipment in front of test pits, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits (see diagram below). No grading equipment should enter this zone during the test procedure. The zone should extend outward to the sides approximately 50 feet from the center of the test pit and 100 feet in the direction of traffic flow. This zone is established both for safety and to avoid excessive ground vibration, which typically decreases test results.

TEST PIT SAFETY PLAN



Slope Tests

When taking slope tests, the technician should park their vehicle directly above or below the test location on the slope. The contractor's representative should effectively keep all equipment at a safe operation distance (e.g. 50 feet) away from the slope during testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location.

Trench Safety

It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Trenches for all utilities should be excavated in accordance with CAL-OSHA and any other applicable safety standards. Safe conditions will be required to enable compaction testing of the trench backfill.

All utility trench excavations in excess of 5 feet deep, which a person enters, are to be shored or laid back. Trench access should be provided in accordance with OSHA standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

Our personnel are directed not to enter any excavation which;

1. is 5 feet or deeper unless shored or laid back,
2. exit points or ladders are not provided,
3. displays any evidence of instability, has any loose rock or other debris which could fall into the trench, or
4. displays any other evidence of any unsafe conditions regardless of depth.

If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraws and notifies their supervisor. The contractors representative will then be contacted in an effort to effect a solution. All backfill not tested due to safety concerns or other reasons is subject to reprocessing and/or removal.

Procedures

In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is directed to inform both the developer's and contractor's representatives. If the condition is not rectified, the technician is required, by company policy, to immediately withdraw and notify their supervisor. The contractor’s representative will then be contacted in an effort to effect a solution. No further testing will be performed until the situation is rectified. Any fill placed in the interim can be considered unacceptable and subject to reprocessing, recompaction or removal.

In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to technicians attention and notify our project manager or office. Effective communication and coordination between the contractors' representative and the field technician(s) is strongly encouraged in order to implement the above safety program and safety in general.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

GEOTEK

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August 23, 2016
Project No. 0934-CR3

Integral Communities
2235 Encinitas Boulevard, Suite 216
Encinitas, California 92024

Attention: Mr. Greg Waite

Subject: Revised Geotechnical Update Letter
West Oaks Project – 11.841± Net-Acre Site
Assessor Parcel Numbers (APNs) 212-110-01, -02, -03, -04, -05, -06, -07, -08 and 212-040-26
City of Carlsbad, San Diego County, California

Reference: GeoTek, Inc., 2013, "Preliminary Geotechnical Evaluation, West Oaks Project – 7.5± Acre Site, APN's 212-110-01, -02, -03, -04, -05, -06, and -07, City of Carlsbad, San Diego County, California," Project No. 0934-CR3, dated January 3.

Dear Mr. Waite:

In accordance with your request, GeoTek, Inc. (GeoTek) is providing this letter as a Geotechnical Update to the referenced report by this firm (GeoTek, 2013). This report presents 2013 CBC seismic design parameters and updated foundation design and construction recommendations. The referenced report presents the results of the preliminary geotechnical evaluation for most of the subject property. The subject project now also includes two additional parcels: the first is located along the northeastern edge of the project (APN 212-110-08), which is largely a drainage area and no development is planned for this parcel area; and one to the west end of the site (APN 212-040-26). This second new parcel has not yet been graded, and appears to be predominantly underlain by natural alluvial soils. Proposed improvements in this parcel area are understood to include paved parking. The recommendations previously provided appear suitable from a geotechnical perspective, unless otherwise superseded herein or in future reports by this firm. Total project site acreage is now approximately 11.841.

SITE DESCRIPTION AND EXISTING CONDITIONS

The subject site is located along West Oaks Way, west of the intersection of Palomar Oaks Way and just south of Palomar Airport Road in the City of Carlsbad, San Diego County, California. The West Oaks project site is now comprised of eight (8) parcels of land.

The project site has previously mostly been rough graded under the purview of Southern California Soil and Testing, Inc. (SCS&T, 1988d), and currently consists of four (4) vacant sheet-graded pads located on both sides of West Oaks Way. The newly added western-most parcel has not been previously graded. According to a report that documents the rough grading (SCS&T, 1988d), engineered fills on the order of at least four (4) feet underlie the site, with maximum depths of fill on the order of up to roughly 10 feet in the area of Lot 1 (eastern-most site lot) where a stabilization fill was constructed to retain/buttress a small area of landslide debris and colluvial deposits.

West Oaks Way is paved and some underground and above ground improvements are present. Existing, known underground site improvements include sewer main lines that are under some graded pad areas, along with water and gas lines beneath the street. Underground dry utilities are also likely present. Above ground improvement include power lines, as well as a couple of retaining walls.

An active drainage course is located along the northern edge of the site and directs storm water to the west. Overall, the project site area is irregular in shape and consists of relatively flat terrain with surface drainage directed toward the west. Total relief across the site, excluding some perimeter slope areas, is roughly 25 feet.

PROPOSED DEVELOPMENT

We understand that anticipated site development will include numerous townhome structures, up to three (3) stories in height, with associated parking and driveway areas. Structural loads are anticipated to be typical for this type of construction.

Site development plans should be reviewed by GeoTek when they become available. Additional geotechnical field exploration, analyses and recommendations may be necessary upon review of site development plans.

The subsequent sections of this report present updated seismic and foundation design criteria and geotechnical recommendations.

SEISMIC DESIGN AND SETTLEMENT CONSIDERATIONS

2013 CBC Criteria

The site is located at approximately 33.1201 Latitude and -117.2926 Longitude. Site spectral accelerations (S_s and S_1), for 0.2 and 1.0 second periods for a Class "D" site, were determined from the USGS Website, Earthquake Hazards Program, Interpolated Probabilistic Ground Motion for the Conterminous 48 States by Latitude/Longitude, 2010 ASCE 7 with July 2013 Errata Data. The results are presented in the following table:

SITE SEISMIC PARAMETERS	
Mapped 0.2 sec Period Spectral Acceleration, Ss	1.092g
Mapped 1.0 sec Period Spectral Acceleration, S1	0.421g
Site Coefficient for Site Class "D", Fa	1.0
Site Coefficient for Site Class "D", Fv	1.5
Maximum Considered Earthquake Spectral Response Acceleration Parameter at 0.2 Second, SMS	1.161g
Maximum Considered Earthquake Spectral Response Acceleration Parameter at 1 second, SM1	0.664g
Design Spectral Response Acceleration for Parameter for 0.2 Second, SDS	0.774g
Design Spectral Response Acceleration for Parameter 1.0 Second, SD1	0.443g
Peak Ground Acceleration Adjusted for Site Class Effects, PGA_M	0.459g

Liquefaction and Settlement Considerations

The project site has liquefaction potential as referenced in the report by this firm (GeoTek, 2013). Peak ground accelerations (PGA) for use in liquefaction analyses have changed as a result of the 2013 CBC adoption. GeoTek has re-evaluated the liquefaction potential of the site using a value to represent site acceleration of $2/3*(PGA_M)$; where PGA_M was determined from the USGS website referenced above. The results of the analysis using the updated site acceleration did not change significantly and GeoTek's previous recommendations are still applicable. As such, the total seismic (earthquake-induced) settlement is not expected to exceed approximately 1.6 inches for this site. Differential settlement of up to one-half to two-third of the total settlement over a horizontal distance of 40 feet could result.

FOUNDATION RECOMMENDATIONS

Foundation design criteria for a conventional foundation system, in general conformance with the 2013 CBC, are presented herein. These are typical design criteria and are not intended to supersede the design by the structural engineer.

Based on the results of Expansion Index testing presented in the referenced report (GeoTek, 2013) and our experience in the area, the onsite soils near subgrade may be classified having "low" (21≤EI≤50) to "medium" (51<EI≤90) expansion potential in accordance with ASTM D 4829. Additional testing should be performed during grading to further evaluate the expansion potential and plasticity index.

A summary of our preliminary foundation design recommendations are presented in the following table:

GEOTECHNICAL RECOMMENDATION FOR MINIMUM DESIGN OF CONVENTIONALLY REINFORCED FOUNDATIONS

DESIGN PARAMETER	"Low" Expansion Potential	"Medium" Expansion Potential
Minimum Exterior Footing Depth (inches below lowest adjacent grade)	One-Story – 12 Two/Three-Story – 18	One-Story – 18 Two/Three-Story – 18
Minimum Interior Footing Depth (inches below lowest adjacent grade)	One-Story – 12 Two/Three-Story – 18	One-Story – 12 Two/Three-Story – 18
Minimum Foundation Width (Inches)*	Supporting One Floor – 12 Supporting Two Floors – 15 Supporting Three Floors - 18	Supporting One Floor – 12 Supporting Two Floors – 15 Supporting Three Floors - 18
Minimum Slab Thickness (inches)	4	4
Minimum Slab Reinforcing	No. 3 rebar 18-inches on-center, each way, placed in middle 1/3 of slab thickness	No. 3 rebar 12-inches on-center, each way, placed in middle 1/3 of slab thickness
Minimum Footing Reinforcement	Two (2) No. 4 Reinforcing Bars, one (1) top and one (1) bottom	Four (4) No. 4 Reinforcing Bars, two (2) top and two (2) bottom
Effective Plasticity Index (assumed)**	20	25
Presaturation of Subgrade Soil (Percent of Optimum)	Minimum 110% to a depth of 12 inches	Minimum 120% to a depth of 12 inches

*Code minimums per Table 1809.7 of the 2013 CBC should be complied with.
**Effective Plasticity Index should be verified during lot rough grading, since no prior testing was performed.

It should be noted that the above recommendations are based on soil support characteristics only. The structural engineer should design the slab and beam reinforcement based on actual loading conditions. If desired, post-tension foundation design parameters can be provided.

The following criteria for design of foundations should be implemented into design:

- An allowable bearing capacity of 1,500 pounds per square foot (psf) may be used for design of continuous and perimeter footings 12 inches deep and 12 inches wide, and pad footings 24 inches square and 12 inches deep. This value may be increased by 250 pounds per square foot for each additional 12 inches in depth and 100 pounds per square foot for each additional 12 inches in width to a maximum value of 2,500 psf.

  The passive earth pressure may be computed as an equivalent fluid having a density of 250 psf per foot of depth, to a maximum earth pressure of 2,500 psf for footings founded on engineered fill. A coefficient of friction between soil and concrete of 0.25 may be used with dead load forces. The upper one foot of soil below the adjacent grade should not be used in calculating passive pressure. When combining passive and frictional resistance, the passive pressure component should also be reduced by one-third.

  The above values may be increased as allowed by Code to resist short-term transient loads (e.g. seismic and wind loads).

- A grade beam, 12 inches wide, should be utilized across large opening or garage entrances. The base of the grade beam should be at the same elevation as the bottom of the adjoining footings (minimum 12 inches in depth).

- A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these are provided in the 2013 California Green Building Standards Code (CALGreen) Section 4.505.2, the 2013 CBC Section 1907.1, ACI 360R-10 and ACI 203.2R-06.

  It should be realized that the effectiveness of the vapor retarding membrane can be adversely impacted as a result of construction related punctures (e.g. stake penetrations, tears, punctures from walking on the vapor retarder placed atop the underlying aggregate layer, etc.). These occurrences should be limited as much as possible during construction. Thicker membranes are generally more resistant to accidental puncture than thinner ones. Products specifically designed for use as moisture/vapor retarders may also be more puncture resistant. Although the CBC specifies a 6 mil vapor retarder membrane, it is GeoTek's opinion that a minimum 10 mil thick membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional.

Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and environmental conditions. Ultimately, the vapor retarding system should be comprised of suitable elements to limited migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties (i.e. thickness, composition, strength, and permeability) to achieve the desired performance level. Consideration should be given to consulting with an individual processing specific expertise in this area for additional evaluation.

Moisture retarders can reduce, but not eliminate moisture vapor rise from the underlying soils up through the slab. Moisture retarder systems should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Concrete Institute, ASTM and California Building Code requirements and guidelines.

GeoTek does not practice in the field of moisture vapor transmission evaluation/mitigation, since that practice is not a geotechnical discipline. Therefore, we recommend that a qualified person, such as the flooring contractor, structural engineer, architect, and/or other experts specializing in moisture control within the building be consulted to evaluate the general and specific moisture vapor transmission paths and associated potential impact on the proposed construction. That person (or persons) should provide recommendations relative to the slab moisture and vapor retarder systems and for mitigation of potential adverse impact of moisture vapor transmission on various components of the structures, as deemed appropriate. In addition, the recommendations in this report and our services in general are not intended to address mold prevention; since we, along with geotechnical consultants in general, do not practice in the area of mold prevention. If specific recommendations addressing potential mold issues are desired, then a professional mold prevention consultant should be contacted.

Miscellaneous Foundation Recommendations

- Isolated exterior footings should be tied back to the main foundation system in two orthogonal directions with either reinforced grade-beams and/or continuous footing, to provide a more rigid and monolithic shallow foundation system.

- To minimize moisture penetration beneath the slab on grade areas, utility trenches should be backfilled with lean concrete or concrete slurry where they intercept the perimeter footing or thickened slab edge.

- Soils from the footing excavations should not be placed in the slab-on-grade areas unless properly compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement.

- Under-slab utility trenches should be compacted to project specifications. Compaction should be achieved with a mechanical compaction device. If backfill soils have dried out, they should be thoroughly moisture conditioned prior to placement in trenches.

- Utility trench excavations should be shored or laid back in accordance with applicable CAL/OSHA standards.

- On-site materials may not be suitable for use as bedding material, but will be suitable as backfill. Jetting of native soils will not be acceptable.

Foundation Set Backs

Where applicable, the following setbacks should apply to all foundations. Any improvements not conforming to these setbacks may be subject to lateral movements and/or differential settlements:

- The outside bottom edge of all footings should be set back a minimum of H/3 (where H is the slope height) from the face of any descending slope. The setback should be at least 7 feet and need not exceed 40 feet.

- The bottom of all footings for structures near retaining walls should be deepened so as to extend below a 1:1 projection upward from the bottom inside edge of the wall stem.

- The bottom of any existing foundations for structures should be deepened so as to extend below a 1:1 projection upward from the bottom of the nearest excavation.

INTENT

It is the intent of this report to aid in the design and construction of the proposed development. The professional opinions and geotechnical advice contained in this report are not intended to imply total performance of the project or guarantee that unusual or variable conditions will not be discovered during or after construction.

The scope of our evaluation is limited to the boundaries of the subject residential development. This review does not and should in no way be construed to encompass any areas beyond the specific area of the proposed construction as indicated to us by the client. Further, no evaluation of any existing site improvements is included. The scope is based on our understanding of the project and the client's needs and geotechnical engineering standards normally used on similar projects in this region.

LIMITATIONS

The materials observed on the project site appear to be representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during site construction. Site conditions may vary due to seasonal changes or other factors. GeoTek, Inc. assumes no responsibility or liability for work, testing or recommendations performed or provided by others.

Since our recommendations are based on the site conditions observed and encountered, and laboratory testing, our conclusion and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty is expressed or implied. Standards of practice are subject to change with time.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to call our office.

Respectfully submitted,
GeoTek, Inc.

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GREENHOUSE GAS EMISSIONS ANALYSIS
for the
West Oaks Project
City of Carlsbad, California

Prepared for:

The Carlsbad Westoaks Project Owner LLC, a Delaware Limited Liability Company
2235 Encinitas Boulevard, Suite 216
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Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024
Contact: Adam Poll, LEED AP BD+C, QEP

OCTOBER 2020

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APPENDIX

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
AB	Assembly Bill
CAP	Climate Action Plan
CARB	California Air Resources Board
CAT	Climate Action Team
CEC	California Energy Commission
CALGreen	California's Green Building Standards
CalEEMod	California Emissions Estimator Model
CEQA	California Environmental Quality Act
CH_4	methane
City	City of Carlsbad
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CAPCOA	California Air Pollution Control Officers Association
CPUC	California Public Utilities Commission
EPA	United States Environmental Protection Agency
GHG	greenhouse gas
GWP	global warming potential
HFCs	hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
MMT	million metric tons
MT	metric tons
NF_3	nitrogen trifluoride
NHTSA	National Highway Traffic Safety Association
N_2	nitrogen gas
N_2O	nitrous oxide
PFCs	perfluorocarbons
Project	West Oaks Project
RPS	Renewable Portfolio Standard
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SB	Senate Bill
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SDG&E	San Diego Gas and Electric
SF_6	sulfur hexafluoride
SMAQMD	Sacramento Metropolitan Air Quality Management District

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EXECUTIVE SUMMARY

The purpose of this technical report is to assess the potential greenhouse gas (GHG) emissions impacts associated with implementation of the proposed West Oaks Project (Project). This assessment utilizes the significance thresholds in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.).

Project Overview

The Project is a multifamily residential development proposed along Palomar Airport Road in the City of Carlsbad (City), California. The Project consists of 192 units comprised of one-bedroom one-bathroom, two-bedroom two-bathroom, and three-bedroom three-bathroom units. The Project also includes onsite parking, a recreation/leasing building, and a community swimming pool. The Project would consist of 150 market rate units and 42 affordable units.

Greenhouse Gas Emissions

Global climate change is primarily considered a cumulative impact but must also be evaluated on a project-level under CEQA. A project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHG emissions. GHGs are gases that absorb infrared radiation in the atmosphere. Principal GHGs regulated under state and federal law and regulations include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). GHG emissions are measured in metric tons of CO_2 equivalent (MT CO_2e), which account for weighted global warming potential (GWP) factors for CH_4 and N_2O.

Project Impacts

Construction of the Project would result in GHG emissions primarily associated with the use of off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles. The Project would generate operational GHG emissions from area sources (landscape maintenance), energy sources (electricity consumption), mobile sources (vehicle trips), water supply and wastewater treatment, and solid waste. Estimated annual Project-generated operational GHG emissions at buildout in 2022 would be approximately 1,357 MT CO_2e per year. Estimated annual Project-generated operational emissions in 2022, plus amortized Project construction emissions plus sequestered carbon, would be approximately 1,379 MT CO_2e per year.

An efficiency metric threshold for the Project's buildout year was estimated at 4.26 MT CO_2e/person/year based on City specific emissions and population data and statewide GHG reduction targets (see Section 4). The Project would have a total service population of 499 and an efficiency metric of 2.76 MT CO_2e/person/year (1,379 MT CO_2e per year / 499 persons).

Therefore, the Project would not exceed the efficiency metric threshold for 2022 and thus would be consistent with the state's targets within SB 32 to reduce GHG emissions to 40 percent below 1990 levels by 2030 . Therefore, GHG impacts would be considered less than significant.

As discussed in Section 5, the Project would be consistent with applicable plans, policies and regulations for the reduction of GHG emissions (i.e. CARB's Scoping Plan and SANDAG's Regional Plan). This determination is based on, but not limited to, the following: (i) the Project's various design attributes maximize the efficiency of the built environment by reducing the consumption of natural gas and increasing electrification; (ii) the Project is located on an infill site along a major transportation thoroughfare in the City of Carlsbad that provides multi-modal transit opportunities; and, (iii) the Project would provide a needed mix of market-rate and affordable units, helping to improve the jobs/housing balance in the City of Carlsbad and provide increased residential opportunities within the City's jurisdictional boundaries. Therefore, the Project's impacts on GHG emissions would be less than significant.

1 INTRODUCTION

1.1 Report Purpose and Scope

The purpose of this technical report is to assess the potential greenhouse gas (GHG) emissions impacts associated with implementation of the proposed West Oaks Project (Project). This assessment utilizes the significance thresholds in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.).

This introductory section provides a description of the Project and the Project location. Section 2 describes existing GHG-related conditions and Section 3 provides a summary of the regulatory setting. Section 4 presents the thresholds of significance applied in the impact analysis contained in Section 5. Lastly, Section 6 includes a list of the references cited.

1.2 Project Location

The approximate 12.73-acre site (including West Oaks Way) is located within the City of Carlsbad (City), California, San Diego County, California. The site is located roughly 2.1 miles east of the Pacific Ocean and is within the Coastal Zone Boundary (Figure 1, Regional Map). Specifically, the site is located approximately 0.5 mile east of Aviara Parkway, directly west of Palomar Oaks Way, and immediately south of Palomar Airport Road. The approximate centroid of the Project site is at longitude 117.2925° West and latitude 33.1210° North within Section 22, Township 12 South, Range 4 West on the U.S. Geological Survey 7.5-minute Encinitas Quadrangle map (Figure 2, Vicinity Map). According to the San Diego Basin Plan, the site is located within the Carlsbad Watershed Encinas Hydrologic Area (904.4) within the Canyon del las Encinas Basin (4.40) (RWQCB 2015). The Project is located on Assessor's Parcel Numbers: 212-110-01 through 212-110-07 and 212-040-26.

1.3 Project Description

The Project would develop 192-unit multifamily apartment homes in a 3-story walk-up Type VB construction. The residences would consist of 42 affordable units (built on-site) and 150 market-rate residences. The Project includes a new driveway entrance and bridge at the western end of West Oaks Way as well as a new internal loop road (Fuscoe Engineering and Summa Architecture 2017). Surface parking would be provided in several areas within the Project providing approximately 382 parking spaces. The Project would also include a swimming pool for shared residential use.

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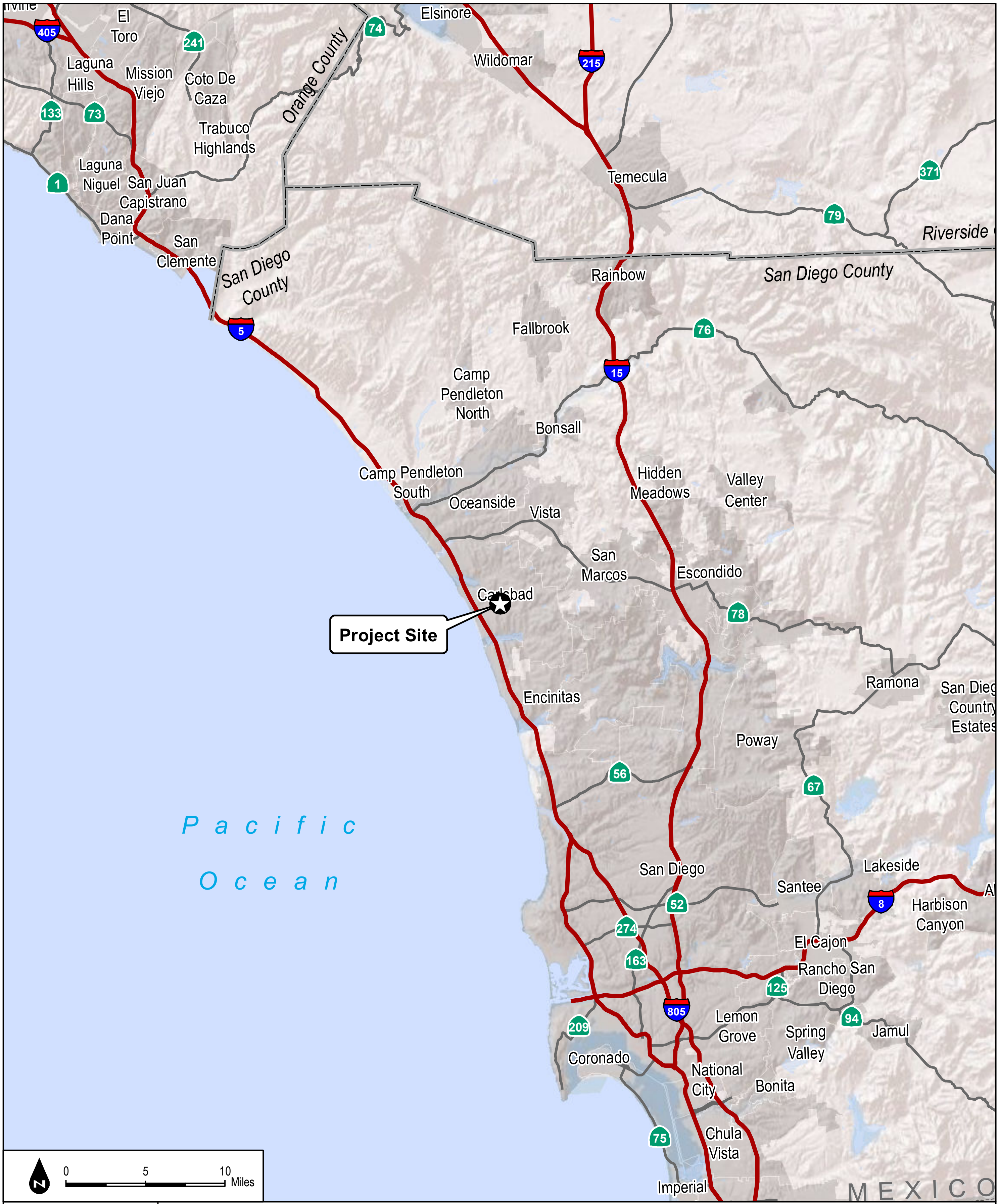

SOURCE: ESRI 2016

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FIGURE 1

Regional Map

Greenhouse Gas Emissions Analysis for the West Oaks Project

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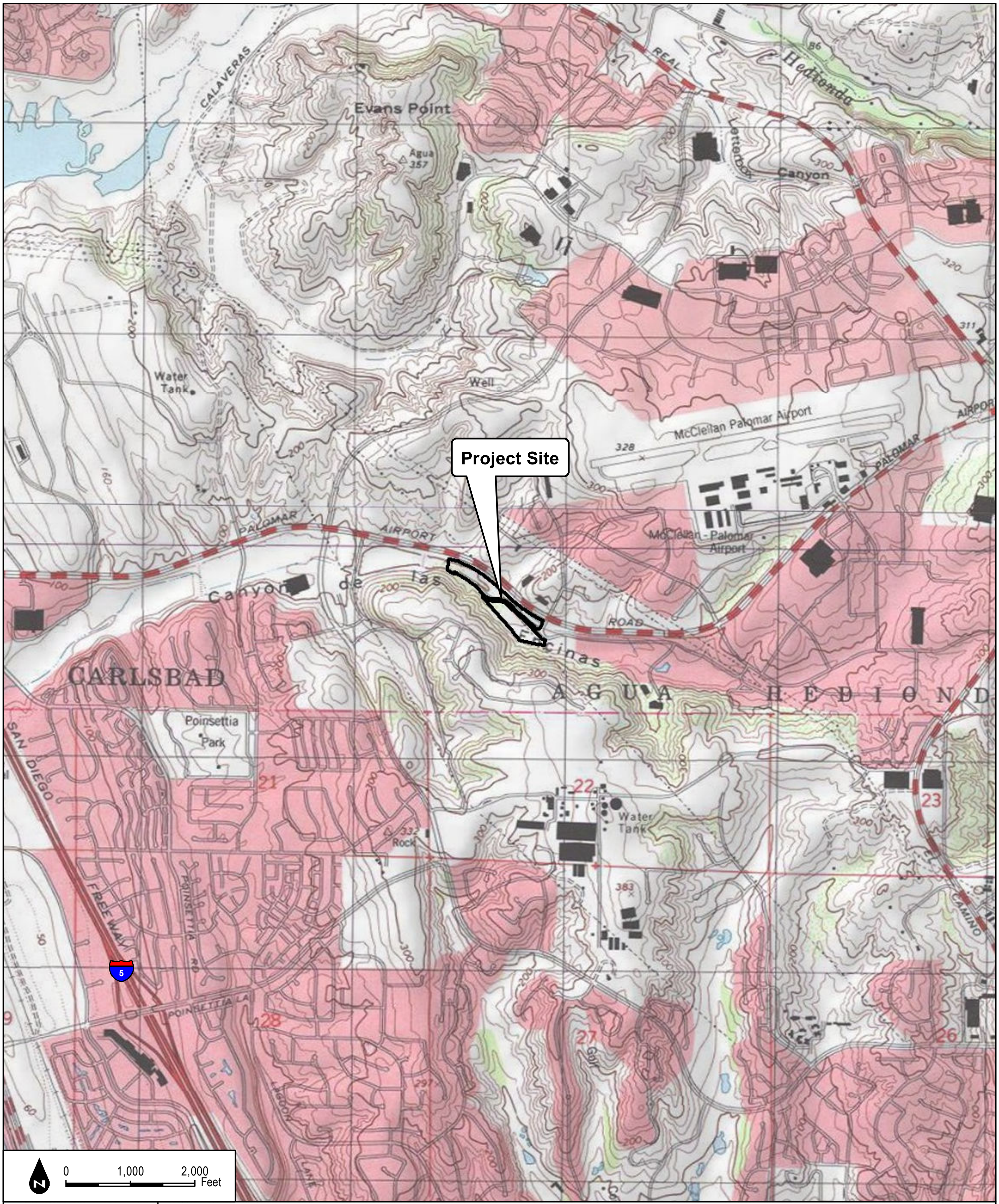

SOURCE: USGS 7.5-Minute Series Encinitas Quadrangle.

FIGURE 2

Vicinity Map

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Greenhouse Gas Emissions Analysis for the West Oaks Project

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2 EXISTING CONDITIONS

2.1 Climate Change Overview

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind patterns, lasting for an extended period of time (decades or longer). The Earth's temperature depends on the balance between energy entering and leaving the planet’s system. Many factors, both natural and human, can cause changes in Earth’s energy balance, including variations in the sun's energy reaching Earth, changes in the reflectivity of Earth’s atmosphere and surface, and changes in the greenhouse effect, which affects the amount of heat retained by Earth’s atmosphere (EPA 2017a).

The greenhouse effect is the trapping and build-up of heat in the atmosphere (troposphere) near the Earth’s surface. The greenhouse effect traps heat in the troposphere through a threefold process as follows: Short-wave radiation emitted by the Sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long-wave radiation; and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and toward the Earth. The greenhouse effect is a natural process that contributes to regulating the Earth’s temperature and creates a pleasant, livable environment on the Earth. Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and causing the Earth’s surface temperature to rise.

The scientific record of the Earth’s climate shows that the climate system varies naturally over a wide range of time scales and that in general, climate changes prior to the Industrial Revolution in the 1700s can be explained by natural causes, such as changes in solar energy, volcanic eruptions, and natural changes in GHG concentrations. Recent climate changes, in particular the warming observed over the past century, however, cannot be explained by natural causes alone. Rather, it is extremely likely that human activities have been the dominant cause of that warming since the mid-20th century and is the most significant driver of observed climate change (IPCC 2014; EPA 2017a). Human influence on the climate system is evident from the increasing GHG concentrations in the atmosphere, positive radiative forcing, observed warming, and improved understanding of the climate system (IPCC 2014). The atmospheric concentrations of GHGs have increased to levels unprecedented in the last 800,000 years, primarily from fossil fuel emissions and secondarily from emissions associated with land use changes (IPCC 2014). Continued emissions of GHGs will cause further warming and changes in all components of the climate system, which is discussed further in Section 2.6, Potential Effects of Climate Change.

2.2 Greenhouse Gases and other Climate Forcing Substances

A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the atmosphere. GHGs include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), water vapor, hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).[1] Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted to the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Manufactured GHGs, which have a much greater heat-absorption potential than CO_2, include fluorinated gases, such as HFCs, HCFCs, PFCs, and SF_6, which are associated with certain industrial products and processes. A summary of the most common GHGs and their sources is included in the following text.[2] Also included is a discussion of other climate forcing substances.

Carbon Dioxide (CO_2). CO_2 is a naturally occurring gas and a by-product of human activities and is the principal anthropogenic GHG that affects the Earth's radiative balance. Natural sources of CO_2 include respiration of bacteria, plants, animals, and fungus; evaporation from oceans; volcanic out-gassing; and decomposition of dead organic matter. Human activities that generate CO_2 are from the combustion of fuels such as coal, oil, natural gas, and wood and changes in land use.

Methane (CH_4). CH_4 is produced through both natural and human activities. CH_4 is a flammable gas and is the main component of natural gas. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Nitrous Oxide (N_2O). N_2O is produced through natural and human activities, mainly through agricultural activities and natural biological processes, although fuel burning and other processes also create N_2O. Sources of N_2O include soil cultivation practices (microbial processes in soil and water), especially the use of commercial and organic fertilizers, manure management, industrial processes (such as in nitric acid production, nylon production, and fossil-fuel-fired power plants), vehicle emissions, and using N_2O as a propellant (such as in rockets, racecars, and aerosol sprays).

Fluorinated Gases. Fluorinated gases (also referred to as F-gases) are synthetic powerful GHGs emitted from many industrial processes. Fluorinated gases are commonly used as substitutes for

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[1] California Health and Safety Code 38505 identifies seven GHGs that CARB is responsible to monitor and regulate to reduce emissions: CO_2, CH_4, N_2O, SF_6, HFCs, PFCs, and NF_3.

[2] The descriptions of GHGs are summarized from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (1995), IPCC Fourth Assessment Report (2007), CARB's Glossary of Air Pollution Terms (2015), and EPA's Glossary of Climate Change Terms (2016).

stratospheric ozone-depleting substances (e.g., CFCs, HCFCs, and halons). The most prevalent fluorinated gases include the following:

- **Hydrofluorocarbons:** HFCs are compounds containing only hydrogen, fluorine, and carbon atoms. HFCs are synthetic chemicals used as alternatives to ozone-depleting substances in serving many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are used in manufacturing.
- **Perfluorocarbons:** PFCs are a group of human-made chemicals composed of carbon and fluorine only. These chemicals were introduced as alternatives, with HFCs, to the ozone depleting substances. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing. Since PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere, these chemicals have long lifetimes, ranging between 10,000 and 50,000 years.
- **Sulfur Hexafluoride:** SF_6 is a colorless gas soluble in alcohol and ether and slightly soluble in water. SF_6 is used for insulation in electric power transmission and distribution equipment, semiconductor manufacturing, the magnesium industry, and as a tracer gas for leak detection.
- **Nitrogen Trifluoride:** NF_3 is used in the manufacture of a variety of electronics, including semiconductors and flat panel displays.

Chlorofluorocarbons (CFCs). CFCs are synthetic chemicals that have been used as cleaning solvents, refrigerants, and aerosol propellants. CFCs are chemically unreactive in the lower atmosphere (troposphere) and the production of CFCs was prohibited in 1987 due to the chemical destruction of stratospheric O_3.

Hydrochlorofluorocarbons (HCFCs). HCFCs are a large group of compounds, whose structure is very close to that of CFCs—containing hydrogen, fluorine, chlorine, and carbon atoms—but including one or more hydrogen atoms. Like HFCs, HCFCs are used in refrigerants and propellants. HCFCs were also used in place of CFCs for some applications; however, their use in general is being phased out.

Black Carbon. Black carbon is a component of fine particulate matter, which has been identified as a leading environmental risk factor for premature death. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influences cloud formation, and darkens the surface of snow and ice, which accelerates heat absorption and melting. Black carbon is a short-lived species that varies spatially, which makes it difficult to quantify the global warming potential. Diesel particulate matter emissions are a major source of black carbon and are toxic air contaminates (TACs) that have been regulated and controlled in California for several decades to protect public health. In relation to declining diesel particulate matter from the California Air Resources Board's (CARB's) regulations pertaining to diesel engines, diesel fuels, and burning activities, CARB estimates that annual black carbon emissions in California have reduced by 70% between 1990 and 2010, with 95% control expected by 2020 (CARB 2014a).

Water Vapor. The primary source of water vapor is evaporation from the ocean, with additional vapor generated by sublimation (change from solid to gas) from ice and snow, evaporation from other water bodies, and transpiration from plant leaves. Water vapor is the most important, abundant, and variable GHG in the atmosphere and maintains a climate necessary for life.

Ozone (O_3). Tropospheric O_3, which is created by photochemical reactions involving gases from both natural sources and human activities, acts as a GHG. Stratospheric O_3, which is created by the interaction between solar ultraviolet radiation and molecular oxygen (O_2), plays a decisive role in the stratospheric radiative balance. Depletion of stratospheric O_3, due to chemical reactions that may be enhanced by climate change, results in an increased ground-level flux of ultraviolet-B radiation.

Aerosols. Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light.

2.3 Global Warming Potential

Gases in the atmosphere can contribute to climate change both directly and indirectly. Direct effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations of the substance produce other GHGs, when a gas influences the atmospheric lifetimes of other gases, and/or when a gas affects atmospheric processes that alter the radiative balance of the Earth (e.g., affect cloud formation or albedo) (EPA 2017a). The Intergovernmental Panel on Climate Change (IPCC) developed the global warming potential (GWP) concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP of a GHG is defined as the ratio of the time-integrated radiative forcing from the instantaneous release of 1 kilogram of a trace substance relative to that of 1 kilogram of a reference gas (IPCC 2014). The reference gas used is CO_2; therefore, GWP-weighted emissions are measured in MT CO_2 equivalent (CO_2e).

The current version of the California Emissions Estimator Model (CalEEMod) (version 2016.3.2) assumes that the GWP for CH_4 is 25 (so emissions of 1 MT of CH_4 are equivalent to emissions of 25 MT of CO_2), and the GWP for N_2O is 298, based on the IPCC Fourth Assessment Report (IPCC 2007). The GWP values identified in CalEEMod were applied to the Project.

2.4 Sources of Greenhouse Gas Emissions

Global Inventory

Anthropogenic GHG emissions worldwide in 2017 (the most recent year for which data is available) totaled approximately 50,860 MMT of CO_2e, excluding land use change and forestry (Olivier and Peters 2018). Six countries—China, the United States, the Russian Federation, India, Japan, and Brazil—and the European community accounted for approximately 65% of the total global emissions, or approximately 33,290 MMT CO_2e (Olivier and Peters 2018). Table 1 presents the top GHG-emissions-producing countries, as well as the European Union.

Table 1
Six Top GHG Producer Countries and the European Union

Emitting Countries	2014 GHG Emissions (MMT CO_2e)[a,b]
China	13,530
United States	6,640
European Union	4,560
India	3,650
Russian Federation	2,220
Japan	1,490
Brazil	1,200
Total	33,290

Source: Olivier and Peters 2018.
Notes: MMT CO_2e = million metric tons of carbon dioxide equivalent.
[a] Column may not add due to rounding.
[b] GHG emissions do not include land use change and forestry-related GHG emissions.

National and State Inventories

Per the 2019 EPA Inventory of U.S. GHG Emissions and Sinks: 1990–2017, total U.S. GHG emissions were approximately 6,457 MMT CO_2e in 2017 (EPA 2019). The primary GHG emitted by human activities in the United States was CO_2, which represented approximately 81.6% of total GHG emissions (6,457 MMT CO_2e). The largest source of CO_2, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 93.2% of CO_2 emissions in 2017 (4,912.0 MMT CO_2e). Relative to the 1990 emissions level, gross U.S. GHG emissions in 2017 were 1.3% higher; however, the gross emissions were down from a high of 15.7% above the 1990 level that occurred in 2007. GHG emissions decreased from 2016 to 2017 by 0.5% (35.5 MMT CO_2e) and, overall, net emissions in 2017 were 13% below 2005 levels (EPA 2019).

According to California's 2000 through 2016 GHG emissions inventory (2018 edition), California emitted 429 MMT CO_2e in 2016, including emissions resulting from out-of-state electrical generation (CARB 2018). The sources of GHG emissions in California include transportation, industry, electric power production from both in-state and out-of-state sources, residential and commercial activities, agriculture, high GWP substances, and recycling and waste. The California GHG emission source categories and their relative contributions in 2016 are presented in Table 2.

Table 2
GHG Emissions Sources in California

Source Category	Annual GHG Emissions (MMT CO_2e)	Percent of Total*
Transportation	176.1	41%
Industrial	98.8	23%
Electricity (in state)	42.9	10%
Electricity (imports)	25.8	6%
Agriculture	34.4	8%
Residential	30.1	7%
Commercial	21.5	5%
Total	429.4	100%

Source: CARB 2018.
Notes: GHG = greenhouse gas; MMT CO_2e = million metric tons of carbon dioxide equivalent.
* Column may not add due to rounding.

Between 2000 and 2016, per-capita GHG emissions in California dropped from a peak of 14 MT per person in 2001 to 10.8 MT per person in 2016, representing a 23% decrease. In addition, total GHG emissions in 2015 were approximately 12 MMT CO_2e less than 2015 emissions (CARB 2018).

According to the GHG inventory data compiled by the Energy Policy Initiative Center, in 2010, the County (as defined to include all cities therein and unincorporated County areas) emitted 34.7 MMT CO_2e (EPIC 2015). As outlined in Table 3, San Diego County GHG Emissions by Sectors, on-road transportation created 37% of these emissions. Similar to emissions trends statewide, electricity generation is the second biggest emitter.

Table 3
San Diego County GHG Emissions by Sectors

Source Category	Annual GHG Emissions (MMT CO_2e)	Percent of Total
On-road transportation	13.14	37.2
Electricity generation	7.97	22.6
Natural gas end uses	2.84	8.0
Heavy Duty Trucks & Vehicles	1.89	5.4
Solid Waste	1.75	4.9
Other Fuels	1.64	4.6
Industrial	1.43	4.1
Aviation	1.37	3.9
Off-Road	0.92	2.6
Wildfire	0.81	2.3
Other – Thermal Cogeneration	0.64	1.8
Water	0.52	1.5
Wastewater	0.16	0.5
Rail	0.11	0.3
Agriculture	0.08	0.2
Marine Vessels	0.05	0.1
Development and Sequestration	(0.65)	N/A
Total	34.67	100

Source: EPIC 2015.
Notes: GHG = greenhouse gas; MMT CO_2e = million metric tons of carbon dioxide equivalent per year

The 2012 emissions inventory for the City is shown in Table 4 below.

Table 4
City GHG Emissions by Sectors

Source Category	Annual GHG Emissions (MT CO_2e)	Percent of Total
On-road transportation[1]	488,000	49.9
Electricity	301,000	30.8
Natural gas	134,000	13.7
Solid Waste	25,000	2.6
Off-Road Transportation[2]	14,000	1.4
Water	12,000	1.2
Wastewater	3,000	0.3
Total	977,000	100

Source: Grim, pers. Comm. 2020
Notes: GHG emissions for each category are rounded. Sums may not add up to totals due to rounding.

[1] Based on SANDAG Series 13 vehicle miles traveled estimates. 2012 is the Series 13 Base Year.

[2] This category includes emissions from the off-road equipment sub-categories as identified in the Carlsbad CAP (lawn and garden, construction, industrial, and light commercial equipment). The sub-categories do not include all off-road vehicles and equipment.

2.5 Carbon Sequestration

Carbon sequestration is the process by which CO_2 is removed from the atmosphere and deposited into a carbon reservoir (e.g., vegetation). Trees and vegetation take in CO_2 from the atmosphere during photosynthesis, break down the CO_2, store the carbon within plant parts, and release the oxygen back into the atmosphere (CARB 2015). A development that changes land use type results in potential release of sequestered carbon to the atmosphere as CO_2, which would not have been released had there been no land-type change. The planting of new trees and vegetation would store new carbon as their wood mass increases via normal growth. This GHG analysis estimates the loss of sequestered carbon associated with the proposed land use change and the gain of sequestered carbon associated with planting new trees.

2.6 Potential Effects of Human Activity on Climate Change

Globally, climate change has the potential to affect numerous environmental resources through uncertain impacts related to future air temperatures and precipitation patterns. The 2014 Intergovernmental Panel on Climate Change Synthesis Report indicated that warming of the climate system is unequivocal and since the 1950s, many of the observed changes are unprecedented over decades to millennia. Signs that global climate change has occurred include warming of the atmosphere and ocean, diminished amounts of snow and ice, and rising sea levels (IPCC 2014).

In California, climate change impacts have the potential to affect sea level rise, agriculture, snowpack and water supply, forestry, wildfire risk, public health, and electricity demand and supply. The primary effect of global climate change has been a 0.2°C rise in average global tropospheric temperature per decade, determined from meteorological measurements worldwide between 1990 and 2005. Scientific modeling predicts that continued emissions of GHGs at or above current rates would induce more extreme climate changes during the twenty-first century than were observed during the twentieth century. A warming of about 0.2°C (0.36°F) per decade is projected, and there are identifiable signs that global warming could be taking place.

Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. A scientific consensus confirms that climate change is already affecting California. The average temperatures in California have increased, leading to more extreme hot days and fewer cold nights; shifts in the water cycle have been observed, with less winter precipitation falling as snow, and both snowmelt and rainwater running off earlier in the year; sea levels have risen; and wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later (CAT 2010).

An increase in annual average temperature is a reasonably foreseeable effect of climate change. Observed changes over the last several decades across the western United States reveal clear signals of climate change. Statewide average temperatures increased by about 1.7°F from 1895 to 2011, and warming has been greatest in the Sierra Nevada. By 2050, California is projected to warm by approximately 2.7°F above 2000 averages, a threefold increase in the rate of warming over the last century. By 2100, average temperatures could increase by 4.1°F to 8.6°F, depending on emissions levels. Springtime warming—a critical influence on snowmelt—will be particularly pronounced. Summer temperatures will rise more than winter temperatures, and the increases will be greater in inland California, compared to the coast. Heat waves will be more frequent, hotter, and longer. There will be fewer extremely cold nights. A decline of Sierra snowpack, which accounts for approximately half of the surface water storage in California and much of the State's water supply, by 30% to as much as 90% is predicted over the next 100 years (CAT 2010).

Model projections for precipitation over California continue to show the Mediterranean pattern of wet winters and dry summers with seasonal, year-to-year, and decade-to-decade variability. For the first time, however, several of the improved climate models shift toward drier conditions by the mid-to-late 21st century in Central and, most notably, Southern California. By late-century, all projections show drying, and half of them suggest 30-year average precipitation will decline by more than 10% below the historical average (CAT 2010).

A summary of current and future climate change impacts to resource areas in California, as discussed in the Safeguarding California: Reducing Climate Risk (CNRA 2014), is provided in the following text.

Agriculture. The impacts of climate change on the agricultural sector are far more severe than the typical variability in weather and precipitation patterns that occur year to year. Some of the specific challenges faced by the agricultural sector and farmers include more drastic and unpredictable precipitation and weather patterns; extreme weather events that range from severe flooding to extreme drought, to destructive storm events; significant shifts in water availably and water quality; changes in pollinator lifecycles; temperature fluctuations, including extreme heat stress and decreased chill hours; increased risks from invasive species and weeds, agricultural pests and plant diseases; and disruptions to the transportation and energy infrastructure supporting agricultural production. These challenges and associated short-term and long-term impacts can have both positive and negative effects on agricultural production. Nonetheless, it is predicted that current crop and livestock production will suffer long-term negative effects resulting in a substantial decrease in the agricultural sector if not managed or mitigated.

Biodiversity and Habitat. The state's extensive biodiversity stems from its varied climate and assorted landscapes, which have resulted in numerous habitats where species have evolved and adapted over time. Specific climate change challenges to biodiversity and habitat include species migration in response to climatic changes, range shift, and novel combinations of species; pathogens, parasites and disease; invasive species; extinction risks; changes in the timing of seasonal life-cycle events; food web disruptions; and threshold effects (i.e., a change in the ecosystem that results in a “tipping point” beyond which irreversible damage or loss has occurs). Habitat restoration, conservation, and resource management across California and through collaborative efforts amongst public, private and nonprofit agencies has assisted in the effort to fight climate change impacts on biodiversity and habitat. One of the key measures in these efforts is ensuring species’ ability to relocate as temperature and water availability fluctuate as a result of climate change, based on geographic region.

Energy. The energy sector provides California residents with a supply of reliable and affordable energy through a complex integrated system. Specific climate change challenges for the energy sector include temperature, fluctuating precipitation patterns, increasing extreme weather events and sea level rise. Increasing temperatures and reduced snowpack negatively impact the availability of a steady flow of snowmelt to hydroelectric reservoirs. Higher temperatures also reduce the capacity of thermal power plants since power plant cooling is less efficient at higher ambient temperatures. Natural gas infrastructure in coastal California is threatened by sea level rise and extreme storm events.

Forestry. Forests occupy approximately 33% of California’s 100 million acres and provide key benefits such as wildlife habitat, absorption of CO_2, renewable energy and building materials. The most significant climate change related risk to forests is accelerated risk of wildfire and more frequent and severe droughts. Droughts have resulted in more large scale mortalities and combined with increasing temperatures have led to an overall increase in wildfire risks. Increased wildfire intensity subsequently increases public safety risks, property damage, fire suppression and emergency response costs, watershed and water quality impacts and vegetation conversions. These factors contribute to decreased forest growth, geographic shifts in tree distribution, loss of fish and wildlife habitat and decreased carbon absorption. Climate change may result in increased establishment of non-native species, particularly in rangelands where invasive species are already a problem. Invasive species may be able to exploit temperature or precipitation changes, or quickly occupy areas denuded by fire, insect mortality or other climate change effects on vegetation.

Ocean and Coastal Ecosystems and Resources. Sea level rise, changing ocean conditions and other climate change stressors are likely to exacerbate long-standing challenges related to ocean and coastal ecosystems in addition to threatening people and infrastructure located along the California coastline and in coastal communities. Sea level rise in addition to more frequent and severe coastal storms and erosion are threatening vital infrastructure such as roads, bridges, power plants, ports and airports, gasoline pipes, and emergency facilities, as well as negatively impacting the coastal recreational assets such as beaches and tidal wetlands. Water quality and ocean acidification threaten the abundance of seafood and other plant and wildlife habitats throughout California and globally.

Public Health. Climate change can impact public health through various environmental changes and is the largest threat to human health in the twenty-first century. Changes in precipitation patterns affect public health primarily through potential for altered water supplies, and extreme events such as heat, floods, droughts, and wildfires. Increased frequency, intensity and duration of extreme heat and heat waves is likely to increase the risk of mortality due to heat related illness as well as exacerbate existing chronic health conditions. Other extreme weather events are likely to negatively impact air quality and increase or intensify respiratory illness such as asthma and allergies. Additional health impacts that may be impacted by climate change include cardiovascular disease, vector-borne diseases, mental health impacts, and malnutrition injuries. Increased frequency of these ailments is likely to subsequently increase the direct risk of injury and/or mortality.

Transportation. Residents of California rely on airports, seaports, public transportation and an extensive roadway network to gain access to destinations, goods and services. While the transportation industry is a source of GHG emissions it is also vulnerable to climate change risks. Particularly, sea level rise and erosion threaten many coastal California roadways, airports, seaports, transit systems, bridge supports, and energy and fueling infrastructure. Increasing temperatures and extended periods of extreme heat threaten the integrity of the roadways and rail lines. High temperatures cause the road surfaces to expand which leads to increased pressure and pavement buckling. High temperatures can also cause rail breakages, which could lead to train derailment. Other forms of extreme weather events, such as extreme storm events, can negatively impact infrastructure which can impair movement of peoples and goods, or potentially block evacuation routes and emergency access roads. Increased wildfires, flooding, erosion risks, landslides, mudslides, and rockslides can all profoundly impact the transportation system and pose a serious risk to public safety.

Water. Water resources in California support residences, plants, wildlife, farmland, landscapes and ecosystems and bring trillions of dollars in economic activity. Climate change could seriously impact the timing, form, amount of precipitation, runoff patterns, and frequency and severity of precipitation events. Higher temperatures reduce the amount of snowpack and lead to earlier snowmelt, which can impact water supply availability, natural ecosystems and winter recreation. Water supply availability during the intense dry summer months is heavily dependent on the snowpack accumulated during the winter time. Increased risk of flooding has a variety of public health concerns including water quality, public safety, property damage, displacement and post-disaster mental health problems. Prolonged and intensified droughts can also negatively groundwater reserves and result in increased overdraft and subsidence. Droughts can also negatively impact agriculture and farmland throughout the state. The higher risk of wildfires can lead to increased erosion, which can negatively impact watersheds and result in poor water quality.

Water temperatures are also prone to increase, which can negatively impact wildlife that rely on a specific range of temperatures for suitable habitat.

3 REGULATORY SETTING

3.1 Federal

Massachusetts v. EPA. In *Massachusetts v. EPA* (April 2007), the U.S. Supreme Court directed the EPA administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In December 2009, the administrator signed a final rule with the following two distinct findings regarding GHGs under Section 202(a) of the federal Clean Air Act:

- The Administrator found that elevated concentrations of 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. This is the "endangerment finding."
- The Administrator further found the combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the Clean Air Act.

Energy Independence and Security Act of 2007. The Energy Independence and Security Act of 2007 (December 2007), among other key measures, would do the following, which would aid in the reduction of national GHG emissions (EPA 2007):

- Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
- Set a target of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020, and directs National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.
- Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy-efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

Federal Vehicle Standards. In response to the U.S. Supreme Court ruling discussed above, the Bush Administration issued Executive Order (EO) 13432 in 2007 directing the EPA, the Department of Transportation, and the Department of Energy to establish regulations that reduce

GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the NHTSA issued a final rule regulating fuel efficiency and GHG emissions from cars and light-duty trucks for model year 2011, and in 2010, the EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016 (EPA 2010).

In 2010, President Barack Obama issued a memorandum directing the Department of Transportation, Department of Energy, EPA, and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The proposed standards projected to achieve 163 grams per mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6%–23% over the 2010 baselines.

In August 2016, the EPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans, and all types and sizes of buses and work trucks. The final standards are expected to lower CO_2 emissions by approximately 1.1 billion MT and reduce oil consumption by up to 2 billion barrels over the lifetime of the vehicles sold under the program (EPA and NHTSA 2016).

On September 19, 2019, the NHTSA and the EPA issued a final action entitled the “One National Program Rule” to enable the federal government to provide nationwide uniform fuel economy and greenhouse gas emission standards for automobile and light-duty trucks (EPA 2019). This action finalizes critical parts of the Safer, Affordable, Fuel-Efficient (SAFE) Vehicles Rule that was first proposed in August 2018. This action makes clear that federal law preempts state and local tailpipe GHG emissions standards as well as zero emission vehicle (ZEV) mandates. California and other states have challenged federal actions that would delay or eliminate GHG reduction measures and have committed to cooperating with other countries to implement global climate change initiatives. The timing and consequences of these types of federal decisions and subsequent challenges are speculative at this time (CARB 2019a). Relatedly, CARB has not determined at this time what impacts the SAFE rule may have on GHG emissions.

3.2 State

The statewide GHG emissions regulatory framework is summarized below by category: state climate change targets, building energy, renewable energy and energy procurement, mobile sources, solid waste, water, and other state regulations and goals. The following text describes executive orders, legislation, regulations, and other plans and policies that would directly or indirectly reduce GHG emissions and/or address climate change issues.

State Climate Change Targets

Executive Order (EO) S-3-05. EO S-3-05 (June 2005) established the following statewide goals: GHG emissions should be reduced to 2000 levels by 2010, GHG emissions should be reduced to 1990 levels by 2020, and GHG emissions should be reduced to 80% below 1990 levels by 2050.

Assembly Bill (AB) 32 and CARB's Climate Change Scoping Plan. In furtherance of the goals established in EO S-3-05, the Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires California to reduce its GHG emissions to 1990 levels by 2020.

Under AB 32, CARB is responsible for and is recognized as having the expertise to carry out and develop the programs and requirements necessary to achieve the GHG emissions reduction mandate of AB 32. Under AB 32, CARB must adopt regulations requiring the reporting and verification of statewide GHG emissions from specified sources. This program is used to monitor and enforce compliance with established standards. CARB also is required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 relatedly authorized CARB to adopt market-based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market-based compliance mechanism adopted.

In 2007, CARB approved a limit on the statewide GHG emissions level for year 2020 consistent with the determined 1990 baseline (427 MMT CO_2e). CARB's adoption of this limit is in accordance with Health and Safety Code Section 38550.

Further, in 2008, CARB adopted the Climate Change Scoping Plan: A Framework for Change (Scoping Plan) in accordance with Health and Safety Code Section 38561. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions for various emission sources/sectors to 1990 levels by 2020. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction features by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. The key elements of the Scoping Plan include the following (CARB 2008):

1. Expanding and strengthening existing energy efficiency programs as well as building and appliance standards
2. Achieving a statewide renewable energy mix of 33%
3. Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85% of California's GHG emissions
4. Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets
5. Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard
6. Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation

In the Scoping Plan, CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5% from the otherwise projected 2020 emissions level; i.e., those emissions that would occur in 2020, absent GHG-reducing laws and regulations (referred to as "Business-As-Usual" [BAU]). For purposes of calculating this percent reduction, CARB assumed that all new electricity generation would be supplied by natural gas plants, no further regulatory action would impact vehicle fuel efficiency, and building energy efficiency codes would be held at 2005 standards.

In the 2011 Final Supplement to the Scoping Plan's Functional Equivalent Document, CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations. Based on the new economic data, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7% (down from 28.5%) from the BAU conditions. When the 2020 emissions level projection also was updated to account for newly implemented regulatory measures, including Pavley I (model years 2009–2016) and the Renewable Portfolio Standard (12% to 20%), CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of 16% (down from 28.5%) from the BAU conditions.

In 2014, CARB adopted the First Update to the Climate Change Scoping Plan: Building on the Framework (First Update). The stated purpose of the First Update is to "highlight California's success to date in reducing its GHG emissions and lay the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80% below 1990 levels by 2050" (CARB 2014b). The First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80% below 1990 levels by 2050 if the state realizes the expected benefits of existing policy goals.

In conjunction with the First Update, CARB (2014b) identified "six key focus areas comprising major components of the state's economy to evaluate and describe the larger transformative actions that will be needed to meet the state's more expansive emission reduction needs by 2050." Those six areas are: (1) energy; (2) transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure); (3) agriculture; (4) water; (5) waste management; and, (6) natural and working lands. The First Update identifies key recommended actions for each sector that will facilitate achievement of EO S-3-05's 2050 reduction goal.

Based on CARB's research efforts presented in the First Update, it has a "strong sense of the mix of technologies needed to reduce emissions through 2050." Those technologies include energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings and industrial machinery; decarbonizing electricity and fuel supplies; and, the rapid market penetration of efficient and clean energy technologies (CARB 2014b).

As part of the First Update, CARB (2014b) recalculated the state's 1990 emissions level using more recent global warming potentials identified by the IPCC. Using the recalculated 1990 emissions level (431 MMT CO_2e) and the revised 2020 emissions level projection identified in the 2011 Final Supplement, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of approximately 15% (instead of 28.5% or 16%) from the BAU conditions.

In December 2017, CARB adopted California's 2017 Climate Change Scoping Plan (2017 Scoping Plan) (CARB 2017b). This plan outlines CARB's strategy for achieving the state's 2030 GHG target as established in Senate Bill (SB) 32 (discussed below), including continuing the Cap-and-Trade Program through 2030. The 2017 Scoping Plan incorporates approaches to cutting short-lived climate pollutants (SLCPs) under the Short-Lived Climate Pollutant Reduction Strategy (a planning document that was adopted by CARB in March 2017), and acknowledges the need for reducing emissions in agriculture and highlights the work underway to ensure that California's natural and working lands increasingly sequester carbon. During development of the 2017 Scoping Plan, CARB held a number of public workshops in the Natural and Working Lands, Agriculture, Energy, and Transportation sectors to inform development of the 2030 Scoping Plan Update (CARB 2017b).

The Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32, SB 32 and the Executive Orders and establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. A project is considered consistent with the statutes and Executive Orders if it meets the general policies in reducing GHG emissions in order to facilitate the achievement of the state's goals and does not impede attainment of those goals. As discussed in several cases, a given project need not be in perfect conformity with each and every planning policy or goals to be consistent. A project would be consistent, if it will further the objectives and not obstruct their attainment.

EO B-30-15. EO B-30-15 (April 2015) identified an interim GHG reduction target in support of targets previously identified under EO S-3-05 and AB 32. EO B-30-15 set an interim target goal of reducing statewide GHG emissions to 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing statewide GHG emissions to 80% below 1990 levels by 2050 as set forth in EO S-3-05. To facilitate achievement of this goal, EO B-30-15 calls for an update to CARB's Scoping Plan to express the 2030 target in terms of MMT CO_2e. The EO also calls for state agencies to continue to develop and implement GHG emission reduction programs in support of the reduction targets. Sector-specific agencies in transportation, energy, water, and forestry were required to prepare GHG reduction plans by September 2015, followed by a report on action taken in relation to these plans in June 2016. EO B-30-15 does not require local agencies to take any action to meet the new interim GHG reduction target.

SB 32 and AB 197. SB 32 and AB 197 (enacted in 2016) are companion bills that set a new statewide GHG reduction targets; make changes to CARB's membership, and increase legislative oversight of CARB's climate change-based activities; and expand dissemination of GHG and other air quality-related emissions data to enhance transparency and accountability. More specifically, SB 32 codified the 2030 emissions reduction goal of EO B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40% below 1990 levels by 2030. AB 197 established the Joint Legislative Committee on Climate Change Policies, consisting of at least three members of the Senate and three members of the Assembly, in order to provide ongoing oversight over implementation of the state's climate policies. AB 197 also added two members of the Legislature to CARB as nonvoting members; requires CARB to make available and update (at least annually via its website) emissions data for GHGs, criteria air pollutants, and TACs from reporting facilities; and, requires CARB to identify specific information for GHG emissions reduction measures when updating the scoping plan.

SB 605 and SB 1383. SB 605 (2014) requires CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants in the state; and SB 1383 (2016) requires CARB to approve and implement that strategy by January 1, 2018. SB 1383 also establishes specific targets for the reduction of SLCPs (40% below 2013 levels by 2030 for methane and HFCs, and 50% below 2013 levels by 2030 for anthropogenic black carbon), and provides direction for reductions from dairy and livestock operations and landfills. Accordingly, and as mentioned above, CARB adopted its Short-Lived Climate Pollutant Reduction Strategy (SLCP Reduction Strategy) in March 2017.

The SLCP Reduction Strategy establishes a framework for the statewide reduction of emissions of black carbon, methane and fluorinated gases.

EO B-55-18

EO B-55-18 (September 2018) established a new statewide goal "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter." This executive order directed CARB to "work with relevant state agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal."

Building Energy

Title 24, Part 6. Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. While not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically establishes Building Energy Efficiency Standards that are designed to ensure new and existing buildings in California achieve energy efficiency and preserve outdoor and indoor environmental quality. The California Energy Commission (CEC) is required by law to adopt standards every 3 years that are cost effective for homeowners over the 30-year lifespan of a building. These standards are updated to consider and incorporate new energy efficient technologies and construction methods. As a result, these standards save energy, increase electricity supply reliability, increase indoor comfort, avoid the need to construct new power plants, and help preserve the environment.

The 2019 Title 24 standards are the currently applicable building energy efficiency standards, and became effective on January 1, 2020. In general, single-family residences built to the 2019 standards are anticipated to use approximately 7% less energy due to energy efficiency measures than those built to the 2016 standards; once rooftop solar electricity generation is factored in, single-family residences built under the 2019 standards will use approximately 53% less energy than those under the 2016 standards (CEC 2018a). Nonresidential buildings built to the 2019 standards are anticipated to use an estimated 30% less energy than those built to the 2016 standards (CEC 2018a).

Title 24, Part 11. In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CALGreen, and establishes minimum mandatory standards as well as voluntary standards pertaining to the planning and design of sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and interior air quality. The CALGreen standards took effect in January 2011 and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential and state-owned buildings and schools and hospitals. The CALGreen 2016 standards became effective on January 1, 2017. The mandatory standards require the following (24 CCR Part 11):

- Mandatory reduction in indoor water use through compliance with specified flow rates for plumbing fixtures and fittings
- Mandatory reduction in outdoor water use through compliance with a local water efficient landscaping ordinance or the California Department of Water Resources' Model Water Efficient Landscape Ordinance
- 65% of construction and demolition waste must be diverted from landfills
- Mandatory inspections of energy systems to ensure optimal working efficiency
- Inclusion of electric vehicle charging stations or designated spaces capable of supporting future charging stations
- Low-pollutant emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring, and particle boards

The CALGreen standards also include voluntary efficiency measures that are provided at two separate tiers and implemented at the discretion of local agencies and applicants. CALGreen's Tier 1 standards call for a 15% improvement in energy requirements; stricter water conservation, 65% diversion of construction and demolition waste, 10% recycled content in building materials, 20% permeable paving, 20% cement reduction, and cool/solar-reflective roofs. CALGreen's more rigorous Tier 2 standards call for a 30% improvement in energy requirements, stricter water conservation, 75% diversion of construction and demolition waste, 15% recycled content in building materials, 30% permeable paving, 25% cement reduction, and cool/solar-reflective roofs.

Title 20. Title 20 of the California Code of Regulations requires manufacturers of appliances to meet state and federal standards for energy and water efficiency. Performance of appliances must be certified through the CEC to demonstrate compliance with standards. New appliances regulated under Title 20 include: refrigerators, refrigerator-freezers and freezers; room air conditioners and room air-conditioning heat pumps; central air conditioners; spot air conditioners; vented gas space heaters; gas pool heaters; plumbing fittings and plumbing fixtures; fluorescent lamp ballasts; lamps; emergency lighting; traffic signal modules; dishwaters; clothes washers and dryers; cooking products; electric motors; low voltage dry-type distribution transformers; power supplies; televisions and consumer audio and video equipment; and battery charger systems. Title 20 presents protocols for testing for each type of appliance covered under the regulations and appliances must meet the standards for energy performance, energy design, water performance and water design. Title 20 contains three types of standards for appliances: federal and state standards for federally regulated appliances, state standards for federally regulated appliances, and state standards for non-federally regulated appliances.

SB 1. SB 1 (2006) established a $3 billion rebate program to support the goal of the state to install rooftop solar energy systems with a generation capacity of 3,000 megawatts through 2016. SB 1 added sections to the Public Resources Code, including Chapter 8.8 (California Solar Initiative), which require building projects applying for ratepayer-funded incentives for photovoltaic systems to meet minimum energy efficiency levels and performance requirements. Section 25780 established that it is a goal of the state to establish a self-sufficient solar industry in which solar energy systems are a viable mainstream option for both homes and businesses within 10 years of adoption, and to place solar energy systems on 50% of new homes within 13 years of adoption. SB 1, also termed "GoSolarCalifornia," was previously titled "Million Solar Roofs."

AB 1470. This bill established the Solar Water Heating and Efficiency Act of 2007. The bill makes findings and declarations of the Legislature relating to the promotion of solar water heating systems and other technologies that reduce natural gas demand. The bill defines several terms for purposes of the act. The bill requires the commission to evaluate the data available from a specified pilot program, and, if it makes a specified determination, to design and implement a program of incentives for the installation of 200,000 solar water heating systems in homes and businesses throughout the state by 2017.

AB 1109. Enacted in 2007, AB 1109 required the CEC to adopt minimum energy efficiency standards for general purpose lighting, to reduce electricity consumption 50% for indoor residential lighting and 25% for indoor commercial lighting.

Renewable Energy and Energy Procurement

SB 1078. SB 1078 (2002) established the Renewable Portfolio Standard (RPS) program, which requires an annual increase in renewable generation by the utilities equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. This goal was subsequently accelerated, requiring utilities to obtain 20% of their power from renewable sources by 2010.

SB 1368. SB 1368 (2006) requires the CEC to develop and adopt regulations for GHG emission performance standards for the long-term procurement of electricity by local publicly owned utilities. These standards must be consistent with the standards adopted by the California Public Utilities Commission (CPUC). This effort will help protect energy customers from financial risks associated with investments in carbon-intensive generation by allowing new capital investments in power plants whose GHG emissions are as low as or lower than new combined-cycle natural gas plants by requiring imported electricity to meet GHG performance standards in California and by requiring that the standards be developed and adopted in a public process.

SB X1 2. SB X1 2 (2011) expanded the RPS by establishing that 20% of the total electricity sold to retail customers in California per year by December 31, 2013, and 33% by December 31, 2020, and in subsequent years be secured from qualifying renewable energy sources. Under the bill, a renewable electrical generation facility is one that uses biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 megawatts or less, digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current, and that meets other specified requirements with respect to its location. In addition to the retail sellers previously covered by the RPS, SB X1 2 added local, publicly owned electric utilities to the RPS.

SB 350. SB 350 (2015) further expanded the RPS by establishing that 50% of the total electricity sold to retail customers in California per year by December 31, 2030 be secured from qualifying renewable energy sources. In addition, SB 350 includes the goal to double the energy efficiency savings in electricity and natural gas final end uses (such as heating, cooling, lighting, or class of energy uses on which an energy-efficiency program is focused) of retail customers through energy conservation and efficiency. The bill also requires the CPUC, in consultation with the CEC, to establish efficiency targets for electrical and gas corporations consistent with this goal.

SB 100

SB 100 (2018) increased the standards set forth in SB 350 establishing that 44% of the total electricity sold to retail customers in California per year by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030, be secured from qualifying renewable energy sources. Under SB 100, it is the policy of the state that eligible renewable energy resources and zero-carbon resources supply 100% of the retail sales of electricity to California. This bill requires that the achievement of 100% zero-carbon electricity resources does not increase the carbon emissions elsewhere in the western grid and that the achievement not occur through resource shuffling.

Mobile Sources

AB 1493. In a response to the transportation sector accounting for more than half of California's CO_2 emissions, AB 1493 was enacted in July 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles that are primarily used for noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. When fully phased in, the near-term (2009–2012) standards will result in a reduction of about 22% in GHG emissions compared to the emissions from the 2002 fleet, while the mid-term (2013–2016) standards will result in a reduction of about 30%.

EO S-1-07. Issued on January 18, 2007, EO S-1-07 sets a declining Low Carbon Fuel Standard for GHG emissions measured in CO_2e grams per unit of fuel energy sold in California. The target of the Low Carbon Fuel Standard is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020. The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel, including extraction/feedstock production, processing, transportation, and final consumption, per unit of energy delivered. CARB adopted the implementing regulation in April 2009. The regulation is expected to increase the production of biofuels, including those from alternative sources, such as algae, wood, and agricultural waste.

SB 375. SB 375 (2008) addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans. SB 375 required CARB to adopt regional GHG reduction targets for the automobile and light-truck sector for 2020 and 2035. Regional metropolitan planning organizations (MPOs) are then responsible for preparing a Sustainable Communities Strategy within their Regional Transportation Plan. The goal of the Sustainable Communities Strategy is to establish a forecasted development pattern for the region that, after considering transportation measures and policies, will achieve, if feasible, the GHG reduction targets. If a Sustainable Communities Strategy is unable to achieve the GHG reduction target, an MPO must prepare an Alternative Planning Strategy demonstrating how the GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies.

Pursuant to Government Code Section 65080(b)(2)(K), a sustainable communities strategy does not: (i) regulate the use of land; (ii) supersede the land use authority of cities and counties; or (iii) require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with it. Nonetheless, SB 375 makes regional and local planning agencies responsible for developing those strategies as part of the federally required metropolitan transportation planning process and the state-mandated housing element process.

In 2010, CARB adopted the first round of SB 375 targets for the regional MPOs. The original targets for SANDAG are a 7% reduction in emissions per capita by 2020 and a 13% reduction by 2035. In March 2018, CARB adopted updated SB 375 targets for the regional MPOs. The updated targets for SANDAG are a 15% reduction in emissions per capita by 2020 and a 19% reduction by 2035. The reduction targets are expressed as a percent change in per capita passenger vehicle GHG emissions relative to 2005 levels.

SANDAG completed and adopted its 2050 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) in October 2011. In November 2011, CARB, by resolution, accepted SANDAG's GHG emissions quantification analysis and determination that, if implemented, the SCS would achieve CARB's 2020 and 2035 GHG emissions reduction targets for the region.

In 2015, SANDAG adopted the next iteration of its RTP/SCS in accordance with statutorily mandated timelines. More specifically, in October 2015, SANDAG adopted San Diego Forward: The Regional Plan. Like the 2050 RTP/SCS, this planning document meets CARB's 2020 and 2035 reduction targets for the region (SANDAG 2015). In December 2015, CARB, by resolution, accepted SANDAG's GHG emissions quantification analysis and determination that, if implemented, the SCS would achieve CARB's 2020 and 2035 GHG emissions reduction targets for the region.

Advanced Clean Cars Program. In January 2012, CARB approved the Advanced Clean Cars program, a new emissions-control program for model years 2015 through 2025. The program combines the control of smog- and soot-causing pollutants and GHG emissions into a single coordinated package. The package includes elements to reduce smog-forming pollution, reduce GHG emissions, promote clean cars, and provide the fuels for clean cars (CARB 2011). To improve air quality, CARB has implemented new emission standards to reduce smog-forming emissions beginning with 2015 model year vehicles. It is estimated that in 2025 cars will emit 75% less smog-forming pollution than the average new car sold today. To reduce GHG emissions, CARB, in conjunction with the EPA and the NHTSA, has adopted new GHG standards for model year 2017 to 2025 vehicles; the new standards are estimated to reduce GHG emissions by 34% in 2025. The Zero Emissions Vehicle (ZEV) program will act as the focused technology of the Advanced Clean Cars program by requiring manufacturers to produce increasing numbers of ZEVs and plug-in hybrid electric vehicles in the 2018 to 2025 model years. The Clean Fuels Outlet regulation will ensure that fuels such as electricity and hydrogen are available to meet the fueling needs of the new advanced technology vehicles as they come to the market.

EO B-16-12. EO B-16-12 (2012) directs state entities under the Governor's direction and control to support and facilitate development and distribution ZEVs. This EO also sets a long-term target of reaching 1.5 million zero-emission vehicles on California's roadways by 2025. On a statewide basis, EO B-16-12 also establishes a GHG emissions reduction target from the transportation sector equaling 80% less than 1990 levels by 2050. In furtherance of this EO, the Governor convened an Interagency Working Group on Zero-Emission Vehicles that has published multiple reports regarding the progress made on the penetration of ZEVs in the statewide vehicle fleet.

SB 350. In 2015, SB 350 – the Clean Energy and Pollution Reduction Act – was enacted into law. As one of its elements, SB 350 establishes a statewide policy for widespread electrification of the transportation sector, recognizing that such electrification is required for achievement of the state's 2030 and 2050 reduction targets (see Public Utilities Code section 740.12).

EO B-48-18

EO B-48-18 (2018) launched an eight-year initiative to accelerate the sale of EVs through a mix of rebate programs and infrastructure improvements. The order also set a new EV target of 5 million EVs in California by 2030. EO B-48-18 included funding for multiple state agencies, including the CEC, to increase EV charging infrastructure and for CARB to provide rebates for the purchase of new EVs and purchase incentives for low-income customers.

Solid Waste

AB 939 and AB 341. In 1989, AB 939, known as the Integrated Waste Management Act (Public Resources Code Sections 40000 et seq.), was passed because of the increase in waste stream and the decrease in landfill capacity. The statute established the California Integrated Waste Management Board, which oversees a disposal reporting system. AB 939 mandated a reduction of waste being disposed where jurisdictions were required to meet diversion goals of all solid waste through source reduction, recycling, and composting activities of 25% by 1995 and 50% by the year 2000.

AB 341 (2011) amended the California Integrated Waste Management Act of 1989 to include a provision declaring that it is the policy goal of the state that not less than 75% of solid waste generated be source-reduced, recycled, or composted by the year 2020, and annually thereafter. In addition, AB 341 required the California Department of Resources Recycling and Recovery (CalRecycle) to develop strategies to achieve the state’s policy goal. CalRecycle has conducted multiple workshops and published documents that identify priority strategies that CalRecycle believes would assist the state in reaching the 75% goal by 2020.

Increasing the amount of commercial solid waste that is recycled, reused, or composted will reduce GHG emissions primarily by 1) reducing the energy requirements associated with the extraction, harvest, and processing of raw materials and 2) using recyclable materials that require less energy than raw materials to manufacture finished products (CalRecycle 2015). Increased diversion of organic materials (green and food waste) will also reduce GHG emissions (CO_2 and CH_4) resulting from decomposition in landfills by redirecting this material to processes that use the solid waste material to produce vehicle fuels, heat, electricity, or compost.

Water

EO B-29-15. In response to the ongoing drought in California, EO B-29-15 (April 2015) set a goal of achieving a statewide reduction in potable urban water usage of 25% relative to water use in 2013. The term of the EO extended through February 28, 2016, although many of the directives have since become permanent water-efficiency standards and requirements. The EO includes specific directives that set strict limits on water usage in the state. In response to EO B-29-15, the

California Department of Water Resources has modified and adopted a revised version of the Model Water Efficient Landscape Ordinance that, among other changes, significantly increases the requirements for landscape water use efficiency and broadens its applicability to include new development projects with smaller landscape areas.

Other State Regulations and Goals

SB 97

SB 97 (August 2007) directed the Governor's Office of Planning and Research (OPR) to develop guidelines under CEQA for the mitigation of GHG emissions. In 2008, OPR issued a technical advisory as interim guidance regarding the analysis of GHG emissions in CEQA documents. The advisory indicated that the lead agency should identify and estimate a project's GHG emissions, including those associated with vehicular traffic, energy consumption, water usage, and construction activities (OPR 2008). The advisory further recommended that the lead agency determine significance of the impacts and impose all mitigation measures necessary to reduce GHG emissions to a level that is less than significant. The California Natural Resources Agency (CNRA) adopted the CEQA Guidelines amendments in December 2009, which became effective in March 2010.

Under the amended CEQA Guidelines, a lead agency has the discretion to determine whether to use a quantitative or qualitative analysis or apply performance standards to determine the significance of GHG emissions resulting from a particular project (14 CCR 15064.4[a]). The CEQA Guidelines require a lead agency to consider the extent to which a project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR 15064.4[b]). The CEQA Guidelines also allow a lead agency to consider feasible means of mitigating the significant effects of GHG emissions, including reductions in emissions through the implementation of project features or off-site measures. The adopted amendments do not establish a GHG emission threshold, instead allowing a lead agency to develop, adopt, and apply its own thresholds of significance or those developed by other agencies or experts. The CNRA also acknowledges that a lead agency may consider compliance with regulations or requirements implementing AB 32 in determining the significance of a project's GHG emissions (CNRA 2009a).

With respect to GHG emissions, the CEQA Guidelines, Section 15064.4(a), state that lead agencies should "make a good faith effort, to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions. The CEQA Guidelines note that an agency may identify emissions by either selecting a "model or methodology" to quantify the emissions or by relying on "qualitative analysis or performance based standards" (14 CCR 15064.4[a, c]). Section 15064.4(b) states that the lead agency should consider the following when assessing the significance of impacts from GHG emissions on the environment: (1) the extent a project may increase or reduce GHG emissions as compared to the existing environmental setting; (2) whether project emissions exceed a threshold of significance that the lead agency determines applies to the project; and (3) the extent to which a project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR 15064.4[b]).

EO S-13-08. EO S-13-08 (November 2008) is intended to hasten California's response to the impacts of global climate change, particularly sea-level rise. Therefore, the EO directs state agencies to take specified actions to assess and plan for such impacts. The final 2009 California Climate Adaptation Strategy report was issued in December 2009 (CNRA 2009a), and an update, Safeguarding California: Reducing Climate Risk, followed in July 2014 (CNRA 2014). To assess the state's vulnerability, the report summarizes key climate change impacts to the state for the following areas: agriculture, biodiversity and habitat, emergency management, energy, forestry, ocean and coastal ecosystems and resources, public health, transportation, and water. Issuance of the Safeguarding California: Implementation Action Plans followed in March 2016 (CNRA 2016). In January 2018, the CNRA released the Safeguarding California Plan: 2018 Update, which communicates current and needed actions that state government should take to build climate change resiliency (CNRA 2018).

3.3 Local

City of Carlsbad General Plan

The State of California requires cities and counties to prepare and adopt a general plan to set out a long-range vision and comprehensive policy framework for its future. The State also mandates that the general plan be updated periodically to ensure relevance and utility. The City of Carlsbad General Plan (General Plan) was unanimously adopted by the City Council on September 22, 2015. The General Plan builds upon many of the goals and strategies of the former 1994 General Plan, in addition to offering new policy direction in the areas of urban form, neighborhood character, historic preservation, public facilities, recreation, conservation, mobility, housing affordability, economic prosperity, and equitable development. It also outlines the plan amendment process, and other implementation strategies, and considers the continued growth of the City beyond the year 2020 (City of Carlsbad 2015a).

Sustainability Element. The Sustainability Element provides the overarching framework and includes policies focused on topics central to sustainability not covered elsewhere. This element provides the overarching framework for sustainability in the City and outlines policies focused on:

- Climate change and GHG reduction;
- Water conservation, recycling, and supply;
- Green building;
- Sustainable energy and energy security; and
- Sustainable food.

The Sustainability Element is closely tied to the City's Community Vision Core Value 6-Sustainability, which aims to build on the City's sustainability initiatives to emerge as a leader in green development and sustainability, and pursue public/ private partnerships, particularly on sustainable water, energy, recycling, and foods. The following goals identified in the Sustainability Element support reduction of GHG emissions in the City:

- **9-G.2:** Undertake initiatives to enhance sustainability by reducing the community's GHG emissions and fostering green development patterns—including buildings, sites, and landscapes.
- **9-G.3:** Promote energy efficiency and conservation in the community.

The following policies identified in the Sustainability Element support reduction of GHG emissions in the City:

- **9-P.1:** Enforce the Climate Action Plan as the city's strategy to reduce greenhouse gas emissions.
- **9-P.2:** Continue efforts to decrease use of energy and fossil fuel consumption in municipal operations, including transportation, waste reduction and recycling, and efficient building design and use.

The Sustainability Element also identifies policies for water conservation, recycling, and supply; green building; sustainable energy; and sustainable food.

City of Carlsbad Climate Action Plan

The City of Carlsbad Climate Action Plan (CAP) was unanimously adopted by the City Council on September 22, 2015 (City of Carlsbad 2015b). The CAP is designed to reduce the City's GHG emissions and streamline environmental review of future development projects in the city in accordance with the California Environmental Quality Act (CEQA).

The CAP includes goals, policies, and actions for the City to reduce GHG emissions and combat climate change and includes: an inventory of citywide and local government GHG emissions; forecasts of future citywide and local government GHG emissions; a comprehensive, citywide strategy and actions to manage and reduce GHG emissions, with emission targets through 2035; and actions that demonstrate the City's commitment to achieve state GHG reduction targets by creating enforceable measures, and monitoring and reporting processes to ensure targets are met. The timeframe for the CAP extends from the date of adoption through 2035. The CAP is considered a qualified plan as described in CEQA Guidelines Section 15183.5(b).

The CAP is intended to be a tool for policy makers, community members and others to guide the implementation of actions that limit the City's GHG emissions. Ensuring that the mitigation measures in the CAP translate from policy language to on-the-ground results is critical to the success of the CAP.

The CAP set the GHG reduction goals for the City at 15% below 2005 levels by 2020, 49% reduction by 2035, and 80% reduction by 2050. The GHG reduction measures outlined in the CAP include the following categories (City of Carlsbad 2015b):

- **Residential, Commercial and Industrial Photovoltaic Systems:** Promote installation of commercial and industrial PV systems to produce an additional 10.7 MW per year above projected amounts, or roughly 15 percent of projected commercial and industrial electricity use, by 2035;
- **Building Cogeneration:** Promote building cogeneration for large commercial and industrial facilities, with the goal of producing 6.9 MW;
- **Single-Family, Multi-Family, Commercial, and City Facility Efficiency Retrofits:** Encourage single-family residential efficiency retrofits with the goal of a 50 percent energy reduction compared to baseline in 30 percent of the total single-family homes citywide by 2035 (approximately 10,000 single-family homes out of a total of 35,000). Encourage multi-family residential efficiency retrofits with the goal of a 50 percent energy reduction in 30 percent of the projected amount of multi-family homes citywide by 2035 (approximately 5,000 out of a total of 17,000). Encourage commercial and city facility efficiency retrofits with the goal equivalent to a 40 percent energy reduction in 30 percent of commercial square footage citywide and in city facilities by 2035;
- **Commercial and City Facility Commissioning:** Encourage commercial and city facility commissioning, or improving existing and new building operations, with the goal equivalent to a 40 percent energy reduction in 30 percent of commercial square footage citywide and in city-owned buildings by 2035;

- **Green Building Code:** Implementation of a 5 percent improvement in energy efficiency above the City of Carlsbad residential green building code (based on CALGreen, the statewide green building code), for new construction;
- **Efficient Lighting Standards:** Replace 50 percent of incandescent and halogen light bulbs citywide with LED or similarly efficient lighting by 2035;
- **Solar Water Heater/Heat Pump Installation:** Install solar water heaters or heat pumps on all new residential and commercial construction. Retrofit up to 30 percent of existing homes and commercial buildings to include solar water heaters or heat pumps;
- **Transportation Demand Management:** Promote Transportation Demand Management Strategies with a goal of achieving a 10 percent increase in alternative mode use by workers in Carlsbad, for a total of 32 percent alternative mode use;
- **Increased Zero-Emissions Vehicle (ZEV) Travel:** Promote an increase in the amount of ZEV miles traveled from a projected 15 percent to 25 percent of total vehicle miles traveled by 2035;
- **Citywide Renewable Projects:** Produce the equivalent amount of energy to power 2,000 homes (roughly equivalent to a 5 percent reduction) by 2035 from renewable energy projects; and
- **Water Utilities System Improvements:** Reduce the intensity of GHG emissions from water utilities (including water supply, wastewater, and recycled water) conveyance, treatment, and distribution by 8 percent by 2035.

The CAP also outlines two approaches for projects to show consistency with the CAP (City of Carlsbad 2015b):

- **Checklist Approach.** The Project Review Checklist below provides direction about measures to be incorporated in individual projects, which will be used during the normal development review process. Project features that help a project meet the provisions of the CAP shall then become part of project conditions of approval.
- **Self-Developed Program Approach.** Rather than use the standard checklist, project proponents can develop their own program that would result in the same outcome as the checklist. Appendix E of the CAP provides a non-exclusive list of potential mitigation measures that can be applied at the project level to reduce project-level greenhouse gas emissions. Other measures not listed in the Appendix may be considered, provided that their effectiveness in reducing greenhouse gas emissions can be demonstrated. The self-developed program approach and selection of mitigation measures shall be subject to city review and approval.

On January 13, 2020, the City Attorney's office released a memorandum (as presented within the January 21, 2020, City Council Agenda materials) detailing that an error was found with the VMT calculation used in the CAP (City of Carlsbad 2020). The memorandum concluded that, due to the VMT estimation error, the emissions forecasts for 2020 and 2035 were no longer accurate and the City may not meet the GHG targets for those years. Further, it concluded that the CAP was no longer considered a qualified GHG reduction plan under CEQA Guidelines Section 15183.5 and could not be used for determining the significance of individual projects under CEQA.

City of Carlsbad Electric Vehicle Charging Ordinance No. CS-349

In 2011, as part of the Climate Action Plan development process, the City of Carlsbad conducted analysis of citywide greenhouse gas emissions, which showed that 39% of the City's greenhouse gas emissions come from cars and trucks. In 2015, the City adopted its Climate Action Plan (as discussed above), which included a goal to increase the amount of zero-emission vehicle miles traveled from 15% to 25% of total vehicle miles traveled by 2035. This ordinance supports this goal by providing zero-emission vehicle parking and electric vehicle charging in new construction and major residential renovations. The measures included in this ordinance align with the requirements of the California Green Building Code and have been proven to be cost-effective when compared to a later retrofit. The ordinance took effect on April 11, 2019. Projects that meet the ordinance criteria and have not applied for a building permit by the effectiveness date will be subject to its requirements.

City of Carlsbad Water Heating Ordinance No. CS-348

The City of Carlsbad's Climate Action Plan also seeks to reduce greenhouse gas emissions by promoting the installation of solar water heaters or heat pumps. In pursuit of the goals established by the Climate Action Plan, the City has adopted a water-heating ordinance, which requires cost-effective water heating measures to be included on all new construction projects. Developers of all new low-rise residential construction projects need to install non-gas water heating equipment in their projects. The residential water-heating ordinance requires new low-rise residential buildings to install cost-effective water heating measures. Required measures include a water heating system that meets one of the following requirements:

- Heat pump water heater, or other form of electric water heating system, that meets California Energy Code (Title 24, Part 6) standards and is paired with a ≥0.3KW (300W) photovoltaic system; or
- Solar water heating system that is OG-300 certified and includes ≥40 sq. ft. of collectors or provides a 0.6 solar fraction.

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4 THRESHOLDS OF SIGNIFICANCE

The significance criteria used to evaluate the Project's GHG emissions impacts are based on the recommendations provided in Appendix G of the CEQA Guidelines. For the purposes of this GHG emissions analysis, the Project would have a significant environmental impact if it would (14 CCR 15000 et seq.):

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

The Appendix G thresholds for GHGs do not prescribe specific methodologies for performing an assessment, do not establish specific quantitative thresholds, and do not mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance consistent with the manner in which other impact areas are handled in CEQA (CNRA 2009a). Additional guidance regarding assessment of GHG's is discussed below.

CEQA Guidelines

With respect to GHG emissions, the CEQA Guidelines Section 15064.4(a) states that lead agencies "shall make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions resulting from a project. The CEQA Guidelines note that an agency has the discretion to either quantify a project's GHG emissions or rely on a "qualitative analysis or performance based standards" (14 CCR 15064.4[a]). A lead agency may use a "model or methodology" to estimate greenhouse gas emissions and has the discretion to select the model or methodology it considers "most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change" (14 CCR 15064.4[c]). The CEQA Guidelines provide that the lead agency should consider the following when determining the significance of impacts from GHG emissions on the environment (14 CCR 15064.4[b]):

1. The extent a project may increase or reduce GHG emissions as compared to the existing environmental setting.
2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

In addition, the CEQA Guidelines specify that "[w]hen adopting or using thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence" (14 CCR 15064.7[c]).

Governor's Office of Planning and Research Guidance

The Governor's Office of Planning and Research technical advisory titled, CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review, states that "public agencies are encouraged but not required to adopt thresholds of significance for environmental impacts. Even in the absence of clearly defined thresholds for GHG emissions, the law requires that such emissions from CEQA projects must be disclosed and mitigated to the extent feasible whenever the lead agency determines that the project contributes to a significant, cumulative climate change impact" (OPR 2008). Furthermore, the advisory document indicates that "in the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a 'significant impact,' individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice" (OPR 2008).

Cumulative Nature of Climate Change

Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. There are currently no established thresholds for assessing whether the GHG emissions of a project in the San Diego Air Basin (SDAB), such as the Project, would be considered a cumulatively considerable contribution to global climate change; however, all reasonable efforts should be made to minimize a project's contribution to global climate change.

While the Project would result in emissions of GHGs during construction and operation, no current guidance exists to indicate what level of GHG emissions would be considered substantial enough to result in a significant adverse impact on global climate. However, it is generally believed that an individual project is of insufficient magnitude by itself to directly influence climate change as scientific uncertainty regarding the significance a project's individual and cumulative effects on global climate change remains.

Thus, GHG impacts are recognized as exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective (CAPCOA 2008). This approach is consistent with that recommended by the CNRA, which noted in its Public Notice for the proposed CEQA amendments (pursuant to SB97) that the evidence before it indicates that in most cases, the impact of GHG emissions should be considered in the context of a cumulative impact, rather than a project-level impact (CNRA 2009a). Similarly, the Final Statement of Reasons for Regulatory

Action on the CEQA Amendments confirm that an environmental impact report or other environmental document must analyze the incremental contribution of a project to GHG levels and determine whether those emissions are cumulatively considerable (CNRA 2009a).

Approaches to Determining Significance

Neither the State of California nor the SDAPCD has adopted quantitative emission-based thresholds of significance for GHG emissions under CEQA. In the absence of an adopted numeric threshold, the significance of the Project's GHG emissions will be evaluated consistent with CEQA Guidelines Section 15064.4(b) by considering whether the Project complies with applicable plans, policies, regulations, and requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

The plans, policies, regulations and requirements that are considered in this analysis include:

- CARB's Scoping Plan and actions taken in furtherance of its objectives to achieve identified near-term (2020), mid-term (2030) and long-term (2045/2050) targets for the reduction of GHG emissions; and,
- Those adopted in furtherance of SB 375, and specifically SANDAG's Regional Plan.

In addition, the project will be evaluated against a City-specific efficiency metric threshold based on the City's 2012 GHG inventory (City of Carlsbad 2020). An efficiency metric threshold is calculated by dividing the allowable GHG emissions inventory in a selected calendar year by the service population (residents plus employees), which then leads to the identification of a quantity of emissions that can be permitted on a per service population basis without significantly impacting the environment. This approach focuses on the overall GHG efficiency of a project relative to regulatory GHG reduction goals.

Under the efficiency metric threshold, the Project's GHG emissions are evaluated relative to the emissions level in the Project's build-out year and the build-out year's associated efficiency metric threshold. To that end, an efficiency metric was calculated based on the 2022 emissions level (the year of project build-out) and the project's service population (sum of number of employees and the number of residents provided by the project).

As there are no jurisdictional/City-based emissions, population, or employment data available specific to the Project's build-out year (2022), an efficiency metric threshold was generated for year 2022 by interpolating the City-based emission targets for years 2020 and 2030. As illustrated below, the efficiency metric threshold is first calculated for 2020, so as to establish the benchmark for compliance with AB 32's 2020 reduction target (a return to 1990 levels). The 2030 emissions reduction goal was based on the SB 32 goal to reduce GHG emissions to 40 percent below 1990 levels by 2030. It should be noted that the downward trajectory from AB 32 to SB 32 is greater than that from AB 32 to EO S-3-05 of 80% below 1990 by 2050 (CARB 2017). By analyzing the project against the quantitative efficiency metric thresholds for the buildout year and for the milestone year for the next legislatively adopted target (2030), this analysis demonstrates that the project would demonstrate progress towards, and be on the trajectory towards helping the state comply with its long-term targets in EO S-3-05. Developing community-wide mass reduction goals using this approach is consistent with CARB (2017, pp. 100–101) recommendations to determine the targets "based on local emissions sectors" and to "develop community-wide GHG emissions reduction goals necessary to reach 2030 and 2050 climate goals."

To develop the 2020 efficiency metric threshold, the State's emissions target from AB 32 was used for year 2020. The 2020 emissions target is 4% below the 2012 statewide emissions (CARB 2019b). Therefore, the 2020 emissions target for the project would be 4% below the 2012 inventory of 977,000 MT CO_2e (or 933,353 MT CO_2e) (the percentage reductions have been rounded for presentation purposes, please reference Appendix A for detailed calculations). To develop the service population for that year, the SANDAG Series 13 Regional Growth Forecast was relied upon for the forecasted population and employment for the City.

To develop the 2030 efficiency metric threshold, the emissions target from SB 32 was used for year 2030 to reduce GHG emissions to 40 percent below 1990 levels by 2030. The 2030 emissions target is 42% below the 2012 statewide emissions (CARB 2019b). Therefore, the 2030 emissions target for the project would be 42% below the 2012 inventory of 977,000 MT CO_2e (or 560,012 MT CO_2e). To develop the service population for that year, the SANDAG Series 13 Regional Growth Forecast was relied upon for the forecasted population and employment for the City.

To develop the 2022 efficiency metric threshold, it is necessary to interpolate the emissions target between the 2020 and 2030 forecasted emissions. To develop the efficiency metric threshold for 2022, the City's forecasted emissions in 2020 were reduced by 5.2% per year through 2030, which is consistent with the CARB's Scoping Plan target for SB 32 (CARB 2015). As there were not population or employment forecasts available for 2022, it was necessary to interpolate the service population using the SANDAG Series 13 Regional Growth Forecast for years 2020 and 2025. The interpolation and resulting service population is shown in Table 5.

Table 5
City of Carlsbad 2022 Interpolated Service Population

	2020	2025	2022[1]
Population	118,450	121,000	119,470
Employment	77,422	79,877	78,404
Total	195,872	200,877	197,874

Notes: [1] The 2022 service population was calculated as follows: (((2025 service population – 2020 service population) ÷ (2025 – 2020)) × (2022 – 2020)) + (2020 service population).

Table 6 shows the estimated GHG emissions target for 2022 based on the Scoping Plan's downward trajectory to meet the SB 32 target.

Table 6
City of Carlsbad 2022 Emissions Target

	2020	2022	2030
Emissions (MT CO_2e)	933,353	842,706	560,012

Source: Emissions are based on the 2012 GHG emission inventory for the City of Carlsbad (Grim, pers. Comm. 2020)
Notes: The 2020 and 2030 City-wide emissions targets were based on meeting the Statewide reduction goals of AB 32 and SB 32, respectively.
The 2022 emissions target was based on the Scoping Plan's downward trajectory of 5.2% per year to meet the goals of SB 32.

The efficiency metric threshold for 2020, 2022, and 2030 are illustrated below in Table 7. If the Project achieves the 2022 efficiency metric threshold, the Project would not interfere with the State's ability to achieve GHG reduction targets per SB 32 and would demonstrate progress toward attaining 2050 targets per EO S-3-05.

Table 7
City of Carlsbad 2020, 2022, and 2030 Efficiency Metric Threshold

Year	Service Population[1] (Population + Employment)	Emissions Target (MT CO_2e)	Efficiency Metric Threshold (MT/SP/yr)
2020[2]	195,872	933,353	4.77
2022[3]	197,874	842,706	4.26
2030[4]	205,074	560,012	2.73

Sources:
[1] SANDAG 2050 Regional Growth Forecast, Series 13 (SANDAG 2013).
[2] Emissions for 2020 are based on the 2012 City of Carlsbad GHG Inventory and GHG reduction goals consistent with AB 32.
[3] Emissions for 2022 are based on the Scoping Plan's downward trajectory to meet the SB 32 target in 2030.
[4] Emissions for 2030 are based on the 2012 City of Carlsbad GHG Inventory and GHG reduction goals consistent with SB 32.
Notes: CO_2e = carbon dioxide equivalent; MT = metric ton; SP = service population; yr = year.

As shown in Table 7, the calculated efficiency metric threshold for 2022 based on the City's 2012 GHG emissions and the statewide emissions reduction trajectory is 4.26 MT/SP/yr. Again, this 2022 efficiency metric threshold reflects the trajectory planned for in the State's Scoping Plan. If the Project achieves the 2022 efficiency metric threshold, it would not interfere with attainment of the 2030 and 2050 statewide emission reduction targets, and therefore not interfere with the State's and the City's ability to achieve the mid-term and long-term GHG reduction targets.

Service Population

Based on a residential density of 2.59 persons per household found within the SANDAG Series 13 Growth Forecast, the Project would have a residential population of 497 (2.59 persons per household X 192 units) (SANDAG 2013). The Project is estimated to have 2 employees, one leasing agent for affordable units and one leasing agent for market-rate units. Therefore, the Project would have a service population of 499 (497 residents + 2 employees).

5 IMPACTS

Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Would the Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Project GHG Emissions

Construction GHG Emissions

Construction Scenario Assumptions

GHG emissions would be associated with the construction phase of the Project components through use of construction equipment and vehicle trips. Emissions of CO_2 were estimated using the California Emissions Estimator Model (CalEEMod), Version 2016.3.2.[3]

For the purposes of modeling, it was assumed that construction of Project components would commence in January 2021 and last approximately 12 months. Table 8 provides the construction timeline and potential phasing of the components that would come online to achieve the target milestones. The construction schedule has been developed based on available information provided by the Project applicant, typical construction practices, and best engineering judgment. Construction phasing is intended to represent a schedule of anticipated activities for use in estimating potential Project-generated construction emissions.

Table 8
Construction Scenario Assumptions

Construction Phase (Duration)	One-way Vehicle Trips			Equipment		
	Average Daily Worker Trips	*Average Daily Vendor Truck Trips*	*Total Haul Truck Trips*	*Equipment Type*	*Quantity*	*Usage Hours*
Site Preparation (10 days)[a]	18	0	0	Rubber Tired Dozers	3	8
				Tractors/loaders/backhoes	4	8
Grading (30 days)[a]	20	0	0	Excavators	2	8
				Graders	1	8
				Rubber Tired Dozers	1	8

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[3] CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform to calculate construction and operational emissions from land use development projects. The model was developed for the California Air Pollution Control Officers Association in collaboration with multiple air districts across the State. Numerous lead agencies in the State, including the SDAPCD, utilize CalEEMod to estimate GHG emissions in accordance with CEQA Guidelines section 15064.4(a)(1).

Table 8
Construction Scenario Assumptions

Construction Phase (Duration)	One-way Vehicle Trips			Equipment		
	Average Daily Worker Trips	*Average Daily Vendor Truck Trips*	*Total Haul Truck Trips*	*Equipment Type*	*Quantity*	*Usage Hours*
				Scrapers	2	8
				Tractors/Loaders/Backhoes	2	8
Trenching (10 days)	8	0	0	Excavators	1	8
				Tractors/Loaders/Backhoes	1	8
				Trenchers	1	8
Building construction (200 days)	204	46	0	Cranes	1	8
				Forklifts	3	8
				Generator Sets	1	8
				Tractors/Loaders/Backhoes	3	8
				Welders	1	8
Paving (20 days)	16	4	0	Pavers	3	8
				Paving Equipment	3	8
				Rollers	3	8
				Tractors/Loaders/Backhoes	2	8
				Signal Board	1	8
Architectural coating (20 days)	42	0	0	Air compressors	1	8

Note: See Appendix A for additional details.

[a] The CalEEMod modeling parameters for the Site Preparation and Grading phases of the Project's construction period are conservative because they do not reflect that the Project site previously was cleared and graded. While the Project site would be subject to some additional grading activities to ready the site for development, given the passage of time since the previously conducted clearing and grading, such activities are not expected to last for 40 days. As a result, the emissions estimates presented herein are conservative and likely serve to over-estimate the Project's construction-related GHG emissions.

The equipment mix assumptions were based on Project design documents, review of related documents, and CalEEMod default equipment, where appropriate. The equipment mix is meant to represent a reasonably conservative estimate of construction activity. For the analysis, it is generally assumed that heavy construction equipment would be operating at the site for approximately 8 hours per day, 5 days per week. Default assumptions provided in CalEEMod were utilized to determine worker trips and vendor truck trips for each potential construction phase. The default CalEEMod trip distance for construction vehicles was assumed, which was a one-way distance of 10.8 miles for worker trips, 7.3 miles for vendor trips, and 20 miles for haul trips.

Carbon Sequestration (Loss)

This GHG analysis estimates the loss of sequestered carbon associated with the proposed land use change under the construction impact analysis. The gain of sequestered carbon associated with planting new trees is evaluated under the operational impact analysis discussed later in this section.

The calculation methodology and default values provided in the CalEEMod Version 2016.3.2, User's Guide (CAPCOA 2017) was used to calculate potential CO_2 emissions associated with the one-time change in carbon sequestration capacity of a vegetation land use type. The calculation of the one-time loss of sequestered carbon is the product of the converted acreage value and the carbon content value for each land use type (vegetation community). The mass of sequestered carbon per unit area (expressed in units of MT of CO_2 per acre) is dependent on the specific land use type. Assuming that the sequestered carbon is released as CO_2 after removal of the vegetation, annual CO_2 is calculated by multiplying total biomass (MT of dry matter per acre) from IPCC data by the carbon fraction in plant material, and then converts MT of carbon to MT of CO_2 based on the molecular weights of carbon and CO_2 (IPCC 2014).

It is assumed that all sequestered carbon from the removed oak trees will be returned to the atmosphere; that is, the wood from the trees and vegetation communities would not be re-used in a solid form or another form that would retain carbon. GHG emissions generated during construction activities, including clearing, tree removal, and grading, were included in the construction GHG emissions calculations.

Estimated Construction Emissions

Table 9 shows the estimated annual GHG construction emissions associated with the Project. Complete details of the emissions calculations are provided in Appendix A of this document.

Table 9

Estimated Annual Construction GHG Emissions

Year	CO_2	CH_4	N_2O	CO_2e
	Metric Tons			
2021	662.42	0.12	0.00	665.42

Source: CalEEMod Version 2016.3.2.
Notes: GHG = greenhouse gas; CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent.
See Appendix A for complete results.

As shown in Table 9, the estimated total GHG emissions from construction of the Project would be 665 MT CO_2e.

The loss of sequestered carbon from removal of 23 oak trees is estimated based on the carbon content estimate for each tree over the growth period (MT CO_2 per tree). The Project would permanently impact 23 oak trees. The loss of sequestered carbon is presented in Table 10.

Table 10
Oak Trees Released Carbon

Tree Species	Growing Period (years)	Sequestration Rate (MT CO_2/tree/year)	Quantity of New Tree Plantings (trees)	Sequestered Carbon (MT CO_2)
Miscellaneous	20	0.0354	23	16.28

Source: CAPCOA 2017.
Notes: MT CO_2 = metric tons carbon dioxide.
See Appendix A for calculations and sources.

As presented in Table 10, the removal of 23 oak trees would result in the release of approximately 16 MT CO_2. Including the construction emissions in Table 5, the total estimated GHG emissions from the construction of the Project would be 681.70 MT CO_2e.

Operational Emissions

Operation of the Project would result in direct GHG emissions from area sources, indirect GHG emissions from use of electricity, vehicular traffic, waste, and water and wastewater.

Operational Scenario Assumptions

Area

The area source category calculates direct sources of GHG emissions located at the Project site including hearths and landscape maintenance equipment. (This source category does not include the emissions associated with natural gas usage in space heating and water heating as these are calculated in the building energy use module of CalEEMod.) The Project will not have natural gas or woodburning fireplaces or woodstoves; as such, the only area source pertinent to this analysis is landscape maintenance equipment.

Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, roto tillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers, as well as air compressors, generators, and pumps. The emissions associated from landscape equipment use were estimated using CalEEMod defaults. For San Diego County, CalEEMod assumes that landscaping equipment would operate 180 days per year. To be conservative, emissions were estimated assuming that landscape maintenance equipment was powered by gasoline or diesel fuel, and not electrified.

Energy

As represented in CalEEMod, energy sources include emissions associated with building electricity and natural gas usage (non-hearth). In accordance with the City's Ordinance No. CS-348, the Project will use electric-based water heating. The Project's residences will also have electric heating, ventilation, and air conditioning (HVAC) equipment and the swimming pool will be heated by an electric water heater. Therefore, the energy use associated with water heating, HVAC equipment, and swimming pool heating was applied to the electric load for the Project. CalEEMod default values for energy consumption for each land use were adjusted for the Project analysis to account for the electrification as discussed above based on the typical annual fuel utilization efficiencies of electric and natural gas devices (US Department of Energy 2020).

In addition to the electrified components of the building envelope, the Project will be designed to include a solar photovoltaic (PV) rooftop system. The size of the system is not known at this time but will meet any requirements under the 2019 Title 24 code. Since the size is not known, solar was not accounted for in the modeling. As explained in Section 3.2, Title 24 of the California Code of Regulations serves to enhance and regulate California's building standards. The most recent amendments to Title 24, Part 6, referred to as the 2019 standards, became effective on January 1, 2020. However, CalEEMod assumes compliance with the previous 2016 standards. The Project will also include a solar water heating system onsite for the swimming pool, in combination with the electric water heater. The solar PV and water heating was not accounted for in the modeling. The Project would also include Energy Star appliances and would use light emitting diode (LED) lighting or other efficient lighting for at least 75% of the total luminaires.

The Project would include 39 electric vehicle capable parking spaces and 20 electric vehicle charging stations in accordance with the City's Ordinance CS-349; however, this was not accounted for in the modeling.

Annual natural gas (non-hearth) and electricity emissions were estimated in CalEEMod using the emissions factors for San Diego Gas and Electric (SDG&E), which would be the energy source provider for the Project. For operational year 2022, the emission factors for SDG&E were adjusted to reflect SDG&E's compliance with the RPS standards, which is based on the renewable procurement percentage of 44% from the most recent 2017 SDG&E RPS submittal (CEC 2018b).

Mobile Sources (Motor Vehicles)

Following the completion of construction activities, the Project would generate GHG emissions from mobile sources (vehicular traffic), as a result of residents and employees associated with the 192 additional residential units. The CalEEMod Version 2016.3.2 model was used to estimate daily emissions from vehicular sources (refer to Appendix A). CalEEMod Version 2016.3.2 default data, including temperature, trip characteristics, variable start information, and emissions factors were used for the model inputs. The Project is estimated to generate up to 1,152 one-way trips per day (Linscott Law & Greenspan 2020). Project-related traffic was assumed to include a mixture of vehicles in accordance with the model outputs for traffic. Emission factors representing the vehicle mix and emissions for 2022 were conservatively used to estimate emissions associated with vehicular sources. The 2022 operational year represents the first full year the Project would be operational. The Project will include on-site bicycle parking and storage for residents.

The California Air Pollution Control Officers Association (CAPCOA) *Quantifying Greenhouse Gas Mitigation Measures* document was relied upon to apply land use and site enhancement mitigation with the CalEEMod (CAPCOA 2010). The following reduction measures were applied within the land use and site enhancement mitigation function within CalEEMod:

- Increased density: 15.08 dwelling units per acre (192 dwelling units / 12.73 acres)
- Improve destination accessibility: 1.18 acres to downtown/job center
- Increase transit accessibility: 1 mile to transit station
- Integrate below market rate housing: 21.9 % of dwelling units are below market rate (42 affordable units / 192 total units).

Solid Waste

The Project would generate solid waste, and therefore, result in CO_2e emissions associated with landfill off-gassing. CalEEMod default values for solid waste generation were used to estimate GHG emissions associated with solid waste. A solid waste diversion rate of 50% was assumed in accordance with AB 341.

Water and Wastewater

Supply, conveyance, treatment, and distribution of water for the Project require the use of electricity, which would result in associated indirect GHG emissions. Similarly, wastewater generated by the Project requires the use of electricity for conveyance and treatment, along with GHG emissions generated during wastewater treatment. Water consumption estimates for both indoor and outdoor water use and associated electricity consumption from water use and wastewater generation were estimated using CalEEMod default values. The Project would include low-flow fixtures in all buildings and water-efficient irrigation system.

Carbon Sequestration (Gain)

This GHG analysis estimates the gain of sequestered carbon that would result from planting and growth of trees on site. The calculation methodology and default values provided in CalEEMod were used to estimate the one-time carbon-stock change from planting new trees. Trees sequester CO_2 while they are actively growing and the amount of CO_2 sequestered depends on the type of tree. Thereafter, the accumulation of carbon in biomass slows with age, and is assumed to be offset by losses from clipping, pruning, and occasional death. Active growing periods are subject to, among other things, species, climate regime, and planting density; however, for modeling purposes, CalEEMod assumes the IPCC active growing period of 20 years (CAPCOA 2017).

The sequestered carbon from new trees modeling does not include CO_2 emissions estimates associated with planting, care, and maintenance activities (e.g., tree planting and care vehicle travel and maintenance equipment operation). Landscape maintenance equipment emissions were included in the area source emission estimates included in the operational GHG emissions calculations. In addition, operational GHG emissions associated with these maintenance activities are anticipated to be minimal.

Estimated Operational Emissions

Table 11 shows the total operational GHG emissions for the Project after accounting for amortized construction emissions.

Table 11
Summary of Estimated Annual GHG Emissions

Emissions Source	MT CO_2	MT CH_4	MT N_2O	MT CO_2e
Area	2.34	0.00	0.00	2.39
Energy	323.17	0.01	0.00	324.39
Mobile	936.42	0.05	0.00	937.71
Waste	10.29	0.61	0.00	25.48
Water	55.97	0.34	0.01	67.10
			Amortized Construction Emissions	*22.72*
			Total Project Emissions	1,379.79

Source: See Appendix A for complete results.
Notes: GHG = greenhouse gas; MT = metric tons; CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent.
Emissions presented represent the “mitigated” output in CalEEMod.

Implementation of the Project, as analyzed at the project-level of analysis, would emit approximately 1,380 MT CO_2e per year.

The gain of sequestered carbon resulting from planting and growth of approximately 35 oak trees on site is estimated based on the carbon sequestration rate for the tree species, the number of new trees, and the growing period. It is assumed that all 35 trees will grow for a minimum of 20 years. Table 12 presents the estimated one-time carbon-stock change resulting from proposed planting of new trees.

Table 12
Planted Trees Sequestered Carbon

Tree Species	Growing Period (years)	Sequestration Rate (MT CO_2/tree/year)	Quantity of New Tree Plantings (trees)	Sequestered Carbon (MT CO_2)
Miscellaneous	20	0.0354	35	24.78

Source: CAPCOA 2017.
Notes: MT CO_2 = metric tons carbon dioxide.
See Appendix A for calculations and sources.

As presented in Table 12, the gain in sequestered carbon resulting from planting 35 trees would be approximately 25 MT CO_2, or 1.24 MT CO_2 per year. Including the sequestered carbon from planted trees, the estimated annual Project-generated GHG emissions would be approximately 1,379 MT CO_2e per year as a result of Project operation.

2030 Operational Emissions

For disclosure purposes only, the operational emissions for the project were estimated assuming an operational year of 2030, rather than the buildout year of 2022. All operational emissions calculation assumptions are identical to that described above for 2022 other than energy and mobile as discussed below.

Energy

Annual natural gas (non-hearth) and electricity emissions were estimated in CalEEMod using the emissions factors for SDG&E, which would be the energy source provider for the Project. For operational year 2030, the emission factors for SDG&E were adjusted to reflect SDG&E's compliance with the RPS standards, which is based on the renewable procurement percentage of 60% in accordance with the procurement requirements set forth in SB 100.

Mobile Sources (Motor Vehicles)

Following the completion of construction activities, the Project would generate GHG emissions from mobile sources (vehicular traffic), as a result of residents and employees associated with the 192 additional residential units. The CalEEMod Version 2016.3.2 model was used to estimate daily emissions from vehicular sources (refer to Appendix A). CalEEMod Version 2016.3.2 default data, including temperature, trip characteristics, variable start information, and emissions factors were used for the model inputs. The Project is estimated to generate up to 1,152 one-way trips per day (Linscott Law & Greenspan 2020). Project-related traffic was assumed to include a mixture of vehicles in accordance with the model outputs for traffic. Emission factors representing the vehicle mix and emissions for 2030 were used to estimate emissions associated with vehicular sources. The Project will include on-site bicycle parking and storage for residents.

Table 13 shows the total operational GHG emissions for the Project after accounting for amortized construction emissions.

Table 13
Summary of Estimated Annual GHG Emissions – Operational Year 2030

Emissions Source	MT CO_2	MT CH_4	MT N_2O	MT CO_2e
Area	2.34	0.00	0.00	2.39
Energy	235.47	0.01	0.00	236.40
Mobile	750.01	0.04	0.00	750.95
Waste	10.29	0.61	0.00	25.48
Water	40.93	0.34	0.01	52.01
			Amortized Construction Emissions	*22.72*
			Total Project Emissions	1,089.95

Source: See Appendix A for complete results.
Notes: GHG = greenhouse gas; MT = metric tons; CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent.
Emissions presented represent the "mitigated" output in CalEEMod.

Implementation of the Project, as analyzed at the project-level of analysis, would emit approximately 1,090 MT CO_2e per year in 2030.

Impact Analysis

As discussed in Section 4, the Project's impact will be assessed based on its consistency with applicable GHG reduction plans, rules, and laws set forth locally, regionally, and statewide. The Project's sustainable attributes will be evaluated against these criteria, and, as such, are provided in detail below:

- The Project would add important housing stock to an infill location close to existing employment and commercial centers.
  - As background, SANDAG's Series 13 Regional Growth Forecast projected that the City of Carlsbad would have 48,448 housing units and 77,422 jobs in 2020, for a jobs/housing ratio of 1.60 (SANDAG 2013). As such, the City needs additional housing units (including affordable units) to balance its employment-generating land uses. By

  providing increased residential opportunities within the City, this Project would help the City to reduce the trip lengths traveled by employees to their work destinations in Carlsbad. This was not accounted for in the modeling.

  - More than 20 percent of the Project's multi-family residential units would be affordable units. This was accounted for in the modeling as discussed in the mobile source emissions above.

- The Project would implement a Tier 2 Transportation Demand Management (TDM) Plan consistent with the City of Carlsbad's "Transportation Demand Management Handbook" (City of Carlsbad 2019b).
  - As part of the TDM Plan, the Project would improve the amenities provided at two bus stops on Palomar Airport Road. This was not accounted for in the modeling.
  - The Project site is located adjacent to Palomar Airport Road, which is served by North County Transit District (NCTD) Bus Route 445. The closest Route 445 stop is located at Palomar Airport Road/Palomar Oaks Way, approximately 240 feet from the Project site. Route 445 provides direct connections to the Coaster's Carlsbad Poinsettia station and the Sprinter's Palomar College station, providing Project residents with transit network opportunities to facilitate their travel (NCTD 2019). This was not accounted for in the modeling.
- The Project would reduce the consumption of natural gas and promote building electrification through a number of design features.
  - The Project would not include natural-gas burning fireplaces or woodstoves. This was accounted for in the modeling as discussed under the area source description above.
  - The Project would use electric-based water heating, HVAC equipment, and swimming pool heating. This was accounted for in the modeling as discussed under the energy source description above.
  - The Project would be designed to include a solar PV rooftop system for the residences. This was not accounted for in the modeling.
  - The Project would include a solar water heating system onsite to heat the swimming pool. This was not accounted for in the modeling.
- The Project would incorporate additional efficiencies in the built environment relating to the consumption of transportation fuels, energy, and water.
  - The Project would include 39 electric vehicle capable parking spaces and 20 electric vehicle charging stations in accordance with the City's Ordinance CS-349. This was not accounted for in the modeling.

  - The Project would include Energy Star appliances. This was accounted for in the modeling as discussed in the energy source description above.
  - The Project would include use of LED lighting or other efficient lighting for at least 75% of the total luminaires. This was accounted for in the modeling as discussed in the energy source description above.
  - The Project would include low-flow or high-efficiency water fixtures (toilet, showerhead, clothes washer, etc.). This was accounted for in the modeling as discussed in the water and wastewater source description above.
- Although the Project would remove 23 oak trees during construction, it would plant 35 oak trees and thus result in a net gain of 12 oak trees. The gain of sequestered carbon resulting from planting and growth of oak trees on site is estimated based on the carbon sequestration rate for the tree species, the number of new trees, and the growing period. This was accounted for in the modeling as discussed under carbon sequestration above.

As shown previously, the total operational emissions for the Project would be approximately 1,379 MT CO_2e per year, including amortized construction emissions. As presented in Section 4, the efficiency metric threshold for the Project's buildout year was 4.26 MT CO_2e/person/year. Therefore, the Project would have an efficiency metric of 2.76 MT CO_2e/person/year (1,379 MT CO_2e per year / 499 persons). Furthermore, as shown in Table 7, the efficiency metric threshold for 2030 would be 2.73 MT CO_2e/person/year. The operational emissions estimated for year 2030 were 1,090 MT CO_2e/year, resulting in an efficiency metric of 2.18 MT CO_2e/person/year. Therefore, the Project would not exceed the efficiency metric threshold for 2022 or 2030 and thus would be consistent with the state's targets within SB 32 for 2030.

Consistency with CARB's 2008 and 2017 Scoping Plans

CARB's 2008 and 2017 Scoping Plans provide a framework for actions to reduce California's GHG emissions in accordance with the statewide 2020 and 2030 and the 2050 goal, and require CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. The 2008 and 2017 Scoping Plans do not directly regulate specific land use projects. Indeed, in the Final Statement of Reasons for the Amendments to the CEQA Guidelines, the CNRA observed that "[t]he [Scoping Plan] may not be appropriate for use in determining the significance of individual projects because it is conceptual at this stage and relies on the future development of regulations to implement the strategies identified in the Scoping Plan" (CNRA 2009a). Under the 2008 and 2017 Scoping Plans, however, there are several state regulatory measures aimed at the identification and reduction of GHG emissions. CARB and other state agencies have adopted many of the measures identified, most of which focus on area source emissions (e.g., energy usage, high-GWP GHGs in consumer products) and changes to the vehicle fleet (i.e., hybrid, electric, and more fuel-efficient vehicles) and associated fuels (e.g., low-carbon fuel standard), among others. The Project would comply with all applicable regulations adopted in furtherance of the 2008 and 2017 Scoping Plans to the extent required by law.

Table ~~13~~ 14 highlights measures that have been developed under the 2008 and 2017 Scoping Plans and the Project's consistency with those measures.

Table ~~13~~14
Project Consistency with Scoping Plan GHG Emission-Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
Transportation Sector		
1.5 million zero-emission and plug-in hybrid light-duty electric vehicles by 2025 (4.2 million Zero-Emissions Vehicles by 2030)	N/A	The Project would include 39 electric vehicle capable parking spaces and 20 electric vehicle charging stations in accordance with the City's Ordinance CS-349.
Reduction in Vehicle Miles Traveled	N/A	The Project is located on an infill site that is in close proximity to multi-modal transportation options. Further, the Project would provide needed residential opportunities (including affordable housing units) in the City of Carlsbad, helping to improve the jobs/housing ratio and reduce the trip lengths traveled by persons employed in the City.
Electricity and Natural Gas Sector		
Energy Efficiency Measures (Electricity)	E-1	The Project would comply with the Title 24, Part 6, building energy efficiency standards applicable at the time of building permit application. Further, as described above, the Project includes numerous design attributes that would reduce natural gas consumption, promote building electrification, and achieve other efficiencies relative to the consumption of energy.
Energy Efficiency (Natural Gas)	CR-1	The Project would comply with the Title 24, Part 6, building energy efficiency standards applicable at the time of building permit application. As discussed above, the Project also includes other design attributes to reduce natural gas consumption, including the use of electric water heaters, HVAC, and pool heating equipment and the elimination of natural gas fireplaces from the design of the residential units.
Solar Water Heating (California Solar Initiative Thermal Program)	CR-2	The Project would employ solar water heating as part of the design to heat the swimming pool.
Renewables Portfolios Standard	E-3	The Project would use energy supplied by San Diego Gas and Electric, which is in compliance with the Renewable Portfolio Standard. SDG&E reported a 44% renewables mix in calendar year 2017.
Senate Bill 1 Million Solar Roofs (California Solar Initiative, New Solar Home Partnership, Public Utility Programs) and Earlier Solar Programs	E-4	The Project would include a solar photovoltaic system located on the roof and carports.

Table ~~13~~14

Project Consistency with Scoping Plan GHG Emission-Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
Water Sector		
Water Use Efficiency	W-1	The Project would utilize water saving features, including low-flow fixtures and water-efficient landscape irrigation.
Reuse Urban Runoff	W-4	The Project would include low impact development measures to the extent feasible to reduce the amount of stormwater runoff from the site.
Green Buildings		
State Green Building Initiative: Leading the Way with State Buildings (Greening New and Existing State Buildings)	GB-1	The Project would be required to be constructed in compliance with state standards in effect at the time of building construction.
Green Building Standards Code (Greening New Public Schools, Residential and Commercial Buildings)	GB-2	The Project's buildings would meet green building standards that are in effect at the time of building permit application.
Beyond Code: Voluntary Programs at the Local Level (Greening New Public Schools, Residential and Commercial Buildings)	GB-3	The Project would be required to be constructed in compliance with local green building standards in effect at the time of building permit application.
Recycling and Waste Management Sector		
Mandatory Commercial Recycling	RW-3	This measure applies to commercial projects. However, during both construction and operation of the Project, the Project would comply with all state regulations related to solid waste generation, storage, and disposal, including the California Integrated Waste Management Act, as amended. During construction, all wastes would be recycled to the maximum extent possible.
High Global Warming Potential Gases Sector		
Limit High Global Warming Potential Use in Consumer Products	H-4	The Project's residents would use consumer products that would comply with the regulations that are in effect at the time of manufacture.

Sources: CARB 2008, 2017b.
Notes: GHG = greenhouse gas; Project = West Oaks Project; CARB = California Air Resources Board; EV = electric vehicle; SF_6 = sulfur hexafluoride.

Based on the analysis in Table ~~13~~14, the Project would be consistent with the applicable strategies and measures in the 2008 and 2017 Scoping Plans.

In addition to the measures outlined in the Table ~~13~~14, the 2008 and 2017 Scoping Plans also highlight, in several areas, the goals and importance of infill projects. Specifically, the Scoping Plans encourage infill projects and characterize them as crucial to achieving the State's long-term climate goals. The Plans encourage accelerating equitable and affordable infill development through enhanced financing and policy incentives and mechanisms.

In addition to the statewide measures presented in Table ~~13~~14, the 2017 Scoping Plan presented a suite of local actions that agencies can take to reduce GHG emissions, as found within Appendix B of the Scoping Plan (CARB 2017). The Project's consistency with the 2017 Scoping Plan's list of potentially feasible local actions is presented in Table ~~14~~15.

Table ~~14~~15

Project Consistency with Scoping Plan Local Actions

Scoping Plan Local Action	Project Consistency
Construction	
Enforce idling time restrictions for construction vehicles	The Project will enforce unnecessary idling to 5 minutes, in accordance with CARB's Off-Road Regulation.
Divert and recycle construction and demolition waste, and use locally-sourced building materials with a high recycled material content to the greatest extent feasible	The Project will divert and recycle construction and demolition waste in accordance with all applicable rules and regulations.
Minimize tree removal, and mitigate indirect GHG emissions increases that occur due to vegetation removal, loss of sequestration, and soil disturbance	Although the Project will remove 23 oak trees during construction, it will plant 35 trees, resulting in a net addition of 12 oak trees onsite.
Operation	
Require on-site EV charging capabilities for parking spaces serving the project to meet jurisdiction-wide EV proliferation goals	The Project will include 39 EV capable and 20 EV charging stations in accordance with the City's Ordinance CS-349.
Provide adequate, safe, convenient, and secure on-site bicycle parking and storage in multi-family residential projects and in non-residential projects	The Project will include on-site bicycle parking and storage for residents.
Require on-site renewable energy generation	The Project will include a solar photovoltaic system located on both rooftop and carport mounted arrays.
Prohibit wood-burning fireplaces in new development, and require replacement of wood-burning fireplaces for renovations over a certain size developments	The Project will not include fireplaces or wood-burning stoves.
Require solar-ready roofs	The Project will include a solar photovoltaic system located on both rooftop and carport mounted arrays.
Require low-water landscaping in new developments	The Project will include water-efficient landscaping techniques, including drip irrigation.
Expand urban forestry and green infrastructure in new land development	The Project will include planting of 35 oak trees and adding 12 net new oak trees to the site.
Require the design of the electric outlets and/or wiring in new residential unit garages to promote electric vehicle usage	The Project will include 39 EV capable and 20 installed charging stations in accordance with the City's Ordinance CS-349.
Require each residential unit to be "solar ready," including installing the appropriate hardware and proper structural engineering	The Project will be designed to include a solar PV rooftop system.

Table ~~14~~15
Project Consistency with Scoping Plan Local Actions

Scoping Plan Local Action	Project Consistency
Require the installation of energy conserving appliances such as on-demand tank-less water heaters and whole-house fans	The Project will include the use of energy conserving appliances, such as ENERGYSTAR labeled.
Require each residential and commercial building equip buildings with energy efficient AC units and heating systems with programmable thermostats/timers	The Project will equip each residential unit with programmable thermostats to control the heating and AC system.
Require each residential and commercial building to utilize low flow water fixtures such as low flow toilets and faucets	The Project would include low-flow or high-efficiency water fixtures (toilet, showerhead, clothes washer, etc.).
Require the use of energy-efficient lighting for all street, parking, and area lighting	The Project will include the use of LED lighting or other efficient lighting for at least 75% of the total luminaires.
Require the landscaping design for parking lots to utilize tree cover and compost/mulch	The Project will include planting of 35 oak trees and adding 12 net new oak trees to the site which will help natural shading.

Source: CARB 2017b.

Notes: GHG = greenhouse gas; Project = The West Oaks Project; CARB = California Air Resources Board; EV = electric vehicle; SF_6 = sulfur hexafluoride.

As shown in Table ~~14~~15, the Project would be consistent with applicable local actions set forth within Appendix B of the 2017 Scoping Plan.

Consistency with Applicable GHG-Related Laws and Regulations

The Project's consistency with statewide GHG reduction strategies is summarized in detail in Table ~~15~~16.

Table ~~15~~16
Applicable GHG-Related Laws and Regulations

Project Component	Applicable Laws/ Regulations	GHG Reduction Measures Required for Project
Building Components/Facility Operations		
Roofs/Ceilings/Insulation	CALGreen Code (Title 24, Part 11) California Energy Code (Title 24, Part 6)	The Project must comply with efficiency standards regarding roofing, ceilings, and insulation. For example: Roofs/Ceilings: New construction must reduce roof heat island effects per CALGreen Code Section 106.11.2, which requires use of roofing materials having a minimum aged solar reflectance, thermal emittance complying with Section A5.106.11.2.2 and A5.106.11.2.3 or a minimum aged Solar Reflectance Index as specified in Tables A5.106.11.2.2, or A5.106.11.2.3. Roofing materials must also meet solar reflectance and thermal emittance standards contained in Title 20 Standards.

Table ~~15~~16
Applicable GHG-Related Laws and Regulations

Project Component	Applicable Laws/ Regulations	GHG Reduction Measures Required for Project
		Roof/Ceiling Insulation: There are also requirements for the installation of roofing and ceiling insulation. (See Title 24, Part 6 Compliance Manual at Section 3.2.2.)
Flooring	CALGreen Code	The Project must comply with efficiency standards regarding flooring materials. For example, for 80% of floor area receiving "resilient flooring," the flooring must meet applicable installation and material requirements contained in CALGreen Code Section 5.504.4.6.
Window and Doors (Fenestration)	California Energy Code	The Project must comply with fenestration efficiency requirements. For example, the choice of windows, glazed doors, and any skylights for the Project must conform to energy consumption requirements affecting size, orientation, and types of fenestration products used. (See Title 24, Part 6 Compliance Manual, Section 3.3.)
Building Walls/Insulation	CALGreen Code California Energy Code	The Project must comply with efficiency requirements for building walls and insulation. Exterior Walls: Must meet requirements in current edition of California Energy Code, and comply with Sections A5.106.7.1 or A5.106.7.2 of CALGreen Code for wall surfaces, as well as Section 5.407.1, which required weather-resistant exterior wall and foundation envelope as required by California Building Code Section 1403.2. Construction must also meet requirements contained in Title 24, Part 6, which vary by material of the exterior walls. (See Title 24, Part 6 Compliance Manual, Part 3.2.3.) Demising (Interior) Walls: Mandatory insulation requirements for demising walls (which separate conditioned from non-conditions space) differ by the type of wall material used. (*Id*. at 3.2.4.) Door Insulation: There are mandatory requirements for air infiltration rates to improve insulation efficiency; they differ according to the type of door. (*Id*. at 3.2.5.) Flooring Insulation: There are mandatory requirements for insulation that depend on the material and location of the flooring. (*Id*. at 3.2.6.)
Finish Materials	CALGreen Code	The Project must comply with pollutant control requirements for finish materials. For example, materials including adhesives, sealants, caulks, paints and coatings, carpet systems, and composite wood products must meet requirements in CALGreen Code to ensure pollutant control. (CALGreen Code Section 5.504.4.)
Wet Appliances (Toilets/Faucets/Urinals, Dishwasher/Clothes Washer, Spa and Pool/Water Heater)	CALGreen Code California Energy Code Appliance Efficiency Regulations (Title 20 Standards)	Wet appliances associated with the Project must meet various efficiency requirements. For example: Spa and Pool: Use associated with the Project is subject to appliance efficiency requirements for service water heating systems and equipment, spa and pool heating systems and equipment. (Title 24, Part 6, Sections 110.3, 110.4, 110.5; Title 20 Standards, Sections 1605.1(g), 1605.3(g); see also California Energy Code.)

Table ~~15~~16

Applicable GHG-Related Laws and Regulations

Project Component	Applicable Laws/ Regulations	GHG Reduction Measures Required for Project
		Toilets/Faucets/Urinals: Use associated with the Project is subject to new maximum rates for toilets, urinals, and faucets effective January 1, 2016: • Showerheads maximum flow rate 2.5 gpm at 80 psi • Wash fountains 2.2 x (rim space in inches/20) gpm at 60 psi • Metering faucets 0.25 gallons/cycle • Lavatory faucets and aerators 1.2 gpm at 60 psi • Kitchen faucets and aerators 1.8 gpm with optional temporary flow of 2.2 gpm at 60 psi • Public lavatory faucets 0.5 gpm at 60 psi • Trough-type urinals 16 inches length • Wall mounted urinals 0.125 gallons per flush • Other urinals 0.5 gallons per flush (Title 20 Standards, Sections 1605.1(h),(i) 1065.3(h),(i).) Water Heaters: Use associated with the Project is subject to appliance efficiency requirements for water heaters. (Title 20 Standards, Sections 1605.1(f), 1605.3(f).) Dishwasher/Clothes Washer: Use associated with the Project is subject to appliance efficiency requirements for dishwashers and clothes washers. (Title 20 Standards, Sections 1605.1(o),(p),(q), 1605.3(o),(p),(q).)
Dry Appliances (Refrigerator/Freezer, Heater/Air Conditioner, Clothes Dryer)	Title 20 Standards CALGreen Code	Dry appliances associated with the Project must meet various efficiency requirements. For example: Refrigerator/Freezer: Use associated with the Project is subject to appliance efficiency requirements for refrigerators and freezers. (Title 20 Standards, Sections 1605.1(a), 1605.3(a).) Heater/Air Conditioner: Use associated with the Project is subject to appliance efficiency requirements for heaters and air conditioners. (Title 20 Standards, Sections 1605.1(b),(c),(d),(e), 1605.3(b),(c),(d),(e) as applicable.) Clothes Dryer: Use associated with the Project is subject to appliance efficiency requirements for clothes dryers. (Title 20 Standards, Section 1605.1(q).)
	CALGreen Code	Installations of HVAC, refrigeration and fire suppression equipment must comply with CALGreen Code Sections 5.508.1.1 and 508.1.2, which prohibits CFCs, halons, and certain HCFCs and HFCs.
Lighting	Title 20 Standards	Lighting associated with the Project will be subject to energy efficiency requirements contained in Title 20 Standards. General Lighting: Indoor and outdoor lighting associated with the Project must comply with applicable appliance efficiency regulations (Title 20 Standards, Sections 1605.1(j),(k),(n), 1605.3(j),(k),(n).) Emergency Lighting and Self-Contained Lighting: the Project must also comply with applicable appliance efficiency regulations (Title 20 Standards, Sections 1605.1(l), 1605.3(l).)

Table ~~15~~16
Applicable GHG-Related Laws and Regulations

Project Component	Applicable Laws/ Regulations	GHG Reduction Measures Required for Project
		Traffic Signal Lighting: For any necessary Project improvements involving traffic lighting, traffic signal modules and traffic signal lamps will need to comply with applicable appliance efficiency regulations (Title 20 Standards, Sections 1605.1(m), 1605.3(m).)
	California Energy Code	Lighting associated with the Project will also be subject to energy efficiency requirements contained in Title 24, Part 6, which contains energy standards for non-residential indoor lighting and outdoor lighting. (See Title 24 Part 6 Compliance Manual, at Sections 5, 6.) Mandatory lighting controls for indoor lighting include, for example, regulations for automatic shut-off, automatic daytime controls, demand responsive controls, and certificates of installation. (Id. at Section 5.) Regulations for outdoor lighting include, for example, creation of lighting zones, lighting power requirements, a hardscape lighting power allowance, requirements for outdoor incandescent and luminaire lighting, and lighting control functionality. (Id. at Section 6.)
	AB 1109	Lighting associated with the Project will be subject to energy efficiency requirements adopted pursuant to AB 1109. Enacted in 2007, AB 1109 required the CEC to adopt minimum energy efficiency standards for general purpose lighting, to reduce electricity consumption 50% for indoor residential lighting and 25% for indoor commercial lighting.
Bicycle and Vehicle Parking	CALGreen Code	The Project will be required to provide compliant bicycle parking, fuel-efficient vehicle parking, and electric vehicle charging spaces (CALGreen Code Sections 5.106.4, 5.106.5.1, 5.106.5.3)
	California Energy Code	The Project is also subject to parking requirements contained in Title 24, Party 6. For example, parking capacity is to meet but not exceed minimum local zoning requirements, and the Project should employ approved strategies to reduce parking capacity (Title 24, Part 6, section 106.6)
Landscaping	CALGreen Code	The CALGreen Code requires and has further voluntary provisions for: - A water budget for landscape irrigation use; - For new water service, separate meters or submeters must be installed for indoor and outdoor potable water use for landscaped areas of 1,000-5,000 square feet; - Provide water-efficient landscape design that reduces use of potable water beyond initial requirements for plant installation and establishment
	Model Water Efficient Landscaping Ordinance	The model ordinance promotes efficient landscaping in new developments and establishes an outdoor water budget for new and renovated landscaped areas that are 500 square feet or larger. (CCR, Title 23, Division 2, Chapter 2.7.)

Table ~~15~~16
Applicable GHG-Related Laws and Regulations

Project Component	Applicable Laws/ Regulations	GHG Reduction Measures Required for Project
	Cap-and-Trade Program	Transportation fuels used in landscape maintenance equipment (e.g., gasoline) would be subject to the Cap-and-Trade Program. (See "Energy Use," below.)
Refrigerants	CARB Management of High GWP Refrigerants for Stationary Sources	Any refrigerants associated with the Project will be subject to CARB standards. CARB's Regulation for the Management of High GWP Refrigerants for Stationary Sources 1) reduces emissions of high-GWP refrigerants from leaky stationary, non-residential refrigeration equipment; 2) reduces emissions resulting from the installation and servicing of stationary refrigeration and air conditioning appliances using high-GWP refrigerants; and 3) requires verification GHG emission reductions. (CCR, Title 17, Division 3, Chapter 1, Subchapter 10, Article 4, Subarticle 5.1, Section 95380 et seq.)
Consumer Products	CARB High GWP GHGs in Consumer Products	All consumer products associated with the Project will be subject to CARB standards. CARB's consumer products regulations set VOC limits for numerous categories of consumer products, and limits the reactivity of the ingredients used in numerous categories of aerosol coating products (CCR, Title 17, Division 3, Chapter 1, Subchapter 8.5.)
Construction		
Use of Off-Road Diesel Engines, Vehicles, and Equipment	CARB In-Use Off-Road Diesel Vehicle Regulation	Any relevant vehicle or machine use associated with the Project will be subject to CARB standards. The CARB In-Use-Off-Road Diesel Vehicle Regulation applies to certain off-road diesel engines, vehicles, or equipment greater than 25 horsepower. The regulation: 1) imposes limits on idling, requires a written idling policy, and requires a disclosure when selling vehicles; 2) requires all vehicles to be reported to CARB (using the Diesel Off-Road Online Reporting System) and labeled; 3) restricts the adding of older vehicles into fleets starting on January 1, 2014; and 4) requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (i.e., exhaust retrofits). The requirements and compliance dates of the Off-Road regulation vary by fleet size, as defined by the regulation.
	Cap-and-Trade Program	Transportation fuels (e.g., gasoline) used in equipment operation would be subject to the Cap-and-Trade Program. (See "Energy Use," below.)
Greening New Construction	CALGreen Code	All new construction, including the Project, must comply with CALGreen Code, as discussed in more detail throughout this table. Adoption of the mandatory CALGreen Code standards for construction has been essential for improving the overall environmental performance of new buildings; it also sets voluntary targets for builders to exceed the mandatory requirements.

Table ~~15~~16
Applicable GHG-Related Laws and Regulations

Project Component	Applicable Laws/ Regulations	GHG Reduction Measures Required for Project
Construction Waste	CALGreen Code	The Project will be subject to CALGreen Code requirements for construction waste reduction, disposal, and recycling, such as a requirement to recycle and/or salvage for reuse a minimum of 50% of the non-hazardous construction waste in accordance with Section 5.408.1.1, 5.408.1.2, or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent.
Worker, vendor and truck vehicle trips (on-road vehicles)	Cap-and-Trade Program	Transportation fuels (e.g., gasoline) used in worker, vendor and truck vehicle trips would be subject to the Cap-and-Trade Program.
Solid Waste		
Solid Waste Management	Landfill Methane Control Measure	Waste associated with the Project will be disposed per state requirements for landfills, material recovery facilities, and transfer stations. Per the statewide GHG emissions inventory, the largest emissions from waste management sectors come from landfills, and are in the form of CH_4. In 2010, CARB adopted a regulation that reduces emissions from methane in landfills, primarily by requiring owners and operators of certain uncontrolled municipal solid waste landfills to install gas collection and control systems, and requires existing and newly installed gas and control systems to operate in an optimal manner. The regulation allows local air districts to voluntarily enter into a memorandum of understanding with CARB to implement and enforce the regulation and to assess fees to cover costs of implementation.
	Mandatory Commercial Recycling (AB 341)	AB 341 will require the Project, if it generates four cubic yards or more of commercial solid waste per week, to arrange for recycling services, using one of the following: self-haul; subscribe to a hauler(s); arranging for pickup of recyclable materials; subscribing to a recycling service that may include mixed waste processing that yields diversion results comparable to source separation. The Project will also be subject to local commercial solid waste recycling program required to be implemented by each jurisdiction under AB 341.
	CALGreen Code	The Project will be subject to CALGreen Code requirement to provide areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling (CALGreen Code Section 5.410.1)
Energy Use		
Electricity/Natural Gas Generation	Cap-and-Trade Program	Electricity and natural gas usage associated with the Project will be subject to the Cap-and-Trade Program. The rules came into effect on January 1, 2013, applying to large electric power plants and large industrial plants. In 2015, importers and distributors of fossil fuels were added to the Cap-and-Trade Program in the second phase. Specifically, on January 1, 2015, cap-and-trade compliance obligations were phased in for suppliers of natural gas,

Table ~~15~~16
Applicable GHG-Related Laws and Regulations

Project Component	Applicable Laws/ Regulations	GHG Reduction Measures Required for Project
		reformulated gasoline blendstock for oxygenate blending (RBOB), distillate fuel oils, and liquefied petroleum gas that meet or exceed specified emissions thresholds. The threshold that triggers a cap-and-trade compliance obligation for a fuel supplier is 25,000 metric tons or more of CO_2e annually from the GHG emissions that would result from full combustion or oxidation of quantities of fuels (including natural gas, RBOB, distillate fuel oil, liquefied petroleum gas, and blended fuels that contain these fuels) imported and/or delivered to California.
Renewable Energy	California RPS (SB X1-2, SB 350, and SB 100)	Energy providers associated with the Project will be required to comply with RPS set by SB X1 2, SB 350, and SB 100. SB X1 2 requires investor-owned utilities, publicly-owned utilities, and electric service providers to increase purchases of renewable energy such that at least 33% of retail sales are procured from renewable energy resources by December 31, 2020. In the interim, each entity was required to procure an average of 20% of renewable energy for the period of January 1, 2011 through December 31, 2013; and will be required to procure an average of 25% by December 31, 2016, and 33% by 2020. SB 350 requires retail sellers and publicly owned utilities to procure 50% of their electricity from eligible renewable energy resources by 2030. SB 100 increased the standards set forth in SB 350 establishing that 44% of the total electricity sold to retail customers in California per year by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030, be secured from qualifying renewable energy sources. SB 100 states that it is the policy of the state that eligible renewable energy resources and zero-carbon resources supply 100% of the retail sales of electricity to California by 2045.
	Million Solar Roofs Program (SB 1)	The Project will participate in California's energy market, which is affected by implementation of the Million Solar Roofs Program. As part of Governor Schwarzenegger's Million Solar Roofs Program, California has set a goal to install 3,000 megawatts of new, solar capacity through 2016. The Million Solar Roofs Program is a ratepayer-financed incentive program aimed at transforming the market for rooftop solar systems by driving down costs over time.
	California Solar Initiative- Thermal Program	The Project will participate in California's energy market, which is affected by implementation of the California Solar Initiative - Thermal Program. The program offers cash rebates of up to $4,366 on solar water heating systems for single-family residential customers. Multifamily and Commercial properties qualify for rebates of up to $800,000 on solar water heating systems and eligible solar pool heating systems qualify for rebates of up to $500,000. Funding for the California Solar Initiative-Thermal program comes from ratepayers of Pacific Gas & Electric, SCE, Southern California Gas Company, and San Diego Gas &

Table ~~15~~16
Applicable GHG-Related Laws and Regulations

Project Component	Applicable Laws/ Regulations	GHG Reduction Measures Required for Project
		Electric. The rebate program is overseen by the CPUC as part of the California Solar Initiative.
	Waste Heat and Carbon Emissions Reduction Act (AB 1613, AB 2791)	The Project will participate in California's energy market, which is affected by implementation of the Waste Heat and Carbon Emissions Reduction Act. Originally enacted in 2007 and amended in 2008, this act directed the CEC, CPUC, and CARB to implement a program that would encourage the development of new combined heat and power systems in California with a generating capacity of not more than 20 megawatts, to increase combined heat and power use by 30,000 gigawatt-hour. The CPUC publicly owned electric utilities, and CEC duly established policies and procedures for the purchase of electricity from eligible combined heat and power systems. CEC guidelines require combined heat and power systems to be designed to reduce waste energy; have a minimum efficiency of 60%; have NO_x emissions of no more than 0.07 pounds per megawatt-hour; be sized to meet eligible customer generation thermal load; operate continuously in a manner that meets expected thermal load and optimizes efficient use of waste heat; and be cost effective, technologically feasible, and environmentally beneficial.
Vehicular/Mobile Sources		
General	SB 375 and SCAG RTP/SCS	The Project is consistent with SANDAG's adopted RTP/SCS, which CARB approved as meeting its regional GHG targets in 2016. See Table 16 for more details regarding the Project's consistency with SANDAGS RTP/SCS.
Fuel	Low Carbon Fuel Standard (LCFS)/ EO S-01-07	Auto trips associated with the Project will be subject to LCFS (EO S-01-07), which requires a 10% or greater reduction in the average fuel carbon intensity by 2020 and 20% by 2030 with a 2010 baseline for transportation fuels in California regulated by CARB. The program establishes a strong framework to promote the low carbon fuel adoption necessary to achieve the Governor's 2030 and 2050 GHG goals.
	Cap-and-Trade Program	Use of gasoline associated with the Project will be subject to the Cap-and-Trade Program. The rules came into effect on January 1, 2013, applying to large electric power plants and large industrial plants. In 2015, importers and distributors of fossil fuels were added to the Cap-and-Trade Program in the second phase. Specifically, on January 1, 2015, cap-and-trade compliance obligations were phased in for suppliers of natural gas, RBOB, distillate fuel oils, and liquefied petroleum gas that meet or exceed specified emissions thresholds. The threshold that triggers a cap-and-trade compliance obligation for a fuel supplier is 25,000 MT or more of CO_2e annually from the GHG emissions that would

Table ~~15~~16
Applicable GHG-Related Laws and Regulations

Project Component	Applicable Laws/ Regulations	GHG Reduction Measures Required for Project
		result from full combustion or oxidation of quantities of fuels (including natural gas, RBOB, distillate fuel oil, liquefied petroleum gas, and blended fuels that contain these fuels) imported and/or delivered to California.
Automotive Refrigerants	CARB Regulation for Small Containers of Automotive Refrigerant	Vehicles associated with the Project will be subject to CARB's Regulation for Small Containers of Automotive Refrigerant. (CCR, Title 17, Division 3, Chapter 1, Subchapter 10, Article 4, Subarticle 5, Section 95360 et seq.) The regulation applies to the sale, use, and disposal of small containers of automotive refrigerant with a GWP greater than 150. The regulation achieves emission reductions through implementation of four requirements: 1) use of a self-sealing valve on the container, 2) improved labeling instructions, 3) a deposit and recycling program for small containers, and 4) an education program that emphasizes best practices for vehicle recharging. This regulation went into effect on January 1, 2010 with a one-year sell-through period for containers manufactured before January 1, 2010. The target recycle rate is initially set at 90%, and rises to 95% beginning January 1, 2012.
Light-Duty Vehicles	AB 1493 (or the Pavley Standard)	Cars that drive to and from the Project will be subject to AB 1493, which directed CARB to adopt a regulation requiring the maximum feasible and cost effective reduction of GHG emissions from new passenger vehicles. Pursuant to AB 1493, CARB adopted regulations that establish a declining fleet average standard for CO_2, CH_4, N_2O, and HFCs (air conditioner refrigerants) in new passenger vehicles and light-duty trucks beginning with the 2009 model year and phased-in through the 2016 model year. These standards are divided into those applicable to lighter and those applicable to heavier portions of the passenger vehicle fleet. The regulations will reduce "upstream" smog-forming emissions from refining, marketing, and distribution of fuel.
	Advanced Clean Car and ZEV Programs	Cars that drive to and from the Project will be subject to the Advanced Clean Car and ZEV Programs. In January 2012, CARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot and global warming gases and requirements for greater numbers of zero-emission vehicles into a single package of standards called Advanced Clean Cars. By 2025, new automobiles will emit 34% fewer global warming gases and 75% fewer smog-forming emissions. The ZEV program will act as the focused technology of the Advanced Clean Cars program by requiring manufacturers to produce increasing numbers of ZEVs and plug-in hybrid electric vehicles in the 2018-2025 model years.

Table ~~15~~16

Applicable GHG-Related Laws and Regulations

Project Component	Applicable Laws/ Regulations	GHG Reduction Measures Required for Project
	Tire Inflation Regulation	Cars that drive to and from the Project will be subject to the CARB Tire Inflation Regulation, which took effect on September 1, 2010, and applies to vehicles with a gross vehicle weight rating of 10,000 pounds or less. Under this regulation, automotive service providers must, inter alia, check and inflate each vehicle's tires to the recommended tire pressure rating, with air or nitrogen, as appropriate, at the time of performing any automotive maintenance or repair service, and to keep a copy of the service invoice for a minimum of three years, and make the vehicle service invoice available to the CARB, or its authorized representative upon request.
	EPA and NHTSA GHG and CAFE standards.	Mobile sources that travel to and from the Project would be subject to EPA and NHTSA GHG and CAFE standards for passenger cars, light-duty trucks, and medium-duty passenger vehicles. (75 FR 25324–25728 and 77 FR 62624–63200.)
Medium- and Heavy-Duty Vehicles	CARB In-Use On-Road Heavy-Duty Diesel Vehicles Regulation (Truck and Bus Regulation)	Any heavy-duty trucks associated with the Project will be subject to CARB standards. The regulation requires diesel trucks and buses that operate in California to be upgraded to reduce emissions. Newer heavier trucks and buses must meet PM filter requirements. Lighter and older heavier trucks must be replaced starting January 1, 2015. By January 1, 2023, nearly all trucks and buses will need to have 2010 model year engines or equivalent. The regulation applies to nearly all privately and federally owned diesel fueled trucks and buses and to privately and publicly owned school buses with a gross vehicle weight rating greater than 14,000 pounds.
	CARB In-Use Off-Road Diesel Vehicle Regulation	Any relevant vehicle or machine use associated with the Project will be subject to CARB standards. The CARB In-Use-Off-Road Diesel Vehicle Regulation applies to certain off-road diesel engines, vehicles, or equipment greater than 25 horsepower. The regulations: 1) imposes limits on idling, requires a written idling policy, and requires a disclosure when selling vehicles; 2) requires all vehicles to be reported to CARB (using the Diesel Off-Road Online Reporting System) and labeled; 3) restricts the adding of older vehicles into fleets starting on January 1, 2014; and 4) requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (i.e., exhaust retrofits). The requirements and compliance dates of the Off-Road regulation vary by fleet size, as defined by the regulation.
	Heavy-Duty Vehicle GHG Emission Reduction Regulation	Any relevant vehicle or machine use associated with the Project will be subject to CARB standards. The CARB Heavy-Duty Vehicle GHG Emission Reduction Regulation applies to heavy-duty tractors that pull 53-foot or

Table ~~15~~16
Applicable GHG-Related Laws and Regulations

Project Component	Applicable Laws/ Regulations	GHG Reduction Measures Required for Project
		longer box-type trailers. (CCR, Title 17, Division 3, Chapter 1, Subchapter 10, Article 4, Subarticle 1, Section 95300 et seq.) Fuel efficiency is improved through improvements in tractor and trailer aerodynamics and the use of low rolling resistance tires.
	EPA and NHTSA GHG and CAFE standards.	Mobile sources that travel to and from the Project would be subject to EPA and NHTSA GHG and CAFE standards for medium- and heavy-duty vehicles. (76 FR 57106–57513.)
Water Use		
Water Use Efficiency	Emergency State Water Board Regulations	Water use associated with the Project will be subject to emergency regulations. On May 18, 2016, partially in response to EO B-27-16, the State Water Board adopted emergency water use regulations (CCR, title 23, Section 864.5 and amended and re-adopted Sections 863, 864, 865, and 866). The regulation directs the State Water Board, Department of Water Resources, and CPUC to implement rates and pricing structures to incentivize water conservation, and calls upon water suppliers, homeowners' associations, California businesses, landlords and tenants, and wholesale water agencies to take stronger conservation measures.
	EO B-37-16	Water use associated with the Project will be subject to Emergency EO B-37-16, issued May 9, 2016, which directs the State Water Resources Control Board to adjust emergency water conservation regulations through the end of January 2017 to reflect differing water supply conditions across the state. The Water Board must also develop a proposal to achieve a mandatory reduction of potable urban water usage that builds off the mandatory 25% reduction called for in EO B-29-15. The Water Board and Department of Water Resources will develop new, permanent water use targets to which the Project will be subject. The Water Board will permanently prohibit water-wasting practices such as hosing off sidewalks, driveways, and other hardscapes; washing automobiles with hoses not equipped with a shut-off nozzle; using non-recirculated water in a fountain or other decorative water feature; watering lawns in a manner that causes runoff, or within 48 hours after measurable precipitation; and irrigating ornamental turf on public street medians.
	EO B-40-17	EO B-40-17 lifted the drought emergency in all California counties except Fresno, Kings, Tulare, and Tuolumne. It also rescinds EO B-29-15, but expressly states that EO B-37-16 remains in effect and directs the State Water Resources Control Board to continue development of permanent prohibitions on wasteful water use to which the Project will be subject.
	SB X7-7	Water provided to the Project will be affected by SB X7-7's requirements for water suppliers. SB X7-7, or the Water Conservation Act of 2009, requires all water suppliers to increase water use efficiency. It also requires,

Table ~~15~~16
Applicable GHG-Related Laws and Regulations

Project Component	Applicable Laws/ Regulations	GHG Reduction Measures Required for Project
		among other things, that the Department of Water Resources, in consultation with other state agencies, develop a single standardized water use reporting form, which would be used by both urban and agricultural water agencies.
	CALGreen Code	The Project is subject to CALGreen Code's water efficiency standards, including a required 20% mandatory reduction in indoor water use. (CALGreen Code, Division 4.3.)
	California Water Code, Division 6, Part 2.10, Sections 10910–10915.	Development and approval of the Project requires the development of a Project-specific Water Supply Assessment.
	Cap-and-Trade Program	Electricity usage associated with water and wastewater supply, treatment and distribution would be subject to the Cap-and-Trade Program.
	California RPS (SB X1-2, SB 350, SB 100)	Electricity usage associated with water and wastewater supply, treatment and distribution associated with the Project will be required to comply with RPS set by SB X1-2, SB 350, and SB 100.

Notes: AB = Assembly Bill; CARB = California Air Resources Board; CEC = California Energy Commission; CFC = chlorofluorocarbon; CH4 = methane; CO2 = carbon dioxide; CO_2e = carbon dioxide equivalent; CPUC = California Public Utilities Commission; EO = Executive Order; EPA = Environmental Protection Agency; GHG = greenhouse gas; GWP = global warming potential; HCFC = hydrochlorofluorocarbon; HFC = hydrofluorocarbon; gpm = gallons per minute; MT = metric tons; N2O = nitrous oxide; NHTSA = National Highway Traffic Safety Administration; PM = particulate matter; RPS = Renewable Portfolio Standard; RTP/SCS = Regional Transportation Plan/Sustainable Communities Strategy; SB = Senate Bill; SCAG = Southern California Association of Governments; VOC = volatile organic compound; ZEV = zero emission vehicle.

As shown, the Project would be consistent with and would not conflict with the applicable GHG-reducing strategies of the state.

Consistency with SANDAG's San Diego Forward: The Regional Plan

Regarding consistency with SANDAG's Regional Plan, the Project would include site design elements and project design features developed to support the policy objectives of the RTP/SCS and SB 375.

SANDAG's Regional Plan is a regional growth-management strategy that targets per-capita GHG reduction from passenger vehicles and light-duty trucks in the San Diego region. The Regional Plan will integrate land use and transportation strategies to meet GHG emissions reduction targets that are forecasted to achieve the state's 2035 and 2050 GHG reduction goals. The State's targets for San Diego County are a 7% reduction per capita in GHG emissions by 2020 compared to 2005 and a 13% reduction by 2035. The 2050 RTP would exceed the State's 2020 goal and meet the 2035 reduction goals (SANDAG 2015). Although the State has not set a 2050 reduction goal, SANDAG has established a 10% reduction per capita in GHG emissions by 2050.

Implementation of the Project would result in an increase in 192 residential units. The most recent Regional Housing Needs Assessment from SANDAG stated that Carlsbad needs to build 430 units per year from 2021 through 2029 (SANDAG 2019). Furthermore, the City projected a deficit of 1,062 very-low and low income units and 238 moderate and above moderate income units (City of Carlsbad 2019a). The Project is expected to bring 192 units to market in 2022, of which 42 will be affordable. Therefore, the Project would not conflict with SANDAG's regional growth forecast for the City.

Table ~~16~~ 17 illustrates the Project's consistency with all applicable goals and policies of SANDAG's Regional Plan (SANDAG 2015).

Table ~~16~~17
San Diego Forward: The Regional Plan Consistency Analysis

Category	Policy Objective or Strategy	Consistency Analysis
The Regional Plan – Policy Objectives		
Mobility Choices	Provide safe, secure, healthy, affordable, and convenient travel choices between the places where people live, work, and play.	*Consistent.* The Project incorporates smart growth and sustainable design principles in its development plan. More specifically, the Project's design puts people in areas that are more accessible to a range of transportation options, including public transit. The design and locational attributes of the Project positively emphasize particular commuting choices and convenient access to the rest of the City and the region, which will reduce the number of vehicle trips and overall VMT.
Mobility Choices	Take advantage of new technologies to make the transportation system more efficient and environmentally friendly.	*Consistent.* The Project includes EV charging stations to support EV adoption. Additionally, the Project would not impair SANDAG's ability to employ new technologies to make travel more reliable and convenient.
Habitat and Open Space Preservation	Focus growth in areas that are already urbanized, allowing the region to set aside and restore more open space in our less developed areas.	*Consistent*. The Project would be located close to major urban and employment centers. As such, the Project proposes to develop future housing opportunities in an infill location that capitalizes on existing infrastructure rather than other non-developed areas—including open space areas, sensitive habitats, or areas otherwise constrained due to topography, flooding, or other factors.
Healthy and Complete Communities	Create great places for everyone to live, work, and play.	*Consistent*. The Project proposes new residential development in an infill location that would integrate residents into the existing community. The Project's location

Table ~~16~~17

San Diego Forward: The Regional Plan Consistency Analysis

Category	Policy Objective or Strategy	Consistency Analysis
		allows ease of access to regional shopping, entertainment, and employment.
Healthy and Complete Communities	Connect communities through a variety of transportation choices that promote healthy lifestyles, including walking and biking.	*Consistent*. The Project's location would provide residents with the opportunity to access employment, recreational, and commercial uses via multiple modes of transportation. The Project would also encourage non-vehicular modes of transportation through its proximate location to nearby amenities.
Environmental Stewardship	Make transportation investments that result in cleaner air, environmental protection, conservation, efficiency, and sustainable living.	*Consistent*. While the Project does not require a transportation investment from SANDAG, it is noted that the Project would include numerous design attributes that reduce natural gas consumption, promote building electrification, enhance the efficiency of energy and water consumption, and facilitate the use of zero emission vehicles.
Environmental Stewardship	Support energy programs that promote sustainability.	*Consistent*. The Project would include numerous design attributes that reduce natural gas consumption, promote building electrification, enhance the efficiency of energy and water consumption, and facilitate the use of zero emission vehicles.
Sustainable Communities Strategy – Strategies		
Strategy #1	Focus housing and job growth in urbanized areas where there is existing and planned transportation infrastructure, including transit.	*Consistent.* The Project would be located on an infill site close to major urban and employment centers. As discussed above, the Project site is located along Palomar Airport Road, which is served by NCTD Bus Route 445. The closest Route 445 stop is located at Palomar Airport Road/Palomar Oaks Way, approximately 240 feet from the Project site. Route 445 provides direct connections to the Coaster's Carlsbad Poinsettia station and the Sprinter's Palomar College station, providing Project residents with transit network opportunities to facilitate their travel.
Strategy #2	Protect the environment and help ensure the success of smart growth land use policies by preserving sensitive habitat, open space, cultural resources, and farmland.	*Consistent.* The Project would be located on an infill site close to major urban and employment centers. As such, the Project proposes to develop future housing opportunities in an infill location that capitalizes on existing infrastructure rather than other non-developed areas—including open space areas, sensitive habitats, or

Table ~~16~~17
San Diego Forward: The Regional Plan Consistency Analysis

Category	Policy Objective or Strategy	Consistency Analysis
		areas otherwise constrained due to topography, flooding, or other factors.
Strategy #3	Invest in a transportation network that gives people transportation choices and reduces greenhouse gas emissions.	*Consistent.* The Project would help reduce greenhouse gas emissions from vehicles in the region compared to a non-infill project. The closest Route 445 stop is located at Palomar Airport Road/Palomar Oaks Way, approximately 240 feet from the Project site. Route 445 provides direct connections to the Coaster's Carlsbad Poinsettia station and the Sprinter's Palomar College station, providing Project residents with transit network opportunities to facilitate their travel.
Strategy #4	Address the housing needs of all economic segments of the population.	*Consistent.* The Project includes both market rate and affordable units to support all economic segments of the population.

Source: SANDAG 2015.
Notes: City = City of Carlsbad; Project = West Oaks Project; VMT = vehicle miles traveled; SANDAG = San Diego Association of Governments; EV = electric vehicle.

As shown in Table ~~16~~17, the Project would be consistent with all applicable Regional Plan policy objectives or strategies. SANDAG worked with the local jurisdictions to identify Regional Housing Needs Assessment allocation options that meet the four goals of housing element law (Government Code Section 65484[d][1]–[4]) within the Regional Plan. The second of the four objectives of the SANDAG Regional Housing Needs Assessment is to promote infill development and socioeconomic equity, the protection of environmental and agricultural resources, and the encouragement of efficient development patterns. Also, one of the key achievements projected for the Regional Plan is for nearly three-quarters of multifamily housing to be built on redevelopment or infill sites. The Project would be consistent with that goal as it would be developed on an infill site.

In summary, the Project is consistent with the statewide GHG reduction goals addressed in CARB's 2008 and 2017 Scoping Plans and SANDAG's Regional Plan. The Project's consistency stems from its location on an urban, infill site; its numerous design attributes that serve to reduce natural gas consumption, promote building electrification, and achieve other efficiencies in the consumption of energy, water and transportation fuels; and, its provision of residential opportunities (including affordable units) in a jurisdiction with a jobs/housing ratio that evidences the need for more housing. Therefore, the Project would be consistent with the statewide GHG reduction goals set forth in AB 32 and SB 32 and demonstrate progress toward attaining the 2050 reduction goals within EO S-3-05. Impacts would be **less than significant**.

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APPENDIX A

CalEEMod Outputs and Estimated Emissions

West Oaks Multi-Family Housing Project

San Diego County APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	2.71	1000sqft	0.06	2,705.00	0
Parking Lot	382.00	Space	3.24	152,800.00	0
City Park	2.93	Acre	2.93	127,630.80	0
Recreational Swimming Pool	1.80	1000sqft	0.04	1,800.00	0
Apartments Mid Rise	192.00	Dwelling Unit	1.63	192,000.00	549

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2022
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	448.3	**CH4 Intensity (lb/MWhr)**	0.018	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - GHG intensity based on SDG&E energy mix.

Land Use - Based on site plan.

Construction Phase - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 2.6.2 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Trips and VMT - CalEEMod defaults.

On-road Fugitive Dust - CalEEMod defaults.

Demolition - No demolition of structures anticipated for this project.

Grading - See Section 7.2.1 for Construction Details.

Architectural Coating - Applicant specified low-VOC, 5 g/L for interior and 50 g/L for exterior. The paving VOC is in accordance with SDAPCD Rule 67.0.1.

Vehicle Trips - Based on the Traffic Impact Analysis.

Vehicle Emission Factors - CalEEMod defaults.

Vehicle Emission Factors - CalEEMod defaults.

Vehicle Emission Factors - CalEEMod defaults.

Road Dust - CalEEMod defaults.

Woodstoves - There are no wood or natural gas burning stoves or fireplaces.

Consumer Products - CalEEMod defaults.

Area Coating - Applicant specified low-VOC, 5 g/L for interior and 50 g/L for exterior. The paving VOC is in accordance with SDAPCD Rule 67.0.1.

Landscape Equipment - CalEEMod defaults.

Energy Use - Includes electric water heaters and HVAC.

Water And Wastewater - CalEEMod defaults.

Solid Waste - CalEEMod defaults.

Land Use Change - This was calculated outside of CalEEMod.

Sequestration - This was calculated outside of CalEEMod.

Construction Off-road Equipment Mitigation - Fugitive dust mitigation in accordance with SDAPCD Rule 55.

Mobile Land Use Mitigation - Increased density, accessibility, transit accessbility, and below market rate units.

Mobile Commute Mitigation - No commute mitigation.

Area Mitigation - It was conservatively assumed 5 g/L for interior and 50 g/L for exterior.

Energy Mitigation - LED or other efficient lighting in 75% of the luminaires and Energy Star appliances.

Water Mitigation - Low flow fixtures and water-use efficient irrigation.

Waste Mitigation - In accordance with AB 341.

Operational Off-Road Equipment -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps - This does not apply to this project.

Stationary Sources - Process Boilers - Does not apply to this project.

Stationary Sources - User Defined - Does not apply to this project.

Stationary Sources - Emergency Generators and Fire Pumps EF - This does not apply to this project.

Stationary Sources - Process Boilers EF - Does not apply to this project.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	5.00
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	50.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	5.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	50
tblAreaCoating	Area_EF_Nonresidential_Interior	250	5
tblAreaCoating	Area_EF_Parking	250	100
tblAreaCoating	Area_EF_Residential_Exterior	250	50
tblAreaCoating	Area_EF_Residential_Interior	250	5
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	50	5
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True

tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	5	50
tblEnergyUse	LightingElect	741.44	0.00
tblEnergyUse	LightingElect	3.81	0.00
tblEnergyUse	NT24E	3,054.10	0.00
tblEnergyUse	NT24E	4.97	0.00
tblEnergyUse	NT24NG	4,180.00	0.00
tblEnergyUse	NT24NG	4.20	0.00
tblEnergyUse	T24E	209.39	7,389.69
tblEnergyUse	T24E	4.66	18.02
tblEnergyUse	T24NG	3,248.74	1,494.92
tblEnergyUse	T24NG	15.99	6.11
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	105.60	0.00
tblFireplaces	NumberNoFireplace	19.20	0.00
tblFireplaces	NumberWood	67.20	0.00
tblLandUse	LandUseSquareFeet	2,710.00	2,705.00
tblLandUse	LotAcreage	3.44	3.24
tblLandUse	LotAcreage	5.05	1.63
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00

tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.018
tblProjectCharacteristics	CO2IntensityFactor	720.49	448.3
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblTripsAndVMT	VendorTripNumber	67.00	46.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripNumber	258.00	204.00
tblTripsAndVMT	WorkerTripNumber	30.00	16.00
tblTripsAndVMT	WorkerTripNumber	52.00	42.00
tblVehicleTrips	ST_TR	6.39	6.00
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	ST_TR	9.10	0.00
tblVehicleTrips	SU_TR	5.86	6.00
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	13.60	0.00
tblVehicleTrips	WD_TR	6.65	6.00
tblVehicleTrips	WD_TR	1.89	0.00
tblVehicleTrips	WD_TR	11.03	0.00
tblVehicleTrips	WD_TR	33.82	0.00
tblWoodstoves	NumberCatalytic	9.60	0.00
tblWoodstoves	NumberNoncatalytic	9.60	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.6275	3.5968	3.3310	7.4100e-003	0.4229	0.1609	0.5838	0.1581	0.1501	0.3082	0.0000	662.4231	662.4231	0.1198	0.0000	665.4182
Maximum	**0.6275**	**3.5968**	**3.3310**	**7.4100e-003**	**0.4229**	**0.1609**	**0.5838**	**0.1581**	**0.1501**	**0.3082**	**0.0000**	**662.4231**	**662.4231**	**0.1198**	**0.0000**	**665.4182**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.6275	3.5968	3.3310	7.4100e-003	0.3017	0.1609	0.4626	0.1011	0.1501	0.2512	0.0000	662.4226	662.4226	0.1198	0.0000	665.4177
Maximum	**0.6275**	**3.5968**	**3.3310**	**7.4100e-003**	**0.3017**	**0.1609**	**0.4626**	**0.1011**	**0.1501**	**0.2512**	**0.0000**	**662.4226**	**662.4226**	**0.1198**	**0.0000**	**665.4177**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**28.67**	**0.00**	**20.77**	**36.04**	**0.00**	**18.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
4	**10-27-2020**	**1-26-2021**	0.4399	0.4399
5	**1-27-2021**	**4-26-2021**	1.0261	1.0261
6	**4-27-2021**	**7-26-2021**	0.8697	0.8697
7	**7-27-2021**	**9-30-2021**	0.6308	0.6308
		Highest	1.0261	1.0261

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.8440	0.0165	1.4307	8.0000e-005		7.9000e-003	7.9000e-003		7.9000e-003	7.9000e-003	0.0000	2.3357	2.3357	2.2600e-003	0.0000	2.3923
Energy	1.6400e-003	0.0140	6.3100e-003	9.0000e-005		1.1300e-003	1.1300e-003		1.1300e-003	1.1300e-003	0.0000	325.4962	325.4962	0.0127	3.0600e-003	326.7253
Mobile	0.3285	1.4698	3.9684	0.0140	1.2396	0.0117	1.2513	0.3319	0.0109	0.3429	0.0000	1,290.8322	1,290.8322	0.0670	0.0000	1,292.5071
Waste						0.0000	0.0000		0.0000	0.0000	20.5731	0.0000	20.5731	1.2158	0.0000	50.9691
Water						0.0000	0.0000		0.0000	0.0000	4.1553	61.1976	65.3529	0.4293	0.0106	79.2498
Total	**1.1741**	**1.5003**	**5.4055**	**0.0142**	**1.2396**	**0.0207**	**1.2603**	**0.3319**	**0.0200**	**0.3519**	**24.7284**	**1,679.8617**	**1,704.5901**	**1.7271**	**0.0137**	**1,751.8436**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.8440	0.0165	1.4307	8.0000e-005		7.9000e-003	7.9000e-003		7.9000e-003	7.9000e-003	0.0000	2.3357	2.3357	2.2600e-003	0.0000	2.3923
Energy	1.6400e-003	0.0140	6.3100e-003	9.0000e-005		1.1300e-003	1.1300e-003		1.1300e-003	1.1300e-003	0.0000	323.1690	323.1690	0.0126	3.0400e-003	324.3896
Mobile	0.2872	1.2198	3.0725	0.0101	0.8781	8.6500e-003	0.8867	0.2351	8.0700e-003	0.2432	0.0000	936.4238	936.4238	0.0513	0.0000	937.7058
Waste						0.0000	0.0000		0.0000	0.0000	10.2866	0.0000	10.2866	0.6079	0.0000	25.4845
Water						0.0000	0.0000		0.0000	0.0000	3.3242	52.6441	55.9683	0.3435	8.5300e-003	67.0994
Total	**1.1328**	**1.2503**	**4.5096**	**0.0103**	**0.8781**	**0.0177**	**0.8958**	**0.2351**	**0.0171**	**0.2522**	**13.6108**	**1,314.5725**	**1,328.1833**	**1.0176**	**0.0116**	**1,357.0716**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**3.51**	**16.66**	**16.57**	**27.19**	**29.16**	**14.67**	**28.93**	**29.16**	**14.29**	**28.32**	**44.96**	**21.75**	**22.08**	**41.08**	**15.42**	**22.53**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2021	1/14/2021	5	10	
2	Grading	Grading	1/15/2021	2/25/2021	5	30	
3	Trenching	Trenching	2/26/2021	3/11/2021	5	10	
4	Building Construction	Building Construction	3/12/2021	12/16/2021	5	200	
5	Paving	Paving	11/15/2021	12/10/2021	5	20	
6	Architectural Coating	Architectural Coating	11/22/2021	12/17/2021	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 3.24

Residential Indoor: 388,800; Residential Outdoor: 129,600; Non-Residential Indoor: 6,758; Non-Residential Outdoor: 2,253; Striped Parking Area: 9,168 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Trenching	Excavators	1	8.00	158	0.38
Trenching	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Trenching	Trenchers	1	8.00	78	0.50
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	3	8.00	130	0.42
Paving	Paving Equipment	3	8.00	132	0.36
Paving	Rollers	3	8.00	80	0.38
Paving	Signal Boards	1	8.00	6	0.82
Paving	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	204.00	46.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	12	16.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	42.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0194	0.2025	0.1058	1.9000e-004		0.0102	0.0102		9.4000e-003	9.4000e-003	0.0000	16.7179	16.7179	5.4100e-003	0.0000	16.8530
Total	**0.0194**	**0.2025**	**0.1058**	**1.9000e-004**	**0.0903**	**0.0102**	**0.1006**	**0.0497**	**9.4000e-003**	**0.0591**	**0.0000**	**16.7179**	**16.7179**	**5.4100e-003**	**0.0000**	**16.8530**

3.2 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1000e-004	2.2000e-004	2.2500e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.3000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.6305	0.6305	2.0000e-005	0.0000	0.6309
Total	**3.1000e-004**	**2.2000e-004**	**2.2500e-003**	**1.0000e-005**	**7.2000e-004**	**1.0000e-005**	**7.3000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.6305**	**0.6305**	**2.0000e-005**	**0.0000**	**0.6309**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0407	0.0000	0.0407	0.0223	0.0000	0.0223	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0194	0.2025	0.1058	1.9000e-004		0.0102	0.0102		9.4000e-003	9.4000e-003	0.0000	16.7178	16.7178	5.4100e-003	0.0000	16.8530
Total	**0.0194**	**0.2025**	**0.1058**	**1.9000e-004**	**0.0407**	**0.0102**	**0.0509**	**0.0223**	**9.4000e-003**	**0.0317**	**0.0000**	**16.7178**	**16.7178**	**5.4100e-003**	**0.0000**	**16.8530**

3.2 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1000e-004	2.2000e-004	2.2500e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.3000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.6305	0.6305	2.0000e-005	0.0000	0.6309
Total	**3.1000e-004**	**2.2000e-004**	**2.2500e-003**	**1.0000e-005**	**7.2000e-004**	**1.0000e-005**	**7.3000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.6305**	**0.6305**	**2.0000e-005**	**0.0000**	**0.6309**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0629	0.6960	0.4632	9.3000e-004		0.0298	0.0298		0.0274	0.0274	0.0000	81.7425	81.7425	0.0264	0.0000	82.4034
Total	**0.0629**	**0.6960**	**0.4632**	**9.3000e-004**	**0.1301**	**0.0298**	**0.1599**	**0.0540**	**0.0274**	**0.0814**	**0.0000**	**81.7425**	**81.7425**	**0.0264**	**0.0000**	**82.4034**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0400e-003	7.4000e-004	7.4900e-003	2.0000e-005	2.4100e-003	2.0000e-005	2.4200e-003	6.4000e-004	2.0000e-005	6.5000e-004	0.0000	2.1016	2.1016	6.0000e-005	0.0000	2.1031
Total	**1.0400e-003**	**7.4000e-004**	**7.4900e-003**	**2.0000e-005**	**2.4100e-003**	**2.0000e-005**	**2.4200e-003**	**6.4000e-004**	**2.0000e-005**	**6.5000e-004**	**0.0000**	**2.1016**	**2.1016**	**6.0000e-005**	**0.0000**	**2.1031**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0586	0.0000	0.0586	0.0243	0.0000	0.0243	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0629	0.6960	0.4632	9.3000e-004		0.0298	0.0298		0.0274	0.0274	0.0000	81.7424	81.7424	0.0264	0.0000	82.4033
Total	**0.0629**	**0.6960**	**0.4632**	**9.3000e-004**	**0.0586**	**0.0298**	**0.0883**	**0.0243**	**0.0274**	**0.0517**	**0.0000**	**81.7424**	**81.7424**	**0.0264**	**0.0000**	**82.4033**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0400e-003	7.4000e-004	7.4900e-003	2.0000e-005	2.4100e-003	2.0000e-005	2.4200e-003	6.4000e-004	2.0000e-005	6.5000e-004	0.0000	2.1016	2.1016	6.0000e-005	0.0000	2.1031
Total	**1.0400e-003**	**7.4000e-004**	**7.4900e-003**	**2.0000e-005**	**2.4100e-003**	**2.0000e-005**	**2.4200e-003**	**6.4000e-004**	**2.0000e-005**	**6.5000e-004**	**0.0000**	**2.1016**	**2.1016**	**6.0000e-005**	**0.0000**	**2.1031**

3.4 Trenching - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.9900e-003	0.0378	0.0407	6.0000e-005		2.3600e-003	2.3600e-003		2.1700e-003	2.1700e-003	0.0000	5.1166	5.1166	1.6500e-003	0.0000	5.1580
Total	**3.9900e-003**	**0.0378**	**0.0407**	**6.0000e-005**		**2.3600e-003**	**2.3600e-003**		**2.1700e-003**	**2.1700e-003**	**0.0000**	**5.1166**	**5.1166**	**1.6500e-003**	**0.0000**	**5.1580**

3.4 Trenching - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	1.0000e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2802	0.2802	1.0000e-005	0.0000	0.2804
Total	**1.4000e-004**	**1.0000e-004**	**1.0000e-003**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2802**	**0.2802**	**1.0000e-005**	**0.0000**	**0.2804**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.9900e-003	0.0378	0.0407	6.0000e-005		2.3600e-003	2.3600e-003		2.1700e-003	2.1700e-003	0.0000	5.1166	5.1166	1.6500e-003	0.0000	5.1580
Total	**3.9900e-003**	**0.0378**	**0.0407**	**6.0000e-005**		**2.3600e-003**	**2.3600e-003**		**2.1700e-003**	**2.1700e-003**	**0.0000**	**5.1166**	**5.1166**	**1.6500e-003**	**0.0000**	**5.1580**

3.4 Trenching - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	1.0000e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2802	0.2802	1.0000e-005	0.0000	0.2804
Total	**1.4000e-004**	**1.0000e-004**	**1.0000e-003**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2802**	**0.2802**	**1.0000e-005**	**0.0000**	**0.2804**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2023	1.8749	1.7671	2.8800e-003		0.1025	0.1025		0.0963	0.0963	0.0000	248.2097	248.2097	0.0612	0.0000	249.7408
Total	**0.2023**	**1.8749**	**1.7671**	**2.8800e-003**		**0.1025**	**0.1025**		**0.0963**	**0.0963**	**0.0000**	**248.2097**	**248.2097**	**0.0612**	**0.0000**	**249.7408**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0142	0.4727	0.1261	1.2300e-003	0.0305	1.0000e-003	0.0315	8.8200e-003	9.6000e-004	9.7700e-003	0.0000	120.2624	120.2624	8.9300e-003	0.0000	120.4856
Worker	0.0709	0.0506	0.5097	1.5800e-003	0.1636	1.1600e-003	0.1648	0.0435	1.0700e-003	0.0445	0.0000	142.9066	142.9066	4.1000e-003	0.0000	143.0090
Total	**0.0851**	**0.5233**	**0.6357**	**2.8100e-003**	**0.1941**	**2.1600e-003**	**0.1963**	**0.0523**	**2.0300e-003**	**0.0543**	**0.0000**	**263.1690**	**263.1690**	**0.0130**	**0.0000**	**263.4946**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2023	1.8749	1.7671	2.8800e-003		0.1025	0.1025		0.0963	0.0963	0.0000	248.2094	248.2094	0.0612	0.0000	249.7405
Total	**0.2023**	**1.8749**	**1.7671**	**2.8800e-003**		**0.1025**	**0.1025**		**0.0963**	**0.0963**	**0.0000**	**248.2094**	**248.2094**	**0.0612**	**0.0000**	**249.7405**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0142	0.4727	0.1261	1.2300e-003	0.0305	1.0000e-003	0.0315	8.8200e-003	9.6000e-004	9.7700e-003	0.0000	120.2624	120.2624	8.9300e-003	0.0000	120.4856
Worker	0.0709	0.0506	0.5097	1.5800e-003	0.1636	1.1600e-003	0.1648	0.0435	1.0700e-003	0.0445	0.0000	142.9066	142.9066	4.1000e-003	0.0000	143.0090
Total	**0.0851**	**0.5233**	**0.6357**	**2.8100e-003**	**0.1941**	**2.1600e-003**	**0.1963**	**0.0523**	**2.0300e-003**	**0.0543**	**0.0000**	**263.1690**	**263.1690**	**0.0130**	**0.0000**	**263.4946**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0232	0.2353	0.2680	4.1000e-004		0.0125	0.0125		0.0116	0.0116	0.0000	35.9420	35.9420	0.0115	0.0000	36.2302
Paving	4.2400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0274**	**0.2353**	**0.2680**	**4.1000e-004**		**0.0125**	**0.0125**		**0.0116**	**0.0116**	**0.0000**	**35.9420**	**35.9420**	**0.0115**	**0.0000**	**36.2302**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2000e-004	4.1100e-003	1.1000e-003	1.0000e-005	2.7000e-004	1.0000e-005	2.7000e-004	8.0000e-005	1.0000e-005	8.0000e-005	0.0000	1.0458	1.0458	8.0000e-005	0.0000	1.0477
Worker	5.6000e-004	4.0000e-004	4.0000e-003	1.0000e-005	1.2800e-003	1.0000e-005	1.2900e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.1208	1.1208	3.0000e-005	0.0000	1.1216
Total	**6.8000e-004**	**4.5100e-003**	**5.1000e-003**	**2.0000e-005**	**1.5500e-003**	**2.0000e-005**	**1.5600e-003**	**4.2000e-004**	**2.0000e-005**	**4.3000e-004**	**0.0000**	**2.1666**	**2.1666**	**1.1000e-004**	**0.0000**	**2.1693**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0232	0.2353	0.2680	4.1000e-004		0.0125	0.0125		0.0116	0.0116	0.0000	35.9420	35.9420	0.0115	0.0000	36.2301
Paving	4.2400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0274**	**0.2353**	**0.2680**	**4.1000e-004**		**0.0125**	**0.0125**		**0.0116**	**0.0116**	**0.0000**	**35.9420**	**35.9420**	**0.0115**	**0.0000**	**36.2301**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2000e-004	4.1100e-003	1.1000e-003	1.0000e-005	2.7000e-004	1.0000e-005	2.7000e-004	8.0000e-005	1.0000e-005	8.0000e-005	0.0000	1.0458	1.0458	8.0000e-005	0.0000	1.0477
Worker	5.6000e-004	4.0000e-004	4.0000e-003	1.0000e-005	1.2800e-003	1.0000e-005	1.2900e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.1208	1.1208	3.0000e-005	0.0000	1.1216
Total	**6.8000e-004**	**4.5100e-003**	**5.1000e-003**	**2.0000e-005**	**1.5500e-003**	**2.0000e-005**	**1.5600e-003**	**4.2000e-004**	**2.0000e-005**	**4.3000e-004**	**0.0000**	**2.1666**	**2.1666**	**1.1000e-004**	**0.0000**	**2.1693**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2199					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9200e-003	0.0204	0.0242	4.0000e-005		1.2500e-003	1.2500e-003		1.2500e-003	1.2500e-003	0.0000	3.4043	3.4043	2.3000e-004	0.0000	3.4102
Total	**0.2228**	**0.0204**	**0.0242**	**4.0000e-005**		**1.2500e-003**	**1.2500e-003**		**1.2500e-003**	**1.2500e-003**	**0.0000**	**3.4043**	**3.4043**	**2.3000e-004**	**0.0000**	**3.4102**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4600e-003	1.0400e-003	0.0105	3.0000e-005	3.3700e-003	2.0000e-005	3.3900e-003	8.9000e-004	2.0000e-005	9.2000e-004	0.0000	2.9422	2.9422	8.0000e-005	0.0000	2.9443
Total	**1.4600e-003**	**1.0400e-003**	**0.0105**	**3.0000e-005**	**3.3700e-003**	**2.0000e-005**	**3.3900e-003**	**8.9000e-004**	**2.0000e-005**	**9.2000e-004**	**0.0000**	**2.9422**	**2.9422**	**8.0000e-005**	**0.0000**	**2.9443**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2199					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9200e-003	0.0204	0.0242	4.0000e-005		1.2500e-003	1.2500e-003		1.2500e-003	1.2500e-003	0.0000	3.4043	3.4043	2.3000e-004	0.0000	3.4102
Total	**0.2228**	**0.0204**	**0.0242**	**4.0000e-005**		**1.2500e-003**	**1.2500e-003**		**1.2500e-003**	**1.2500e-003**	**0.0000**	**3.4043**	**3.4043**	**2.3000e-004**	**0.0000**	**3.4102**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4600e-003	1.0400e-003	0.0105	3.0000e-005	3.3700e-003	2.0000e-005	3.3900e-003	8.9000e-004	2.0000e-005	9.2000e-004	0.0000	2.9422	2.9422	8.0000e-005	0.0000	2.9443
Total	**1.4600e-003**	**1.0400e-003**	**0.0105**	**3.0000e-005**	**3.3700e-003**	**2.0000e-005**	**3.3900e-003**	**8.9000e-004**	**2.0000e-005**	**9.2000e-004**	**0.0000**	**2.9422**	**2.9422**	**8.0000e-005**	**0.0000**	**2.9443**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Increase Transit Accessibility

Integrate Below Market Rate Housing

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2872	1.2198	3.0725	0.0101	0.8781	8.6500e-003	0.8867	0.2351	8.0700e-003	0.2432	0.0000	936.4238	936.4238	0.0513	0.0000	937.7058
Unmitigated	0.3285	1.4698	3.9684	0.0140	1.2396	0.0117	1.2513	0.3319	0.0109	0.3429	0.0000	1,290.8322	1,290.8322	0.0670	0.0000	1,292.5071

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	1,152.00	1,152.00	1152.00	3,289,309	2,330,010
City Park	0.00	0.00	0.00		
General Office Building	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Recreational Swimming Pool	0.00	0.00	0.00		
Total	1,152.00	1,152.00	1,152.00	3,289,309	2,330,010

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Recreational Swimming Pool	9.50	7.30	7.30	33.00	48.00	19.00	52	39	9

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
City Park	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
General Office Building	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
Parking Lot	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
Recreational Swimming Pool	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	306.9703	306.9703	0.0123	2.7400e-003	308.0946
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	309.2975	309.2975	0.0124	2.7600e-003	310.4304
NaturalGas Mitigated	1.6400e-003	0.0140	6.3100e-003	9.0000e-005		1.1300e-003	1.1300e-003		1.1300e-003	1.1300e-003	0.0000	16.1987	16.1987	3.1000e-004	3.0000e-004	16.2950
NaturalGas Unmitigated	1.6400e-003	0.0140	6.3100e-003	9.0000e-005		1.1300e-003	1.1300e-003		1.1300e-003	1.1300e-003	0.0000	16.1987	16.1987	3.1000e-004	3.0000e-004	16.2950

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	287025	1.5500e-003	0.0132	5.6300e-003	8.0000e-005		1.0700e-003	1.0700e-003		1.0700e-003	1.0700e-003	0.0000	15.3167	15.3167	2.9000e-004	2.8000e-004	15.4078
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	16527.5	9.0000e-005	8.1000e-004	6.8000e-004	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.8820	0.8820	2.0000e-005	2.0000e-005	0.8872
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.6400e-003**	**0.0140**	**6.3100e-003**	**8.0000e-005**		**1.1300e-003**	**1.1300e-003**		**1.1300e-003**	**1.1300e-003**	**0.0000**	**16.1987**	**16.1987**	**3.1000e-004**	**3.0000e-004**	**16.2950**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	287025	1.5500e-003	0.0132	5.6300e-003	8.0000e-005		1.0700e-003	1.0700e-003		1.0700e-003	1.0700e-003	0.0000	15.3167	15.3167	2.9000e-004	2.8000e-004	15.4078
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	16527.5	9.0000e-005	8.1000e-004	6.8000e-004	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.8820	0.8820	2.0000e-005	2.0000e-005	0.8872
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.6400e-003**	**0.0140**	**6.3100e-003**	**8.0000e-005**		**1.1300e-003**	**1.1300e-003**		**1.1300e-003**	**1.1300e-003**	**0.0000**	**16.1987**	**16.1987**	**3.1000e-004**	**3.0000e-004**	**16.2950**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	1.41882e +006	288.5107	0.0116	2.5700e-003	289.5674
City Park	0	0.0000	0.0000	0.0000	0.0000
General Office Building	48744.1	9.9119	4.0000e-004	9.0000e-005	9.9482
Parking Lot	53480	10.8749	4.4000e-004	1.0000e-004	10.9148
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000
Total		**309.2975**	**0.0124**	**2.7600e-003**	**310.4304**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	1.41882e+006	288.5107	0.0116	2.5700e-003	289.5674
City Park	0	0.0000	0.0000	0.0000	0.0000
General Office Building	48744.1	9.9119	4.0000e-004	9.0000e-005	9.9482
Parking Lot	42035.3	8.5477	3.4000e-004	8.0000e-005	8.5790
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000
Total		**306.9703**	**0.0123**	**2.7400e-003**	**308.0946**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.8440	0.0165	1.4307	8.0000e-005		7.9000e-003	7.9000e-003		7.9000e-003	7.9000e-003	0.0000	2.3357	2.3357	2.2600e-003	0.0000	2.3923
Unmitigated	0.8440	0.0165	1.4307	8.0000e-005		7.9000e-003	7.9000e-003		7.9000e-003	7.9000e-003	0.0000	2.3357	2.3357	2.2600e-003	0.0000	2.3923

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0220					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7785					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0434	0.0165	1.4307	8.0000e-005		7.9000e-003	7.9000e-003		7.9000e-003	7.9000e-003	0.0000	2.3357	2.3357	2.2600e-003	0.0000	2.3923
Total	**0.8440**	**0.0165**	**1.4307**	**8.0000e-005**		**7.9000e-003**	**7.9000e-003**		**7.9000e-003**	**7.9000e-003**	**0.0000**	**2.3357**	**2.3357**	**2.2600e-003**	**0.0000**	**2.3923**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0220					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7785					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0434	0.0165	1.4307	8.0000e-005		7.9000e-003	7.9000e-003		7.9000e-003	7.9000e-003	0.0000	2.3357	2.3357	2.2600e-003	0.0000	2.3923
Total	**0.8440**	**0.0165**	**1.4307**	**8.0000e-005**		**7.9000e-003**	**7.9000e-003**		**7.9000e-003**	**7.9000e-003**	**0.0000**	**2.3357**	**2.3357**	**2.2600e-003**	**0.0000**	**2.3923**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	55.9683	0.3435	8.5300e-003	67.0994
Unmitigated	65.3529	0.4293	0.0106	79.2498

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	12.5096 / 7.88647	54.9079	0.4097	0.0101	68.1534
City Park	0 / 3.49104	7.8869	3.2000e-004	7.0000e-005	7.9157
General Office Building	0.481658 / 0.29521	2.0951	0.0158	3.9000e-004	2.6050
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	0.106458 / 0.0652482	0.4631	3.4900e-003	9.0000e-005	0.5758
Total		**65.3529**	**0.4293**	**0.0106**	**79.2498**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	10.0077 / 7.4054	46.4029	0.3278	8.0900e-003	57.0083
City Park	0 / 3.27809	7.4058	3.0000e-004	7.0000e-005	7.4329
General Office Building	0.385327 / 0.277202	1.7688	0.0126	3.1000e-004	2.1770
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	0.0851661 / 0.0612681	0.3909	2.7900e-003	7.0000e-005	0.4812
Total		**55.9683**	**0.3436**	**8.5400e-003**	**67.0994**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	10.2866	0.6079	0.0000	25.4845
Unmitigated	20.5731	1.2158	0.0000	50.9691

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	88.32	17.9282	1.0595	0.0000	44.4163
City Park	0.25	0.0508	3.0000e-003	0.0000	0.1257
General Office Building	2.52	0.5115	0.0302	0.0000	1.2673
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	10.26	2.0827	0.1231	0.0000	5.1598
Total		**20.5731**	**1.2158**	**0.0000**	**50.9691**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	44.16	8.9641	0.5298	0.0000	22.2081
City Park	0.125	0.0254	1.5000e-003	0.0000	0.0629
General Office Building	1.26	0.2558	0.0151	0.0000	0.6337
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	5.13	1.0413	0.0615	0.0000	2.5799
Total		**10.2866**	**0.6079**	**0.0000**	**25.4845**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

West Oaks Multi-Family Housing Project

San Diego County APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	2.71	1000sqft	0.06	2,705.00	0
Parking Lot	382.00	Space	3.24	152,800.00	0
City Park	2.93	Acre	2.93	127,630.80	0
Recreational Swimming Pool	1.80	1000sqft	0.04	1,800.00	0
Apartments Mid Rise	192.00	Dwelling Unit	1.63	192,000.00	549

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2022
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	448.3	**CH4 Intensity (lb/MWhr)**	0.018	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - GHG intensity based on SDG&E energy mix.

Land Use - Based on site plan.

Construction Phase - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 2.6.2 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Trips and VMT - CalEEMod defaults.

On-road Fugitive Dust - CalEEMod defaults.

Demolition - No demolition of structures anticipated for this project.

Grading - See Section 7.2.1 for Construction Details.

Architectural Coating - Applicant specified low-VOC, 5 g/L for interior and 50 g/L for exterior. The paving VOC is in accordance with SDAPCD Rule 67.0.1.

Vehicle Trips - Based on the Traffic Impact Analysis.

Vehicle Emission Factors - CalEEMod defaults.

Vehicle Emission Factors - CalEEMod defaults.

Vehicle Emission Factors - CalEEMod defaults.

Road Dust - CalEEMod defaults.

Woodstoves - There are no wood or natural gas burning stoves or fireplaces.

Consumer Products - CalEEMod defaults.

Area Coating - Applicant specified low-VOC, 5 g/L for interior and 50 g/L for exterior. The paving VOC is in accordance with SDAPCD Rule 67.0.1.

Landscape Equipment - CalEEMod defaults.

Energy Use - Includes electric water heaters and HVAC.

Water And Wastewater - CalEEMod defaults.

Solid Waste - CalEEMod defaults.

Land Use Change - This was calculated outside of CalEEMod.

Sequestration - This was calculated outside of CalEEMod.

Construction Off-road Equipment Mitigation - Fugitive dust mitigation in accordance with SDAPCD Rule 55.

Mobile Land Use Mitigation - Increased density, accessibility, transit accessbility, and below market rate units.

Mobile Commute Mitigation - No commute mitigation.

Area Mitigation - It was conservatively assumed 5 g/L for interior and 50 g/L for exterior.

Energy Mitigation - LED or other efficient lighting in 75% of the luminaires and Energy Star appliances.

Water Mitigation - Low flow fixtures and water-use efficient irrigation.

Waste Mitigation - In accordance with AB 341.

Operational Off-Road Equipment -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps - This does not apply to this project.

Stationary Sources - Process Boilers - Does not apply to this project.

Stationary Sources - User Defined - Does not apply to this project.

Stationary Sources - Emergency Generators and Fire Pumps EF - This does not apply to this project.

Stationary Sources - Process Boilers EF - Does not apply to this project.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	5.00
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	50.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	5.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	50
tblAreaCoating	Area_EF_Nonresidential_Interior	250	5
tblAreaCoating	Area_EF_Parking	250	100
tblAreaCoating	Area_EF_Residential_Exterior	250	50
tblAreaCoating	Area_EF_Residential_Interior	250	5
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	50	5
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True

tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	5	50
tblEnergyUse	LightingElect	741.44	0.00
tblEnergyUse	LightingElect	3.81	0.00
tblEnergyUse	NT24E	3,054.10	0.00
tblEnergyUse	NT24E	4.97	0.00
tblEnergyUse	NT24NG	4,180.00	0.00
tblEnergyUse	NT24NG	4.20	0.00
tblEnergyUse	T24E	209.39	7,389.69
tblEnergyUse	T24E	4.66	18.02
tblEnergyUse	T24NG	3,248.74	1,494.92
tblEnergyUse	T24NG	15.99	6.11
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	105.60	0.00
tblFireplaces	NumberNoFireplace	19.20	0.00
tblFireplaces	NumberWood	67.20	0.00
tblLandUse	LandUseSquareFeet	2,710.00	2,705.00
tblLandUse	LotAcreage	3.44	3.24
tblLandUse	LotAcreage	5.05	1.63
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00

tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.018
tblProjectCharacteristics	CO2IntensityFactor	720.49	448.3
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblTripsAndVMT	VendorTripNumber	67.00	46.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripNumber	258.00	204.00
tblTripsAndVMT	WorkerTripNumber	30.00	16.00
tblTripsAndVMT	WorkerTripNumber	52.00	42.00
tblVehicleTrips	ST_TR	6.39	6.00
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	ST_TR	9.10	0.00
tblVehicleTrips	SU_TR	5.86	6.00
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	13.60	0.00
tblVehicleTrips	WD_TR	6.65	6.00
tblVehicleTrips	WD_TR	1.89	0.00
tblVehicleTrips	WD_TR	11.03	0.00
tblVehicleTrips	WD_TR	33.82	0.00
tblWoodstoves	NumberCatalytic	9.60	0.00
tblWoodstoves	NumberNoncatalytic	9.60	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	28.0984	49.9949	55.1421	0.1088	18.2141	2.4303	20.2596	9.9699	2.2668	11.8517	0.0000	10,663.8327	10,663.8327	2.1364	0.0000	10,717.2421
Maximum	**28.0984**	**49.9949**	**55.1421**	**0.1088**	**18.2141**	**2.4303**	**20.2596**	**9.9699**	**2.2668**	**11.8517**	**0.0000**	**10,663.8327**	**10,663.8327**	**2.1364**	**0.0000**	**10,717.2421**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	28.0984	49.9949	55.1421	0.1088	8.2777	2.4303	10.3232	4.5080	2.2668	6.3899	0.0000	10,663.8327	10,663.8327	2.1364	0.0000	10,717.2421
Maximum	**28.0984**	**49.9949**	**55.1421**	**0.1088**	**8.2777**	**2.4303**	**10.3232**	**4.5080**	**2.2668**	**6.3899**	**0.0000**	**10,663.8327**	**10,663.8327**	**2.1364**	**0.0000**	**10,717.2421**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.55**	**0.00**	**49.05**	**54.78**	**0.00**	**46.08**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	4.8690	0.1832	15.8971	8.4000e-004		0.0878	0.0878		0.0878	0.0878	0.0000	28.6073	28.6073	0.0277	0.0000	29.3008
Energy	8.9700e-003	0.0769	0.0346	4.9000e-004		6.2000e-003	6.2000e-003		6.2000e-003	6.2000e-003		97.8412	97.8412	1.8800e-003	1.7900e-003	98.4226
Mobile	1.9058	7.8334	22.4881	0.0803	6.9746	0.0641	7.0387	1.8640	0.0599	1.9239		8,164.5794	8,164.5794	0.4086		8,174.7943
Total	**6.7838**	**8.0936**	**38.4198**	**0.0816**	**6.9746**	**0.1581**	**7.1326**	**1.8640**	**0.1538**	**2.0179**	**0.0000**	**8,291.0279**	**8,291.0279**	**0.4382**	**1.7900e-003**	**8,302.5177**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	4.8690	0.1832	15.8971	8.4000e-004		0.0878	0.0878		0.0878	0.0878	0.0000	28.6073	28.6073	0.0277	0.0000	29.3008
Energy	8.9700e-003	0.0769	0.0346	4.9000e-004		6.2000e-003	6.2000e-003		6.2000e-003	6.2000e-003		97.8412	97.8412	1.8800e-003	1.7900e-003	98.4226
Mobile	1.6749	6.5356	17.1400	0.0582	4.9405	0.0474	4.9879	1.3204	0.0442	1.3646		5,922.2426	5,922.2426	0.3109		5,930.0141
Total	**6.5529**	**6.7958**	**33.0717**	**0.0596**	**4.9405**	**0.1414**	**5.0818**	**1.3204**	**0.1382**	**1.4586**	**0.0000**	**6,048.6911**	**6,048.6911**	**0.3405**	**1.7900e-003**	**6,057.7375**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**3.40**	**16.04**	**13.92**	**27.06**	**29.16**	**10.59**	**28.75**	**29.16**	**10.17**	**27.72**	**0.00**	**27.05**	**27.05**	**22.30**	**0.00**	**27.04**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2021	1/14/2021	5	10	
2	Grading	Grading	1/15/2021	2/25/2021	5	30	
3	Trenching	Trenching	2/26/2021	3/11/2021	5	10	
4	Building Construction	Building Construction	3/12/2021	12/16/2021	5	200	
5	Paving	Paving	11/15/2021	12/10/2021	5	20	
6	Architectural Coating	Architectural Coating	11/22/2021	12/17/2021	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 3.24

Residential Indoor: 388,800; Residential Outdoor: 129,600; Non-Residential Indoor: 6,758; Non-Residential Outdoor: 2,253; Striped Parking Area: 9,168 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Trenching	Excavators	1	8.00	158	0.38
Trenching	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Trenching	Trenchers	1	8.00	78	0.50
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	3	8.00	130	0.42
Paving	Paving Equipment	3	8.00	132	0.36
Paving	Rollers	3	8.00	80	0.38
Paving	Signal Boards	1	8.00	6	0.82
Paving	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	204.00	46.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	12	16.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	42.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.656 9	3,685.656 9	1.1920		3,715.457 3
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**		**3,685.656 9**	**3,685.656 9**	**1.1920**		**3,715.457 3**

3.2 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0623	0.0405	0.4774	1.4700e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		146.5994	146.5994	4.1800e-003		146.7040
Total	**0.0623**	**0.0405**	**0.4774**	**1.4700e-003**	**0.1479**	**1.0200e-003**	**0.1489**	**0.0392**	**9.4000e-004**	**0.0402**		**146.5994**	**146.5994**	**4.1800e-003**		**146.7040**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.1298	0.0000	8.1298	4.4688	0.0000	4.4688			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**8.1298**	**2.0445**	**10.1743**	**4.4688**	**1.8809**	**6.3497**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.2 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0623	0.0405	0.4774	1.4700e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		146.5994	146.5994	4.1800e-003		146.7040
Total	**0.0623**	**0.0405**	**0.4774**	**1.4700e-003**	**0.1479**	**1.0200e-003**	**0.1489**	**0.0392**	**9.4000e-004**	**0.0402**		**146.5994**	**146.5994**	**4.1800e-003**		**146.7040**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**8.6733**	**1.9853**	**10.6587**	**3.5965**	**1.8265**	**5.4230**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0449	0.5305	1.6300e-003	0.1643	1.1300e-003	0.1654	0.0436	1.0500e-003	0.0446		162.8882	162.8882	4.6500e-003		163.0044
Total	**0.0692**	**0.0449**	**0.5305**	**1.6300e-003**	**0.1643**	**1.1300e-003**	**0.1654**	**0.0436**	**1.0500e-003**	**0.0446**		**162.8882**	**162.8882**	**4.6500e-003**		**163.0044**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9030	0.0000	3.9030	1.6184	0.0000	1.6184			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**3.9030**	**1.9853**	**5.8883**	**1.6184**	**1.8265**	**3.4449**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0449	0.5305	1.6300e-003	0.1643	1.1300e-003	0.1654	0.0436	1.0500e-003	0.0446		162.8882	162.8882	4.6500e-003		163.0044
Total	**0.0692**	**0.0449**	**0.5305**	**1.6300e-003**	**0.1643**	**1.1300e-003**	**0.1654**	**0.0436**	**1.0500e-003**	**0.0446**		**162.8882**	**162.8882**	**4.6500e-003**		**163.0044**

3.4 Trenching - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7989	7.5613	8.1384	0.0117		0.4712	0.4712		0.4335	0.4335		1,128.0146	1,128.0146	0.3648		1,137.1351
Total	**0.7989**	**7.5613**	**8.1384**	**0.0117**		**0.4712**	**0.4712**		**0.4335**	**0.4335**		**1,128.0146**	**1,128.0146**	**0.3648**		**1,137.1351**

3.4 Trenching - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0277	0.0180	0.2122	6.5000e-004	0.0657	4.5000e-004	0.0662	0.0174	4.2000e-004	0.0179		65.1553	65.1553	1.8600e-003		65.2018
Total	**0.0277**	**0.0180**	**0.2122**	**6.5000e-004**	**0.0657**	**4.5000e-004**	**0.0662**	**0.0174**	**4.2000e-004**	**0.0179**		**65.1553**	**65.1553**	**1.8600e-003**		**65.2018**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7989	7.5613	8.1384	0.0117		0.4712	0.4712		0.4335	0.4335	0.0000	1,128.0146	1,128.0146	0.3648		1,137.1351
Total	**0.7989**	**7.5613**	**8.1384**	**0.0117**		**0.4712**	**0.4712**		**0.4335**	**0.4335**	**0.0000**	**1,128.0146**	**1,128.0146**	**0.3648**		**1,137.1351**

3.4 Trenching - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0277	0.0180	0.2122	6.5000e-004	0.0657	4.5000e-004	0.0662	0.0174	4.2000e-004	0.0179		65.1553	65.1553	1.8600e-003		65.2018
Total	**0.0277**	**0.0180**	**0.2122**	**6.5000e-004**	**0.0657**	**4.5000e-004**	**0.0662**	**0.0174**	**4.2000e-004**	**0.0179**		**65.1553**	**65.1553**	**1.8600e-003**		**65.2018**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Off-Road	2.0228	18.7492	17.6706	0.0288		1.0251	1.0251		0.9625	0.9625		2,736.0438	2,736.0438	0.6751		2,752.9212
Total	**2.0228**	**18.7492**	**17.6706**	**0.0288**		**1.0251**	**1.0251**		**0.9625**	**0.9625**		**2,736.0438**	**2,736.0438**	**0.6751**		**2,752.9212**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1391	4.6842	1.1937	0.0125	0.3114	9.8400e-003	0.3212	0.0896	9.4100e-003	0.0991		1,340.2190	1,340.2190	0.0958		1,342.6130
Worker	0.7056	0.4584	5.4109	0.0167	1.6758	0.0116	1.6874	0.4445	0.0107	0.4552		1,661.4594	1,661.4594	0.0474		1,662.6448
Total	**0.8447**	**5.1426**	**6.6046**	**0.0291**	**1.9872**	**0.0214**	**2.0086**	**0.5341**	**0.0201**	**0.5542**		**3,001.6783**	**3,001.6783**	**0.1432**		**3,005.2578**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0228	18.7492	17.6706	0.0288		1.0251	1.0251		0.9625	0.9625	0.0000	2,736.0438	2,736.0438	0.6751		2,752.9212
Total	**2.0228**	**18.7492**	**17.6706**	**0.0288**		**1.0251**	**1.0251**		**0.9625**	**0.9625**	**0.0000**	**2,736.0438**	**2,736.0438**	**0.6751**		**2,752.9212**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1391	4.6842	1.1937	0.0125	0.3114	9.8400e-003	0.3212	0.0896	9.4100e-003	0.0991		1,340.2190	1,340.2190	0.0958		1,342.6130
Worker	0.7056	0.4584	5.4109	0.0167	1.6758	0.0116	1.6874	0.4445	0.0107	0.4552		1,661.4594	1,661.4594	0.0474		1,662.6448
Total	**0.8447**	**5.1426**	**6.6046**	**0.0291**	**1.9872**	**0.0214**	**2.0086**	**0.5341**	**0.0201**	**0.5542**		**3,001.6783**	**3,001.6783**	**0.1432**		**3,005.2578**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3152	23.5297	26.8013	0.0411		1.2541	1.2541		1.1549	1.1549		3,961.9300	3,961.9300	1.2705		3,993.6935
Paving	0.4244					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.7397**	**23.5297**	**26.8013**	**0.0411**		**1.2541**	**1.2541**		**1.1549**	**1.1549**		**3,961.9300**	**3,961.9300**	**1.2705**		**3,993.6935**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0121	0.4073	0.1038	1.0800e-003	0.0271	8.6000e-004	0.0279	7.8000e-003	8.2000e-004	8.6100e-003		116.5408	116.5408	8.3300e-003		116.7490
Worker	0.0553	0.0360	0.4244	1.3100e-003	0.1314	9.1000e-004	0.1323	0.0349	8.4000e-004	0.0357		130.3105	130.3105	3.7200e-003		130.4035
Total	**0.0674**	**0.4433**	**0.5282**	**2.3900e-003**	**0.1585**	**1.7700e-003**	**0.1603**	**0.0427**	**1.6600e-003**	**0.0443**		**246.8513**	**246.8513**	**0.0121**		**247.1525**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3152	23.5297	26.8013	0.0411		1.2541	1.2541		1.1549	1.1549	0.0000	3,961.9300	3,961.9300	1.2705		3,993.6935
Paving	0.4244					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.7397**	**23.5297**	**26.8013**	**0.0411**		**1.2541**	**1.2541**		**1.1549**	**1.1549**	**0.0000**	**3,961.9300**	**3,961.9300**	**1.2705**		**3,993.6935**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0121	0.4073	0.1038	1.0800e-003	0.0271	8.6000e-004	0.0279	7.8000e-003	8.2000e-004	8.6100e-003		116.5408	116.5408	8.3300e-003		116.7490
Worker	0.0553	0.0360	0.4244	1.3100e-003	0.1314	9.1000e-004	0.1323	0.0349	8.4000e-004	0.0357		130.3105	130.3105	3.7200e-003		130.4035
Total	**0.0674**	**0.4433**	**0.5282**	**2.3900e-003**	**0.1585**	**1.7700e-003**	**0.1603**	**0.0427**	**1.6600e-003**	**0.0443**		**246.8513**	**246.8513**	**0.0121**		**247.1525**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Archit. Coating	21.9867					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2919	2.0358	2.4234	3.9600e-003		0.1255	0.1255		0.1255	0.1255		375.2641	375.2641	0.0258		375.9079
Total	**22.2786**	**2.0358**	**2.4234**	**3.9600e-003**		**0.1255**	**0.1255**		**0.1255**	**0.1255**		**375.2641**	**375.2641**	**0.0258**		**375.9079**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1453	0.0944	1.1140	3.4300e-003	0.3450	2.3800e-003	0.3474	0.0915	2.2000e-003	0.0937		342.0652	342.0652	9.7600e-003		342.3092
Total	**0.1453**	**0.0944**	**1.1140**	**3.4300e-003**	**0.3450**	**2.3800e-003**	**0.3474**	**0.0915**	**2.2000e-003**	**0.0937**		**342.0652**	**342.0652**	**9.7600e-003**		**342.3092**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	21.9867					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2919	2.0358	2.4234	3.9600e-003		0.1255	0.1255		0.1255	0.1255	0.0000	375.2641	375.2641	0.0258		375.9079
Total	**22.2786**	**2.0358**	**2.4234**	**3.9600e-003**		**0.1255**	**0.1255**		**0.1255**	**0.1255**	**0.0000**	**375.2641**	**375.2641**	**0.0258**		**375.9079**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1453	0.0944	1.1140	3.4300e-003	0.3450	2.3800e-003	0.3474	0.0915	2.2000e-003	0.0937		342.0652	342.0652	9.7600e-003		342.3092
Total	**0.1453**	**0.0944**	**1.1140**	**3.4300e-003**	**0.3450**	**2.3800e-003**	**0.3474**	**0.0915**	**2.2000e-003**	**0.0937**		**342.0652**	**342.0652**	**9.7600e-003**		**342.3092**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Increase Transit Accessibility

Integrate Below Market Rate Housing

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.6749	6.5356	17.1400	0.0582	4.9405	0.0474	4.9879	1.3204	0.0442	1.3646		5,922.2426	5,922.2426	0.3109		5,930.0141
Unmitigated	1.9058	7.8334	22.4881	0.0803	6.9746	0.0641	7.0387	1.8640	0.0599	1.9239		8,164.5794	8,164.5794	0.4086		8,174.7943

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	1,152.00	1,152.00	1152.00	3,289,309	2,330,010
City Park	0.00	0.00	0.00		
General Office Building	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Recreational Swimming Pool	0.00	0.00	0.00		
Total	1,152.00	1,152.00	1,152.00	3,289,309	2,330,010

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Recreational Swimming Pool	9.50	7.30	7.30	33.00	48.00	19.00	52	39	9

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
City Park	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
General Office Building	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
Parking Lot	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
Recreational Swimming Pool	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	8.9700e-003	0.0769	0.0346	4.9000e-004		6.2000e-003	6.2000e-003		6.2000e-003	6.2000e-003		97.8412	97.8412	1.8800e-003	1.7900e-003	98.4226
NaturalGas Unmitigated	8.9700e-003	0.0769	0.0346	4.9000e-004		6.2000e-003	6.2000e-003		6.2000e-003	6.2000e-003		97.8412	97.8412	1.8800e-003	1.7900e-003	98.4226

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	786.369	8.4800e-003	0.0725	0.0308	4.6000e-004		5.8600e-003	5.8600e-003		5.8600e-003	5.8600e-003		92.5140	92.5140	1.7700e-003	1.7000e-003	93.0638
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	45.281	4.9000e-004	4.4400e-003	3.7300e-003	3.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		5.3272	5.3272	1.0000e-004	1.0000e-004	5.3588
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**8.9700e-003**	**0.0769**	**0.0346**	**4.9000e-004**		**6.2000e-003**	**6.2000e-003**		**6.2000e-003**	**6.2000e-003**		**97.8412**	**97.8412**	**1.8700e-003**	**1.8000e-003**	**98.4226**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	0.786369	8.4800e-003	0.0725	0.0308	4.6000e-004		5.8600e-003	5.8600e-003		5.8600e-003	5.8600e-003		92.5140	92.5140	1.7700e-003	1.7000e-003	93.0638
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	0.045281	4.9000e-004	4.4400e-003	3.7300e-003	3.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		5.3272	5.3272	1.0000e-004	1.0000e-004	5.3588
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**8.9700e-003**	**0.0769**	**0.0346**	**4.9000e-004**		**6.2000e-003**	**6.2000e-003**		**6.2000e-003**	**6.2000e-003**		**97.8412**	**97.8412**	**1.8700e-003**	**1.8000e-003**	**98.4226**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Mitigated	4.8690	0.1832	15.8971	8.4000e-004		0.0878	0.0878		0.0878	0.0878	0.0000	28.6073	28.6073	0.0277	0.0000	29.3008
Unmitigated	4.8690	0.1832	15.8971	8.4000e-004		0.0878	0.0878		0.0878	0.0878	0.0000	28.6073	28.6073	0.0277	0.0000	29.3008

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory						lb/day							lb/day			
Architectural Coating	0.1205					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.2659					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4827	0.1832	15.8971	8.4000e-004		0.0878	0.0878		0.0878	0.0878		28.6073	28.6073	0.0277		29.3008
Total	**4.8690**	**0.1832**	**15.8971**	**8.4000e-004**		**0.0878**	**0.0878**		**0.0878**	**0.0878**	**0.0000**	**28.6073**	**28.6073**	**0.0277**	**0.0000**	**29.3008**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1205					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.2659					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4827	0.1832	15.8971	8.4000e-004		0.0878	0.0878		0.0878	0.0878		28.6073	28.6073	0.0277		29.3008
Total	**4.8690**	**0.1832**	**15.8971**	**8.4000e-004**		**0.0878**	**0.0878**		**0.0878**	**0.0878**	**0.0000**	**28.6073**	**28.6073**	**0.0277**	**0.0000**	**29.3008**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

West Oaks Multi-Family Housing Project

San Diego County APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	2.71	1000sqft	0.06	2,705.00	0
Parking Lot	382.00	Space	3.24	152,800.00	0
City Park	2.93	Acre	2.93	127,630.80	0
Recreational Swimming Pool	1.80	1000sqft	0.04	1,800.00	0
Apartments Mid Rise	192.00	Dwelling Unit	1.63	192,000.00	549

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2022
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	448.3	**CH4 Intensity (lb/MWhr)**	0.018	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - GHG intensity based on SDG&E energy mix.

Land Use - Based on site plan.

Construction Phase - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 2.6.2 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Trips and VMT - CalEEMod defaults.

On-road Fugitive Dust - CalEEMod defaults.

Demolition - No demolition of structures anticipated for this project.

Grading - See Section 7.2.1 for Construction Details.

Architectural Coating - Applicant specified low-VOC, 5 g/L for interior and 50 g/L for exterior. The paving VOC is in accordance with SDAPCD Rule 67.0.1.

Vehicle Trips - Based on the Traffic Impact Analysis.

Vehicle Emission Factors - CalEEMod defaults.

Vehicle Emission Factors - CalEEMod defaults.

Vehicle Emission Factors - CalEEMod defaults.

Road Dust - CalEEMod defaults.

Woodstoves - There are no wood or natural gas burning stoves or fireplaces.

Consumer Products - CalEEMod defaults.

Area Coating - Applicant specified low-VOC, 5 g/L for interior and 50 g/L for exterior. The paving VOC is in accordance with SDAPCD Rule 67.0.1.

Landscape Equipment - CalEEMod defaults.

Energy Use - Includes electric water heaters and HVAC.

Water And Wastewater - CalEEMod defaults.

Solid Waste - CalEEMod defaults.

Land Use Change - This was calculated outside of CalEEMod.

Sequestration - This was calculated outside of CalEEMod.

Construction Off-road Equipment Mitigation - Fugitive dust mitigation in accordance with SDAPCD Rule 55.

Mobile Land Use Mitigation - Increased density, accessibility, transit accessbility, and below market rate units.

Mobile Commute Mitigation - No commute mitigation.

Area Mitigation - It was conservatively assumed 5 g/L for interior and 50 g/L for exterior.

Energy Mitigation - LED or other efficient lighting in 75% of the luminaires and Energy Star appliances.

Water Mitigation - Low flow fixtures and water-use efficient irrigation.

Waste Mitigation - In accordance with AB 341.

Operational Off-Road Equipment -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps - This does not apply to this project.

Stationary Sources - Process Boilers - Does not apply to this project.

Stationary Sources - User Defined - Does not apply to this project.

Stationary Sources - Emergency Generators and Fire Pumps EF - This does not apply to this project.

Stationary Sources - Process Boilers EF - Does not apply to this project.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	5.00
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	50.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	5.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	50
tblAreaCoating	Area_EF_Nonresidential_Interior	250	5
tblAreaCoating	Area_EF_Parking	250	100
tblAreaCoating	Area_EF_Residential_Exterior	250	50
tblAreaCoating	Area_EF_Residential_Interior	250	5
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	50	5
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True

tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	5	50
tblEnergyUse	LightingElect	741.44	0.00
tblEnergyUse	LightingElect	3.81	0.00
tblEnergyUse	NT24E	3,054.10	0.00
tblEnergyUse	NT24E	4.97	0.00
tblEnergyUse	NT24NG	4,180.00	0.00
tblEnergyUse	NT24NG	4.20	0.00
tblEnergyUse	T24E	209.39	7,389.69
tblEnergyUse	T24E	4.66	18.02
tblEnergyUse	T24NG	3,248.74	1,494.92
tblEnergyUse	T24NG	15.99	6.11
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	105.60	0.00
tblFireplaces	NumberNoFireplace	19.20	0.00
tblFireplaces	NumberWood	67.20	0.00
tblLandUse	LandUseSquareFeet	2,710.00	2,705.00
tblLandUse	LotAcreage	3.44	3.24
tblLandUse	LotAcreage	5.05	1.63
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00

tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.018
tblProjectCharacteristics	CO2IntensityFactor	720.49	448.3
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblTripsAndVMT	VendorTripNumber	67.00	46.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripNumber	258.00	204.00
tblTripsAndVMT	WorkerTripNumber	30.00	16.00
tblTripsAndVMT	WorkerTripNumber	52.00	42.00
tblVehicleTrips	ST_TR	6.39	6.00
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	ST_TR	9.10	0.00
tblVehicleTrips	SU_TR	5.86	6.00
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	13.60	0.00
tblVehicleTrips	WD_TR	6.65	6.00
tblVehicleTrips	WD_TR	1.89	0.00
tblVehicleTrips	WD_TR	11.03	0.00
tblVehicleTrips	WD_TR	33.82	0.00
tblWoodstoves	NumberCatalytic	9.60	0.00
tblWoodstoves	NumberNoncatalytic	9.60	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	28.2280	50.0535	54.8724	0.1072	18.2141	2.4307	20.2596	9.9699	2.2672	11.8517	0.0000	10,495.4490	10,495.4490	2.1395	0.0000	10,548.9362
Maximum	**28.2280**	**50.0535**	**54.8724**	**0.1072**	**18.2141**	**2.4307**	**20.2596**	**9.9699**	**2.2672**	**11.8517**	**0.0000**	**10,495.4490**	**10,495.4490**	**2.1395**	**0.0000**	**10,548.9362**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	28.2280	50.0535	54.8724	0.1072	8.2777	2.4307	10.3232	4.5080	2.2672	6.3899	0.0000	10,495.4490	10,495.4490	2.1395	0.0000	10,548.9362
Maximum	**28.2280**	**50.0535**	**54.8724**	**0.1072**	**8.2777**	**2.4307**	**10.3232**	**4.5080**	**2.2672**	**6.3899**	**0.0000**	**10,495.4490**	**10,495.4490**	**2.1395**	**0.0000**	**10,548.9362**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.55**	**0.00**	**49.05**	**54.78**	**0.00**	**46.08**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	4.8690	0.1832	15.8971	8.4000e-004		0.0878	0.0878		0.0878	0.0878	0.0000	28.6073	28.6073	0.0277	0.0000	29.3008
Energy	8.9700e-003	0.0769	0.0346	4.9000e-004		6.2000e-003	6.2000e-003		6.2000e-003	6.2000e-003		97.8412	97.8412	1.8800e-003	1.7900e-003	98.4226
Mobile	1.8483	8.0503	22.0273	0.0762	6.9746	0.0646	7.0391	1.8640	0.0603	1.9243		7,745.5387	7,745.5387	0.4100		7,755.7880
Total	**6.7263**	**8.3104**	**37.9590**	**0.0775**	**6.9746**	**0.1585**	**7.1331**	**1.8640**	**0.1543**	**2.0183**	**0.0000**	**7,871.9872**	**7,871.9872**	**0.4396**	**1.7900e-003**	**7,883.5114**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	4.8690	0.1832	15.8971	8.4000e-004		0.0878	0.0878		0.0878	0.0878	0.0000	28.6073	28.6073	0.0277	0.0000	29.3008
Energy	8.9700e-003	0.0769	0.0346	4.9000e-004		6.2000e-003	6.2000e-003		6.2000e-003	6.2000e-003		97.8412	97.8412	1.8800e-003	1.7900e-003	98.4226
Mobile	1.6220	6.6720	17.1525	0.0552	4.9405	0.0478	4.9883	1.3204	0.0447	1.3650		5,613.3301	5,613.3301	0.3151		5,621.2071
Total	**6.5000**	**6.9322**	**33.0842**	**0.0565**	**4.9405**	**0.1418**	**5.0823**	**1.3204**	**0.1386**	**1.4590**	**0.0000**	**5,739.7785**	**5,739.7785**	**0.3447**	**1.7900e-003**	**5,748.9305**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**3.36**	**16.58**	**12.84**	**27.09**	**29.16**	**10.57**	**28.75**	**29.16**	**10.15**	**27.71**	**0.00**	**27.09**	**27.09**	**21.59**	**0.00**	**27.08**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2021	1/14/2021	5	10	
2	Grading	Grading	1/15/2021	2/25/2021	5	30	
3	Trenching	Trenching	2/26/2021	3/11/2021	5	10	
4	Building Construction	Building Construction	3/12/2021	12/16/2021	5	200	
5	Paving	Paving	11/15/2021	12/10/2021	5	20	
6	Architectural Coating	Architectural Coating	11/22/2021	12/17/2021	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 3.24

Residential Indoor: 388,800; Residential Outdoor: 129,600; Non-Residential Indoor: 6,758; Non-Residential Outdoor: 2,253; Striped Parking Area: 9,168 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Trenching	Excavators	1	8.00	158	0.38
Trenching	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Trenching	Trenchers	1	8.00	78	0.50
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	3	8.00	130	0.42
Paving	Paving Equipment	3	8.00	132	0.36
Paving	Rollers	3	8.00	80	0.38
Paving	Signal Boards	1	8.00	6	0.82
Paving	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	204.00	46.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	12	16.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	42.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.2 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0706	0.0454	0.4488	1.3800e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		137.6186	137.6186	3.9500e-003		137.7174
Total	**0.0706**	**0.0454**	**0.4488**	**1.3800e-003**	**0.1479**	**1.0200e-003**	**0.1489**	**0.0392**	**9.4000e-004**	**0.0402**		**137.6186**	**137.6186**	**3.9500e-003**		**137.7174**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.1298	0.0000	8.1298	4.4688	0.0000	4.4688			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**8.1298**	**2.0445**	**10.1743**	**4.4688**	**1.8809**	**6.3497**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.2 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0706	0.0454	0.4488	1.3800e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		137.6186	137.6186	3.9500e-003		137.7174
Total	**0.0706**	**0.0454**	**0.4488**	**1.3800e-003**	**0.1479**	**1.0200e-003**	**0.1489**	**0.0392**	**9.4000e-004**	**0.0402**		**137.6186**	**137.6186**	**3.9500e-003**		**137.7174**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**8.6733**	**1.9853**	**10.6587**	**3.5965**	**1.8265**	**5.4230**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0785	0.0505	0.4987	1.5300e-003	0.1643	1.1300e-003	0.1654	0.0436	1.0500e-003	0.0446		152.9095	152.9095	4.3900e-003		153.0193
Total	**0.0785**	**0.0505**	**0.4987**	**1.5300e-003**	**0.1643**	**1.1300e-003**	**0.1654**	**0.0436**	**1.0500e-003**	**0.0446**		**152.9095**	**152.9095**	**4.3900e-003**		**153.0193**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9030	0.0000	3.9030	1.6184	0.0000	1.6184			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**3.9030**	**1.9853**	**5.8883**	**1.6184**	**1.8265**	**3.4449**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0785	0.0505	0.4987	1.5300e-003	0.1643	1.1300e-003	0.1654	0.0436	1.0500e-003	0.0446		152.9095	152.9095	4.3900e-003		153.0193
Total	**0.0785**	**0.0505**	**0.4987**	**1.5300e-003**	**0.1643**	**1.1300e-003**	**0.1654**	**0.0436**	**1.0500e-003**	**0.0446**		**152.9095**	**152.9095**	**4.3900e-003**		**153.0193**

3.4 Trenching - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7989	7.5613	8.1384	0.0117		0.4712	0.4712		0.4335	0.4335		1,128.0146	1,128.0146	0.3648		1,137.1351
Total	**0.7989**	**7.5613**	**8.1384**	**0.0117**		**0.4712**	**0.4712**		**0.4335**	**0.4335**		**1,128.0146**	**1,128.0146**	**0.3648**		**1,137.1351**

3.4 Trenching - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0314	0.0202	0.1995	6.1000e-004	0.0657	4.5000e-004	0.0662	0.0174	4.2000e-004	0.0179		61.1638	61.1638	1.7600e-003		61.2077
Total	**0.0314**	**0.0202**	**0.1995**	**6.1000e-004**	**0.0657**	**4.5000e-004**	**0.0662**	**0.0174**	**4.2000e-004**	**0.0179**		**61.1638**	**61.1638**	**1.7600e-003**		**61.2077**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7989	7.5613	8.1384	0.0117		0.4712	0.4712		0.4335	0.4335	0.0000	1,128.0146	1,128.0146	0.3648		1,137.1351
Total	**0.7989**	**7.5613**	**8.1384**	**0.0117**		**0.4712**	**0.4712**		**0.4335**	**0.4335**	**0.0000**	**1,128.0146**	**1,128.0146**	**0.3648**		**1,137.1351**

3.4 Trenching - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0314	0.0202	0.1995	6.1000e-004	0.0657	4.5000e-004	0.0662	0.0174	4.2000e-004	0.0179		61.1638	61.1638	1.7600e-003		61.2077
Total	**0.0314**	**0.0202**	**0.1995**	**6.1000e-004**	**0.0657**	**4.5000e-004**	**0.0662**	**0.0174**	**4.2000e-004**	**0.0179**		**61.1638**	**61.1638**	**1.7600e-003**		**61.2077**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0228	18.7492	17.6706	0.0288		1.0251	1.0251		0.9625	0.9625		2,736.0438	2,736.0438	0.6751		2,752.9212
Total	**2.0228**	**18.7492**	**17.6706**	**0.0288**		**1.0251**	**1.0251**		**0.9625**	**0.9625**		**2,736.0438**	**2,736.0438**	**0.6751**		**2,752.9212**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1466	4.6717	1.3292	0.0121	0.3114	0.0102	0.3216	0.0896	9.7900e-003	0.0994		1,305.5688	1,305.5688	0.1017		1,308.1115
Worker	0.8002	0.5146	5.0862	0.0157	1.6758	0.0116	1.6874	0.4445	0.0107	0.4552		1,559.6771	1,559.6771	0.0448		1,560.7973
Total	**0.9468**	**5.1863**	**6.4154**	**0.0278**	**1.9872**	**0.0218**	**2.0090**	**0.5341**	**0.0205**	**0.5546**		**2,865.2458**	**2,865.2458**	**0.1465**		**2,868.9088**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0228	18.7492	17.6706	0.0288		1.0251	1.0251		0.9625	0.9625	0.0000	2,736.0438	2,736.0438	0.6751		2,752.9212
Total	**2.0228**	**18.7492**	**17.6706**	**0.0288**		**1.0251**	**1.0251**		**0.9625**	**0.9625**	**0.0000**	**2,736.0438**	**2,736.0438**	**0.6751**		**2,752.9212**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1466	4.6717	1.3292	0.0121	0.3114	0.0102	0.3216	0.0896	9.7900e-003	0.0994		1,305.5688	1,305.5688	0.1017		1,308.1115
Worker	0.8002	0.5146	5.0862	0.0157	1.6758	0.0116	1.6874	0.4445	0.0107	0.4552		1,559.6771	1,559.6771	0.0448		1,560.7973
Total	**0.9468**	**5.1863**	**6.4154**	**0.0278**	**1.9872**	**0.0218**	**2.0090**	**0.5341**	**0.0205**	**0.5546**		**2,865.2458**	**2,865.2458**	**0.1465**		**2,868.9088**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3152	23.5297	26.8013	0.0411		1.2541	1.2541		1.1549	1.1549		3,961.9300	3,961.9300	1.2705		3,993.6935
Paving	0.4244					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.7397**	**23.5297**	**26.8013**	**0.0411**		**1.2541**	**1.2541**		**1.1549**	**1.1549**		**3,961.9300**	**3,961.9300**	**1.2705**		**3,993.6935**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0128	0.4062	0.1156	1.0600e-003	0.0271	8.9000e-004	0.0280	7.8000e-003	8.5000e-004	8.6500e-003		113.5277	113.5277	8.8400e-003		113.7488
Worker	0.0628	0.0404	0.3989	1.2300e-003	0.1314	9.1000e-004	0.1323	0.0349	8.4000e-004	0.0357		122.3276	122.3276	3.5100e-003		122.4155
Total	**0.0755**	**0.4466**	**0.5145**	**2.2900e-003**	**0.1585**	**1.8000e-003**	**0.1603**	**0.0427**	**1.6900e-003**	**0.0444**		**235.8553**	**235.8553**	**0.0124**		**236.1643**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3152	23.5297	26.8013	0.0411		1.2541	1.2541		1.1549	1.1549	0.0000	3,961.9300	3,961.9300	1.2705		3,993.6935
Paving	0.4244					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.7397**	**23.5297**	**26.8013**	**0.0411**		**1.2541**	**1.2541**		**1.1549**	**1.1549**	**0.0000**	**3,961.9300**	**3,961.9300**	**1.2705**		**3,993.6935**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0128	0.4062	0.1156	1.0600e-003	0.0271	8.9000e-004	0.0280	7.8000e-003	8.5000e-004	8.6500e-003		113.5277	113.5277	8.8400e-003		113.7488
Worker	0.0628	0.0404	0.3989	1.2300e-003	0.1314	9.1000e-004	0.1323	0.0349	8.4000e-004	0.0357		122.3276	122.3276	3.5100e-003		122.4155
Total	**0.0755**	**0.4466**	**0.5145**	**2.2900e-003**	**0.1585**	**1.8000e-003**	**0.1603**	**0.0427**	**1.6900e-003**	**0.0444**		**235.8553**	**235.8553**	**0.0124**		**236.1643**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	21.9867					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2919	2.0358	2.4234	3.9600e-003		0.1255	0.1255		0.1255	0.1255		375.2641	375.2641	0.0258		375.9079
Total	**22.2786**	**2.0358**	**2.4234**	**3.9600e-003**		**0.1255**	**0.1255**		**0.1255**	**0.1255**		**375.2641**	**375.2641**	**0.0258**		**375.9079**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1647	0.1059	1.0472	3.2200e-003	0.3450	2.3800e-003	0.3474	0.0915	2.2000e-003	0.0937		321.1100	321.1100	9.2300e-003		321.3406
Total	**0.1647**	**0.1059**	**1.0472**	**3.2200e-003**	**0.3450**	**2.3800e-003**	**0.3474**	**0.0915**	**2.2000e-003**	**0.0937**		**321.1100**	**321.1100**	**9.2300e-003**		**321.3406**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	21.9867					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2919	2.0358	2.4234	3.9600e-003		0.1255	0.1255		0.1255	0.1255	0.0000	375.2641	375.2641	0.0258		375.9079
Total	**22.2786**	**2.0358**	**2.4234**	**3.9600e-003**		**0.1255**	**0.1255**		**0.1255**	**0.1255**	**0.0000**	**375.2641**	**375.2641**	**0.0258**		**375.9079**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1647	0.1059	1.0472	3.2200e-003	0.3450	2.3800e-003	0.3474	0.0915	2.2000e-003	0.0937		321.1100	321.1100	9.2300e-003		321.3406
Total	**0.1647**	**0.1059**	**1.0472**	**3.2200e-003**	**0.3450**	**2.3800e-003**	**0.3474**	**0.0915**	**2.2000e-003**	**0.0937**		**321.1100**	**321.1100**	**9.2300e-003**		**321.3406**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Increase Transit Accessibility

Integrate Below Market Rate Housing

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.6220	6.6720	17.1525	0.0552	4.9405	0.0478	4.9883	1.3204	0.0447	1.3650		5,613.3301	5,613.3301	0.3151		5,621.2071
Unmitigated	1.8483	8.0503	22.0273	0.0762	6.9746	0.0646	7.0391	1.8640	0.0603	1.9243		7,745.5387	7,745.5387	0.4100		7,755.7880

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	1,152.00	1,152.00	1152.00	3,289,309	2,330,010
City Park	0.00	0.00	0.00		
General Office Building	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Recreational Swimming Pool	0.00	0.00	0.00		
Total	1,152.00	1,152.00	1,152.00	3,289,309	2,330,010

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Recreational Swimming Pool	9.50	7.30	7.30	33.00	48.00	19.00	52	39	9

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
City Park	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
General Office Building	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
Parking Lot	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122
Recreational Swimming Pool	0.598645	0.040929	0.181073	0.106149	0.015683	0.005479	0.016317	0.023976	0.001926	0.001932	0.006016	0.000753	0.001122

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	8.9700e-003	0.0769	0.0346	4.9000e-004		6.2000e-003	6.2000e-003		6.2000e-003	6.2000e-003		97.8412	97.8412	1.8800e-003	1.7900e-003	98.4226
NaturalGas Unmitigated	8.9700e-003	0.0769	0.0346	4.9000e-004		6.2000e-003	6.2000e-003		6.2000e-003	6.2000e-003		97.8412	97.8412	1.8800e-003	1.7900e-003	98.4226

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	786.369	8.4800e-003	0.0725	0.0308	4.6000e-004		5.8600e-003	5.8600e-003		5.8600e-003	5.8600e-003		92.5140	92.5140	1.7700e-003	1.7000e-003	93.0638
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	45.281	4.9000e-004	4.4400e-003	3.7300e-003	3.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		5.3272	5.3272	1.0000e-004	1.0000e-004	5.3588
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**8.9700e-003**	**0.0769**	**0.0346**	**4.9000e-004**		**6.2000e-003**	**6.2000e-003**		**6.2000e-003**	**6.2000e-003**		**97.8412**	**97.8412**	**1.8700e-003**	**1.8000e-003**	**98.4226**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	0.786369	8.4800e-003	0.0725	0.0308	4.6000e-004		5.8600e-003	5.8600e-003		5.8600e-003	5.8600e-003		92.5140	92.5140	1.7700e-003	1.7000e-003	93.0638
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	0.045281	4.9000e-004	4.4400e-003	3.7300e-003	3.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		5.3272	5.3272	1.0000e-004	1.0000e-004	5.3588
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**8.9700e-003**	**0.0769**	**0.0346**	**4.9000e-004**		**6.2000e-003**	**6.2000e-003**		**6.2000e-003**	**6.2000e-003**		**97.8412**	**97.8412**	**1.8700e-003**	**1.8000e-003**	**98.4226**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	4.8690	0.1832	15.8971	8.4000e-004		0.0878	0.0878		0.0878	0.0878	0.0000	28.6073	28.6073	0.0277	0.0000	29.3008
Unmitigated	4.8690	0.1832	15.8971	8.4000e-004		0.0878	0.0878		0.0878	0.0878	0.0000	28.6073	28.6073	0.0277	0.0000	29.3008

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1205					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.2659					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4827	0.1832	15.8971	8.4000e-004		0.0878	0.0878		0.0878	0.0878		28.6073	28.6073	0.0277		29.3008
Total	**4.8690**	**0.1832**	**15.8971**	**8.4000e-004**		**0.0878**	**0.0878**		**0.0878**	**0.0878**	**0.0000**	**28.6073**	**28.6073**	**0.0277**	**0.0000**	**29.3008**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1205					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.2659					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4827	0.1832	15.8971	8.4000e-004		0.0878	0.0878		0.0878	0.0878		28.6073	28.6073	0.0277		29.3008
Total	**4.8690**	**0.1832**	**15.8971**	**8.4000e-004**		**0.0878**	**0.0878**		**0.0878**	**0.0878**	**0.0000**	**28.6073**	**28.6073**	**0.0277**	**0.0000**	**29.3008**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

West Oaks Multi-Family Housing Project - 2030

San Diego County APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	2.71	1000sqft	0.06	2,705.00	0
Parking Lot	382.00	Space	3.24	152,800.00	0
City Park	2.93	Acre	2.93	127,630.80	0
Recreational Swimming Pool	1.80	1000sqft	0.04	1,800.00	0
Apartments Mid Rise	192.00	Dwelling Unit	1.63	192,000.00	549

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2030
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	320.22	**CH4 Intensity (lb/MWhr)**	0.013	**N2O Intensity (lb/MWhr)**	0.003

1.3 User Entered Comments & Non-Default Data

Project Characteristics - GHG intensity based on SDG&E energy mix.

Land Use - Based on site plan.

Construction Phase - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 2.6.2 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Off-road Equipment - See Section 7.2.1 for Construction Details.

Trips and VMT - CalEEMod defaults.

On-road Fugitive Dust - CalEEMod defaults.

Demolition - No demolition of structures anticipated for this project.

Grading - See Section 7.2.1 for Construction Details.

Architectural Coating - Applicant specified low-VOC, 5 g/L for interior and 50 g/L for exterior. The paving VOC is in accordance with SDAPCD Rule 67.0.1.

Vehicle Trips - Based on the Traffic Impact Analysis.

Vehicle Emission Factors - CalEEMod defaults.

Vehicle Emission Factors - CalEEMod defaults.

Vehicle Emission Factors - CalEEMod defaults.

Road Dust - CalEEMod defaults.

Woodstoves - There are no wood or natural gas burning stoves or fireplaces.

Consumer Products - CalEEMod defaults.

Area Coating - Applicant specified low-VOC, 5 g/L for interior and 50 g/L for exterior. The paving VOC is in accordance with SDAPCD Rule 67.0.1.

Landscape Equipment - CalEEMod defaults.

Energy Use - Includes electric water heaters and HVAC.

Water And Wastewater - CalEEMod defaults.

Solid Waste - CalEEMod defaults.

Land Use Change - This was calculated outside of CalEEMod.

Sequestration - This was calculated outside of CalEEMod.

Construction Off-road Equipment Mitigation - Fugitive dust mitigation in accordance with SDAPCD Rule 55.

Mobile Land Use Mitigation - Increased density, accessibility, transit accessbility, and below market rate units.

Mobile Commute Mitigation - No commute mitigation.

Area Mitigation - It was conservatively assumed 5 g/L for interior and 50 g/L for exterior.

Energy Mitigation - LED or other efficient lighting in 75% of the luminaires and Energy Star appliances.

Water Mitigation - Low flow fixtures and water-use efficient irrigation.

Waste Mitigation - In accordance with AB 341.

Operational Off-Road Equipment -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps - This does not apply to this project.

Stationary Sources - Process Boilers - Does not apply to this project.

Stationary Sources - User Defined - Does not apply to this project.

Stationary Sources - Emergency Generators and Fire Pumps EF - This does not apply to this project.

Stationary Sources - Process Boilers EF - Does not apply to this project.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	50
tblAreaCoating	Area_EF_Nonresidential_Interior	250	5
tblAreaCoating	Area_EF_Parking	250	100
tblAreaCoating	Area_EF_Residential_Exterior	250	50
tblAreaCoating	Area_EF_Residential_Interior	250	5
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblEnergyUse	LightingElect	741.44	0.00
tblEnergyUse	LightingElect	3.81	0.00
tblEnergyUse	NT24E	3,054.10	0.00
tblEnergyUse	NT24E	4.97	0.00
tblEnergyUse	NT24NG	4,180.00	0.00
tblEnergyUse	NT24NG	4.20	0.00
tblEnergyUse	T24E	209.39	7,389.69

tblEnergyUse	T24E	4.66	18.02
tblEnergyUse	T24NG	3,248.74	1,494.92
tblEnergyUse	T24NG	15.99	6.11
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	105.60	0.00
tblFireplaces	NumberNoFireplace	19.20	0.00
tblFireplaces	NumberWood	67.20	0.00
tblLandUse	LandUseSquareFeet	2,710.00	2,705.00
tblLandUse	LotAcreage	3.44	3.24
tblLandUse	LotAcreage	5.05	1.63
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.013
tblProjectCharacteristics	CO2IntensityFactor	720.49	320.22
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.003
tblVehicleTrips	ST_TR	6.39	6.00
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	ST_TR	9.10	0.00
tblVehicleTrips	SU_TR	5.86	6.00
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	13.60	0.00
tblVehicleTrips	WD_TR	6.65	6.00
tblVehicleTrips	WD_TR	1.89	0.00
tblVehicleTrips	WD_TR	11.03	0.00
tblVehicleTrips	WD_TR	33.82	0.00

tblWoodstoves	NumberCatalytic	9.60	0.00
tblWoodstoves	NumberNoncatalytic	9.60	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.6275	3.5968	3.3310	7.4100e-003	0.4229	0.1609	0.5838	0.1581	0.1501	0.3082	0.0000	662.4231	662.4231	0.1198	0.0000	665.4182
Maximum	**0.6275**	**3.5968**	**3.3310**	**7.4100e-003**	**0.4229**	**0.1609**	**0.5838**	**0.1581**	**0.1501**	**0.3082**	**0.0000**	**662.4231**	**662.4231**	**0.1198**	**0.0000**	**665.4182**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.6275	3.5968	3.3310	7.4100e-003	0.3017	0.1609	0.4626	0.1011	0.1501	0.2512	0.0000	662.4226	662.4226	0.1198	0.0000	665.4177
Maximum	**0.6275**	**3.5968**	**3.3310**	**7.4100e-003**	**0.3017**	**0.1609**	**0.4626**	**0.1011**	**0.1501**	**0.2512**	**0.0000**	**662.4226**	**662.4226**	**0.1198**	**0.0000**	**665.4177**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**28.67**	**0.00**	**20.77**	**36.04**	**0.00**	**18.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
2	**11-17-2020**	**2-16-2021**	0.8203	0.8203
3	**2-17-2021**	**5-16-2021**	0.8369	0.8369
4	**5-17-2021**	**8-16-2021**	0.8792	0.8792
5	**8-17-2021**	**9-30-2021**	0.4301	0.4301
		Highest	0.8792	0.8792

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.8434	0.0164	1.4254	8.0000e-005		7.9200e-003	7.9200e-003		7.9200e-003	7.9200e-003	0.0000	2.3357	2.3357	2.2400e-003	0.0000	2.3916
Energy	1.6400e-003	0.0140	6.3100e-003	9.0000e-005		1.1300e-003	1.1300e-003		1.1300e-003	1.1300e-003	0.0000	237.1294	237.1294	9.2800e-003	2.3700e-003	238.0667
Mobile	0.2238	0.9724	2.7006	0.0111	1.2389	7.2000e-003	1.2461	0.3316	6.6900e-003	0.3383	0.0000	1,031.4127	1,031.4127	0.0497	0.0000	1,032.6562
Waste						0.0000	0.0000		0.0000	0.0000	20.5731	0.0000	20.5731	1.2158	0.0000	50.9691
Water						0.0000	0.0000		0.0000	0.0000	4.1553	43.7134	47.8686	0.4286	0.0105	61.7078
Total	**1.0688**	**1.0029**	**4.1324**	**0.0113**	**1.2389**	**0.0163**	**1.2552**	**0.3316**	**0.0157**	**0.3474**	**24.7284**	**1,314.5912**	**1,339.3196**	**1.7057**	**0.0129**	**1,385.7915**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.8434	0.0164	1.4254	8.0000e-005		7.9200e-003	7.9200e-003		7.9200e-003	7.9200e-003	0.0000	2.3357	2.3357	2.2400e-003	0.0000	2.3916
Energy	1.6400e-003	0.0140	6.3100e-003	9.0000e-005		1.1300e-003	1.1300e-003		1.1300e-003	1.1300e-003	0.0000	235.4671	235.4671	9.2100e-003	2.3500e-003	236.3981
Mobile	0.1940	0.8399	2.0805	8.0600e-003	0.8776	5.3600e-003	0.8830	0.2349	4.9800e-003	0.2399	0.0000	750.0082	750.0082	0.0377	0.0000	750.9502
Waste						0.0000	0.0000		0.0000	0.0000	10.2866	0.0000	10.2866	0.6079	0.0000	25.4845
Water						0.0000	0.0000		0.0000	0.0000	3.3242	37.6036	40.9278	0.3430	8.4100e-003	52.0092
Total	**1.0390**	**0.8703**	**3.5122**	**8.2300e-003**	**0.8776**	**0.0144**	**0.8920**	**0.2349**	**0.0140**	**0.2490**	**13.6108**	**1,025.4146**	**1,039.0254**	**1.0000**	**0.0108**	**1,067.2336**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**2.78**	**13.22**	**15.01**	**26.91**	**29.16**	**11.32**	**28.93**	**29.17**	**10.86**	**28.33**	**44.96**	**22.00**	**22.42**	**41.37**	**16.33**	**22.99**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2021	1/14/2021	5	10	
2	Grading	Grading	1/15/2021	2/25/2021	5	30	
3	Trenching	Trenching	2/26/2021	3/11/2021	5	10	
4	Building Construction	Building Construction	3/12/2021	12/16/2021	5	200	
5	Paving	Paving	11/15/2021	12/10/2021	5	20	
6	Architectural Coating	Architectural Coating	11/22/2021	12/17/2021	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 3.24

Residential Indoor: 388,800; Residential Outdoor: 129,600; Non-Residential Indoor: 6,758; Non-Residential Outdoor: 2,253; Striped Parking Area: 9,168 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Trenching	Excavators	1	8.00	158	0.38
Trenching	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Trenching	Trenchers	1	8.00	78	0.50
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	3	8.00	130	0.42
Paving	Paving Equipment	3	8.00	132	0.36
Paving	Rollers	3	8.00	80	0.38
Paving	Signal Boards	1	8.00	6	0.82
Paving	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	0	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	0	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	0	204.00	46.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	0	16.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	0	42.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0194	0.2025	0.1058	1.9000e-004		0.0102	0.0102		9.4000e-003	9.4000e-003	0.0000	16.7179	16.7179	5.4100e-003	0.0000	16.8530
Total	**0.0194**	**0.2025**	**0.1058**	**1.9000e-004**	**0.0903**	**0.0102**	**0.1006**	**0.0497**	**9.4000e-003**	**0.0591**	**0.0000**	**16.7179**	**16.7179**	**5.4100e-003**	**0.0000**	**16.8530**

3.2 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1000e-004	2.2000e-004	2.2500e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.3000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.6305	0.6305	2.0000e-005	0.0000	0.6309
Total	**3.1000e-004**	**2.2000e-004**	**2.2500e-003**	**1.0000e-005**	**7.2000e-004**	**1.0000e-005**	**7.3000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.6305**	**0.6305**	**2.0000e-005**	**0.0000**	**0.6309**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0407	0.0000	0.0407	0.0223	0.0000	0.0223	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0194	0.2025	0.1058	1.9000e-004		0.0102	0.0102		9.4000e-003	9.4000e-003	0.0000	16.7178	16.7178	5.4100e-003	0.0000	16.8530
Total	**0.0194**	**0.2025**	**0.1058**	**1.9000e-004**	**0.0407**	**0.0102**	**0.0509**	**0.0223**	**9.4000e-003**	**0.0317**	**0.0000**	**16.7178**	**16.7178**	**5.4100e-003**	**0.0000**	**16.8530**

3.2 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						tons/yr								MT/yr		
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1000e-004	2.2000e-004	2.2500e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.3000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.6305	0.6305	2.0000e-005	0.0000	0.6309
Total	**3.1000e-004**	**2.2000e-004**	**2.2500e-003**	**1.0000e-005**	**7.2000e-004**	**1.0000e-005**	**7.3000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.6305**	**0.6305**	**2.0000e-005**	**0.0000**	**0.6309**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						tons/yr								MT/yr		
Fugitive Dust					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0629	0.6960	0.4632	9.3000e-004		0.0298	0.0298		0.0274	0.0274	0.0000	81.7425	81.7425	0.0264	0.0000	82.4034
Total	**0.0629**	**0.6960**	**0.4632**	**9.3000e-004**	**0.1301**	**0.0298**	**0.1599**	**0.0540**	**0.0274**	**0.0814**	**0.0000**	**81.7425**	**81.7425**	**0.0264**	**0.0000**	**82.4034**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0400e-003	7.4000e-004	7.4900e-003	2.0000e-005	2.4100e-003	2.0000e-005	2.4200e-003	6.4000e-004	2.0000e-005	6.5000e-004	0.0000	2.1016	2.1016	6.0000e-005	0.0000	2.1031
Total	**1.0400e-003**	**7.4000e-004**	**7.4900e-003**	**2.0000e-005**	**2.4100e-003**	**2.0000e-005**	**2.4200e-003**	**6.4000e-004**	**2.0000e-005**	**6.5000e-004**	**0.0000**	**2.1016**	**2.1016**	**6.0000e-005**	**0.0000**	**2.1031**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0586	0.0000	0.0586	0.0243	0.0000	0.0243	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0629	0.6960	0.4632	9.3000e-004		0.0298	0.0298		0.0274	0.0274	0.0000	81.7424	81.7424	0.0264	0.0000	82.4033
Total	**0.0629**	**0.6960**	**0.4632**	**9.3000e-004**	**0.0586**	**0.0298**	**0.0883**	**0.0243**	**0.0274**	**0.0517**	**0.0000**	**81.7424**	**81.7424**	**0.0264**	**0.0000**	**82.4033**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0400e-003	7.4000e-004	7.4900e-003	2.0000e-005	2.4100e-003	2.0000e-005	2.4200e-003	6.4000e-004	2.0000e-005	6.5000e-004	0.0000	2.1016	2.1016	6.0000e-005	0.0000	2.1031
Total	**1.0400e-003**	**7.4000e-004**	**7.4900e-003**	**2.0000e-005**	**2.4100e-003**	**2.0000e-005**	**2.4200e-003**	**6.4000e-004**	**2.0000e-005**	**6.5000e-004**	**0.0000**	**2.1016**	**2.1016**	**6.0000e-005**	**0.0000**	**2.1031**

3.4 Trenching - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.9900e-003	0.0378	0.0407	6.0000e-005		2.3600e-003	2.3600e-003		2.1700e-003	2.1700e-003	0.0000	5.1166	5.1166	1.6500e-003	0.0000	5.1580
Total	**3.9900e-003**	**0.0378**	**0.0407**	**6.0000e-005**		**2.3600e-003**	**2.3600e-003**		**2.1700e-003**	**2.1700e-003**	**0.0000**	**5.1166**	**5.1166**	**1.6500e-003**	**0.0000**	**5.1580**

3.4 Trenching - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	1.0000e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2802	0.2802	1.0000e-005	0.0000	0.2804
Total	**1.4000e-004**	**1.0000e-004**	**1.0000e-003**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2802**	**0.2802**	**1.0000e-005**	**0.0000**	**0.2804**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.9900e-003	0.0378	0.0407	6.0000e-005		2.3600e-003	2.3600e-003		2.1700e-003	2.1700e-003	0.0000	5.1166	5.1166	1.6500e-003	0.0000	5.1580
Total	**3.9900e-003**	**0.0378**	**0.0407**	**6.0000e-005**		**2.3600e-003**	**2.3600e-003**		**2.1700e-003**	**2.1700e-003**	**0.0000**	**5.1166**	**5.1166**	**1.6500e-003**	**0.0000**	**5.1580**

3.4 Trenching - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	1.0000e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2802	0.2802	1.0000e-005	0.0000	0.2804
Total	**1.4000e-004**	**1.0000e-004**	**1.0000e-003**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2802**	**0.2802**	**1.0000e-005**	**0.0000**	**0.2804**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2023	1.8749	1.7671	2.8800e-003		0.1025	0.1025		0.0963	0.0963	0.0000	248.2097	248.2097	0.0612	0.0000	249.7408
Total	**0.2023**	**1.8749**	**1.7671**	**2.8800e-003**		**0.1025**	**0.1025**		**0.0963**	**0.0963**	**0.0000**	**248.2097**	**248.2097**	**0.0612**	**0.0000**	**249.7408**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0142	0.4727	0.1261	1.2300e-003	0.0305	1.0000e-003	0.0315	8.8200e-003	9.6000e-004	9.7700e-003	0.0000	120.2624	120.2624	8.9300e-003	0.0000	120.4856
Worker	0.0709	0.0506	0.5097	1.5800e-003	0.1636	1.1600e-003	0.1648	0.0435	1.0700e-003	0.0445	0.0000	142.9066	142.9066	4.1000e-003	0.0000	143.0090
Total	**0.0851**	**0.5233**	**0.6357**	**2.8100e-003**	**0.1941**	**2.1600e-003**	**0.1963**	**0.0523**	**2.0300e-003**	**0.0543**	**0.0000**	**263.1690**	**263.1690**	**0.0130**	**0.0000**	**263.4946**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2023	1.8749	1.7671	2.8800e-003		0.1025	0.1025		0.0963	0.0963	0.0000	248.2094	248.2094	0.0612	0.0000	249.7405
Total	**0.2023**	**1.8749**	**1.7671**	**2.8800e-003**		**0.1025**	**0.1025**		**0.0963**	**0.0963**	**0.0000**	**248.2094**	**248.2094**	**0.0612**	**0.0000**	**249.7405**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0142	0.4727	0.1261	1.2300e-003	0.0305	1.0000e-003	0.0315	8.8200e-003	9.6000e-004	9.7700e-003	0.0000	120.2624	120.2624	8.9300e-003	0.0000	120.4856
Worker	0.0709	0.0506	0.5097	1.5800e-003	0.1636	1.1600e-003	0.1648	0.0435	1.0700e-003	0.0445	0.0000	142.9066	142.9066	4.1000e-003	0.0000	143.0090
Total	**0.0851**	**0.5233**	**0.6357**	**2.8100e-003**	**0.1941**	**2.1600e-003**	**0.1963**	**0.0523**	**2.0300e-003**	**0.0543**	**0.0000**	**263.1690**	**263.1690**	**0.0130**	**0.0000**	**263.4946**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0232	0.2353	0.2680	4.1000e-004		0.0125	0.0125		0.0116	0.0116	0.0000	35.9420	35.9420	0.0115	0.0000	36.2302
Paving	4.2400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0274**	**0.2353**	**0.2680**	**4.1000e-004**		**0.0125**	**0.0125**		**0.0116**	**0.0116**	**0.0000**	**35.9420**	**35.9420**	**0.0115**	**0.0000**	**36.2302**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2000e-004	4.1100e-003	1.1000e-003	1.0000e-005	2.7000e-004	1.0000e-005	2.7000e-004	8.0000e-005	1.0000e-005	8.0000e-005	0.0000	1.0458	1.0458	8.0000e-005	0.0000	1.0477
Worker	5.6000e-004	4.0000e-004	4.0000e-003	1.0000e-005	1.2800e-003	1.0000e-005	1.2900e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.1208	1.1208	3.0000e-005	0.0000	1.1216
Total	**6.8000e-004**	**4.5100e-003**	**5.1000e-003**	**2.0000e-005**	**1.5500e-003**	**2.0000e-005**	**1.5600e-003**	**4.2000e-004**	**2.0000e-005**	**4.3000e-004**	**0.0000**	**2.1666**	**2.1666**	**1.1000e-004**	**0.0000**	**2.1693**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0232	0.2353	0.2680	4.1000e-004		0.0125	0.0125		0.0116	0.0116	0.0000	35.9420	35.9420	0.0115	0.0000	36.2301
Paving	4.2400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0274**	**0.2353**	**0.2680**	**4.1000e-004**		**0.0125**	**0.0125**		**0.0116**	**0.0116**	**0.0000**	**35.9420**	**35.9420**	**0.0115**	**0.0000**	**36.2301**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2000e-004	4.1100e-003	1.1000e-003	1.0000e-005	2.7000e-004	1.0000e-005	2.7000e-004	8.0000e-005	1.0000e-005	8.0000e-005	0.0000	1.0458	1.0458	8.0000e-005	0.0000	1.0477
Worker	5.6000e-004	4.0000e-004	4.0000e-003	1.0000e-005	1.2800e-003	1.0000e-005	1.2900e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.1208	1.1208	3.0000e-005	0.0000	1.1216
Total	**6.8000e-004**	**4.5100e-003**	**5.1000e-003**	**2.0000e-005**	**1.5500e-003**	**2.0000e-005**	**1.5600e-003**	**4.2000e-004**	**2.0000e-005**	**4.3000e-004**	**0.0000**	**2.1666**	**2.1666**	**1.1000e-004**	**0.0000**	**2.1693**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2199					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9200e-003	0.0204	0.0242	4.0000e-005		1.2500e-003	1.2500e-003		1.2500e-003	1.2500e-003	0.0000	3.4043	3.4043	2.3000e-004	0.0000	3.4102
Total	**0.2228**	**0.0204**	**0.0242**	**4.0000e-005**		**1.2500e-003**	**1.2500e-003**		**1.2500e-003**	**1.2500e-003**	**0.0000**	**3.4043**	**3.4043**	**2.3000e-004**	**0.0000**	**3.4102**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4600e-003	1.0400e-003	0.0105	3.0000e-005	3.3700e-003	2.0000e-005	3.3900e-003	8.9000e-004	2.0000e-005	9.2000e-004	0.0000	2.9422	2.9422	8.0000e-005	0.0000	2.9443
Total	**1.4600e-003**	**1.0400e-003**	**0.0105**	**3.0000e-005**	**3.3700e-003**	**2.0000e-005**	**3.3900e-003**	**8.9000e-004**	**2.0000e-005**	**9.2000e-004**	**0.0000**	**2.9422**	**2.9422**	**8.0000e-005**	**0.0000**	**2.9443**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2199					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9200e-003	0.0204	0.0242	4.0000e-005		1.2500e-003	1.2500e-003		1.2500e-003	1.2500e-003	0.0000	3.4043	3.4043	2.3000e-004	0.0000	3.4102
Total	**0.2228**	**0.0204**	**0.0242**	**4.0000e-005**		**1.2500e-003**	**1.2500e-003**		**1.2500e-003**	**1.2500e-003**	**0.0000**	**3.4043**	**3.4043**	**2.3000e-004**	**0.0000**	**3.4102**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4600e-003	1.0400e-003	0.0105	3.0000e-005	3.3700e-003	2.0000e-005	3.3900e-003	8.9000e-004	2.0000e-005	9.2000e-004	0.0000	2.9422	2.9422	8.0000e-005	0.0000	2.9443
Total	**1.4600e-003**	**1.0400e-003**	**0.0105**	**3.0000e-005**	**3.3700e-003**	**2.0000e-005**	**3.3900e-003**	**8.9000e-004**	**2.0000e-005**	**9.2000e-004**	**0.0000**	**2.9422**	**2.9422**	**8.0000e-005**	**0.0000**	**2.9443**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Increase Transit Accessibility

Integrate Below Market Rate Housing

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1940	0.8399	2.0805	8.0600e-003	0.8776	5.3600e-003	0.8830	0.2349	4.9800e-003	0.2399	0.0000	750.0082	750.0082	0.0377	0.0000	750.9502
Unmitigated	0.2238	0.9724	2.7006	0.0111	1.2389	7.2000e-003	1.2461	0.3316	6.6900e-003	0.3383	0.0000	1,031.4127	1,031.4127	0.0497	0.0000	1,032.6562

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	1,152.00	1,152.00	1152.00	3,289,309	2,330,010
City Park	0.00	0.00	0.00		
General Office Building	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Recreational Swimming Pool	0.00	0.00	0.00		
Total	1,152.00	1,152.00	1,152.00	3,289,309	2,330,010

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Recreational Swimming Pool	9.50	7.30	7.30	33.00	48.00	19.00	52	39	9

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.616428	0.037185	0.177402	0.097684	0.012090	0.005279	0.017663	0.025476	0.001931	0.001677	0.005617	0.000785	0.000782
City Park	0.616428	0.037185	0.177402	0.097684	0.012090	0.005279	0.017663	0.025476	0.001931	0.001677	0.005617	0.000785	0.000782
General Office Building	0.616428	0.037185	0.177402	0.097684	0.012090	0.005279	0.017663	0.025476	0.001931	0.001677	0.005617	0.000785	0.000782
Parking Lot	0.616428	0.037185	0.177402	0.097684	0.012090	0.005279	0.017663	0.025476	0.001931	0.001677	0.005617	0.000785	0.000782
Recreational Swimming Pool	0.616428	0.037185	0.177402	0.097684	0.012090	0.005279	0.017663	0.025476	0.001931	0.001677	0.005617	0.000785	0.000782

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	219.2684	219.2684	8.9000e-003	2.0500e-003	220.1031
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	220.9307	220.9307	8.9700e-003	2.0700e-003	221.7718
NaturalGas Mitigated	1.6400e-003	0.0140	6.3100e-003	9.0000e-005		1.1300e-003	1.1300e-003		1.1300e-003	1.1300e-003	0.0000	16.1987	16.1987	3.1000e-004	3.0000e-004	16.2950
NaturalGas Unmitigated	1.6400e-003	0.0140	6.3100e-003	9.0000e-005		1.1300e-003	1.1300e-003		1.1300e-003	1.1300e-003	0.0000	16.1987	16.1987	3.1000e-004	3.0000e-004	16.2950

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	287025	1.5500e-003	0.0132	5.6300e-003	8.0000e-005		1.0700e-003	1.0700e-003		1.0700e-003	1.0700e-003	0.0000	15.3167	15.3167	2.9000e-004	2.8000e-004	15.4078
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	16527.5	9.0000e-005	8.1000e-004	6.8000e-004	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.8820	0.8820	2.0000e-005	2.0000e-005	0.8872
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.6400e-003**	**0.0140**	**6.3100e-003**	**8.0000e-005**		**1.1300e-003**	**1.1300e-003**		**1.1300e-003**	**1.1300e-003**	**0.0000**	**16.1987**	**16.1987**	**3.1000e-004**	**3.0000e-004**	**16.2950**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	287025	1.5500e-003	0.0132	5.6300e-003	8.0000e-005		1.0700e-003	1.0700e-003		1.0700e-003	1.0700e-003	0.0000	15.3167	15.3167	2.9000e-004	2.8000e-004	15.4078
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	16527.5	9.0000e-005	8.1000e-004	6.8000e-004	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.8820	0.8820	2.0000e-005	2.0000e-005	0.8872
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.6400e-003**	**0.0140**	**6.3100e-003**	**8.0000e-005**		**1.1300e-003**	**1.1300e-003**		**1.1300e-003**	**1.1300e-003**	**0.0000**	**16.1987**	**16.1987**	**3.1000e-004**	**3.0000e-004**	**16.2950**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	1.41882e +006	206.0828	8.3700e-003	1.9300e-003	206.8673
City Park	0	0.0000	0.0000	0.0000	0.0000
General Office Building	48744.1	7.0801	2.9000e-004	7.0000e-005	7.1070
Parking Lot	53480	7.7679	3.2000e-004	7.0000e-005	7.7975
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000
Total		**220.9307**	**8.9800e-003**	**2.0700e-003**	**221.7718**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	1.41882e +006	206.0828	8.3700e-003	1.9300e-003	206.8673
City Park	0	0.0000	0.0000	0.0000	0.0000
General Office Building	48744.1	7.0801	2.9000e-004	7.0000e-005	7.1070
Parking Lot	42035.3	6.1056	2.5000e-004	6.0000e-005	6.1288
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000
Total		**219.2684**	**8.9100e-003**	**2.0600e-003**	**220.1031**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.8434	0.0164	1.4254	8.0000e-005		7.9200e-003	7.9200e-003		7.9200e-003	7.9200e-003	0.0000	2.3357	2.3357	2.2400e-003	0.0000	2.3916
Unmitigated	0.8434	0.0164	1.4254	8.0000e-005		7.9200e-003	7.9200e-003		7.9200e-003	7.9200e-003	0.0000	2.3357	2.3357	2.2400e-003	0.0000	2.3916

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0220					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7785					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0429	0.0164	1.4254	8.0000e-005		7.9200e-003	7.9200e-003		7.9200e-003	7.9200e-003	0.0000	2.3357	2.3357	2.2400e-003	0.0000	2.3916
Total	**0.8434**	**0.0164**	**1.4254**	**8.0000e-005**		**7.9200e-003**	**7.9200e-003**		**7.9200e-003**	**7.9200e-003**	**0.0000**	**2.3357**	**2.3357**	**2.2400e-003**	**0.0000**	**2.3916**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0220					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7785					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0429	0.0164	1.4254	8.0000e-005		7.9200e-003	7.9200e-003		7.9200e-003	7.9200e-003	0.0000	2.3357	2.3357	2.2400e-003	0.0000	2.3916
Total	**0.8434**	**0.0164**	**1.4254**	**8.0000e-005**		**7.9200e-003**	**7.9200e-003**		**7.9200e-003**	**7.9200e-003**	**0.0000**	**2.3357**	**2.3357**	**2.2400e-003**	**0.0000**	**2.3916**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	40.9278	0.3430	8.4100e-003	52.0092
Unmitigated	47.8686	0.4286	0.0105	61.7078

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	12.5096 / 7.88647	40.3545	0.4091	9.9700e-003	53.5519
City Park	0 / 3.49104	5.6336	2.3000e-004	5.0000e-005	5.6550
General Office Building	0.481658 / 0.29521	1.5402	0.0158	3.8000e-004	2.0482
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	0.106458 / 0.0652482	0.3404	3.4800e-003	8.0000e-005	0.4527
Total		**47.8686**	**0.4286**	**0.0105**	**61.7078**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	10.0077 / 7.4054	34.0526	0.3274	7.9900e-003	44.6172
City Park	0 / 3.27809	5.2899	2.1000e-004	5.0000e-005	5.3101
General Office Building	0.385327 / 0.277202	1.2983	0.0126	3.1000e-004	1.7051
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	0.0851661 / 0.0612681	0.2870	2.7900e-003	7.0000e-005	0.3769
Total		**40.9278**	**0.3430**	**8.4200e-003**	**52.0092**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	10.2866	0.6079	0.0000	25.4845
Unmitigated	20.5731	1.2158	0.0000	50.9691

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	88.32	17.9282	1.0595	0.0000	44.4163
City Park	0.25	0.0508	3.0000e-003	0.0000	0.1257
General Office Building	2.52	0.5115	0.0302	0.0000	1.2673
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	10.26	2.0827	0.1231	0.0000	5.1598
Total		**20.5731**	**1.2158**	**0.0000**	**50.9691**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	44.16	8.9641	0.5298	0.0000	22.2081
City Park	0.125	0.0254	1.5000e-003	0.0000	0.0629
General Office Building	1.26	0.2558	0.0151	0.0000	0.6337
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Recreational Swimming Pool	5.13	1.0413	0.0615	0.0000	2.5799
Total		**10.2866**	**0.6079**	**0.0000**	**25.4845**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

West Oaks Project

Vegetation

Land Use Change - Net Sequestered Carbon

The project's changes in land use results in changes in CO_2 sequestration from the atmosphere which would not have been captured had there been no land-type change.

Future planting of trees within the project site will sequester CO_2 and is considered to result in a one-time carbon-stock change. Trees sequester CO_2 while they are actively growing.

Summary:

Project Vegetation Land Use	Vegetation Land Use Category Subtype	Net Loss (acres)	Loss of Sequestered CO_2 (MT CO_2)
Oak Tree	N/A	NA	20.53
Total			**20.53**

Project Tree Category/Species	Tree Category	Number of Trees (trees)	Gain of Sequestered CO_2 (MT CO_2)
Unknown	Miscellaneous	35.00	24.78
Total			**24.78**

Total CO_2E emissions released (loss) (MT)	**20.53**
CO_2E sequestered from Net New Trees (gain) (MT)	**24.78**
Total CO_2E Released (loss - gain) (MT)	**-4.25**
Amortized Net Change of CO_2E over 30 years (MT/year)	**-0.14**

West Oaks Project

Vegetation

Land Use Change - Gain of Sequestered Carbon

Planting trees will sequester CO_2 and is considered to result in a one-time carbon-stock change. Trees sequester CO_2 while they are actively growing. The amount of CO_2 sequestered depends on the type of tree.

Equation:

Total Sequestered CO_2 (MT CO_2) = (Growing Period x $\Sigma\, t$ (Sequestration t x Trees t))

Where:

Growing Period = growing period for all trees, expressed in years (20 years is the default)
Sequestration t = default annual CO_2 accumulation per tree for broad species class t
Trees t = number of net new trees of broad species class t

Total Sequestered CO_2 is the growing period for all trees multiplied by the summation of annual CO_2 accumulation multiplied by the number of new trees per broad species class.

Default CalEEMod Factors

The program uses default annual CO_2 accumulation per tree for broad species class as follows:

Species	CO_2 Sequestered (MT/tree/year)
Aspen	0.0352
Soft Maple	0.0433
Mixed Hardwood	0.0367
Hardwood Maple	0.0521
Juniper	0.0121
Cedar/Larch	0.0264
Douglas Fir	0.0447
True Fir/Hemlock	0.0381
Pine	0.0319
Spruce	0.0337
Miscellaneous	0.0354

Notes:

"CO2 Sequestered" is based on IPCC's carbon (C) values converted to carbon dioxide (CO2) using ratio of molecular weights (44/12).
Miscellaneous is the average of all other broad species classes. To be assumed if tree type is not known.

Reference:

CalEEMod Users Guide, Appendix A Calculation Details (Section 11 Vegetation, pages 50-53)

West Oaks Project

Calculations:

Project Tree Category/Species	Tree Category	Growing Period (year)	Number of Trees (trees)	Tree CO_2 Sequestered Factor (MT CO_2/Tree/Year)	Released CO_2 (MT CO_2)
Unknown	Miscellaneous	20	29.00	0.0354	20.53
	Total				**20.53**

Notes:

Growing Period
The program assumes the IPCC active growing period of 20 years. Thereafter, the accumulation of carbon in biomass slows with age, and will be completely offset by losses from clipping, pruning, and occasional death. Actual active growing periods are subject to, among other things, species, climate regime, and planting density. Note that trees may also be replaced at the end of the 20-year cycle, which would result in additional years of carbon sequestration. However, this would be offset by the potential net release of carbon from the removal of the replaced tree.

West Oaks Project

Vegetation

Land Use Change - Gain of Sequestered Carbon

Planting trees will sequester CO_2 and is considered to result in a one-time carbon-stock change. Trees sequester CO_2 while they are actively growing. The amount of CO_2 sequestered depends on the type of tree.

Equation:

Total Sequestered CO_2 (MT CO_2) = (Growing Period x $\Sigma\, t$ (Sequestration t x Trees t))

Where:

Growing Period = growing period for all trees, expressed in years (20 years is the default)

Sequestration t = default annual CO_2 accumulation per tree for broad species class t

Trees t = number of net new trees of broad species class t

Total Sequestered CO_2 is the growing period for all trees multiplied by the summation of annual CO_2 accumulation multiplied by the number of new trees per broad species class.

Default CalEEMod Factors

The program uses default annual CO_2 accumulation per tree for broad species class as follows:

Species	CO_2 Sequestered (MT/tree/year)
Aspen	0.0352
Soft Maple	0.0433
Mixed Hardwood	0.0367
Hardwood Maple	0.0521
Juniper	0.0121
Cedar/Larch	0.0264
Douglas Fir	0.0447
True Fir/Hemlock	0.0381
Pine	0.0319
Spruce	0.0337
Miscellaneous	0.0354

Notes:

"CO2 Sequestered" is based on IPCC’s carbon (C) values converted to carbon dioxide (CO2) using ratio of molecular weights (44/12).

Miscellaneous is the average of all other broad species classes. To be assumed if tree type is not known.

Reference:

CalEEMod Users Guide, Appendix A Calculation Details (Section 11 Vegetation, pages 50-53)

West Oaks Project

Calculations:

Project Tree Category/Species	Tree Category	Growing Period (year)	Number of Trees (trees)	Tree CO_2 Sequestered Factor ($MT\ CO_2$/Tree/Year)	Sequestered CO_2 ($MT\ CO_2$)
Unknown	Miscellaneous	20	35.00	0.0354	24.78
Total					**24.78**

Notes:

A minimum of 250 trees was estimated to be planted onsite based on preliminary landscape design plans prepared for the project by Pamela Burton & Company and HED.

Growing Period

The program assumes the IPCC active growing period of 20 years. Thereafter, the accumulation of carbon in biomass slows with age, and will be completely offset by losses from clipping, pruning, and occasional death. Actual active growing periods are subject to, among other things, species, climate regime, and planting density. Note that trees may also be replaced at the end of the 20-year cycle, which would result in additional years of carbon sequestration. However, this would be offset by the potential net release of carbon from the removal of the replaced tree.

Carlsbad Emission Inventory

Emissions Category	2012
On-Road Transportation*	488,000
Electricity	301,000
Natural Gas	134,000
Solid Waste	25,000
Off-Road Transportation**	14,000
Water	12,000
Wastewater	3,000
Total (MT CO2e)	977,000

GHG emissions for each category are rounded. Sums may not add up to totals due to rounding.

*Based on SANDAG Series 13 vehicle miles traveled estimates. 2012 is the Series 13 Base Year.

**This category includes emissions from the off-road equipment sub-categories as identified in the Carlsbad CAP (lawn and garden, construction, industrial, and light commercial equipment). The sub-categories do not include all off-road vehicles and equipment.

CA GHG Inventory	MMT CO2e	% Reduction
1990	431	
2012	451	
CA Targets	MMT CO2e	
2020	431	96%
2030	258.60	60%

Efficency Metric

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Emissions Targets (MT CO2e)											
	933,352.61	886,871.85	842,705.83	800,739.26	760,862.62	722,971.82	686,967.98	652,757.13	620,249.96	589,361.65	560,011.57
Service Pop											
Pop	118450	118,960.00	119,470.00	119,980.00	120,490.00	121,000.00	121,379.80	121,759.60	122,139.40	122,519.20	122899
Emply	77422	77,913.00	78,404.00	78,895.00	79,386.00	79,877.00	80,336.60	80,796.20	81,255.80	81,715.40	82175
Total	195872	196873	197874	198875	199876	200877	201716.4	202555.8	203395.2	204234.6	205074
Efficiency Metric (MT CO2e/SP/yr)											
	4.77	4.50	4.26	4.03	3.81	3.60	3.41	3.22	3.05	2.89	2.73

Sources:

1990 State Inventory (2020 limit): https://ww3.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf

2012 State Inventory: https://ww3.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_by_scopingplan_00-17.xlsx

2020, 2025, and 2030 Carlsbad Service Population: http://datasurfer.sandag.org/ (Selections Made: Forecast, Series 13, Jurisdiction, Carlsbad)

2030 targets based on 40% below 1990 levels in accordance with SB 32

Iterim year targets based on 5.2% reduction year over year, https://ww3.arb.ca.gov/cc/scopingplan/meetings/10_1_15slides/2015slides.pdf