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May 19, 2014

Mr. Jon Rilling
The Accretive Group of Companies
12275 El Camino Real, Suite 110
San Diego, CA 92130

Reference: Mountain Ridge Road Fire Station Alternative – Greenhouse Gas Analysis
(RECON Number 6153)

Dear Mr. Rilling:

This technical analysis identifies and documents potential greenhouse gas (GHG) impacts related to the Mountain Ridge Road Fire Station Alternative (Alternative) for the proposed Lilac Hills Ranch project (proposed project). Three figures are enclosed with this analysis: Figure 1 shows the regional location of the project site; Figure 2 shows the boundary of the project site plotted on an aerial photograph of the project vicinity; and Figure 3 shows the land use plan for the Alternative. The analysis of the proposed project is contained in the *Climate Change Technical Report, Lilac Hills Ranch, San Diego County, California* (GHG Report; RECON 2014).[1]

**Description of the Mountain Ridge Road Fire Station Alternative**

The Mountain Ridge Road Fire Station Alternative would be located on the same 608-acre site as the proposed project, and would consist of the same mix of residential, commercial, and institutional uses, along with parks, open space, and other project amenities, including the Water Reclamation Facility and Recycling Facility. Specifically, the Alternative entails construction and operation of the same component parts as the proposed project, including single-family detached, single-family attached, mixed-use residential, and age-restricted single-family homes, totaling a maximum of 1,746 dwelling units; amenities to serve the senior citizen neighborhood, including a 200-bed group residential facility; commercial uses; a K-8 school; a 50-room country inn; civic facilities, including a fire station; public and private parks; an institutional facility; and private recreational facilities and other recreational amenities. Open space areas would retain some of the existing citrus and avocado groves, along with 104.1 acres of sensitive biological/wetland habitat. Additional biological open space may be provided off-site to mitigate impacts to upland habitat and contribute to a proposed regional preserve system.

In comparison to the proposed project, the Alternative would relocate the proposed fire station from Phase 3 to Phase 5 of the project site. As shown on Figure 3, this Alternative would provide the Deer Springs Fire Protection District (DSFPD) with a 2-acre site within Phase 5 for a future permanent fire station. The station would consist of 3,000 square feet of livable space with two, dual-stacked engine bays equal to 1,500 square feet. The station would include eight parking

[1]The GHG Report contains information regarding the existing conditions and regulatory setting that are applicable to the analysis of both the proposed project and the Alternative evaluated in this letter report.

spaces for firefighters and two spaces for the public. The final design of the fire station will require a Site Plan and will need to be approved by the DSFPD.

To accommodate the location of the fire station within Phase 5, the Alternative would convert and improve Mountain Ridge Road from a 2-lane private road with restricted access to a County public road, classified as a Rural Residential Collector. Specifically, this Alternative would improve Mountain Ridge Road to allow for a 28-foot paved roadway within a 40-foot graded easement, with a reduced speed of 30 miles per hour (mph).[2] The Alternative also proposes to remove all access restriction (gates) on Mountain Ridge Road and along Lilac Hills Ranch Road, allowing public travel through the project site.

Like the proposed project, access under the Alternative would be provided by two permanent access points to West Lilac Road, which turns into Main Street within the project site. Additional access would be provided by a legal physical connection to West Lilac Road via Covey Lane, and emergency access would be provided via Street "B" via Rodriguez Road.

As discussed below, the Alternative would not alter the travel distance associated with the proposed project on a regional level, nor would it change the emissions associated with operations of buildings. However, the Alternative would result in a different set of construction-related assumptions due to the designation and improvement of Mountain Ridge Road as a County public road, in lieu of the proposed project's private road designation.

**County Significance Criteria**

The County has approved "Guidelines for Determining Significance and Report Format and Content Requirements: Climate Change" (County Guidelines), dated November 7, 2013, which are used as the basis for determining the significance of the proposed project's and this Alternative's GHG emissions. As stated in the County Guidelines, the County's Climate Action Plan (CAP) provides the overall framework for assessing significance and demonstrates a range of feasible reduction measures that can be implemented to achieve an overall reduction in GHG emissions that is supportive of the state-mandated reduction target embodied in Assembly Bill (AB) 32. Project-type specific implementing thresholds are included in the County Guidelines in order to allow projects to clearly demonstrate compliance with the CAP and identify the significance of cumulative contributions to GHG emissions. As with the proposed project, the threshold used to assess GHG emissions from the Alternative is the Performance Threshold, which states that:

> A proposed project would have a cumulatively considerable contribution to climate change impacts if it would result in a net increase of construction and operational greenhouse gas emissions, either directly or indirectly, and if the project would incorporate mitigation that achieves less than a 16-percent total reduction compared to unmitigated emissions.

In accordance with the County Guidelines, an impact analysis shall occur relative to the existing environmental baseline and consider whether project-related emissions are cumulatively considerable. "Projects that have cumulatively considerable (i.e., significant) impacts, according to the County's Guidelines, shall include project design features and/or adopt mitigation to reduce or avoid impacts to below the cumulatively considerable level" (County of San Diego 2013). As with the proposed project, the Alternative incorporates project design measures in order to meet the

---

[2]A standard Rural Residential Collector includes a 28-foot-wide paved roadway with a 48-foot-wide graded easement. While the Alternative would pursue a road exception request to improve Mountain Ridge Road with a reduced 40-foot graded easement, the analysis below assumes the worst-case scenario of a standard Rural Residential Collector with a 48-foot-wide graded easement.

16 percent performance threshold. These design measures are the same as those identified for the proposed project in the GHG Report.

As the primary difference in the Alternative and the proposed project is construction along Mountain Ridge Road and the relocation of the fire station already proposed as part of the project, the primary difference in emissions is construction related and temporary in nature. Construction activities for the Alternative would cease at the end of construction and the alternative access route would have little difference on overall travel distances. Therefore the GHG emissions associated with the Alterative would have little effect on 2035 (County CAP) or 2050 (AB 32) GHG emissions, or with the mandates under AB 375. Therefore, the Alternative would have a similar impact as the proposed project on GHG emissions in 2035 and 2050.

**Analysis Methodologies and Assumptions**

The methodology for the analysis of this Alternative is the same as that described for the proposed project in the GHG Report (RECON 2014). However, a brief summary of the methods used also is provided below.

Construction

Off-site roadway construction activities were modeled using the Road Construction Emissions Model, version 7.1.5.1, developed by the Sacramento Metropolitan Air Quality Management District (SMAQMD). Construction emissions were modeled using Alternative-specific construction information when available. Where the Alternative-specific information was not available, default assumptions provided in the model were used to estimate construction emissions, see Attachment 1.

As with construction of the proposed project, construction activities associated with the Alternative would be subject to several control measures per the requirements of the County of San Diego, San Diego Air Pollution Control District (SDAPCD) rules, and the California Air Resources Board (CARB) In-Use Off-Road Diesel Vehicle Regulation. Accordingly, all construction equipment is modeled as Tier III emissions compliant.

For GHG modeling purposes, construction of the improvements to Mountain Ridge Road proposed by the Alternative would occur in 2018 (during Phase 5) and require six months to complete. The total length of construction along Mountain Ridge Road would be approximately 0.6 mile and occur over approximately 20 acres with a daily disturbance of 2.5 acres. Annual emissions from construction equipment were quantified and added to the total GHG emissions (construction and operational) of the proposed project prior to incorporation of reduction strategies and measures.

Operation

Based on the *Lilac Hills Ranch Mountain Ridge Road Fire Station Alternative Traffic Impact Analysis* (Chen Ryan 2014), the Alternative would not result in greater trip generation as the improvements of Mountain Ridge Road would not change any proposed land uses, other than relocating the fire station from Phase 3 to Phase 5. The GHG modeling is based on conservative vehicle miles traveled (VMT) estimates and the minor differences in VMT associated with the 16 additional trips and redistribution of 2,410 average daily trips on Mountain Ridge Road from other project access roadways does not affect the mass emission estimates as all trips for any specific purpose are assumed to travel the same distance under either scenario. Thus, for GHG analysis purposes, mobile-GHG emissions from vehicular operation under either the proposed project or the Alternative are the same.

**Impact Analysis**

Based on the modeling, construction of the improvements to Mountain Ridge Road would emit 457.8 metric tons (MT) of carbon dioxide equivalents ($CO_2E$) that would not otherwise occur under the proposed project. Construction emissions associated with Mountain Ridge Road alone, under the Alternative, would equate to 15.26 $MTCO_2E$ per year when amortized over a 30-year period. The annual construction emissions from Mountain Ridge Road combined with the annual construction emissions of the other project components result in 582.38 $MTCO_2E$ per year of construction-related emissions for the Alternative, as shown below in Table 1.

**TABLE 1**
**COMPARISON OF TOTAL ANNUAL ESTIMATED GHG EMISSIONS FOR THE PROPOSED PROJECT AND MOUNTAIN RIDGE ROAD FIRE STATION ALTERNATIVE**

| Emission Sources | Proposed Project (in $MTCO_2E$) | Alternative (in $MTCO_2E$) |
|---|---|---|
| Construction | 567.12 | 582.38 |
| Vehicles | 22,884.92 | 22,884.92 |
| Energy Use | 5,244.09 | 5,244.09 |
| Area Sources | 2,758.35 | 2,758.35 |
| Water Use | 1,397.09 | 1,397.09 |
| Solid Waste | 683.31 | 683.31 |
| **Subtotal** | **33,534.88** | **33,550.14** |
| Existing Uses | -484.2 | -484.2 |
| **TOTAL** | **33,050.68** | **33,065.94** |

As shown in Table 1, the additional construction associated with the Alternative would increase total annual emissions over the proposed project by 15.26 $MTCO_2E$, due to the additional construction contemplated with widening and realigning Mountain Ridge Road under the Alternative. The Alternative would result in the same operation-related emissions as the proposed project.

As shown in Table 2, the Alternative would surpass the County's Performance Threshold of 16 percent by achieving a 19.3 percent reduction over the unmitigated project.

**TABLE 2**
**TOTAL ANNUAL ESTIMATED GHG EMISSIONS**
**FOR THE MOUNTAIN RIDGE ROAD FIRE STATION ALTERNATIVE IN 2020**
**(UNMITIGATED AND MITIGATED)**

| Emission Sources | Annual Emission Unmitigated (in $MTCO_2E$) | Annual Emissions Mitigated (in $MTCO_2E$) | Percent Reduction |
|---|---|---|---|
| Construction[1] | 582.38 | 582.38 | 0.0% |
| Vehicles | 26,863.73 | 22,884.92 | 14.8% |
| Energy Use | 6,976.23 | 5,077.75 | 27.2% |
| Area Sources | 4,229.82 | 2,758.35 | 34.7% |
| Water Use | 1,746.36 | 1,397.09 | 20.0% |
| Solid Waste | 854.14 | 683.31 | 20.0% |
| **Subtotal** | **41,252.66** | **33,383.80** | **19.1%** |
| Existing Uses | -484.2 | -484.2 | |
| **TOTAL** | **40,768.46** | **32,899.60** | **19.3%** |
| **Performance Threshold percent reduction** | NA | **19.3%** | -- |

[1]Construction emissions include Phases 1 through 5 as amortized over a 30-year period.

Table 3 shows the increase in emissions associated with the Alternative as compared to the proposed project. While total emissions, both unmitigated and mitigated, would increase with the Alternative, the present reduction from the unmitigated condition would remain the same.

**TABLE 3**
**TOTAL ANNUAL ESTIMATED GHG EMISSIONS: MOUNTAIN RIDGE ROAD FIRE STATION ALTERNATIVE COMPARED TO THE PROJECT**

| | Annual Emissions Unmitigated (in $MTCO_2E$) | Annual Emissions Mitigated (in $MTCO_2E$) | Percent Reduction |
|---|---|---|---|
| Mountain Ridge Road Fire Station Alternative | **40,768.46** | **32,899.60** | **19.3%** |
| Project[1] | **40,753.21** | **32,884.34** | **19.3%** |
| **Difference in Total Emissions** | 15.26 | **15.26** | No Change |

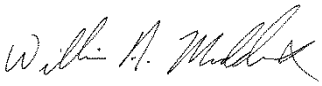
[1]Reference: Table 14, GHG Report.

Because the Alternative would not decrease the level of percentage reductions identified in the GHG Report, the Alternative would not result in any new impacts as compared to the proposed project and the Alternative's impacts would be less than significant.

**Summary**

This technical analysis identifies and documents potential GHG impacts related to the Mountain Ridge Road Fire Station Alternative as compared to those impacts identified in the GHG Report for the Lilac Hills Ranch project. The Alternative would result in an additional 457.8 $MTCO_2E$ of construction-related emissions. This would amortize to 15.26 $MTCO_2E$ per year over a 30-year period, for a total of 582.38 $MTCO_2E$ per year when combined with the annual construction emissions from the other project components. Like the proposed project, the Alternative would achieve a 19.3 percent reduction in GHG emissions from the unmitigated condition, which is the same reduction identified for the proposed project. Therefore, like the project, the Alternative impacts associated with the Alternative's GHG emissions would be less than significant.

Sincerely,



William Maddux
Senior Air Quality and Noise Specialist

WAM:sh


Project Location

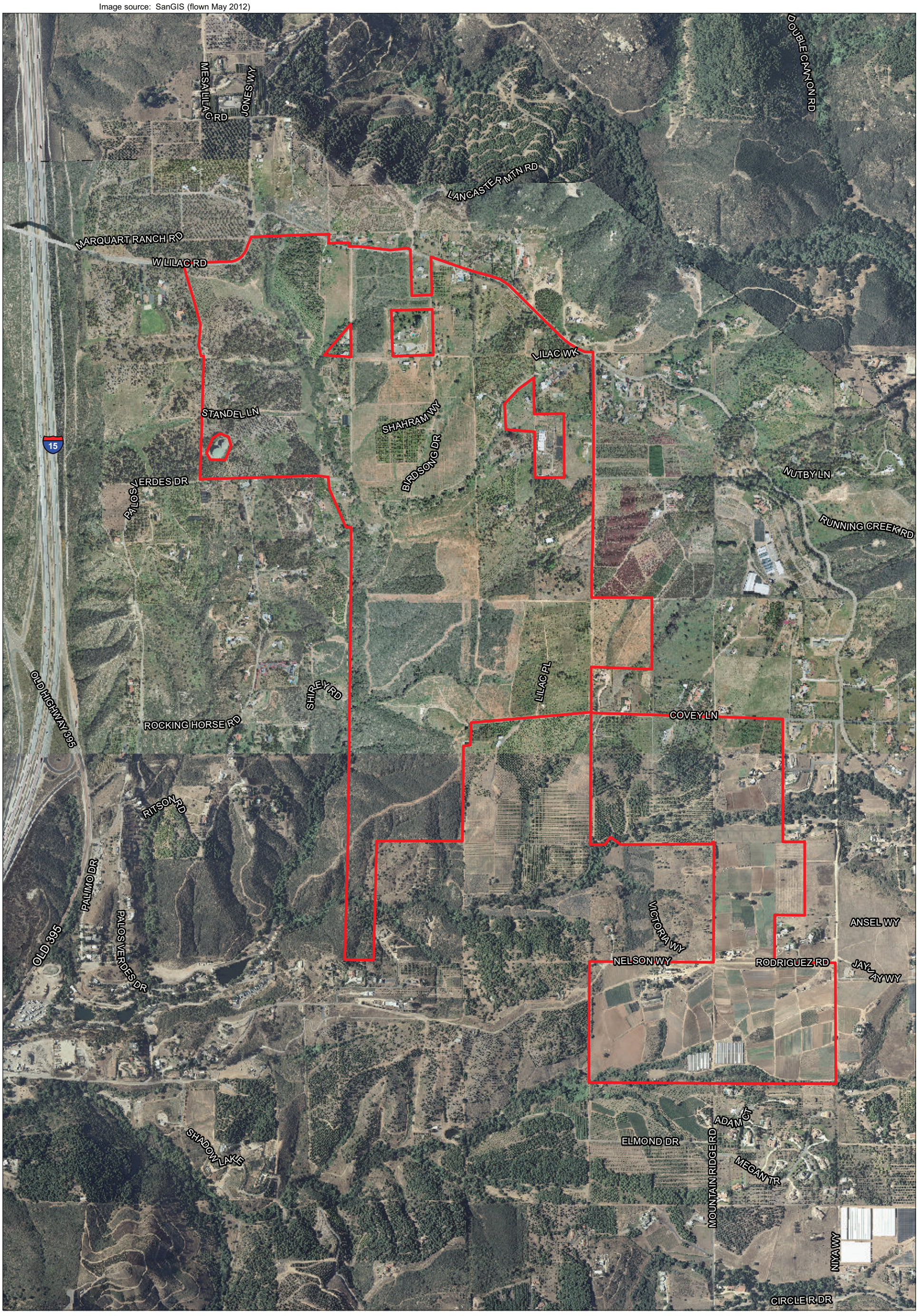
FIGURE 1

Regional Location

RECON

M:\JOBS4\6153\common_gis\fig1_air.mxd 1/14/2014 ccn

Image source: SanGIS (flown May 2012)




RECON

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FIGURE 2

Project Location on an Aerial Photograph

Map Source: Development Design Services

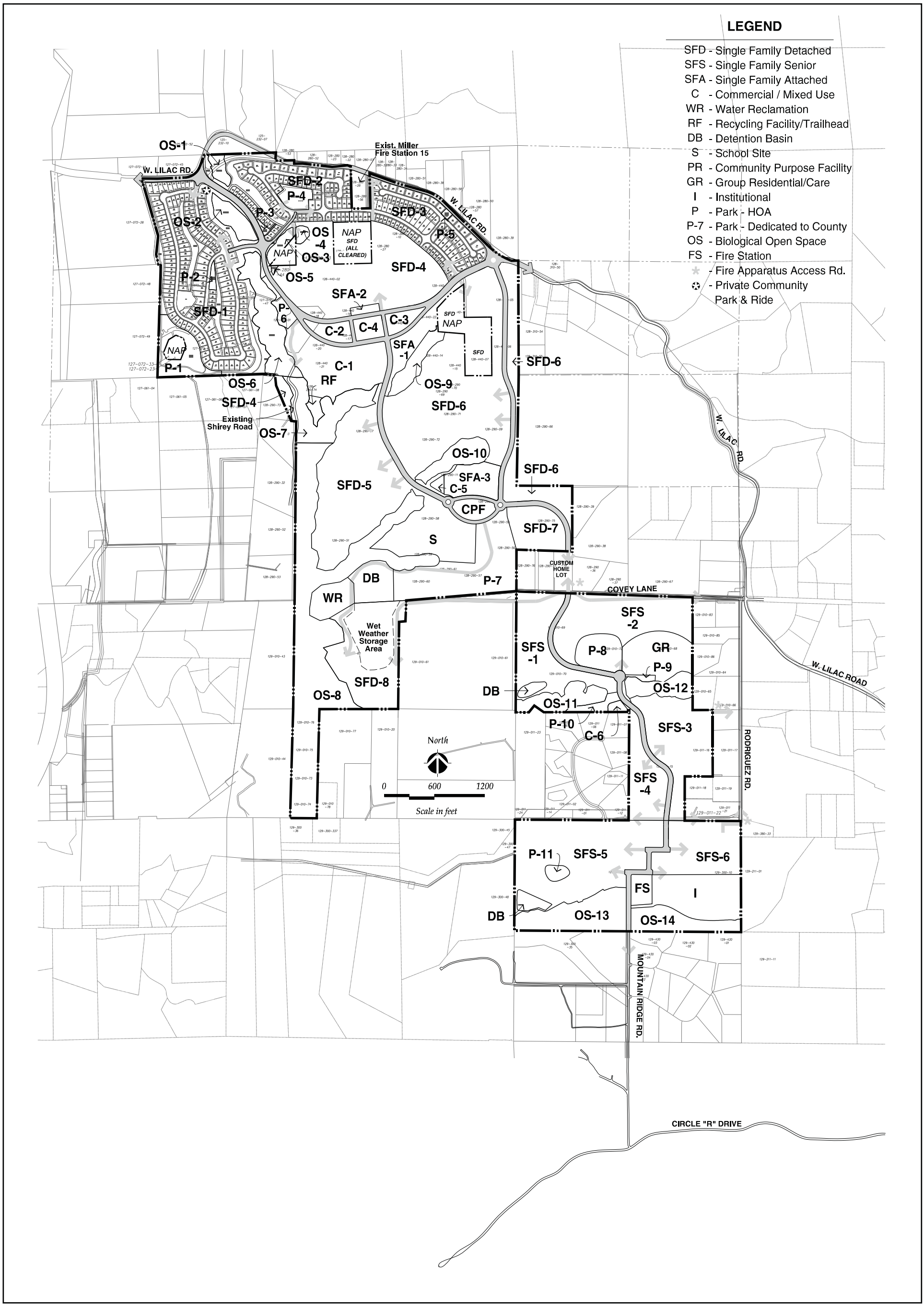


FIGURE 3
Mountain Ridge Road Fire Station Alternative – Land Use Plan

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# Attachment 1

# Road Construction Emissions Model
# GHG Calculations

## Road Construction Emissions Model, Version 7.1.5.1

| Emission Estimates for -> Mountain Ridge Road<br>Project Phases (English Units) | ROG (lbs/day) | CO (lbs/day) | NOx (lbs/day) | Total PM10 (lbs/day) | Exhaust PM10 (lbs/day) | Fugitive Dust PM10 (lbs/day) | Total PM2.5 (lbs/day) | Exhaust PM2.5 (lbs/day) | Fugitive Dust PM2.5 (lbs/day) | CO2 (lbs/day) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Grubbing/Land Clearing** | 1.0 | 8.0 | 12.2 | 25.5 | 0.5 | 25.0 | 5.6 | 0.4 | 5.2 | 1,738.5 |
| **Grading/Excavation** | 6.7 | 43.0 | 75.1 | 28.4 | 3.4 | 25.0 | 8.3 | 3.1 | 5.2 | 10,227.6 |
| **Drainage/Utilities/Sub-Grade** | 5.6 | 34.3 | 54.9 | 27.8 | 2.8 | 25.0 | 7.8 | 2.6 | 5.2 | 7,088.9 |
| **Paving** | 2.1 | 14.8 | 18.9 | 1.2 | 1.2 | - | 1.1 | 1.1 | - | 2,861.6 |
| **Maximum (pounds/day)** | 6.7 | 43.0 | 75.1 | 28.4 | 3.4 | 25.0 | 8.3 | 3.1 | 5.2 | 10,227.6 |
| **Total (tons/construction project)** | 0.3 | 2.2 | 3.6 | 1.6 | 0.2 | 1.4 | 0.4 | 0.2 | 0.3 | 483.9 |

Notes:

| | |
|---|---|
| Project Start Year -> | 2018 |
| Project Length (months) -> | 6 |
| Total Project Area (acres) -> | 20 |
| Maximum Area Disturbed/Day (acres) -> | 3 |
| Total Soil Imported/Exported ($yd^3$/day)-> | 200 |

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

| Emission Estimates for -> Mountain Ridge Road<br>Project Phases (Metric Units) | ROG (kgs/day) | CO (kgs/day) | NOx (kgs/day) | Total PM10 (kgs/day) | Exhaust PM10 (kgs/day) | Fugitive Dust PM10 (kgs/day) | Total PM2.5 (kgs/day) | Exhaust PM2.5 (kgs/day) | Fugitive Dust PM2.5 (kgs/day) | CO2 (kgs/day) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Grubbing/Land Clearing** | 0.5 | 3.6 | 5.5 | 11.6 | 0.2 | 11.4 | 2.6 | 0.2 | 2.4 | 790.2 |
| **Grading/Excavation** | 3.0 | 19.5 | 34.1 | 12.9 | 1.6 | 11.4 | 3.8 | 1.4 | 2.4 | 4,648.9 |
| **Drainage/Utilities/Sub-Grade** | 2.5 | 15.6 | 24.9 | 12.7 | 1.3 | 11.4 | 3.5 | 1.2 | 2.4 | 3,222.2 |
| **Paving** | 0.9 | 6.7 | 8.6 | 0.6 | 0.6 | - | 0.5 | 0.5 | - | 1,300.7 |
| **Maximum (kilograms/day)** | 3.0 | 19.5 | 34.1 | 12.9 | 1.6 | 11.4 | 3.8 | 1.4 | 2.4 | 4,648.9 |
| **Total (megagrams/construction project)** | 0.3 | 2.0 | 3.2 | 1.4 | 0.2 | 1.3 | 0.4 | 0.1 | 0.3 | 438.9 |

Notes:

| | |
|---|---|
| Project Start Year -> | 2018 |
| Project Length (months) -> | 6 |
| Total Project Area (hectares) -> | 8 |
| Maximum Area Disturbed/Day (hectares) -> | 1 |
| Total Soil Imported/Exported ($meters^3$/day)-> | 153 |

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

# Road Construction Emissions Model

**Version 7.1.5.1**

## Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells C10 through C25.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

**Input Type**

| | | |
|---|---|---|
| Project Name | Mountain Ridge Road | |
| Construction Start Year | 2018 | Enter a Year between 2009 and 2025 (inclusive) |
| Project Type | 1 | 1 New Road Construction<br>2 Road Widening<br>3 Bridge/Overpass Construction |
| Project Construction Time | 6.00 | months |
| Predominant Soil/Site Type: Enter 1, 2, or 3 | 2 | 1. Sand Gravel<br>2. Weathered Rock-Earth<br>3. Blasted Rock |
| Project Length | 0.60 | miles |
| Total Project Area | 20.00 | acres |
| Maximum Area Disturbed/Day | 2.50 | acres |
| Water Trucks Used? | 1 | 1. Yes<br>2. No |
| Soil Imported | 100.00 | $yd^3$/day |
| Soil Exported | 100.00 | $yd^3$/day |
| Average Truck Capacity | 20 | $yd^3$ (assume 20 if unknown) |

**The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.**

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

| Construction Periods | User Override of Construction Months | Program Calculated Months |
|---|---|---|
| Grubbing/Land Clearing | | 0.60 |
| Grading/Excavation | | 2.70 |
| Drainage/Utilities/Sub-Grade | | 1.80 |
| Paving | | 0.90 |
| **Totals** | 0.00 | 6.00 |

| 2005 | % | 2006 | % | 2007 | % |
|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**NOTE: soil hauling emissions are included in the Grading/Excavation Construction Period Phase, therefore the Construction Period for Grading/Excavation cannot be zero if hauling is part of the project.**

Hauling emission default values can be overridden in cells C45 through C46.

## Soil Hauling Emissions

| User Input | User Override of Soil Hauling Defaults | Default Values |
|---|---|---|
| Miles/round trip | | 30 |
| Round trips/day | | 10 |
| Vehicle miles traveled/day (calculated) | | 300 |

| Hauling Emissions | ROG | NOx | CO | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| Emission rate (grams/mile) | 0.15 | 6.66 | 0.67 | 0.16 | 0.09 | 1624.61 |
| Emission rate (grams/trip) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pounds per day | 0.10 | 4.40 | 0.44 | 0.10 | 0.06 | 1073.53 |
| Tons per contruction period | 0.00 | 0.13 | 0.01 | 0.00 | 0.00 | 31.88 |

Worker commute default values can be overridden in cells C60 through C65.

## Worker Commute Emissions

| | User Override of Worker Commute Default Values | Default Values |
|---|---|---|
| Miles/ one-way trip | | 20 |
| One-way trips/day | | 2 |
| No. of employees: Grubbing/Land Clearing | | 5 |
| No. of employees: Grading/Excavation | | 18 |
| No. of employees: Drainage/Utilities/Sub-Grade | | 15 |
| No. of employees: Paving | | 11 |

| | ROG | NOx | CO | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| Emission rate - Grubbing/Land Clearing (grams/mile) | 0.120 | 0.154 | 1.399 | 0.047 | 0.020 | 443.880 |
| Emission rate - Grading/Excavation (grams/mile) | 0.120 | 0.154 | 1.399 | 0.047 | 0.020 | 443.880 |
| Emission rate - Draining/Utilities/Sub-Grade (gr/mile) | 0.120 | 0.154 | 1.399 | 0.047 | 0.020 | 443.880 |
| Emission rate - Paving (grams/mile) | 0.120 | 0.154 | 1.399 | 0.047 | 0.020 | 443.880 |
| Emission rate - Grubbing/Land Clearing (grams/trip) | 0.415 | 0.255 | 3.410 | 0.004 | 0.003 | 95.711 |
| Emission rate - Grading/Excavation (grams/trip) | 0.415 | 0.255 | 3.410 | 0.004 | 0.003 | 95.711 |
| Emission rate - Draining/Utilities/Sub-Grade (gr/trip) | 0.415 | 0.255 | 3.410 | 0.004 | 0.003 | 95.711 |
| Emission rate - Paving (grams/trip) | 0.415 | 0.255 | 3.410 | 0.004 | 0.003 | 95.711 |
| Pounds per day - Grubbing/Land Clearing | 0.062 | 0.074 | 0.691 | 0.021 | 0.009 | 197.650 |
| Tons per const. Period - Grub/Land Clear | 0.000 | 0.000 | 0.005 | 0.000 | 0.000 | 1.304 |
| Pounds per day - Grading/Excavation | 0.217 | 0.258 | 2.419 | 0.072 | 0.031 | 691.775 |
| Tons per const. Period - Grading/Excavation | 0.006 | 0.008 | 0.072 | 0.002 | 0.001 | 20.546 |
| Pounds per day - Drainage/Utilities/Sub-Grade | 0.186 | 0.221 | 2.074 | 0.062 | 0.026 | 592.950 |
| Tons per const. Period - Drain/Util/Sub-Grade | 0.004 | 0.004 | 0.041 | 0.001 | 0.001 | 11.740 |
| Pounds per day - Paving | 0.140 | 0.166 | 1.555 | 0.047 | 0.020 | 444.713 |
| Tons per const. Period - Paving | 0.001 | 0.002 | 0.015 | 0.000 | 0.000 | 4.403 |
| tons per construction period | 0.012 | 0.014 | 0.133 | 0.004 | 0.002 | 37.993 |

Water truck default values can be overriden in cells C91 through C93 and E91 through E93.

| Water Truck Emissions | User Override of Default # Water Trucks | Program Estimate of Number of Water Trucks | User Override of Truck Miles Traveled/Day | Default Values Miles Traveled/Day |
|---|---|---|---|---|
| Grubbing/Land Clearing - Exhaust | | 1 | | 40 |
| Grading/Excavation - Exhaust | | 1 | | 40 |
| Drainage/Utilities/Subgrade | | 1 | | 40 |

| | ROG | NOx | CO | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| Emission rate - Grubbing/Land Clearing (grams/mile) | 0.15 | 6.66 | 0.67 | 0.16 | 0.09 | 1624.61 |
| Emission rate - Grading/Excavation (grams/mile) | 0.15 | 6.66 | 0.67 | 0.16 | 0.09 | 1624.61 |
| Emission rate - Draining/Utilities/Sub-Grade (gr/mile) | 0.15 | 6.66 | 0.67 | 0.16 | 0.09 | 1624.61 |
| Pounds per day - Grubbing/Land Clearing | 0.01 | 0.59 | 0.06 | 0.01 | 0.01 | 143.14 |
| Tons per const. Period - Grub/Land Clear | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.94 |
| Pound per day - Grading/Excavation | 0.01 | 0.59 | 0.06 | 0.01 | 0.01 | 143.14 |
| Tons per const. Period - Grading/Excavation | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 4.25 |
| Pound per day - Drainage/Utilities/Subgrade | 0.01 | 0.59 | 0.06 | 0.01 | 0.01 | 143.14 |
| Tons per const. Period - Drainage/Utilities/Subgrade | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 2.83 |

Fugitive dust default values can be overridden in cells C110 through C112.

| Fugitive Dust | User Override of Max Acreage Disturbed/Day | Default Maximum Acreage/Day | PM10 pounds/day | PM10 tons/per period | PM2.5 pounds/day | PM2.5 tons/per period |
|---|---|---|---|---|---|---|
| Fugitive Dust - Grubbing/Land Clearing | | 2.5 | 25.0 | 0.2 | 5.2 | 0.0 |
| Fugitive Dust - Grading/Excavation | | 2.5 | 25.0 | 0.7 | 5.2 | 0.2 |
| Fugitive Dust - Drainage/Utilities/Subgrade | | 2.5 | 25.0 | 0.5 | 5.2 | 0.1 |

## Off-Road Equipment Emissions

| **Grubbing/Land Clearing** | Default Number of Vehicles | | ROG | CO | NOx | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|---|---|
| Override of Default Number of Vehicles | *Program-estimate* | Type | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day |
| | | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cement and Mortar Mixers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Crawler Tractors | 0.66 | 4.47 | 8.32 | 0.31 | 0.29 | 824.93 |
| | | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Excavators | 0.31 | 2.79 | 3.20 | 0.16 | 0.14 | 572.78 |
| | | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Graders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Construction Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other General Industrial Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Material Handling Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pavers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Paving Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Plate Compactors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rollers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Scrapers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 2 | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Tractors/Loaders/Backhoes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Grubbing/Land Clearing | pounds per day | 1.0 | 7.3 | 11.5 | 0.5 | 0.4 | 1397.7 |
| | Grubbing/Land Clearing | tons per phase | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 9.2 |

| **Grading/Excavation** | Default Number of Vehicles | | ROG | CO | NOx | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|---|---|
| Override of Default Number of Vehicles | *Program-estimate* | Type | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day |
| | | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cement and Mortar Mixers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0 | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Crawler Tractors | 0.66 | 4.47 | 8.32 | 0.31 | 0.29 | 824.93 |
| | | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 3 | Excavators | 0.94 | 8.37 | 9.60 | 0.47 | 0.43 | 1718.33 |
| | | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Graders | 0.87 | 3.46 | 8.31 | 0.47 | 0.43 | 667.39 |
| | | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Construction Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other General Industrial Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Material Handling Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pavers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Paving Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Plate Compactors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | Rollers | 0.54 | 3.02 | 4.95 | 0.34 | 0.31 | 558.85 |
| | | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Rubber Tired Loaders | 0.44 | 3.11 | 5.26 | 0.18 | 0.16 | 662.49 |
| | 2 | Scrapers | 2.37 | 14.51 | 28.08 | 1.11 | 1.02 | 3217.12 |
| 0.00 | 2 | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | Tractors/Loaders/Backhoes | 0.56 | 3.14 | 5.28 | 0.37 | 0.34 | 670.05 |
| | | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Grading/Excavation | pounds per day | 6.4 | 40.1 | 69.8 | 3.2 | 3.0 | 8319.2 |
| | Grading | tons per phase | 0.2 | 1.2 | 2.1 | 0.1 | 0.1 | 247.1 |

| **Drainage/Utilities/Subgrade**<br>Override of Default Number of Vehicles | Default<br>Number of Vehicles<br>*Program-estimate* | | ROG<br>pounds/day | CO<br>pounds/day | NOx<br>pounds/day | PM10<br>pounds/day | PM2.5<br>pounds/day | CO2<br>pounds/day |
|---|---|---|---|---|---|---|---|---|
| | | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Air Compressors | 0.58 | 3.40 | 3.86 | 0.30 | 0.27 | 507.95 |
| | | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cement and Mortar Mixers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crawler Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Excavators | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Generator Sets | 0.43 | 2.96 | 3.42 | 0.23 | 0.21 | 487.07 |
| | 1 | Graders | 0.87 | 3.46 | 8.31 | 0.47 | 0.43 | 667.39 |
| | | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Construction Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other General Industrial Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Material Handling Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pavers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Paving Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Plate Compactors | 0.04 | 0.21 | 0.25 | 0.01 | 0.01 | 34.45 |
| | | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Pumps | 0.36 | 2.44 | 2.83 | 0.19 | 0.18 | 396.14 |
| | | Rollers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Rough Terrain Forklifts | 0.17 | 2.03 | 2.02 | 0.10 | 0.09 | 372.67 |
| | | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | Scrapers | 2.37 | 14.51 | 28.08 | 1.11 | 1.02 | 3217.12 |
| 0.00 | 2 | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | Tractors/Loaders/Backhoes | 0.56 | 3.14 | 5.28 | 0.37 | 0.34 | 670.05 |
| | | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Drainage | pounds per day | 5.4 | 32.2 | 54.1 | 2.8 | 2.5 | 6352.8 |
| | Drainage | tons per phase | 0.1 | 0.6 | 1.1 | 0.1 | 0.1 | 125.8 |

| **Paving** | Default Number of Vehicles | | ROG | CO | NOx | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|---|---|
| Override of Default Number of Vehicles | *Program-estimate* | Type | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day |
| | | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cement and Mortar Mixers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crawler Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Excavators | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Graders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Construction Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other General Industrial Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Material Handling Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Pavers | 0.33 | 2.84 | 3.45 | 0.17 | 0.16 | 482.19 |
| | 1 | Paving Equipment | 0.24 | 2.69 | 2.59 | 0.13 | 0.12 | 426.37 |
| | | Plate Compactors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 3 | Rollers | 0.80 | 4.53 | 7.43 | 0.51 | 0.47 | 838.28 |
| | | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Scrapers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 2 | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | Tractors/Loaders/Backhoes | 0.56 | 3.14 | 5.28 | 0.37 | 0.34 | 670.05 |
| | | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Paving | pounds per day | 1.9 | 13.2 | 18.8 | 1.2 | 1.1 | 2416.9 |
| | Paving | tons per phase | 0.0 | 0.1 | 0.2 | 0.0 | 0.0 | 23.9 |
| **Total Emissions all Phases (tons per construction period) =>** | | | 0.3 | 2.0 | 3.4 | 0.2 | 0.2 | 406.0 |

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

| Equipment | | Default Values Horsepower | | Default Values Hours/day |
|---|---|---|---|---|
| Aerial Lifts | | 63 | | 8 |
| Air Compressors | | 106 | | 8 |
| Bore/Drill Rigs | | 206 | | 8 |
| Cement and Mortar Mixers | | 10 | | 8 |
| Concrete/Industrial Saws | | 64 | | 8 |
| Cranes | | 226 | | 8 |
| Crawler Tractors | | 208 | | 8 |
| Crushing/Proc. Equipment | | 142 | | 8 |
| Excavators | | 163 | | 8 |
| Forklifts | | 89 | | 8 |
| Generator Sets | | 66 | | 8 |
| Graders | | 175 | | 8 |
| Off-Highway Tractors | | 123 | | 8 |
| Off-Highway Trucks | | 400 | | 8 |
| Other Construction Equipment | | 172 | | 8 |
| Other General Industrial Equipment | | 88 | | 8 |
| Other Material Handling Equipment | | 167 | | 8 |
| Pavers | | 126 | | 8 |
| Paving Equipment | | 131 | | 8 |
| Plate Compactors | | 8 | | 8 |
| Pressure Washers | | 26 | | 8 |
| Pumps | | 53 | | 8 |
| Rollers | | 81 | | 8 |
| Rough Terrain Forklifts | | 100 | | 8 |
| Rubber Tired Dozers | | 255 | | 8 |
| Rubber Tired Loaders | | 200 | | 8 |
| Scrapers | | 362 | | 8 |
| Signal Boards | | 20 | | 8 |
| Skid Steer Loaders | | 65 | | 8 |
| Surfacing Equipment | | 254 | | 8 |
| Sweepers/Scrubbers | | 64 | | 8 |
| Tractors/Loaders/Backhoes | | 98 | | 8 |
| Trenchers | | 81 | | 8 |
| Welders | | 45 | | 8 |

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**END OF DATA ENTRY SHEET**