# BAYER HEALTHCARE PRODUCT TESTING FACILITY
## INITIAL STUDY

PUBLIC REVIEW DRAFT
AUGUST 2014


## LEAD AGENCY

CITY OF BERKELEY
PLANNING AND DEVELOPMENT DEPARTMENT
2120 MILVIA STREET
BERKELEY CA 94704

URBAN PLANNING PARTNERS INC.

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# PROJECT DESCRIPTION

1. **Project Title:** Bayer HealthCare Product Testing Facility Project

2. **Lead Agency Name and Address:**
   City of Berkeley
   2120 Milvia Street
   Berkeley, CA 94704

3. **Contact Person and Phone Number:**
   Aaron Sage, AICP, Senior Planner
   Planning and Development Department
   Land Use Planning Division
   2120 Milvia Street, Berkeley CA 94704

   Phone: (510) 981-7425
   Email: asage@cityofberkeley.info

4. **Project Location:**
   801 Grayson Street, Berkeley, CA 94710

   Portion of Assessor's Parcel No. 054-174800201

5. **Project Sponsor's Name and Address:**
   Victor Warren, Architect
   Site Architect
   Bayer HealthCare LLC
   800 Dwight Way
   Berkeley, CA 94701-1986

6. **General Plan Designation**[1]**:**
   Manufacturing

7. **Zoning**[2]**:**
   Mixed Manufacturing (MM)

8. **Description of Project:**

[1] City of Berkeley, 2002. General Plan – Figure 4: General Plan Land Use Diagram.
[2] City of Berkeley, 2014e. Land Use Zoning Districts. March 20.

# Background

## Project Location and Background

The Bayer HealthCare LLC (Bayer) Campus in the City of Berkeley is located approximately 2.5 miles from Downtown Berkeley as shown in Figure 1. The Bayer Campus is comprised of approximately 46 acres and is roughly bounded by the Southern Pacific Railroad right-of-way to the west, Seventh Street to the east, Grayson Street to the south, and Dwight Way to the North together with Parking Lot E which is located on a portion of the block between Dwight, Seventh, Parker and Sixth streets, as shown in Figure 1. (There are three contiguous parcels near the corner of Carleton and Seventh Streets which are not owned by Bayer.) The Bayer Campus houses pharmaceutical operations with supporting office uses and includes two primary areas:

- 800 Dwight Way, the original "North Campus," north of Carleton Street, which is comprised of approximately 31 acres; and
- 801 Grayson Street, the "South Properties," south of Carleton Street, which is approximately 15 acres.

This Initial Study/Mitigated Negative Declaration evaluates the Product Testing Facility Project (project) which includes parcels in both the North Campus and the South Properties.

In 1992, Bayer (formerly named Miles Inc.) and the City of Berkeley entered into a 30-year Development Agreement (DA) (dated February 25, 1992) for the Bayer North Campus outlining the long-term development program for the North Campus, including up to 1.167 million square feet of floor area. The DA was amended June 10, 1999 (First Amendment to the DA) to modify the site plan, building, and phasing among other revisions. An EIR analyzed the potential impacts of the development proposed as part of the DA. The EIR was certified in 1991. The DA addresses a wide range of anticipated projects in the North Campus, but does not include the South Properties in its project area.

A Use Permit for the South Properties was approved and a Mitigated Negative Declaration adopted on July 21, 2000. While the north and south subareas are governed by two, separate City entitlements, they are operated as one Bayer Campus.

## Project Site and Description

The project site includes several parcels within the Bayer Campus, as shown in Figure 2. The proposed project includes two components and affects the following existing and proposed buildings:

1. Construction of a New Building (#88) for product testing, with approximately 80,000 square feet within three-stories on the South Properties. Building #88 represents modernization and consolidation of existing product testing facilities (see items 2 and 3, below) and would support Bayer's pharmaceutical operations.

2. Demolition of three buildings (#s 28, 28A and 50), which currently house product testing and pharmaceutical operations, total approximately 65,000 square feet on the North Campus.

The net increase in building area as a result of the new building and demolition components is approximately 15,000 square feet. While Bayer does not anticipate adding any employees due to this expansion, the new building would increase the capacity of the campus. At an estimated 600 square feet per employee, the project could increase capacity by 25 additional employees.[3]

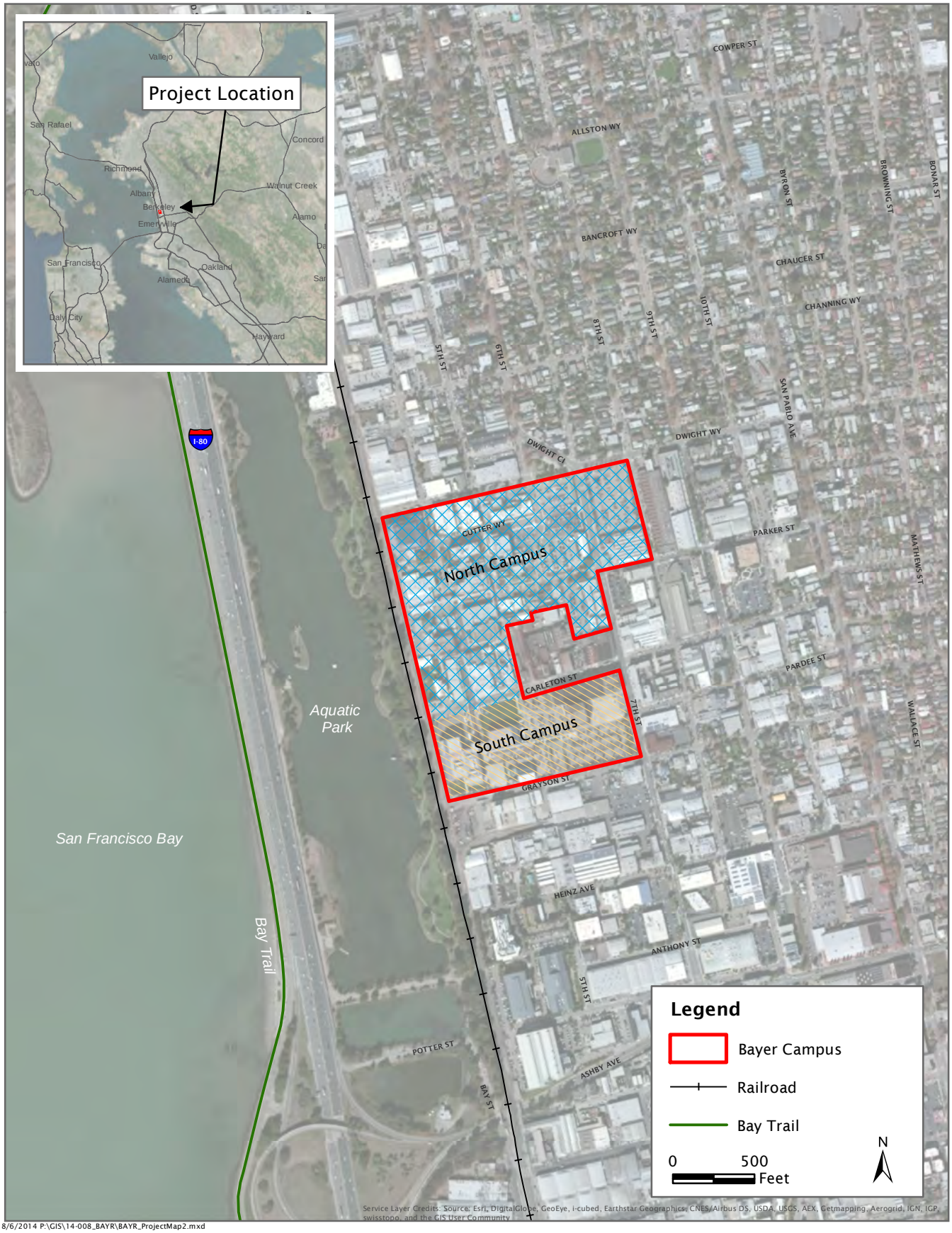
This Initial Study/Mitigated Negative Declaration collectively refers to these improvements as the "project" and to areas where each would occur as the "project site." Details about each component are provided in the Project Details subsection below.

## Surrounding Uses

North of the Bayer Campus are one- and two-story artisan, industrial, business and residential uses. To the south, the area is bounded by one- and two-story artisan, industrial, and business uses. To the east, including along Carleton Street directly adjacent to the Campus, are one- to four-story industrial and business uses, with some ground-floor retail spaces. A few single-family homes are located southeast of Seventh and Grayson Streets. To the west, the Southern Pacific Railroad right-of-way runs generally north-south and separates the Campus from Berkeley's Aquatic Park. Access to the Bayer Campus is through guarded entrances on both Dwight Way and Grayson Street west of Seventh Street. The main regional access for employees or visitors is from Interstate 80 (I-80) using the CA-13 S/Ashby Ave or University Ave exits.

Along Grayson Street, the Bayer Campus is surrounded by a fence and street trees. On Seventh Street, the fence and street trees are interrupted from midblock to the corner of Carleton and Seventh Streets by Building #84. On the northwest corner of Carleton and Seventh Streets are three non-Bayer properties, housing several business and industrial uses, including the Macaulay Foundry, David Brothers' property, and Electro Coatings. Most of the rest of the Bayer Campus along Seventh Street and Dwight Way is surrounded by fencing and street trees. Views into the site are of parking lots and buildings. Because of obstructing buildings, at no point can a viewer see past the site towards the Aquatic Park and San Francisco Bay.

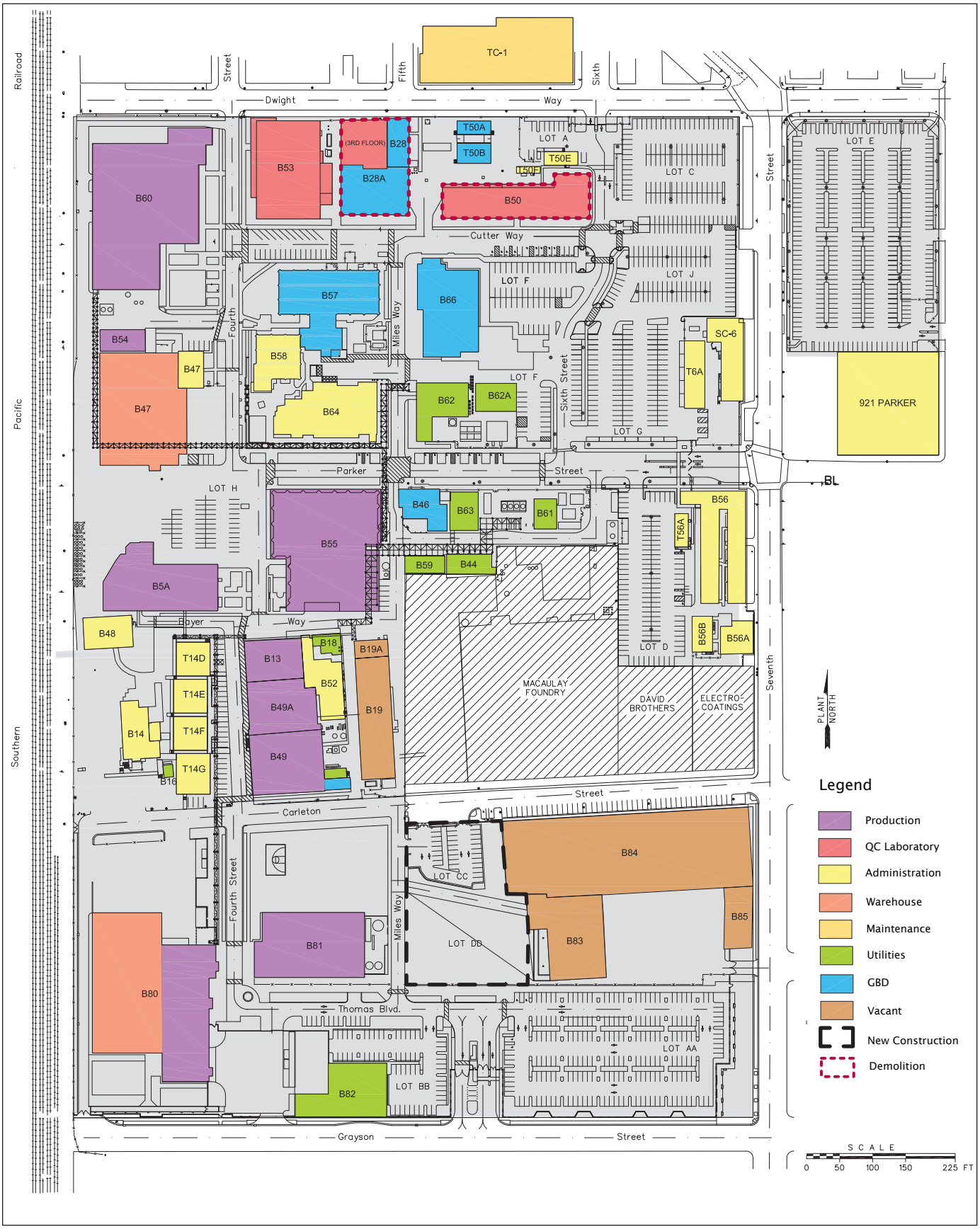
[3] This factor represents Bayer's estimate of future employee generation rates based on the number of employees per square foot for product testing work.




8/6/2014 P:\GIS\14-008_BAYR\BAYR_ProjectMap2.mxd

Source: Urban Planning Partners, Inc. 2014

Figure 1
Bayer HealthCare Product Testing Facility
Project Location Map




Source: Bayer HealthCare; Urban Planning Partners, 2014.

Figure 2
Bayer HealthCare Product Testing Facility
Project Site

## Project Details

### New Building Site - Building #88

The site for Building #88 is located on Lots CC and DD, between Carleton Street, Miles Way and Thomas Boulevard near the corner of Grayson Street and Seventh Street, as shown in Figure 2. The site is primarily vacant. Lot CC, the northern portion of the site is occupied by a paved parking lot, with some limited vegetation, including trees and landscaping between parking aisles. Lot DD, the southern portion of the site is vacant gravel, which is used informally for parking. Prior to construction, the existing low bushes and landscaped islands in the parking lot would be removed. The trees would be removed, temporarily replanted in containers, and then relocated elsewhere on the Bayer Campus.

To the west of the new building site is Building #81, which houses a pharmaceutical manufacturing facility and an open lawn north of that building. To the north is the Macaulay Foundry (not part of the Bayer Campus). To the east of new building site are the existing Buildings #83 and #84, both of which are currently unoccupied. Building #83 (also known as the Colgate building) is approximately 90 feet tall, exceeding both the existing height limit for this zoning district and the proposed height of the project. To the south of the new building site is a surface parking lot and the Grayson Street entrance. The new building's entrance would face Miles Way near Thomas Boulevard.

Building #88 is proposed to be product testing facility devoted to the testing of pharmaceutical products to support Bayer's manufacturing process (e.g., product testing to ensure products meet national and international regulatory requirements). The building is proposed to be 80,000 square feet within three-stories (45 feet, plus mechanical equipment and screening measuring approximately 16 feet, which is permitted by the City's Municipal Code). The building would operate using 24-hour/7-day work shifts. Building materials would include matte-finish metal panels, glazing (windows), metal louvers, and metal sunshades and canopies in a contemporary industrial architectural style, similar to Buildings #60, #66, #80, and #81 of the Bayer Campus.

Planned site improvements include an outdoor courtyard between the north side of the new building and the existing Building #83. The courtyard would be approximately 18,300 square feet and would include trees and native grasses along the Thomas Way sidewalk, a grove of trees at the Carleton Street frontage, lawn, and irrigation for the trees only.

The South Properties (approximately 627,000 square feet) currently accommodates about 400,000 square feet of developed square footage. With the approximately 80,000-square-foot Project, the floor area ratio (FAR) on the South Properties would be about 0.7.

### Demolition Site - Buildings #28, #28A and #50

The demolition site is located in the North Campus, along Dwight Way, as shown on Figure 2. Buildings #28, #28A, and #50, which occupy a 2.2-acre area, are proposed for demolition. The majority of the operations would be replaced by and consolidated into Building #88, described above. The total floor area to be demolished is approximately 65,000 square feet. The demolition of Buildings #28 and #50 is identified in the 1992 DA and was previously evaluated in the EIR prepared for the Miles Inc. long range plan and Development Agreement.[4] The demolition of Building #28A represents a new proposal. Still, this Initial Study/Mitigated Negative Declaration evaluates demolition of all three buildings.

The applicant estimates that the amount of refuse from Buildings #28 and #28A would be 25 million pounds (12,500 tons). Approximately 90 percent would be recycled and 10 percent placed in landfill. Refuse from Building #50 is estimated at 5 million pounds (2,500 tons), with approximately 40 percent anticipated to be recycled and 60 percent placed in landfill. Once the buildings are demolished, the lots would be left vacant and maintained with a combination of paving and landscaping until Bayer determines a future use for the site.

## Construction and Demolition

### Phasing

The Building #88 component of the project is proposed to be constructed in one phase lasting approximately 2 years, potentially beginning in January 2015. During the construction period, access would be via the existing Grayson Street gate. All temporary facilities, parking for contractors and construction delivery and storage areas would be internal to the site.

Following construction of Building #88, the majority of operations and employees of Buildings #28, #28A, and #50 would be moved and consolidated into Building #88in approximately 2017. The remaining occupants would be relocated in the future to other facilities on the Bayer campus. Buildings #28, #28A, and #50 would occur between 2018 and 2022. Prior to their demolition, Buildings #28, #28A, and #50 would be used for laboratory or office uses in the short-term in support of the transition between product testing facilities.

As a result, there would be a period of approximately 1 to 5 years during which Building #88 would be functioning and Buildings #28, #28A, and #50 would still be operational. However, Bayer does not propose hiring additional employees during this time above and beyond the 25 employees expected to occupy the project's net additional 15,000 square

[4] City of Berkeley, 1992a. "Development Agreement By and Between the City of Berkeley and Miles Inc. for the Miles Inc. Long Range Development Plan." February 25: Exhibit C – Site Development Plan.

feet. Therefore no impacts are expected from the temporary, simultaneous operation of Buildings #88, #28, #28A and #50, and this issue is not discussed further in the analysis that follows. Per Berkeley Municipal Code 23B.56.030, the applicant's representation indicating minimal job generation (approximately 25 new employees as stated above) and demolition of Buildings #28, #28A and #50 proceeding within 5 years of occupancy, will be made a condition of approval of the permit.

**Foundation**

Bayer has begun work on a geotechnical analysis that will inform the design for the new building's foundation. For purposes of this analysis, it conservatively is assumed that the foundation work would use augur-drilled piles.

## Access, Transit, and Parking

The project would not involve the construction of new entrances to the South Properties or internal driveways, or otherwise result in any changes to the circulation network. The building would include an at-grade loading dock.

The Bayer Campus is served by several Alameda-Contra Costa (AC) Transit bus lines. The 49 line stops on Seventh Street and provides access to the Downtown Berkeley Bay Area Rapid Transit District (BART) Station and the Rockridge BART Station, via Dwight Way and Claremont Avenue, respectively. The Z and J lines provide service to San Francisco during commute hours. Additional local and rapid bus lines are located ¼-mile east of the Bayer Campus on San Pablo Avenue.

The Berkeley Amtrak Station is located 1 mile north of the Bayer Campus and the Ashby BART Station is approximately 1.5 miles to the east. Through its Transportation Demand Management Program Bayer currently funds the West Berkeley BART Shuttle, which runs from the Ashby BART Station and the Berkeley Amtrak station, and is used by approximately 120 employees daily.[5]

The Bayer Campus has approximately 1,250 parking spaces. The project would remove 29 designated stalls (as well as the vacant gravel lot informally used for parking), resulting in a supply of 1,221 spaces following implementation of the project. Bayer estimates that the parking demand from existing facilities is 1,003 spaces, based on parking ratios of 500 to 1,000 sq. ft./parking stall, depending on the building function. As a conservative estimate,[6] the net new square footage could generate a demand of 30 spaces (15,000 sq. ft./500 sq. ft.). As a result, the project could increase Campus-wide parking demand to 1,033 spaces.

[5] City of Berkeley, 2012. "Bayer Annual Report (2011)." Memorandum to the Board & Commission Secretaries. October 18.

[6] The City's parking requirement for manufacturing uses is much lower—1 space/1,500 square feet for uses of at least 10,000 square feet (Berkeley Municipal Code Section 23E.76.080).

## Plan and Zoning Consistency

The project site is in an area designated for Manufacturing in the General Plan and Mixed Manufacturing in the West Berkeley Plan, and is located in the Mixed Manufacturing Zoning District. The project is consistent with these use designations. The project is also consistent with the 45-foot height limit in the Mixed Manufacturing District and the City's regulations regarding appurtenances for exhaust systems. Per the requirements of the Mixed Manufacturing District, creation of 40,000 square feet or more of gross floor area is subject to a Use Permit.

9. **Requested Applications:**

| Lead Agency | Required Permit |
|---|---|
| City of Berkeley | Use Permit<br>Design Review |

10. **Other public agencies whose approval may be required (e.g., permits, financing approval, or participation agreement):**

San Francisco Bay Regional Water Quality Control Board - Construction General Permit

## ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact Unless Mitigation Incorporated" as indicated by the checklist on the following pages.

- ❒ Aesthetics
- ■ Biological Resources
- ❒ Greenhouse Gas Emissions
- ❒ Land Use/Planning
- ❒ Population/Housing
- ❒ Transportation/Traffic
- ❒ Agriculture and Forestry Resources
- ■ Cultural Resources
- ■ Hazards & Hazardous Materials
- ❒ Mineral Resources
- ❒ Public Services
- ❒ Utilities/Service Systems
- ■ Air Quality
- ■ Geology/Soils
- ■ Hydrology/Water Quality
- ■ Noise
- ❒ Recreation
- ❒ Mandatory Findings of Significance

**Determination.** (To be completed by the Lead Agency.)

On the basis of this initial evaluation:

❒ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

■ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

❒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

❒ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

❒ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Carol R. Johnson

Land Use Planning Manager _____ August 6, 2014

Signature Date

# ENVIRONMENTAL CHECKLIST

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **I. AESTHETICS** | | | | |
| Would the project: | | | | |
| a) Have a substantial adverse effect on a scenic vista? | ❒ | ❒ | ■ | ❒ |
| b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? | ❒ | ❒ | ❒ | ■ |
| c) Substantially degrade the existing visual character or quality of the site and its surroundings? | ❒ | ❒ | ■ | ❒ |
| d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? | ❒ | ❒ | ■ | ❒ |

## Affected Environment

The visual landscape surrounding the Bayer Campus is developed with urban uses and consists primarily of industrial, artisan, business, and residential uses. West of the Bayer Campus is the Southern Pacific Railroad and associated right-of-way, Berkeley Aquatic Park, and Interstate 80/580. The San Francisco Bay Trail and Bay are just west of Interstate 80/580. To the east are commercial (offices and some ground-floor retail), industrial, single-family residential, and institutional uses including the two-story middle school campus for Ecole Bilingue de Berkeley and three-story ActivSpace facility. Further east are the Berkeley and Oakland Hills. To the south and southeast are more cultural, industrial, and commercial uses such as the two-story Metro Lofts, Berkeley Bowl West, and California Shakespeare Theater.

Building heights in the project site vicinity are generally one- and two-stories, with a few commercial and residential uses reaching three- and four-stories. Along the west border of the Bayer Campus, parts of Berkeley Aquatic Park and the San Francisco Bay are visible; however, they are not visible from the project site.

Building #88 is proposed to be three stories, and 45 feet (plus, mechanical equipment and other appurtenances, which would be screened and extend up to 16 feet above the roof). Within the Bayer Campus, the new building site is immediately surrounded by the Colgate Building, to the east, a Warehouse Packaging Facility to the west, and a Sterile Filling Facility to the southwest. Administrative, Development and Central Utilities buildings

immediately surround the demolition project sites. Potential impacts due to the construction and demolition components of the project are described below.

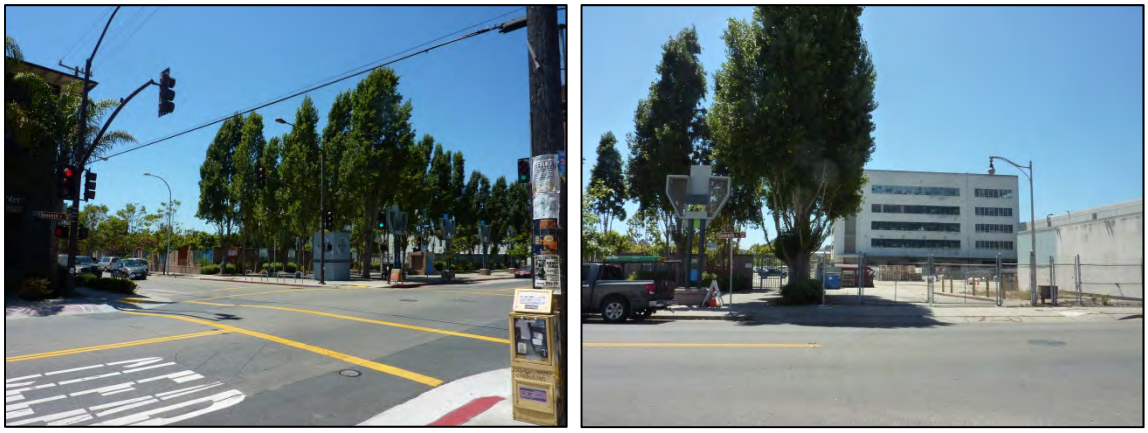
## Discussion

a) *Have a substantial adverse effect on a scenic vista?*

**Less Than Significant.** The Berkeley General Plan (General Plan) identifies several scenic resources including the San Francisco Bay, the hills, and significant landmarks such as the Golden Gate Bridge. The following policy from the General Plan seeks to protect views of these natural assets:

> Policy UD-31 Views: Construction should avoid blocking significant views, especially ones toward the Bay, the hills, and significant landmarks such as the Campanile, Golden Gate Bridge, and Alcatraz Island. Whenever possible, new buildings should enhance a vista or punctuate or clarify the urban pattern.

The demolition and new building sites are located in an urbanized area of Berkeley. Although the Bayer Campus is not open to the public, public views are available from the surrounding streets, including Dwight Way and Grayson Street. Additionally, the new building would be visible to the public from other industrial and business uses along Grayson Street and within the Bayer Campus. Similarly, public views of the demolition project would be visible from businesses on Dwight Way and Seventh Street. As shown in View #1, the five-story Colgate Building (Building #83), a fence, and a double row of trees block most or all of the views of the new building site from the street level on Seventh Street, especially during non-winter months when the foliage is full.



*View#1: Looking northwest (left) and west (right) from Seventh Street toward the new building site.*

The following visual simulations (Figures I-1 through I-4) show both the existing view and how the site would appear after Building #88 is built from locations near Seventh and Grayson Streets, where the project would be most visible from a public street.

In Figure I-1, the visual simulation shows that during winter months, the top floor of Building #88 would be more visible from Seventh Street than in View #1 as a result of less foliage on the trees. Similarly, in Figure I-2, the simulated view of Building #88 is more prominent on Grayson Street, facing northwest when the trees are bare. Figure I-3 shows that Building #88 would be most visible directly in front of the site, facing north on Grayson Street. In Figure I-4, the existing brick wall in front of Lot BB only allows partial views of Building #88 when facing northeast on Grayson Street. In each simulated view, Building #88 does not substantially degrade views of scenic resources, such as the East Bay Hills or the Bay. It generally fits in with the bulk and scale of adjacent uses within the Bayer campus, and steps down in height from the adjacent and taller Building #83.

As shown in View #2, large trees and the three-story Building #80 block views of the new building site from Berkeley Aquatic Park. Similarly, in View #3, the proposed three-story project would not disrupt views from the Berkeley Hills towards the San Francisco Bay, or any other visual resources identified in the General Plan.

*View# 2: Looking northeast toward the new building site from the San Francisco Bay Trail in Aquatic Park and from the Southern Pacific Railroad right-of-way.*


Existing view of new building site


Simulated view of Building #88

Source: Bayer HealthCare, 2014.

Figure I-1
Bayer HealthCare Product Testing Facility
Looking northwest from Seventh Street

Existing view of new building site

Simulated view of Building #88

Source: Bayer HealthCare, 2014.

Figure I-2
Bayer HealthCare Product Testing Facility
Looking northwest from Grayson Street


Existing view of new building site


Simulated view of Building #88

Source: Bayer HealthCare, 2014.

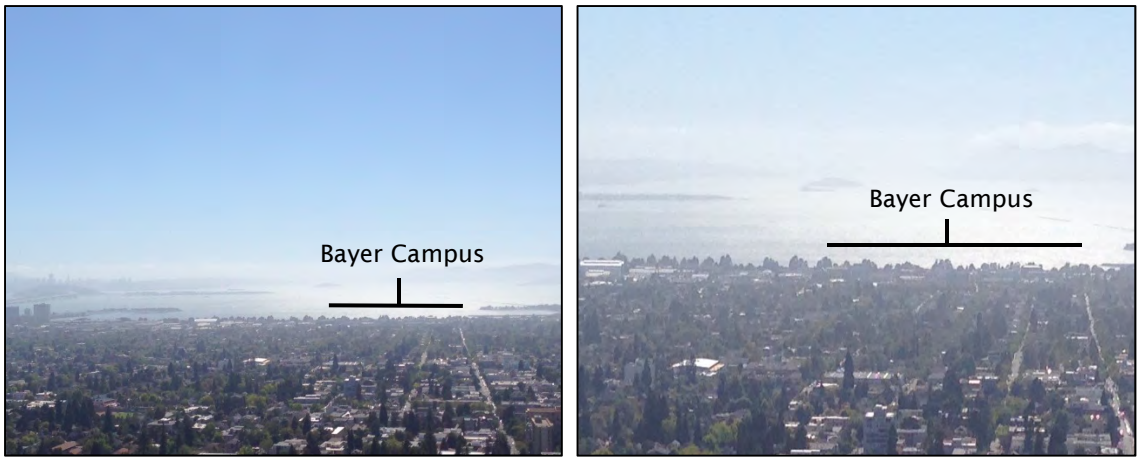
Figure I-3
Bayer HealthCare Product Testing Facility
Looking north from Grayson Street

Existing view of new building site

Simulated view of Building #88

Source: Bayer HealthCare, 2014.

Figure I-4
Bayer HealthCare Product Testing Facility
Looking northeast from Grayson Street




*View# 3: Looking west toward the Bayer Campus from Dwight Place in the Berkeley Hills.*

Building #88 would not significantly alter views of the Berkeley Hills or San Francisco Bay from a public street. The demolition component of the project would change views of the Bayer Campus and may increase views of the open sky, but would not significantly alter any scenic views. In sum, the changes in views resulting from the project would not significantly alter views from public viewpoints, nor would they degrade public views of the San Francisco Bay or other visual resources identified in the General Plan, and therefore, would have a less-than-significant impact on scenic vistas.

b) *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State Scenic Highway?*

**No Impact.** There are no State scenic highways within the vicinity of the Bayer Campus.[7] The closest scenic highway is the MacArthur Freeway (Interstate 580), which is designated by the State Department of Transportation (Caltrans) as a California Scenic Highway between San Leandro to State Route 24 in Oakland. The Bayer Campus is located approximately 3 miles from the designated portion of Interstate 580, and is not visible from this highway. In addition, scenic roadways are not designated in the General Plan. Therefore, the proposed project would have no impact on scenic resources associated with a State scenic highway.

c) *Substantially degrade the existing visual character or quality of the site and its surroundings?*

**Less Than Significant.** The visual character of the new building site would change with the introduction of a three-story building in place of a vacant lot and surface parking. The south elevation will be the most visible elevation from a public street—Grayson Street.

[7] California Department of Transportation, 2014. California Scenic Highway System. Accessed June 23. Website: http://www.dot.ca.gov/hq/LandArch/scenic_highways/route580.htm

According to the plan submittal stamp-received July 23, 2014 by the City of Berkeley, this elevation is proposed as a glass curtain wall revealing an interior stairwell, and matte metal panels with a Bayer logo sign. The visual character of the surrounding vicinity consists of other industrial, manufacturing, and storage facilities that range from one to three-stories in height with the exception of the five-story Colgate Building directly adjacent to the new building site. As a result, the addition of the three-story Building #88 would be consistent with surrounding development. Grayson Street, Seventh Street, and Dwight Way are lined with trees and a fence that surrounds the perimeter of the Bayer Campus, which buffer views into the site.

The visual character of the demolition site would also change with the removal of three buildings. There would be a temporary degradation of the visual character during demolition activities; however, once completed, the area would be left vacant, and maintained with a combination of paving and landscaping, until Bayer determines a future use of the site

The Bayer Campus area is undergoing change with several redevelopment projects already having been implemented including a Warehouse Packaging Facility and Sterile Filing Facility to the west and southwest of the new building site. The City of Berkeley has already approved of a Storage Facility to be constructed west of the new building site in 2014/2015 and the Colgate Building immediately east is approved for re-use as office space. The proposed project would fit in with the redevelopment program on the Bayer Campus by contributing to efforts to modernize its facilities. Thus, the project would have a less-than-significant impact on the existing visual character of the site and its surroundings.

d) *Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?*

**Less Than Significant.** The new building site is currently characterized by a vacant lot and surface parking and exterior lighting in the area consists primarily of street lighting. The proposed project would introduce new sources of light and glare as a result of building materials and lighting within the building, but new sources of lighting are not anticipated to be substantial in the context of existing light sources. Moreover, lighting effects would be confined to the Bayer Campus, given the location of the construction project in the interior of the site, and would not substantially affect public streets or spaces. The proposed project would be subject to the City's standard conditions of approval which require light sources to be shielded and directed away from adjacent properties as stated in the General Plan:

> Policy EM-42: Outdoor lighting should be chosen to avoid glare and provide an attractive nighttime environment with "fully shielded" fixtures to limit light rays emitted above the horizontal plane.

Therefore, uses near the project site would not be adversely affected by new light sources at the project site. In addition, the Development Agreement specifies that highly reflective glass or other highly reflective surface materials are not permitted. Building materials for Building #88 include matte-finish metal panels and glazing (windows), similar to those used in other locations on the Bayer Campus (specifically, Building 66) and consistent with the Development Agreement. As a result, daytime glare is not expected to be substantial. As such, the proposed project would result in less-than-significant light and glare impacts.

## II. AGRICULTURAL AND FOREST RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California agricultural land evaluation and site assessment model (1997) prepared by the California Dept. of conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significantly environmental effects, lead agencies may refer to information compiled by the California department of forestry and fire protection regarding the state's inventory of forest land, including the forest and range assessment project and the forest legacy assessment project; and forest carbon measurement methodology provided in forest protocols adopted by the California air resources board. Would the project:

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to a non-agricultural use? | ❒ | ❒ | ❒ | ■ |
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? | ❒ | ❒ | ❒ | ■ |
| c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Governmental Code section 51104(g))? | ❒ | ❒ | ❒ | ■ |
| d) Result in the loss of forest land or conversion of forest land to non-forest use? | ❒ | ❒ | ❒ | ■ |
| e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use? | ❒ | ❒ | ❒ | ■ |

**No Impact.** Bayer Campus is a developed/disturbed site that does not include any agricultural or forest resources. No Prime Farmland, Unique Farmland, or Farmland of Statewide Importance exists on the Bayer Campus. As a result, the project would not impact any agricultural or forest resources.

## III. AIR QUALITY

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project: | | | | |
| a) Conflict with or obstruct implementation of the applicable air quality plan? | ❒ | ❒ | ■ | ❒ |
| b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation? | ❒ | ■ | ❒ | ❒ |
| c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? | ❒ | ❒ | ■ | ❒ |
| d) Expose sensitive receptors to substantial pollutant concentrations? | ❒ | ❒ | ■ | ❒ |
| e) Create objectionable odors affecting a substantial number of people? | ❒ | ❒ | ■ | ❒ |

### Affected Environment

#### Regulatory Framework

The United States Environmental Protection Agency (EPA) is responsible for implementing the programs established under the federal Clean Air Act, such as establishing and reviewing the national ambient air quality standards (NAAQSs) and judging the adequacy of State Implementation Plans (SIPs). The California Air Resources Board (CARB) is responsible for establishing and reviewing the California ambient air quality standards (CAAQSs), developing and managing the California SIP, identifying Toxic Air Contaminants (TACs), and overseeing the activities of regional air quality management districts. In California, mobile emissions sources (e.g., construction equipment, trucks, and automobiles) are regulated by CARB and stationary emissions sources (e.g., industrial facilities) are regulated by the air quality management districts. The project is located in the San Francisco Bay Area Air Basin (SFBAAB), which is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD).

#### Criteria Air Pollutants

Under the federal Clean Air Act of 1970, the EPA has identified six criteria air pollutants that are pervasive in urban environments. EPA calls these pollutants criteria air pollutants

because the agency has regulated them by developing specific public health- and welfare-based criteria as the basis for setting the NAAQSs. The six criteria air pollutants are ozone, carbon monoxide (CO), sulfur dioxide, nitrogen dioxide, lead, and particulate matter (PM).

Criteria air pollutants are emitted directly into the atmosphere and/or are formed in the atmosphere. For example, ozone is formed in the atmosphere through a series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NOx). ROG and NOx are known as precursor compounds for ozone. There are two fractions of PM emissions that are regulated based on aerodynamic resistance diameters equal to or less than 10 microns (PM10) and 2.5 microns (PM2.5). These PM fractions are a concern because they are small enough to be inhaled into the air passages and lungs, which can cause adverse health effects. Larger dust particles with aerodynamic resistance diameters greater than 10 microns settle out rapidly and are easily filtered by human breathing passages. The finer PM2.5 fraction, which includes diesel exhaust particles, poses a more significant threat to human health because these smaller particles can penetrate deeper into the lungs.

The regulation of criteria air pollutants in California is generally achieved through regional air quality plans and emission limitations (i.e., permits) on stationary sources to achieve ambient air quality standards. The CAAQSs and NAAQSs are intended to incorporate an adequate margin of safety to protect the public health and welfare. They are designed to protect places where people are most susceptible to air pollutants, known as "sensitive receptors". Sensitive receptors include schools, convalescent homes, and hospitals because the very young, the old, and the infirm are more susceptible to air-quality-related health problems than the general public. Residential areas are also considered sensitive to poor air quality because people are often at home for extended periods, thereby increasing the duration of exposure to potential air contaminants.

The CAAQSs, which are based on meteorological conditions unique to California, are either equal to or more stringent than the NAAQSs. In accordance with the federal Clean Air Act and California Clean Air Act, areas in California are classified as either in "attainment" or "non-attainment" for each criteria air pollutant, based on whether or not the NAAQSs or CAAQSs have been achieved. The SFBAAB is currently designated "non-attainment" for the state one-hour and eight-hour ozone standards, the national eight-hour ozone standard, and for the state PM10 and PM2.5 standards. The SFBAAB is "in attainment" or "unclassified" with respect to the other ambient air quality standards.[8]

[8] BAAQMD, 2014. *Air Quality Standards and Attainment Status*. Accessed 1 July. http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm.

### Toxic Air Contaminants

TACs, which are considered non-criteria air pollutants, are airborne substances that are capable of causing adverse human health effects (i.e., injury or illness). Common sources of TAC emissions include stationary sources, such as gasoline stations and dry cleaners, and mobile sources, such as vehicle exhaust along highways and major roadways. Unlike criteria pollutants which are regionally regulated based on the CAAQSs, TAC emissions are evaluated based on estimations of localized concentrations and risk assessments. For risk assessment purposes, TACs are separated into carcinogens and non-carcinogens. Carcinogens are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per one million exposed individuals over a lifetime of exposure. Non-carcinogenic substances are generally assumed to have a safe threshold below which health impacts would not occur. Acute and chronic exposure to non-carcinogens is expressed as a hazard index (HI), which is the sum of expected exposure levels divided by the corresponding acceptable exposure levels. In the Bay Area, adverse air quality impacts to public health from TACs are predominantly from diesel particulate matter (DPM).[9]

### Air Quality Plans

In accordance with the federal Clean Air Act and California Clean Air Act, the BAAQMD is required to prepare and update an air quality plan that outlines measures by which both stationary and mobile sources of pollutants can be controlled in order to achieve NAAQSs and CAAQSs in areas designated as non-attainment. In September 2010, the BAAQMD adopted the *Bay Area 2010 Clean Air Plan* (CAP),[10] which serves as an update to the previous *Bay Area 2005 Ozone Strategy*.[11] The 2010 CAP includes 55 control measures to reduce ozone precursors, PM, TACs, and greenhouse gases (GHGs). The 2010 CAP was developed based on computer modeling and analysis of existing air quality monitoring data and emissions inventories, and incorporated traffic and population growth projections prepared by the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Government, respectively.

### BAAQMD CEQA Air Quality Guidelines

In accordance with the 2010 CAP, the BAAQMD developed and adopted thresholds of significance (Thresholds) that were incorporated into the 2010 *CEQA Air Quality Guidelines*.[12] The purpose of the *CEQA Air Quality Guidelines* is to assist lead agencies in the evaluation and mitigation of air quality impacts generated from new developments

[9] BAAQMD, 2010a. *Bay Area 2010 Clean Air Plan*. September 15.
[10] Ibid.
[11] BAAQMD, 2006. *Bay Area 2005 Ozone Strategy*. 6 January.
[12] BAAQMD, 2010b. *California Environmental Quality Act Air Quality Guidelines*. May.

during the construction and operational phases of a project. The 2010 Thresholds established levels at which air pollution emissions would cause significant environmental impacts. The 2010 Thresholds include emission values for ozone precursors (ROG and NOx), PM2.5, PM10, local CO, TACs, and GHGs. Relative to the established Thresholds, the BAAQMD also developed and incorporated screening criteria into the 2010 *CEQA Air Quality Guidelines*. The screening criteria can be used to conservatively indicate whether a proposed project would result in potentially significant air quality impacts and if more detailed air quality assessments are necessary.

On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA before adopting the 2010 Thresholds, because the 2010 Thresholds are considered a "project" subject to CEQA review. The court issued a writ of mandate ordering BAAQMD to set aside and cease dissemination of the adopted 2010 Thresholds until approved under CEQA. In view of the court's order, the BAAQMD updated the *CEQA Air Quality Guidelines* in 2012 to exclude the recommended use of the 2010 Thresholds and associated screening criteria for CEQA analysis.

On August 13, 2013, the California First Appellate District Court of Appeal reversed the trial court's decision by finding that the adoption of the 2010 Thresholds was not itself a "project" requiring CEQA review. The Court of Appeal's decision has since been appealed to the California Supreme Court, where the issue of using the 2010 Thresholds to evaluate the impact of existing environmental conditions on future project users is being challenged as a "reverse application" of the intended CEQA process. More specifically, the Supreme Court's review is limited to following: "Under what circumstances, if any, does the California Environmental Quality Act require an analysis of how existing environmental conditions will impact future residents or users (receptors) of a proposed project?"

Since the adoption process and scientific soundness of the 2010 Thresholds have not been challenged, lead agencies may continue to use the 2010 Thresholds and associated screening criteria while the issue is pending in the Supreme Court. The 2010 Thresholds and associated screening criteria are used in this initial study in conjunction with 2012 *CEQA Air Quality Guidelines*[13] for the evaluation of air quality impacts related to the proposed project.

## Discussion

a) *Conflict with or obstruct implementation of the applicable air quality plan?*

**Less than Significant.** The current and applicable air quality plan is the 2010 CAP. Based on the current 2012 *CEQA Air Quality Guidelines*, the following criteria should be

[13] BAAQMD, 2012. *California Environmental Quality Act Air Quality Guidelines*. May.

considered to determine if a project would conflict with or obstruct implementation of the 2010 CAP:

- Does the project support the primary goals of the air quality plan?
- Does the project include applicable control measures from the air quality plan?
- Does the project disrupt or hinder implementation of any air quality plan control measures?

The goals of the 2010 CAP are to reduce the emissions and ambient concentrations of ozone precursors, PM, TACs, and GHGs, and to reduce public exposure to harmful pollutants. Since the project would not result in any significant and unavoidable air quality impact-related emissions, ambient concentrations, or public exposures (see Sections b-d, below), the project supports the primary goals of the 2010 CAP.

The 2010 CAP includes 55 control measures that aim to reduce air pollution from stationary, area, and mobile sources. The control measures are organized into five categories: stationary source measures, mobile source measures, transportation control measures, land use and local impact measures, and energy and climate measures. The project's consistency with each control measure group is described below.

- Stationary source measures are enforced by BAAQMD pursuant to its authority to control emissions from permitted facilities. As a quality control testing facility, the project would not generate any point-source pollutant emissions subject to BAAQMD permit restrictions. Since the project would not be a permitted BAAQMD facility, the station source measures are not applicable to the project.
- Mobile source measures are generally statewide-programs implemented by CARB that aim to reduce vehicle emissions by accelerating the replacement of older, dirtier vehicles and equipment. Consistent with the mobile source measures, heavy-duty diesel vehicles used during project construction would be required to comply with the CARB's Off-Road Diesel Vehicle Regulation.[14]
- Transportation control measures are strategies to reduce of vehicle trips, use, miles traveled, idling, or traffic congestion for the purpose of reducing motor vehicle emissions. Project-specific measures include developing land use patterns that facilitate alternative commutes, such as walking, bicycling and group transit (e.g., carpool, buses, and commuter rail). The project would be consistent with the transportation control measures by providing access to commuting alternatives, such as sidewalks for walking, nearby bicycle paths, and bus transportation to the Bay Area Rapid Transit system.
- Land use and local impact measures are designed to 1) promote mixed-use, compact development to reduce motor vehicle travel and emissions, and 2) ensure

[14] CARB, 2014. *In-Use Off-Road Diesel Vehicle Regulation Overview*. Revised February.

that growth is planned in a way that protects people from exposure to air pollution from stationary and mobile sources of emissions. As discussed in Section III(d), below, the project would not expose sensitive receptors to air pollution from nearby stationary or mobile sources. In addition, the project would not change the existing land use (manufacturing). Therefore, the land use and local impact measures are not applicable to the project.

- Energy and climate measures are designed to reduce ambient concentrations of criteria pollutants, reduce emissions of carbon dioxide, and protect our climate by promoting energy conservation, renewable energy production, reductions in "urban heat island" effects, and tree[15] plantings. The City of Berkeley requires that new buildings meet the requirements of the California State Green Building Code (also known as "CALGreen") and supplemental green building policies to reduce energy and water usage in buildings. The project would be consistent with the energy and climate measures by complying with the City's green building requirements.

As described above, the project would comply with applicable control measures. The traffic growth projected for the proposed project would generally be accounted for by the MTC traffic projections in the 2010 CAP and, therefore, would not be expected to hinder or disrupt implementation of the plan. According to the 2012 *CEQA Air Quality Guidelines*, the project would have a less-than-significant impact on the implementation of the applicable air quality plan.

b) *Violate any air quality standard or contribute substantially to an existing or projected air quality violation?*

**Potentially Significant Unless Mitigation Incorporation.** Potential impacts of the construction and demolition components of the project related to the air quality violations can be mitigated to a less-than-significant level, as described below. Potential operational impacts are found to be less than significant.

**General Construction**

Common pollutant emissions of concern during construction include ROG, NOx, exhaust PM2.5 and PM10 from equipment, and fugitive dust PM2.5 and PM10 from earth-moving activities. According to the screening criteria in the 2010 CEQA *Air Quality Guidelines*, construction projects that include demolition are required to estimate emissions of ozone precursors and PM to determine if emissions could exceed the applicable Thresholds and substantially contribute to existing violations of CAAQSs in the SFBAAB.[16] Potential

[15] Specifically trees with low emissions of volatile organic compounds.

[16] Note that the screening criteria for "general light industry" construction is 259,000-square feet. The project's proposed building construction is about 80,000-square feet, which is below the screening criteria. However, due to the project's demolition activities, the project's construction emissions have been evaluated.

emission sources for the project would include demolition of Buildings# and #28A and grading, building construction, paving, and architectural coatings for the proposed project site. The BAAQMD recommends using the most current version of the California Emissions Estimator Model (CalEEMod) to estimate the construction emissions of a proposed project. A copy of the CalEEMod report for construction, which summarizes the input parameters, assumptions, and findings, are included in Appendix A. Unmitigated pollutant emissions during project construction were estimated using the CalEEMod default values, except as noted below.

- The building square footage and lot size were modified to equal the values in the proposed project description (approximately 80,000 square feet and approximately 1 acre, respectively).
- The estimated average daily emissions of ozone precursors and PM10 and PM2.5 from equipment exhaust during construction are compared to the 2010 Thresholds in Table III-1. The estimated emissions for ROG, NOx, and exhaust PM2.5 and PM10 were below the 2010 Thresholds and, therefore, would have a less-than-significant impact on their respective attainment status.

**TABLE III-1 SUMMARY OF AVERAGE CRITERIA POLLUTANT EMISSIONS DURING PROJECT CONSTRUCTION**

| Pollutant | ROG | NOx | Exhaust PM10 | Exhaust PM2.5 |
|---|---|---|---|---|
| Units | lb/day | lb/day | lb/day | lb/day |
| Emissions | 11 | 23 | 1.5 | <1.0 |
| Thresholds | 54 | 54 | 82 | 54 |
| Exceedance | No | No | No | No |

Note: lb/day = pounds per day
Source: CalEEMod (Appendix A)

There are no quantitative Threshold values for fugitive dust PM2.5 and PM10 from construction; however, the BAAQMD considers implementation of best management practices sufficient to reduce related air quality impacts from fugitive dust PM to a less-than-significant level. More specifically, the BAAQMD recommends implementing their *Basic Construction Mitigation Measures*[17] as best management practices for all construction projects to reduce emissions of fugitive dust PM, as well as ozone precursors and exhaust PM (regardless of the estimated emissions). The BAAQMD's *Basic*

[17] BAAQMD, 2012. op. cit.

*Construction Mitigation Measures* are summarized under **Mitigation Measure AQ-1**, below.

Mitigation Measure AQ-1: The project shall comply with the following BAAQMD's *Basic Construction Mitigation Measures*:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

Implementation of **Mitigation Measure AQ-1** would reduce potential impacts to existing air quality standards from fugitive dust PM emissions during project construction to a less-than-significant level.

**Construction Demolition**

Construction activities would include building demolition, which could potentially release hazardous building materials into the environment (if present). Building materials such as thermal system insulation, surfacing materials, and asphalt and vinyl flooring materials installed in buildings prior to 1981 may contain asbestos.[18] Lead compounds may be

[18] Title 8 of the California Code of Regulations §5208. *Asbestos*.

present in interior and exterior paints used for commercial buildings, regardless of construction date.[19] Lead and asbestos are State-recognized carcinogens.[20]

The removal of hazardous building materials prior to demolition and renovation is governed by federal and state regulations. In accordance with Section 19827.5 of the California Health and Safety Code, the City of Berkeley requires a permit for the demolition of any structure. The City's demolition permit requires the applicant to 1) demonstrate compliance with the BAAQMD's notification and abatement requirements for the demolition of buildings that may contain asbestos and 2) properly contain and dispose of lead-based paint.

The BAAQMD's requirements for notification and abatement of asbestos (if present) prior to demolition are described under BAAQMD's Regulation 11, Rule 2, *Asbestos Demolition, Renovation and Manufacturing*. All friable (crushable by hand) asbestos-containing materials (ACMs) or nonfriable ACMs subject to damage must be abated prior to demolition in accordance with applicable requirements. Friable ACMs must be disposed of as an asbestos waste at an approved facility. Nonfriable ACMs may be disposed of as nonhazardous waste at landfills that will accept such wastes. Workers conducting asbestos abatement must be trained in accordance with federal Occupational Health and Safety Administration (OSHA) and California Division of Occupational Safety and Health (Cal/OSHA) requirements.

Loose and peeling lead-based paint must be disposed of as a state and/or federal hazardous waste if the concentration of lead equals or exceeds applicable waste thresholds. Both OSHA and Cal/OSHA regulations require a supervisor who is certified to identify existing and predictable lead hazards to oversee air monitoring and other protective measures during demolition activities where lead-based paint may be present. Special protective measures and notification to Cal/OSHA are required for highly hazardous construction tasks related to lead, such as manual demolition, abrasive blasting, welding, cutting, or torch burning of structures where lead-based paint is present.[21]

Compliance with the City's demolition permit requirements and existing regulations related to asbestos and lead-based paint abatement would reduce the potential for public health hazards associated with airborne asbestos fibers or lead dust to a less-than-significant level during project demolition.

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[19] Department of Toxic Substances Control (DTSC), 2006. *Interim Guidance Evaluation of School Sites with Potential Soil Contamination as a Result of Lead from Lead-Based Paint, Organochlorine Pesticides from Termiticides, and Polychlorinated Biphenyls from Electrical Transformers*. Revised June 9.
[20] California Environmental Protection Agency, 2014. *Safe Drinking Water and Toxic Enforcement Act of 1986, Chemicals Known to the State to Cause Cancer or Reproductive Toxicity*. June 16.
[21] Title 8 of the California Code of Regulations §1532.1. *Lead.*

**Operation**

Common pollutant emissions of concern during the operational phase of a project include ROG, NOx, and exhaust PM2.5 and PM10 from equipment. Emissions of ozone precursors and PM above applicable Thresholds could substantially contribute to the existing violations of CAAQSs within the SFBAAB. Pollutant emissions during the operational phase of the project would be attributed to the net increase in existing operating conditions. Since the project area (about 80,000 square feet) would replace current operations located in about 65,000 square feet of the existing Quality Control Testing Facilities, the pollutant emissions of concern would generally be attributed to the net-area increase of 15,000 square feet. The project's net-area increase is expected to result in the employment of up to 25 additional staff.

The pollutant emissions during project operation were estimated using CalEEMod and a copy of the report, which summarizes the input parameters, assumptions, and findings, is included in Appendix A. The primary source of air pollutant emissions of concern during operation of the project would be from the net increase in mobile sources (i.e., vehicle trips). Other common sources of pollutant emissions of concern would include the net increases in energy use (e.g., combustion of natural gas from space or water heating) and area sources (e.g., consumer products, architectural coatings, and landscape maintenance equipment). The emissions from energy use and area sources were conservatively estimated based on the assumption that the existing and proposed project emissions per square foot are equal; therefore, the project's net increase in area (15,000 square feet) would directly result in a net increase in pollutant emissions above existing conditions during project operations. This conservative assumption does not account for air pollutant emission reductions that would result from implementation of the City's green building policies. As described above, these policies require new buildings to implement provisions of CALGreen and supplemental measures to ensure the City reduces energy and water usage in buildings.

The unmitigated pollutant emissions during project operations were estimated using the CalEEMod default values, except as noted below.

- The building square footage was modified to equal the net increase in area (15,000 square feet).
- Based on the assumptions of the transportation analysis conducted for the project, the weekday vehicle trip rate was increased to 8.11 trips/1,000 square feet/day (Appendix C).

The estimated average daily emissions of ozone precursors and PM10 and PM2.5 from equipment exhaust during the operational phase of the project are compared to applicable Thresholds in Table III-2.

**TABLE III-2 SUMMARY OF AVERAGE CRITERIA POLLUTANT EMISSIONS DURING PROJECT OPERATION**

| Pollutant | ROG | NOx | Exhaust PM10 | Exhaust PM2.5 |
|---|---|---|---|---|
| Units | lb/day | lb/day | lb/day | lb/day |
| Emissions | 0.9 | 1.2 | <1.0 | <1.0 |
| Thresholds | 54 | 54 | 82 | 54 |
| Exceedance | No | No | No | No |

Source: CalEEMod (Appendix A)

The estimated unmitigated emissions for ROG, NOx, and exhaust PM2.5 and PM10 were below the 2010 Thresholds and, therefore, would have a less-than-significant impact on their respective attainment status.

c) *Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?*

**Less than Significant.** Air pollution in the SFBAAB is generally a cumulative impact and, therefore, future development projects contribute to the region's adverse air quality impacts on a cumulative basis. In developing the 2010 Thresholds, the BAAQMD considered the emission levels for which an individual project's emissions would be cumulatively considerable; including the emissions of criteria pollutants already exceeding CAAQSs. The SFBAAB is currently designated a nonattainment area for ozone and PM. As discussed under Section III(b), above, emissions of ozone precursors and PM during the construction, demolition, and operational phases of the project would not exceed the 2010 Thresholds. Therefore, the cumulative impact of ozone precursors and PM from the project would be less than significant.

d) *Expose sensitive receptors to substantial pollutant concentrations?*

**Less than Significant.** Potential construction and operational impacts are found to be less than significant.

**Construction**

TAC emissions during construction are typically limited to DPM from heavy-duty diesel vehicles and equipment. The BAAQMD recommends evaluating potential air quality impacts to sensitive receptors (e.g., a place where people live, play, or convalesce) located

within 1,000 feet of a proposed project.[22] Based on the 2010 Thresholds, significant impacts to sensitive receptors would include an incremental increase of 10 cancer cases per million people, an acute or chronic non-cancer Hazard Index (HI) greater than 1.0, or ambient PM2.5 concentration greater than an annual average of 0.3 micrograms per cubic meter ($\mu g/m^3$).[23] The closest sensitive receptors to the project are residential apartments located about 600 feet to the east. Annual average concentrations of DPM and PM2.5 concentrations were estimated at the nearest receptor using the U.S. Environmental Protection Agency's (EPA's) AERSCREEN model. In accordance with guidance from the BAAQMD[24] and California EPA[25], a screening-level health risk assessment was conducted to evaluate the construction-period DPM cancer and non-cancer risks to sensitive receptors.

The total emissions of DPM were assumed to equal the total PM10 emissions estimated by CalEEMod annualized over 246 days[26] of construction. The U.S. EPA's AERSCREEN model was used to conservatively estimate the annual average concentration of DPM and PM2.5 at the nearest receptor location. Construction emissions were modeled as a single-point source at the center of the project site. The input parameters and results of the AERSCREEN model are included in Appendix A.

The modeled estimate of the maximum annual DPM concentration at the receptor location was used to calculate the incremental increase in cancer risk and chronic HI from project construction. The acute HI for DPM was not calculated because an acute reference exposure level has not been approved by the Office of Environmental Health Hazard Assessment (OEHHA) and CARB.

Cancer risk and chronic HI were assessed for children under the age of 2, who represent the most sensitive population group to adverse air quality conditions that would likely be present at a nearby residence. The average daily breathing rate estimated by OEHHA for a child under the age of 2 (658 liters per kilogram per day[27]) was assumed for the risk assessment. The cancer risk was averaged over a lifetime (70-year period) under the assumption that the children would be exposed up to 24 hours every day during the construction period. The input parameters and results of the health risk assessment are included in Appendix A.

Conservative estimates of the health risks posed by the project to the nearest residential receptor from construction DPM and exhaust PM2.5 are summarized and compared to the 2010 Thresholds in Table III-3. The estimated cancer risk and chronic HI from DPM, as

[22] BAAQMD, 2012. op. cit.
[23] BAAQMD, 2010b. op. cit.
[24] BAAQMD, 2011. *Recommended Methods for Screening and Modeling Local Risks and Hazards*. May.
[25] California EPA, 2003. *Air Toxics Hot Spots Program Risk Assessment Guidelines; the Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessment*. August.
[26] Construction days estimated by CalEEMod based on the size of construction (see Appendix A).
[27] OEHHA, 2012. *Technical Support Document for Exposure Assessment and Stochastic Analysis*. August.

well as the annual average PM2.5 concentration, were below the applicable Thresholds; therefore, TAC emissions during construction would have a less-than-significant-impact on sensitive receptors in the local community.

**TABLE III-3 SUMMARY OF THE HEALTH RISK ASSESSMENT FOR DPM AND PM2.5 EMISSIONS DURING PROJECT CONSTRUCTION**

| | Diesel Particulate Matter | | | Exhaust PM2.5 |
|---|---|---|---|---|
| | Annual Average Concentration | Child <2 Excess Cancer Risk | Chronic Hazard Index | Annual Average Concentration |
| Units | ($\mu g/m^3$) | $(10^6)^{-1}$ | --- | ($\mu g/m^3$) |
| Estimates | 0.05 | 3.2 | 0.01 | 0.05 |
| Thresholds | --- | 10 | 1.0 | 0.3 |
| Exceedance | --- | No | No | No |

Note: "---" = not applicable
Source: Appendix A

### Operation

According to definitions in the 2010 *CEQA Air Quality Guidelines*, the project would not create a new source of TAC emissions (e.g. a permitted BAAQMD facility, freeway, railroad yard, port, or truck distribution center) or introduce a new sensitive receptor to nearby existing sources of TAC emissions. As a result, operation of the project would have a less-than-significant impact on sensitive receptors in the local community related to TAC emissions.

The occurrence of localized CO concentrations, also known as "hotspots," can impact sensitive receptors in local communities. The source of local CO emissions is often associated with heavy traffic congestion, which most frequently occur at signalized intersections of high-volume roadways. The 2010 *CEQA Air Quality Guidelines* provide screening criteria to conservatively assess if a proposed project could result in CO emissions that would cause local CO concentrations to exceed the 2010 Thresholds. The proposed project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria are met:

- The project is consistent with an applicable Congestion Management Program (CMP) established by the County Congestion Management Agency for designated roads or highways, regional transportation plans, and local congestion management agency plans.
- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.

- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

The Alameda County Transportation Commission (CTC) serves as the County Congestion Management Agency. The Alameda CTC updates the County's CMP every two years to assess, monitor, and improve the performance of the County's multimodal transportation system and strengthen the integration of transportation and land use planning. The current 2013 CMP[28] requires an analysis of any project that is expected to generate more than 100 afternoon-peak-hour vehicle trips. The proposed project is expected to generate 16 PM peak-hour vehicle trips during the weekdays, as documented in Appendix C. Since the project would generate less than 100 afternoon-peak-hour vehicle trips, the project is consistent with the current CMP.

The intersection of Interstate 80 and State Route 13 south of the project site is the most heavily congested intersection in the project vicinity with a peak afternoon traffic volume of 15,933 vehicles per hour reported in 2000. Based on Alameda CTC traffic volume forecasts, the peak afternoon traffic volume at this intersection would increase to about 30,729 vehicles per hour by 2035.[29] Therefore, additional traffic from the project (12 or less trips per hour) would not increase traffic volumes at the intersection to more than 44,000 vehicles per hour. Further, vertical and/or horizontal mixing is not substantially limited at intersections near the project site. Since the project meets the BAAQMD screening criteria, the project would have a less-than-significant air quality impact on nearby sensitive receptors related to local CO concentrations.

e) *Create objectionable odors affecting a substantial number of people?*

**Less than Significant.** Odor impacts could result from creating a new odor source or from exposing a new receptor to an existing odor source. Typical odor sources are generally associated with municipal, industrial, or agricultural land uses, such as wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source, the wind speed and direction, and the sensitivity of receptors. As a quality control testing facility, the project would not be expected to generate significant odors or expose a substantial number of people to potential odors from nearby manufacturing facilities. Therefore, project impacts related to odors would be less than significant.

[28] Alameda County Transportation Commission (CTC), 2013. *Congestion Management Program*. October.
[29] Alameda CTC, 2011. *Alameda Countywide Transportation Model Update; Projections 2009 Model Documentation*. August 9.

## IV. BIOLOGICAL RESOURCES

Would the project:

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? | ❒ | ❒ | ■ | ❒ |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service? | ❒ | ❒ | ■ | ❒ |
| c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | ❒ | ❒ | ❒ | ■ |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | ❒ | ■ | ❒ | ❒ |
| e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | ❒ | ❒ | ■ | ❒ |
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan or other approved local, regional, or state habitat conservation plan? | ❒ | ❒ | ❒ | ■ |

### Affected Environment

The project site is located within a developed area and has no natural vegetation, habitat for special-status species, wetlands, or riparian habitats. The new building site is currently occupied by a surface parking lot and a vacant lot used informally for parking. Seven planted trees occur in the center of the new building site—in the parking lot—and several other trees and shrubs are located around the perimeter. On the demolition site, there are three trees along the edge of Building #28A at Cutter Way. Additionally, there are five street trees located along the Dwight Way public right-of-way along the site frontage of

the demolition site, and specifically Buildings #28 and #28A. Potential impacts due to the construction and demolition components of the project are described below.

## Discussion

a) *Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?*

**Less Than Significant.** Due to the lack of natural vegetation and urban surroundings, the trees and shrubs on the site are unlikely to provide suitable habitat for special-status bird species. After redevelopment, the site would continue to be used by common wildlife species that are adapted to urban environments. The site is not occupied by, or suited for, any special-status species. Consequently, the project would not result in any direct or indirect adverse effects on special-status plant or wildlife species and the potential impact would be less than significant.

b) *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?*

**Less Than Significant.** The project site has been disturbed by development, eliminating all native plant species, and natural communities that may have been present at one time. The nearest sensitive natural communities to the project site are located in the Berkeley Aquatic Park, west of existing buildings on the property and the Southern Pacific Railroad tracks. There are no known plants or animals of importance on the project site and it is not part of a riparian habitat or other natural community, nor is it part of a federally protected wetland; therefore, the project's impact would be less than significant.

c) *Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

**No Impact.** No jurisdictional wetlands or waters exist within the project site. Further, according to the City's interactive creek map, the site is not subject to the provisions found in Berkeley Municipal Code (BMC) Chapter 17.08 "Preservation and Restoration of Natural Watercourses."[30] As discussed in *Section IX: Hydrology and Water Quality*, the applicant must show compliance with the City's Stormwater Measures, as specified in **Mitigation Measure HYD-1** and **Mitigation Measure HYD-2**, prior to issuance of a building permit.

[30] City of Berkeley, 2014i. Information Technology, Parcel Conditions and Permit History. accessed July 2. http://www.ci.berkeley.ca.us/ppop/Home/Creeks/69299.

d) *Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

**Potentially Significant Unless Mitigation Incorporated.** The project site is not located within a migratory wildlife movement corridor. Common wildlife species that are adapted to moving through urban environments may be present on the site; however, there is no sensitive species habitat present.

Approximately seven planted trees would be removed from the new building site, replanted in containers, and relocated elsewhere on the property prior to construction. Likewise the trees adjacent to buildings proposed for demolition would be removed and replanted, if feasible, and relocated on the Bayer Campus.

Street trees along Dwight Way, adjacent to the facilities that would be demolished (Buildings #28, #28A and #50), and several small shrubs exist on the project site. Although demolition would not require removal of street trees along Dwight Way, some trimming or tree protection during demolition may be required. Trees and shrubs that would be removed from the new building site or that may be trimmed for demolition could be suitable for nesting birds, which could cause impact nesting birds and raptors protected by the Migratory Bird Treaty Act and CDFG Code 3503 and 3503.5. In addition, noise and vibration from project construction and demolition could cause adverse impacts to nesting birds in trees that would not be removed. Impacts to nesting birds or raptors would be a potentially significant impact. Implementation of **Mitigation Measure BIO-1** would reduce this potential impact to a less-than-significant level.

Mitigation Measure BIO-1: Nesting Birds: To avoid construction-related direct impacts (nest removal) or indirect impacts (increased noise levels) on nesting birds, one of the following measures shall be implemented:

- Conduct tree removal and/or tree trimming between September 1 and January 31, outside of the nesting season, to avoid or minimize potential impacts to nesting birds.

OR

- Conduct pre-construction surveys for nesting birds if construction and tree removal activities take place during the nesting season (from February 1 to August 31). A qualified wildlife biologist shall conduct a pre-construction nest survey no more than 5 days prior to initiation of construction activities. If active nests are encountered, species-specific measures shall be prepared by a qualified biologist and implemented to prevent abandonment of the active nest. At a minimum, grading in the vicinity of the nest shall be deferred until the young birds have fledged. A minimum exclusion buffer of 50 feet (300 feet or more for raptors)

shall be maintained during construction, depending on the species and location. The perimeter of the nest-setback zone shall be fenced or adequately demarcated with staked flagging at 20-foot intervals, and construction personnel and activities would be restricted in the area. A survey report by a qualified biologist verifying that (1) no active nests are present, or (2) the young have fledged, shall be submitted to the City and CDFW prior to initiation of grading in the nest-setback zone. The qualified biologist shall serve as a construction monitor during those periods when construction activities occur near active nest areas to ensure that no inadvertent impacts to these nests occur.

e) *Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*

**Less Than Significant.** As discussed above, there are no significant biological resources on or adjacent to the project site other than the existing street trees and shrubs. There are currently approximately five mature street trees along the demolition site's street frontage on Dwight Way. These street trees are subject to the City's Trees and Shrubs Ordinance (Municipal Code Chapter 12.44) and addressed in the City's General Plan includes the following policy and action regarding street trees.

> Policy EM-29 Street and Park Trees: Maintain, enhance, and preserve street and park trees to improve the environment and provide habitat.
>
> > Action A: Ensure that new development preserves existing trees, wherever feasible, and adds trees in the public right-of-way, where appropriate.

However, it may not be possible to conduct the demolition work without irreparably harming the trees. If trimming or other modification of street trees along Dwight Way were to be required, the project applicant must apply for a permit for such actions through the Director of Recreation and Parks, per Berkeley Municipal Code Section 12.44.020. (Trees located on the Bayer Campus are not in a public right-of-way or park and thus not subject to these requirements.) Implementation of Mitigation BIO-1 would reduce potential impacts to nesting birds related to tree removal or maintenance to a less-than-significant level.

f) *Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan or other approved local, regional, or state habitat conservation plan?*

**No Impact.** There is no Habitat Conservation Plan or other approved local, regional, or State habitat conservation plan that applies to the project site. Therefore, the project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan or other approved local, regional, or State habitat conservation plan. As a result, no impact would occur.

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **V. CULTURAL RESOURCES** | | | | |
| Would the project: | | | | |
| a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5? | ❒ | ❒ | ■ | ❒ |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? | ❒ | ■ | ❒ | ❒ |
| c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | ❒ | ■ | ❒ | ❒ |
| d) Disturb any human remains, including those interred outside of formal cemeteries? | ❒ | ■ | ❒ | ❒ |

## Affected Environment

This analysis considers the project's impact to historic architectural, archeological resources and human remains, and paleontological resources on the project site. The analysis is based on a cultural resources analysis prepared by William Self Associates, Inc. (WSA) for the project site in July 2014 (see Appendix B). WSA implemented a records search, Native American Heritage Commission consultation, and archaeological sensitivity study of the proposed project. In addition, WSA prepared a Historic Resources Evaluation of the three buildings proposed for demolition: #28, #28A, and #50:

- **Building #28A** is a large (49,836 square foot), three-story, L-shaped building situated on the north edge of the Bayer Campus along the south side of Dwight Way. It was constructed in 1973 and is 41 years old.
- **Building #28** is a small (3,440 square foot), single-story building that was constructed in 1967, six years prior to the construction of Building #28A. The west and south sides of the building are not visible, as they abut the much larger Building #28A.
- **Building #50** is a 15,765 square foot, single-story, L-shaped building situated on the north edge of the Bayer Campus just east of Buildings #28/#28A. The main body of the building was constructed in 1956 and is 58 years old. The rectangular portion of the building that forms the "L" at the east end was added in 1963.

To be potentially eligible for individual listing on the California Register of historic Resources (CRHR), a structure must usually be more than 50 years old, must have historic significance, and must retain its physical integrity. Properties less than 50 years old, such as Buildings #28A and #28, may be considered potentially eligible for listing on the CRHR

if they are exceptionally significant or if enough time has passed for the property's significance to be understood. The demolition of Buildings #28 and #50 was analyzed and certified as part of the EIR prepared in 1991 for the Miles Inc. long range plan and Development Agreement (DA). However, since these two buildings are now 47 and 58 years old, respectively, they are evaluated again in this Initial Study, given that 23 years have passed since the 1991 EIR evaluation. Buildings #28 and #50 were evaluated by the Landmarks Preservation Commission (LPC) as part of the public review process for the DA, and the LPC took no action to initiate them as landmarks. Building #28A was not included in the DA or LPC evaluations, however, Ordinance No. 6106-NS approving the DA states that the DA site "shall not be subject to the requirements of Chapter 3.24 of the Berkeley Municipal Code, relating to the Landmarks Preservation Commission."[31]

## Discussion

a) *Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5??*

**Less Than Significant.** The analysis below finds a less-than-significant impact to historical resources regarding the Building #28A, #28, and #50 demolition sites. The new building site is currently vacant and contains no structures, and therefore will not cause a substantial adverse change in the significance of a historical resource, and is not discussed further.

In terms of historic significance, the CRHR evaluates a resource based on four criteria. These criteria and their applicability to each of the three buildings proposed for demolition are analyzed below. (See Appendix B for the complete historic resources evaluation.)

- Criterion 1 (Event): Resources associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.
    - While Bayer Pharmaceuticals is certainly an important local business, and west Berkeley has traditionally been home to manufacturing and industrial land uses, Buildings #28A, #28, and #50 do not appear to be associated with events that made a significant contribution to the broad pattern of local or regional history.
- Criterion 2 (Person): Resources associated with the lives of persons important to local, California or national history.

[31] City of Berkeley, 1992b. Ordinance No. 6106-NS "Approving a Development Agreement Between the City of Berkeley and Miles Inc. Relative to Certain Property Located at Fourth and Parker Streets within the City of Berkeley and Revising Certain Provisions of the Municipal Code Relative to Height, Parking, and Loading Dock Requirements and Landmarks Preservation with Respect to the Project Site.

- Research conducted to date indicates that while the building has been used as part of Bayer's bio-manufacturing and supply of protein therapeutic products, Buildings #28A, #28, and #50 are not associated with the lives of persons important to local, California or national history.

- Criterion 3 (Design/Construction): Resources that embody the distinctive characteristics of a type, period, region or method of construction, or that represent the work of a master or possess high artistic values.
    - Building #28A reflects several elements of Modern design popular in the 1970s, including concrete walls with vertical accents and an unelaborated roofline, but it is not a distinctive example of a specific type. It represents general trends as they were applied to a bio-manufacturing/laboratory facility, but does not represent the work of a master or possess high artistic values. Building #28 is a small, functional trailer and does not represent the work of a master or possess high artistic values, nor does it embody the distinctive characteristics of a type, period, region or method of construction. Building #50, while primarily a functional office/laboratory space, does contain some aesthetic elements such as repeating vertical windows and an exaggerated roof overhang on the north elevation. However, it is not a distinctive example of a specific type, period, region or method of construction.
- Criterion 4 (Information Potential): Resources that have yielded or have the potential to yield information important to the prehistory or history of the local area, California or the nation.
    - Archival research conducted within the scope of this architectural assessment provided no specific indication that Buildings #28A, #28, and #50 have the potential to yield exceptionally important information related to the state or nation's prehistory or history.

Therefore, Buildings #28A, #28, and #50 are not recommended as potentially eligible under the four criteria above and the potential impact of the project on historical resources is less than significant.

b) *Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?*

**Potentially Significant Unless Mitigation Incorporation.** No cultural resources have been recorded within the new building site. Five cultural resources have been recorded within ¼ mile of the new building site, as documented in Appendix B, but they are not anticipated to be affected by any substantial adverse change as a result of the project. As discussed in Appendix B, known nearby prehistoric archaeological sites likely consists of shell midden that has been transported from off-site; other intact prehistoric shellmounds are located

within a mile of the Bayer South Property. In addition, the project area is located in close proximity to the Bay shore and active drainage channels. Prehistoric archaeological deposits, should they be located within the South Property project area, may be buried by alluvial soils.

As a result, WSA identifies a moderate potential for encountering potentially significant cultural resources within the footprint of the proposed new building. WSA recommends that a qualified archaeologist be present during upcoming geotechnical or environmental coring that will precede construction of the new building. The archaeologist would visually inspect and log the soils that underlie the project area as the cores are retrieved and determine if cultural material such as prehistoric shell midden is present and will be disturbed as a result of proposed construction. Implementation of **Mitigation Measure CULT-1** would ensure that impacts to any archaeological resources discovered during construction would be reduced to a less-than-significant level.

> Mitigation Measure CULT-1: Should an archaeological resource be encountered during project construction activities, the construction contractor shall halt construction in the vicinity of the find and immediately notify the City of Berkeley Planning & Development Director. Construction activities shall be redirected and a qualified archaeologist, in consultation with the City, shall: 1) evaluate the archaeological deposit to determine if it meets the CEQA definition of a historical or unique archaeological resource and 2) make recommendations about the treatment of the deposit, as warranted. If the deposit does meet the CEQA definition of a historical or unique archaeological resource, then it shall be avoided to the extent feasible by project construction activities. If avoidance is not feasible, then adverse effects to the deposit shall be mitigated as specified in CEQA Guidelines section 15126.4(b) (for historic resources) or CEQA section 21083.2 (for unique archaeological resources). If data recovery excavation is warranted, CEQA Guidelines section 15126.4(b)(3)(C), which requires a data recovery plan prior to data recovery excavation, shall be followed. If the significant identified resources are unique archaeological resources, mitigation of these resources shall be subject to the limitations on mitigation measures for archaeological resources identified in CEQA sections 21083.2(c) through 21083.2(f).

c) *Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*

**Potentially Significant Unless Mitigation Incorporation.** Although there is no documentation that suggests paleontological resources are present within the project site, there is a possibility that construction activities could uncover paleontological resources beneath the surface. Implementation of the following mitigation measure would ensure that potential impacts to paleontological resources would be reduced to a less-than-significant level.

Mitigation Measure CULT-2: If paleontological resources are encountered during site preparation or grading activities, all work within 25 feet of the discovery shall be redirected until a qualified paleontologist has assessed the discoveries and made recommendations. Paleontological resources include fossil plants and animals, and evidence of past life such as trace fossils and tracks. If the paleontological resources are found to be significant, adverse effects to such resources shall be avoided by project activities to the extent feasible. If project activities cannot avoid the resources, the adverse effects shall be mitigated. In accordance with CEQA Guidelines Section 15126.4(b)(3), mitigation may include data recovery and analysis, preparation of a final report, and the formal transmission or delivery of any fossil material recovered to a paleontological repository, such as the University of California Museum of Paleontology (UCMP). Upon completion of project activities, the final report shall document methods and findings of the mitigation and be submitted to the City of Berkeley and a suitable paleontological repository.

d) *Would the project disturb any human remains, including those interred outside of formal cemeteries?*

**Potentially Significant Unless Mitigation Incorporation.** The potential to uncover Native American human remains exists in locations throughout California. Although not anticipated, human remains could be identified during site-preparations and grading activities, resulting in a significant impact to Native American cultural resources. Implementation of the following mitigation measure would reduce potential adverse impacts to human remains to a less-than-significant level.

Mitigation Measure CULT-3: If human remains are encountered during construction activities, work within 25 feet of the discovery shall be redirected and the Alameda County Coroner notified immediately. At the same time, an archaeologist shall be contacted to assess the situation and consult with the appropriate agencies. If the human remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of this identification. The Native American Heritage Commission will identify a Most Likely Descendant to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods.

Upon completion of the assessment, the archaeologist shall prepare a report documenting the methods and results, and provide recommendations for the treatment of the human remains and any associated cultural materials, as appropriate and in coordination with the recommendations of the Most Likely Descendant. The report shall be submitted to the City of Berkeley and the Northwest Information Center.

## VI. GEOLOGY AND SOILS

Would the project:

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: | | | | |
| i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. | ❒ | ❒ | ■ | ❒ |
| ii. Strong seismic ground shaking? | ❒ | ❒ | ■ | ❒ |
| iii. Seismic-related ground failure, including liquefaction? | ❒ | ■ | ❒ | ❒ |
| iv. Landslides? | ❒ | ❒ | ❒ | ■ |
| b) Result in substantial soil erosion or the loss of topsoil? | ❒ | ❒ | ■ | ❒ |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | ❒ | ❒ | ■ | ❒ |
| d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? | ❒ | ❒ | ■ | ❒ |
| e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? | ❒ | ❒ | ❒ | ■ |

### Affected Environment

Information regarding geology and soils for the project is based on previous environmental analysis conducted for the 801 Grayson "South Properties" Use Permit,[32] public agency geologic hazard maps and databases, and the Seismic Hazard Evaluation prepared by Fugro Consultants, Inc.[33]

[32] City of Berkeley, 2000. "Environmental Initial Study: Use Permit Application for South Properties Project 801 Grayson Street Berkeley, California. May 18.

[33] Fugro Consultants, Inc., 2014. "Seismic Hazard Evaluation - Proposed Laboratory Building, Bayer Healthcare Facility, Berkeley, California." Letter to Flad Architects. July 10.

The Seismic Hazard Evaluation determined that based on previous and recent subsurface investigation, the materials present at the new building site include non-engineered fill and sandy clay deposits interlayered with some stiff, well-graded sandy deposits. The non-engineered fill consists primarily of a mixture of debris and native near surface clay. The extent and depth of fill varies across the site. Underlying the fill are interlayered clays to clayey sands with gravel. The fine-grained soils have varying sand content and are generally stiff to very stiff. The sands and gravel are predominantly clayey and medium-dense to dense. Borings on the site determined undocumented fill of variable thickness, between 3 and 14 feet, are expected.

a) *Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:*

   i. *Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.*

**Less than Significant.** Surface rupture occurs when the ground surface is broken due to fault movement during an earthquake. Alquist-Priolo Earthquake Fault Zones mapped by the California Geological Survey delineate areas around active faults with potential surface fault rupture hazards that would require specific geological investigations prior to approval of certain kinds of development within the delineated area. The project site is not located within or adjacent to an Earthquake Fault Zone.[34] Therefore, the project would have a less-than-significant impact on people or structures related to surface fault rupture.

   ii. *Strong seismic ground shaking?*

**Less Than Significant.** Seismic ground shaking generally refers to all aspects of motion of the earth's surface resulting from an earthquake, and is normally the major cause of damage in seismic events. Berkeley lies within an area that contains many active and potentially active faults and is considered to be an area of high seismic activity. The closest fault, the Hayward fault, approximately 2.5 miles east of the Bayer Campus, extends from San Pablo Bay in Richmond, 60 miles southeast to San José. The Hayward fault is designated by the Alquist-Priolo Earthquake Fault Zoning Act as an active fault which is defined as having displacement within the last 11,000 years. Ground shaking is likely to occur within the life of the project as a result of future earthquakes.

The U. S. Geological Survey (USGS) Working Group on California Earthquake Probabilities evaluated the probability of one or more earthquakes of Richter magnitude 6.7 or higher

[34] Department of Conservation, 2014. California Geological Survey. "Oakland West Quadrangle" effective 1982. Accessed July 10. http://www.quakeca.gov/gmaps/WH/regulatorymaps.htm.

occurring in the San Francisco Bay Area through 2036. Based on seismic shaking hazard maps USGS, there is a 31 percent chance that an earthquake along the Hayward Fault could generate violent ground shaking at the project site within the next 30 years, which could damage even some well-constructed multi-family wood construction buildings.[35]

The Modified Mercalli Intensity scale (MMI) is the most commonly used scale to measure the subjective effects of earthquake intensity in values ranging from I to XII (1 to 12). The Association of Bay Area Governments (ABAG) has classified the Modified Mercalli Intensity Shaking Severity Level of ground shaking in the project vicinity due to an earthquake on the North Hayward segment of the Hayward-Rodgers Creek Fault System as 9-Violent.[36] Violent shaking would result in collapse or serious damage to masonry buildings; shifting of unbolted wood structures off their foundations; and underground pipe breakage. The Project is located on Type D soil, a type of soil that amplifies seismic ground shaking.[37]

As required by the City's standard conditions of approval, project design and construction would be required to be in conformance with, or exceed, current best standards for earthquake resistant construction in accordance with the California Building Code (Title 24, Seismic Zone 4), the City of Berkeley's Building Code (BMC Chapter 19.28), and with the generally accepted standards of geotechnical practice for seismic design in Northern California. Prior to the issuance of a building permit, the Building Official must confirm that the building permit plans, specifications and other related information conform to the California codes in effect at the time, and all other applicable local ordinances.

Because the severity of future earthquakes cannot be predicted with complete certainty, it is acknowledged that seismic hazards cannot be completely eliminated, even with implementation of site-specific geotechnical methods and advanced building practices. However, the seismic design standards of the California Building Code are intended to prevent catastrophic building failure in the most severe earthquakes currently anticipated. Therefore, compliance with these standards described above would reduce potential seismic hazards to a less-than-significant level.

*iii. Seismic-related ground failure, including liquefaction?*

**Potentially Significant Unless Mitigation Incorporation.** Liquefaction is a transformation of soil from a solid to a liquefied state during which saturated soil temporarily loses strength resulting from the buildup of excess pore water pressure, especially during earthquake-induced cyclic loading.

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[35] United States Geological Survey, 2014a. *2008 Bay Area Earthquake Probabilities*. Accessed July 10. http://earthquake.usgs.gov/regional/nca/ucerf/

[36] Association of Bay Area Governments (ABAG), 2014. Alameda County Earthquake Hazard. USGS data effective 2013. Accessed July 10. http://quake.abag.ca.gov/earthquakes/Alameda/.

[37] United States Geological Survey, 2014b. Earthquake Hazards Program. "Soil Type and Shaking Hazard in the San Francisco Bay Area." Accessed July 10. http://earthquake.usgs.gov/regional/nca/soiltype/map/.

The California Geological Survey has developed Seismic Hazard Zone Maps that delineate areas susceptible to liquefaction that require additional investigation to determine the extent and magnitude of potential ground failure prior to development. A portion of the City of Berkeley is located with a Seismic Hazard Zone for liquefaction.[38] USGS identifies the area of the project site as having moderate liquefaction susceptibility.[39]

More site-specific evaluation in the Seismic Hazard Evaluation identified limited to negligible liquefaction potential at the site of the proposed new building. The subsurface conditions at the site consist primarily of clays that are not susceptible to liquefaction. The soils include occasional sand/gravel layers below the water table. However, those layers typically have relatively high blow counts/cone penetrating testing tip resistance. Also, the layers generally appear to be clayey.[40]

The peer review of the Seismic Hazard Evaluation concurred that native earth material below the site fill is non-liquefiable. However, it acknowledged that from 3 to 14 feet of undocumented fill had been identified across the building site. Some of this fill material would be anticipated to be below the anticipated future high groundwater levels, and could be subject to liquefaction.[41] As a condition of project approval, a design-level geotechnical analysis of how to resolve the potential poor performance of this fill will need to be prepared and implemented.

> Mitigation Measure GEO-1: Prior to the issuance of any site-specific grading permits, a design-level geotechnical investigation, in compliance with City of Berkeley requirements, shall be prepared by a licensed professional engineer and submitted to the City for review and confirmation that the proposed improvements fully comply with City requirements. The investigation shall determine the new construction project's geotechnical conditions and measures to address these hazards. Measures shall include but may not be limited to foundation and grading recommendations for the project to address fill conditions, which could include removal and replacement of the fill to modern engineering standards, or extending foundations for the new structure so that support is provided by native materials beneath the fill. All recommendations in the report shall be implemented as a condition of approval.

Implementation of **Mitigation Measure GEO-1** and compliance with existing building code regulations, as described above, will reduce this potential liquefaction impact to a less-than-significant level.

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[38] Department of Conservation, 2014, op. cit.
[39] United States Geological Survey. 2014c. Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California. Accessed July 10. http://earthquake.usgs.gov/regional/nca/qmap/
[40] Fugro Consultants, Inc., 2014.
[41] Cotton, Shires and Associates, Inc., 2014. "Geotechnical Peer Review – Liquefaction Zone; Bayer Laboratory Building." July 31.

*iv. Landslides?*

**No Impact.** Seismically-induced landslides occur as the rapid movement of large masses of soil on unstable slopes during an earthquake. As part of the Seismic Hazard Zone mapping, the California Geological Survey has determined that the project site is not included in a zone susceptible to earthquake-induced landslides.[42] The proposed project site is nearly level, and there are no hills adjacent to the site. There are no known landslides near the site, nor is the site in the path of any known or potential landslides. Improvements proposed as part of the project do not include substantial mounding of earth or other substantive changes to grade that would create slope instability hazards. Therefore, persons or structures would not be adversely affected by landslides at the project site. There is no impact.

b) *Result in substantial soil erosion or the loss of topsoil?*

**Less than Significant.** Erosion is the entrainment and movement of soil material by natural processes, such as wind and water. The rate of soil erosion, which is dependent on the local landscape, climate, soil properties, and stormwater runoff, can be accelerated by human activities such as construction grading and excavation.

Construction of the project would involve activities such as site clearing, grading, and excavation. Some earthwork activities associated with construction activities would disturb subsurface soils, causing erosion. As required by the City's standard conditions of approval, prior to any excavation, grading, clearing, or other activities involving soil disturbance during the rainy season (between October 15 and April 15), the applicant must obtain approval of an erosion prevention plan by the Building and Safety Division and the Public Works Department. The applicant is also responsible for following these and any other measures required by the Building and Safety Division and the Public Works Department. Compliance with these conditions would ensure that impacts related to soil erosion are less than significant.

c) *Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?*

**Less than Significant.** Subsidence is the settlement of organic soils and/or saturated mineral soils of low density following drainage. Soils susceptible to lateral spreading, sloughing, or caving pose a risk when to human health and structures when located near a steep or vertical slope (e.g., basement foundation). Settlement is a common concern for new buildings, because the weight of newly constructed buildings can cause significant compaction of the underlying soils. Since the new building site is relatively flat and there would be no subsurface structures, caving would only likely occur during excavation or

[42] Department of Conservation, 2014, op. cit.

trenching activities at the new building site. Caving is always a potentially significant hazard for excavation or trenching greater than about 5 feet below ground surface.

The California Division of Occupational Safety and Health (Cal/OSHA) requires adequate protection from potential caving during all excavation and trenching activities, such as the installation of protective barricades along trench walls.[43] Compliance with Cal/OSHA requirements would reduce project impacts related to caving to a less-than-significant level. Additionally, as discussed in *Section VI.a.iv*, landslide risk is very low.

Lateral spreading occurs where the contact between a layer of liquefiable material and the material below is sloped. Saturated sands lose their strength during an earthquake and become fluid-like and mobile. As a result, the ground may undergo large permanent displacements that can damage underground utilities and well-built surface structures. Large-scale lateral spreading is considered unlikely at this site because the site is essentially level and the probability for liquefaction at the site is considered low, as discussed above.[44] Implementation of existing building code requirements described in *Section VI.a.ii* will reduce potential instability impacts to a less-than-significant level.

d) *Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?*

**Less Than Significant.** Expansive soils can undergo significant volume changes with changes in moisture content and are known to shrink and harden when dried and expand and soften when wetted. The shrink-swell capacity of expansive soils can cause damage to foundations and pipelines. The Soils Report documented in the South Properties Use Permit and The Seismic Hazard Evaluation do not indicate the presence of expansive soils. Furthermore, compliance with existing building code requirements as described in *Section VI.a.ii* will reduce potential impacts associated with expansive soils to less-than-significant levels.

e) *Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?*

**No Impact.** Wastewater conveyance and treatment for the proposed project would be provided by the City of Berkeley and EBMUD. Development of the project would not involve the use of septic tanks or alternative wastewater disposal systems. Therefore there would be no impact.

[43] Title 29 of the Code of Federal Regulation, Part 1926.650-651.
[44] Fugro Consultants, Inc., 2014.

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **VII. GREENHOUSE GAS EMISSIONS** | | | | |
| Would the project: | | | | |
| a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | ❒ | ❒ | ■ | ❒ |
| b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | ❒ | ❒ | ■ | ❒ |

## Affected Environment

Climate change refers to change in the Earth's weather patterns including the rise in the Earth's temperature due to an increase in heat-trapping greenhouse gases (GHGs) in the atmosphere. According to the Bay Area Air Quality Management District (BAAQMD)'s *Bay Area 2010 Clean Air Plan* (CAP), some of the potential effects of increased GHG emissions and the associated climate change may include loss in snow pack (affecting water supply), sea level rise, more frequent extreme weather events, more large forest fires, and more drought years. In addition, climate change may increase electricity demand for cooling, decrease the availability of hydroelectric power, and affect regional air quality and public health.[45]

In 2006, State legislation passed the California Global Warming Solutions Act (AB 32), which requires the California Air Resource Board (CARB) to develop and implement regulatory and market mechanisms that will reduce GHG emissions to 1990 levels by 2020. In 2009, the City of Berkeley adopted a *Climate Action Plan* that exceeds the AB 32 GHG emission reduction goals.[46] The plan identifies 30 specific goals designed to help reduce Berkeley's community-wide global warming emissions 33 percent by 2020 relative to 2000 levels.

The primary GHG emissions of concern are carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$). Other GHGs of concern include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$), but their contribution to climate change is less than 1% of the total by well-mixed[47] GHGs.[48] Each GHG has a different global warming potential (GWP). For instance, $CH_4$ traps about 21 times more heat per molecule

[45] BAAQMD, 2010a. op. cit.
[46] City of Berkeley, 2009. *Climate Action Plan*. June
[47] GHGs that have atmospheric lifetimes long enough to be relatively homogeneously mixed in the troposphere.
[48] IPCC, 2013. *Climate Change 2013; the Physical Science Basis; Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*.

than $CO_2$. As a result, emissions of GHGs are reported in metric tons of "carbon dioxide equivalents" ($CO_2e$), where each GHG is weighted by its GWP relative to $CO_2$. Carbon dioxide emissions dominate the GHG inventory in the San Francisco Bay Area Air Basin (SFBAAB), accounting for more than 90% of the total $CO_2e$ emissions reported.[49]

In 2010, BAAQMD developed and adopted GHG thresholds of significance (Thresholds) that were incorporated into the 2010 *CEQA Air Quality Guidelines*.[50] The GHG Thresholds are designed to help lead agencies in the SFBAAB assess GHG emissions from new projects and meet GHG emission reduction goals, such as those contained in AB 32. As discussed in *Section III: Air Quality*, above, use of the 2010 Thresholds is currently being challenged in the California Supreme Court as a "reverse application" of the intended CEQA process. However, the 2010 Thresholds are used in this Initial Study because the scientific soundness of the Thresholds has not been challenged.

## Discussion

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

**Less than Significant.** Potential impacts related to emissions of GHGs from the project would have a less-than-significant impact.

The BAAQMD's GHG Thresholds for the operational phase of the project requires compliance with one of the following:

- Compliance with a qualified GHG Reduction Strategy;
- Annual emissions less than 1,100 metric tons per year (MT/yr) of $CO_2e$; or
- Annual emissions less than 4.6 MT/yr of $CO_2e$ per service population.

The City's *Climate Action Plan* in not a qualified GHG Reduction Strategy since it precedes the BAAQMD *CEQA Air Quality Guidelines* which can allow for streamlined environmental review on new development projects. Still, the Climate Action Plan does represent the City's policy for GHG reduction. To estimate annual GHG emissions during the operational phase of a project, BAAQMD recommends using the most current version of the California Emissions Estimator Model (CalEEMod). CalEEMod utilizes widely accepted models for emission estimates combined with appropriate default data that can be used if site-specific information is not available. A copy of the CalEEMod report for the project, which summarizes the input parameters, assumptions, and findings, is included in Appendix A.

The GHG emissions were conservatively estimated based on the assumption that the existing and proposed project emissions per square foot are equal; therefore, the

[49] BAAQMD, 2010a. op. cit.
[50] BAAQMD, 2010b. op. cit.

project's net increase in area (15,000 square feet) would directly result in a net increase in GHG emissions above existing conditions during project operations. This conservative assumption does not account for GHG reductions that would likely result from implementation of the City's green building policies. These policies include requirements for new buildings to implement provisions of the California State Green Building Code (also known as "CALGreen") and supplemental measures to ensure the City diverts waste from landfills, reduces energy and water usage in buildings, and achieves the GHG emission reduction goals of the City's *Climate Action Plan*.

The unmitigated GHG emissions during project operations were estimated using the CalEEMod default values, except as noted below.

- The building square footage was modified to equal the net increase in area (15,000 square feet).
- Based on the assumptions of the transportation analysis conducted for the project (Appendix C), the weekday vehicle trip rate was increased to 8.11 trips/1,000 square feet/day.
- Wastewater treatment processes were changed to 100% aerobic treatment and 100% anaerobic digestion with cogeneration, based on the design of the EMBUD wastewater treatment plant that services the project area.

Based on the CalEEMod estimates, the primary source of GHG emissions during operation of the project would be from the net increase in mobile sources (i.e., vehicle trips). The average emissions of GHGs calculated in CalEEMod for the operational phase of the project are compared to the 2010 Thresholds in Table VII-1. The project's estimated GHG emissions do not exceed the annual emissions Threshold. Therefore, the project's operational GHG emissions would have a less-than-significant impact on global climate change.

**TABLE VII-1 SUMMARY OF AVERAGE GHG EMISSIONS DURING PROJECT OPERATION**

| Pollutant | GHGs |
|---|---|
| Units | MT/$CO_2$e/yr |
| Emissions | 193 |
| Thresholds | 1,100 |
| Exceedance | No |

Source: CalEEMod (Appendix A)

BAAQMD has not developed Thresholds for construction-related GHG emissions. Common GHG emissions sources during construction include construction equipment, truck traffic, and associated construction worker traffic. BAAQMD recommends calculating the GHG emissions to disclose the emissions levels that would occur during construction. Based on the size and type of development, CalEEMod estimated that project construction would last 246 days.[51] Over this time period, the total emissions of GHGs calculated in CalEEMod for the construction phase of both the demolition and construction components of the project would be about 292 MT of $CO_2$e. This estimate does not account for GHG reductions required under the City's green building policies described above. By conservatively comparing the GHG emissions estimated during construction without emission reductions from implementing the City's green building requirements to the operational GHG emission Threshold (1,100 MT/yr of $CO_2$e), the project's construction GHG emissions would also have a less-than-significant impact on global climate change.

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

**Less than Significant.** The GHG emission reductions goals adopted under the City's *Climate Action Plan* are consistent with the Statewide GHG reductions required under AB 32.[52] The project would comply with the *Climate Action Plan* and AB 32 by implementing the City's required green building policies described above. Therefore, the project's impact on applicable plans, policies, or regulations related to GHG emission reductions in the SFBAAB would be less than significant.

[51] The total number of construction days is estimated based on default equipment usage and construction phase lengths in CalEEMod. While actual equipment usage and construction phase lengths may vary for the project, the estimated total construction days provides a conservative estimate of pollutant emissions for the project.
[52] City of Berkeley, 2009. *op cit*.

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **VIII. HAZARDS** | | | | |
| Would the project: | | | | |
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | ❒ | ❒ | ■ | ❒ |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? | ❒ | ■ | ❒ | ❒ |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | ❒ | ❒ | ■ | ❒ |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | ❒ | ■ | ❒ | ❒ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area? | ❒ | ❒ | ❒ | ■ |
| f) For a project located within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? | ❒ | ❒ | ❒ | ■ |
| g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | ❒ | ❒ | ■ | ❒ |
| h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands? | ❒ | ❒ | ❒ | ■ |

## Affected Environment

The hazards analysis is based on a Phase I Environmental Site Assessment (ESA) prepared for the proposed quality control testing facility site in July 2014.[53] The Phase I ESA scope included a review of historical land use information; a review of environmental records

[53] BASELINE Environmental Consulting (BASELINE), 2014. Phase I Environmental Site Assessment, Proposed Bayer Manufacturing Quality Control Testing Facility Project, Berkeley, California. July 15.

from local, State, and federal sources; a reconnaissance of the site; an interview with the current site owner's representatives; and a Vapor Encroachment Screening (VES) to evaluate the potential for contaminants to affect indoor air quality at the site.

*Historical Land Uses*

The Phase I ESA determined that the site was undeveloped land prior to 1915. The site was developed as part of the Colgate-Palmolive facility no later than 1939 and was operated through 1980. Between 1983 and 1986, environmental investigation and cleanup activities were performed at the site under oversight by the Department of Health Services (DHS) (predecessor to the Department of Toxic Substances Control [DTSC]). The DHS oversight case was closed in 1988, indicating that investigation and shallow soil remediation was adequately completed. The site was vacant land from at least 1993 to 1998 following the demolition of the former Colgate-Palmolive Facility buildings. The site has been used as parking lots by Bayer from at least 2005 through the present.

*Hazardous Materials at the Site*

A Phase I ESA was previously prepared for the site in 1993[54]. The 1993 ESA determined that the shallow soils in numerous areas at the Colgate-Palmolive facility contained concentrations of heavy metals above hazardous waste concentrations; four of these areas were remediated by excavation and off-site disposal between 1983 and 1986 as part of remedial activities under DHS oversight. Based on available records on soil cleanup documentation, it is unclear whether shallow soil remediation was performed in the central portion of the site where elevated concentrations of metals were detected during the 1980s investigations. Based on this information, the long history of industrial manufacturing activities at the site, and the likelihood that lead based paint was present on the structures which formerly occupied the site, the 2014 Phase I ESA concluded that metals-impacted soils likely remain at the site[55].

Six groundwater monitoring wells were installed at the Colgate-Palmolive facility and were monitored sporadically prior to 1993, at which time they were destroyed. Chlorinated solvents were detected in groundwater samples previously collected beneath the Colgate-Palmolive facility, and the impacts were attributed to an off-site source.[56] More recently, impacts from chlorinated solvents were detected in a grab groundwater sample collected from the basement of Building B19, located immediately northwest of the site, suggesting that impacts from chlorinated solvents may still be present in groundwater in the vicinity of the site.[57] Therefore, groundwater and soil vapor beneath the site may be impacted with

[54] Engineering Science, 1993. Phase I ESA of the Former Colgate-Palmolive Facility, 2700 7th Street, Berkeley, California. May 13.
[55] BASELINE, 2014, op. cit.
[56] Engineering Science, 1993, op cit.
[57] BASELINE, 2014, op. cit.

volatile organic compounds (VOCs) at concentrations which could impact indoor air quality and pose potential health risks for future site occupants.

Six underground storage tanks (USTs) containing fuel oil, gasoline, alcohol, and naphtha were removed from the Colgate-Palmolive facility between 1984 and 1990.[58] Contaminated soil associated with two of these UST removals was excavated and either aerated on-site and re-used as backfill or was transported of-site. No fuel or BTEX constituents were detected in groundwater samples collected in May 1989 from the six monitoring wells at the Colgate-Palmolive facility.[59] Based on available information, the 2014 Phase I ESA concluded that residual contamination from the former USTs would not be considered significant for the site.[60]

*Recommendations of the Phase I ESA*

The 2014 Phase I ESA concluded that soil, groundwater, and soil gas at the site could be affected by contaminants and the report made five recommendations for further action at the site[61]:

1. Soil vapor samples should be collected from the site and analyzed for VOCs to determine if potential impacts in soil vapor could pose potential health risks for future site occupants.

2. If future construction activities would require dewatering at the site, groundwater should be pumped into a holding tank, tested, and discharged or disposed of in accordance with applicable regulations. Alternatively, groundwater conditions could be evaluated by a licensed professional prior to performing dewatering activities by conducting a groundwater quality investigation.

3. If future construction activities would require excavation and off-site disposal of soil, the soil should be stockpiled and sampled for waste classification purposes. Alternatively, soil sampling could be completed prior to site development by a licensed professional.

4. A Soil and Groundwater Management Plan (SGMP) should be prepared to provide guidelines for the handling, characterization, and disposal of soil and groundwater which may be generated during future construction activities. The SGMP should include the components required by the Berkeley Toxics Management Division (TMD) as described in the Standard TMD Conditions for Use Permit and Building

[58] Engineering Science, 1993, op cit.
[59] Ibid.
[60] BASELINE, 2014, op cit.
[61] Ibid.

Permit Applications. The SGM should be submitted to the TMD for approval when submitting the Building Permit Application.

5. Soil, soil vapor, and groundwater analytical results should be screened against applicable environmental screening levels to ensure the protection of construction workers, future site users, and the environment, as well as hazardous waste thresholds to determine soil management options. This and all other environmental investigation results for the project should be provided to the project contractors, so the findings may be incorporated into their Health and Safety and Hazards Communication Programs.

## Discussion

a) *Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*

**Less Than Significant Impact.** The project proposes the construction of a quality control testing facility and the demolition of existing Bayer HealthCare facilities. Routine use of hazardous materials at these facilities would be expected to include laboratory chemicals and small amounts of maintenance and custodial supplies. However, these materials would not be expected to be used in sufficient quantities or contrary to normal and intended use to pose a threat to human health or the environment. Use of hazardous materials by businesses is regulated by California Certified Unified Program Agency (CUPA) programs (California Health and Safety Code Chapter 6.11), which are administered at the Bayer HealthCare Berkeley South Properties by Berkeley TMD. The CUPA programs include hazardous waste business plan (HMBP) requirements, hazardous waste generator requirements, underground and aboveground storage tank requirements, and the California Accidental Release Program (CalARP). These existing programs would ensure protection of human health and the environment during operation of the project.

As the total project area, including the new building site and demolition site is greater than one acre in area, management of hazardous materials at the these sites during construction activities would be subject to the requirements of the Stormwater Construction General Permit (CGP), discussed in more detail in *Section IX: Hydrology and Water Quality*. Compliance with the CGP would require preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) designed to reduce the risk of spills or leaks from the reaching the environment, including procedures to address minor spills of hazardous materials.

Development and operation of the project would therefore have a less-than-significant impact on the public and the environment related to the routine transport, use, and handling of hazardous materials. No additional mitigation is required.

b) *Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? Project construction activities would include the use of hazardous materials such as motor fuels, oils, solvents, and lubricants. An accidental release of hazardous materials during fueling, maintenance, or improper operation of construction equipment could potentially occur and pose a risk to construction workers, the public, and the environment.*

**Potentially Significant Unless Mitigation Incorporated.** The 2014 Phase I ESA concluded that soils at the proposed quality control testing facility site may contain elevated concentrations of metals, and that soil gas and groundwater may be affected by chlorinated solvents and other VOCs from off-site sources.[62] Soil and groundwater contamination could adversely affect construction workers who may come into direct contact with those materials. In addition, if these materials are improperly managed and disposed of during construction, they could be released to the environment and pose a potential risk to other members of the public. These risks can be reduced through a comprehensive soil and groundwater management plan, which would incorporate worker health and safety measures and safe stockpiling and disposal procedures.

VOCs in soil gases could be released from the soil and/or groundwater and have the potential to migrate into enclosed buildings and accumulate in indoor air, posing a potential health risk to future workers at the new building site. These indoor air health risks can be reduced through remedial activities (such as groundwater treatment) or through institutional controls and engineering controls (IC/EC), which could include the incorporation of vapor barriers or foundation venting in project design, or a deed restriction prohibiting construction of buildings over certain portions of the site. The implementation of **Mitigation Measure HAZ-1** would reduce potential impacts from residual hazardous materials contamination at the new building site to a less-than-significant level.

As detailed in Section III, *Air Quality*, construction activities would include demolition activities, which could expose construction workers and the public to hazardous building materials and could release hazardous building materials into the environment. Asbestos may be present in building materials such as thermal system insulation, surfacing materials, and asphalt and vinyl flooring materials installed in buildings prior to 1981.[63] Lead compounds may be present in interior and exterior paints used for commercial buildings, regardless of construction date.[64] PCBs have not been manufactured in the United States since 1977, but may still be found in older electrical equipment and in other building materials, like light ballasts. The buildings to be demolished were constructed between 1962 and 1972. Therefore, asbestos, lead-based paint, PCBs may all be present

[62] Ibid.
[63] Title 8 of the California Code of Regulations §5208. *Asbestos*.
[64] DTSC, 2006, op. cit.

in these buildings. Compliance with existing city, state, and federal regulations and requirements, as well as the implementation of **Mitigation Measure HAZ-2**, would reduce the risk of hazardous materials release and exposure during building demolition activities to a less-than-significant level

> Mitigation Measure HAZ-1: The project shall comply with the following two-part mitigation measure to reduce potential impacts from residual hazardous materials contamination at the new building site to a less-than-significant level:
>
> > HAZ-1a: A soil vapor investigation shall be conducted at the new building site by a qualified environmental professional. The investigation work plan describing the methodology and sample locations shall be submitted to the Toxics Management Division (TMD) for review and approval prior to field work. Soil vapor samples shall be collected from the new building site in areas where buildings are proposed, analyzed for VOCs, and the analytical results compared to applicable San Francisco Bay Regional Water Quality Control Board (Regional Water Board) Environmental Screening Levels. As a condition of approval for construction permits, the applicant shall incorporate measures in project design to ensure that any potential added health risks to future site users from on- and off-site sources is reduced to a cumulative risk of less than $1 \times 10^{-6}$ (one in one million) for carcinogens and a cumulative hazard index of less than 1.0 for non-carcinogens, or as otherwise required by a regulatory oversight agency. The evaluation of risk would be subject to review and/or approval by regulatory oversight agencies. These agencies could also require additional site investigation, such as the collection of soil and groundwater samples, to more fully delineate the extent of contaminants of concern at the site.
> >
> > The potential risks to human health in excess of these goals must be reduced either by remediation of the soil vapor source (e.g., groundwater treatment) and/or implementation of institutional controls and engineering controls (IC/EC). If extensive remedial activities are determined to be the appropriate response action, additional CEQA review may be required to evaluate potential impacts related to air quality, noise, and traffic. IC/EC may include the use of soil vapor barriers, building foundation venting systems, and/or deed restrictions. If IC/EC are implemented, an Operations and Maintenance Program must be prepared and implemented to ensure that the measures adopted are maintained throughout the life of the project. The soil vapor investigation, response plan (if required), and Operations and Maintenance Program (if required) shall be submitted to the TMD for review and approval when submitting the Building Permit Application.

HAZ-1b: A Soil and Groundwater Management Plan (SGMP) shall be prepared to provide guidelines for the handling, characterization, and disposal of soil and groundwater which may be generated during future construction activities. The SGMP shall include the components required by TMD as described the Standard TMD Conditions for Use Permit and Building Permit Applications. The SGMP shall be submitted to the TMD for review and approval when submitting the Building Permit Application.

Mitigation Measure HAZ-2: A hazardous materials building survey shall be conducted for Buildings #28, #28A, #50, and #30 at the Bayer HealthCare Berkeley South Properties. As a condition of approval for demolition and building permits, the project applicant shall implement the recommendations of the survey report and shall certify that asbestos-containing materials have been abated by a Certified Asbestos Contractor and that lead-based paint has been abated and/or stabilized by licensed lead paint abatement professional.

c) *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?*

**Less Than Significant Impact.** The project site is located within one-quarter mile of two private schools and preschools: the Ecole Bilingue De Berkeley at 1009 Heinz Avenue and Aquatic Park Preschool at 830 Heinz Avenue. However, no hazardous materials emissions with the potential to affect these schools would be anticipated during demolition, construction, or operation of the project. No mitigation is required.

d) *Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?*

**Potentially Significant Unless Mitigation Incorporated.** The former Colgate-Palmolive facility at the project site is listed on several government lists of hazardous materials sites, including the State Leaking Underground Storage Tank site list, due to USTs removed from the project site between 1984 and 1990, and the DTSC EnviroStor database due to investigation and remediation of metals-affected shallow soils at the project site conducted between 1983 and 1986.[65] The 2014 Phase I ESA concluded that residual contamination may be present at the project site, which could pose a potential health hazard to construction workers coming into contact with those soils.[66] Implementation of **Mitigation Measure HAZ-1**, above, would address residual hazardous materials contamination at the site and reduce this potential impact to a less-than-significant level.

[65] Ibid.
[66] Ibid.

e) *For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?*

**No Impact.** Oakland International Airport, the closest airport, is located approximately nine miles south of the project site. The project is not located within a public airport land use plan or within two miles of a public use airport.

f) *For a project located within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?*

**No Impact.** The project is not located within the vicinity of a private airstrip.

g) *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*

**Less than Significant Impact.** California General Industry Safety Orders require that all employers in California prepare and implement an Emergency Action Plan (Title 8, Section 3220 of the California Code of Regulations). The Emergency Action Plan designates employee responsibilities, evacuation procedures and routes, alarm systems, and training procedures. The applicant will be required to prepare an Emergency Action Plan incorporating the proposed project. Development and operation of the project would not have the potential to adversely affect emergency response or evacuation plans for nearby properties as it will not obstruct adjoining streets, interfere with vehicular or pedestrian traffic, or obstruct access for emergency vehicles. Therefore, the project would not have the potential to create a significant impact due to impairment or interference with emergency response or emergency evacuation plans.

h) *Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?*

**No Impact.** The project site is in an urban area and is not within or adjacent to a California Department of Forestry and Fire Protection (CalFIRE) mapped wildland fire hazard area.[67,68]

[67] California Department of Forestry and Fire Protection (Cal FIRE), 2007. Fire Hazard Severity Zones in SRA: Alameda County. November 7.
[68] California Department of Forestry and Fire Protection (Cal FIRE), 2008. Very High Fire Hazard Severity Zones in LRA: Alameda County. September 3.

## IX. HYDROLOGY AND WATER QUALITY

Would the project:

| | | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|---|
| a) | Violate any water quality standards or waste discharge requirements? | ❒ | ■ | ❒ | ❒ |
| b) | Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)? | ❒ | ❒ | ■ | ❒ |
| c) | Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site? | ❒ | ■ | ❒ | ❒ |
| d) | Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? | ❒ | ❒ | ■ | ❒ |
| e) | Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? | ❒ | ❒ | ■ | ❒ |
| f) | Otherwise substantially degrade water quality? | ❒ | ❒ | ■ | ❒ |
| g) | Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? | ❒ | ❒ | ❒ | ■ |
| h) | Place within a 100-year flood hazard area structures which would impede or redirect flood flows? | ❒ | ❒ | ❒ | ■ |
| i) | Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding of as a result of the failure of a levee or dam? | ❒ | ❒ | ■ | ❒ |
| j) | Inundation by seiche, tsunami, or mudflow? | ❒ | ❒ | ■ | ❒ |

## Affected Environment

Information regarding hydrology and water quality for the project is based on available public agency hydrologic maps and reports. No specific information on hydrology or drainage was provided by the applicant.

The nearest surface water bodies to the Bayer Campus are the lagoons at Aquatic Park,[69] just 250 feet to the west and the San Francisco Bay, which is located approximately 1,200 feet to the west. There are no creeks or streams crossing the site.

## Discussion

a) *Violate any water quality standards or waste discharge requirements?*

**Potentially Significant Unless Mitigation Incorporated.** The State Water Resources Control Board and nine Regional Water Quality Control Boards regulate water quality of surface water and groundwater bodies throughout California. In the Bay Area, including the project site, the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) is responsible for implementation the Water Quality Control Plan (Basin Plan). The Basin Plan establishes beneficial water uses for waterways and water bodies within the region.

Runoff water quality is regulated by the National Pollutant Discharge Elimination System (NPDES) Program (established through the federal Clean Water Act). The NPDES program objective is to control and reduce pollutant discharges to surface water bodies. Compliance with NPDES permits is mandated by state and federal statutes and regulations. Locally, the NPDES Program is overseen by the Regional Water Board. The Alameda Countywide Clean Water Program assists cities, towns, and unincorporated areas with coordination and consistency of approaches across the County in implementing the Regional Water Board requirements.

Potential stormwater impacts in development projects may occur during construction and operation phases. Any construction activities, including grading, that would result in the disturbance of one acre or more (which includes the proposed project) would be required to comply with the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activity (Construction General Permit).

The project would redevelop approximately a 1.8-acre area at the Quality Control Testing facility, and would therefore be subject to the Construction General Permit. Under the Construction General Permit, preparation of a Storm Water Pollution Prevention Plan (SWPPP) for the site would be required. The SWPPP would include best management

[69] Aquatic Park encompasses 102 acres and includes three separate lagoons, which support a variety of wildlife, including fish, invertebrates, and birds.

practices (BMPs) for erosion and sediment control, site management and housekeeping/waste management, management of non-stormwater discharges, run-on and runoff controls, and BMP inspection/maintenance/repair activities, as consistent with the most recent version of the California Stormwater Quality Association Stormwater Best Management Handbook-Construction.

Operation of the project would be subject to the Regional Water Board's Municipal Regional Permit (MRP), implemented in October 2009 by Order R2-2009-0074. Provision C.3 of the MRP addresses new development and redevelopment projects. As project construction would replace more than 10,000 square feet of the existing impervious surface at the site, runoff from the new redevelopment area must be treated in accordance with C.3 provisions.[70] A Stormwater Control Plan (SCP) must be prepared and submitted for the project site detailing design elements and implementation measures to meet MRP requirements. The project would be required to include Low Impact Development (LID) design measures and a Stormwater Facility Operation and Maintenance Plan must be prepared to ensure that stormwater control measures are inspected, maintained, and funded for the life of the project.

Implementation of the following mitigation measure would reduce potential impacts of the proposed project on stormwater quality to a less-than-significant level:

> Mitigation Measure HYD-1: As a condition of approval for construction and grading permits for the project, the applicant shall demonstrate compliance with the Construction General Permit, including the preparation and implementation of a SWPPP to address storm water runoff during project construction. The SWPPP shall be submitted to the City for review and approval prior to the issuance of any permits for ground disturbing activities.
>
> The SWPPP shall be prepared by a Qualified SWPPP Developer in accordance with the requirements of the Construction General Permit and include BMPs for erosion and sediment control, site management/housekeeping/waste management, management of non-stormwater discharges, run-on and runoff controls, and BMP inspection/maintenance/repair activities.
>
> The SWPPP shall include a construction site monitoring program that identifies requirements for dry weather visual observations of pollutants at all discharge locations, and as appropriate (depending on the Risk Level), sampling of the site

[70] Since the project would result in an alteration of less than 50 percent of the impervious surface of a previously existing development that was not subject to Provision C.3, only the new and/or replaced impervious surface of the project must be included in the treatment system design (i.e., stormwater treatment systems must be designed and sized to treat stormwater runoff from the new and/or replaced impervious surface of the project [MRP C.3.b.ii.(3)(b)]).

effluent and receiving waters. A Qualified SWPPP Practitioner shall be responsible for implementing the BMPs at the site and performing all required monitoring and inspection and maintenance activities.

Mitigation Measure HYD-2: The project applicant shall fully comply with Provision C.3 of the Municipal Regional Permit. The project applicant shall prepare and implement a Stormwater Control Plan (SCP) for the project. The SCP shall be submitted to the city for review and approval prior to the issuance of any permits for ground disturbing activities. At a minimum, the SCP for the project shall include:

1. Low Impact Development (LID) design details incorporated into the project. Specific LID design may include, but is not limited to: using pervious pavements and green roofs, dispersing runoff to landscaped areas, and/or routing runoff to rain gardens, cisterns, swales, and other small-scale facilities distributed throughout the site.

2. Measures to address potential stormwater contaminants. These may include measures to cover or control potential sources of stormwater pollutants at the project site.

3. A Stormwater Facility Operation and Maintenance Plan for the project site, which will include periodic inspection and maintenance of the storm drainage system. Persons responsible for performing and funding the requirements of this plan shall be identified. This plan must be finalized prior to issuance of building permits for the project.

b) *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?*

**Less than Significant Impact.** The proposed project does not include the use of groundwater. Water is supplied by the East Bay Municipal Utility District (EBMUD). Although no use of groundwater is proposed for the project, some dewatering may be required during construction activities. Any dewatering activity would be expected to be temporary and affect only the uppermost water-bearing zone, not the deeper regional aquifer. Therefore, the proposed project would not deplete groundwater supplies or interfere substantially with groundwater recharge. Potential impacts to groundwater supplies or recharge would be considered less than significant.

c) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?*

**Potentially Significant Unless Mitigation Incorporated.** The proposed project would not alter the course of a stream or a river. The project site is in an urban area and would continue to be served by an existing stormwater drainage system. Compliance with construction-phase stormwater requirements (**Mitigation Measure HYD-1**) would ensure that development of the project would not result in substantial erosion or siltation on- or off-site.

d) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?*

**Less than Significant Impact.** The redevelopment area is covered almost completely by impervious surfaces. Compliance with operation-phase stormwater treatment requirements (**Mitigation Measure HYD-2**) and development of the courtyard as part of Building #88 would likely increase pervious areas and stormwater infiltration, decreasing total runoff. No increase in runoff is expected as a result of the project, and therefore the potential for the project to increase on- or off-site flooding hazards is less than significant.

e) *Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?*

**Less than Significant Impact.** As described above, the proposed project would not be expected to increase runoff, and therefore the potential for the project to exceed the capacity of existing or planned stormwater drainage systems is less than significant.

f) *Otherwise substantially degrade water quality*

**Less than Significant Impact.** The proposed project would not result in any substantial changes to on-site water quality, with the exception of potential impacts associated with stormwater runoff. Adherence to the requirements of construction- and operation-phase stormwater permits (**Mitigation Measures HYD-1** and **HYD-2**) would further reduce potential impacts. No additional impacts to water quality would be expected; therefore the impact on water quality would be less than significant.

g) *Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?*

**No Impact.** No housing is included in the proposed project and therefore no impact related to placement of housing in the floodplain would occur.

h) *Place within a 100-year flood hazard area structures which would impede or redirect flood flows?*

**No impact.** The project site is not located within the Federal Emergency Management Agency-designated 100-year flood hazard area,[71] and therefore no impact related to placement of structures in the floodplain would occur.

i) *Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding of as a result of the failure of a levee or dam?*

**Less Than Significant Impact.** The project site is not located within a mapped dam failure inundation area.[72] The nearest mapped dam failure inundation area is for the Berryman Reservoir, a 15-million gallon capacity reservoir located approximately 2.5 miles east of the project site that is owned and maintained by EBMUD. The mapped inundation area borders the Bayer Campus to the west (Aquatic Park is included in the inundation area). In addition, there are no levees protecting the site from flooding and as a result, no risk of failure. Therefore, this impact is less than significant.

j) *Inundation by seiche, tsunami, or mudflow?*

**Less than Significant Impact.** No enclosed large surface water bodies, which might be subject to potential impacts from seiches, are located in the project vicinity (the lagoons in Aquatic Park are too small to generate a damaging seiche). The project site, at an elevation of more than 30 feet above sea level, would, in general, not be subject to coastal hazards (tsunami, sea level rise, or extreme high tides). The project site is just outside the eastern margin of an identified tsunami inundation area (Aquatic Park is within the inundation zone).[73] Therefore, this potential impact is less than significant. Please refer to *Section VI: Geology and Soils*, for further information regarding mudflows, a type of landslide. In summary, impacts related to inundation from coastal hazards are less than significant.

[71] Federal Emergency Management Agency (FEMA), 2009. Flood Insurance Rate Map, Alameda County, California and Incorporated Areas, Map Number 06001C0056G. Effective Date August 3.
[72] Association of Bay Area Governments (ABAG), 1995. Dam Failure Inundation Hazard Map for Berkeley/Albany.
[73] California Emergency Management Agency (CEMA), California Geological Survey, University of Southern California, 2009. Tsunami Inundation Map for Emergency Planning Oakland West Quadrangle. July 31.

| | | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|---|
| **X.** | **LAND USE AND PLANNING** | | | | |
| Would the project: | | | | | |
| a) | Physically divide an established community? | ❒ | ❒ | ❒ | ■ |
| b) | Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect? | ❒ | ❒ | ❒ | ■ |
| c) | Conflict with any applicable habitat conservation plan or natural community conservation plan? | ❒ | ❒ | ❒ | ■ |

**No Impact.** The Bayer Campus is currently not open to the public and is completely surrounded by fencing. The proposed project would occur entirely within the existing campus. As a result, the project would not physically divide an established community. Rather, the project would develop the Campus to promote and accommodate a more efficient use of land within an existing private property.

The project is consistent with the General Plan's Manufacturing land use designation and with the following General Plan policies:

> Policy LU-33 West Berkeley Plan: Implement the West Berkeley Plan and take actions that will achieve the three purposes of the Plan:
>
> > 1. Maintain the full range of land uses and economic activities including residences, manufacturing, services, retailing, and other activities in West Berkeley.

In addition, the project is consistent with the West Berkeley Plan's Mixed Manufacturing land use district which encourages incorporating biotech companies with heavy and light industrial uses:

> Goal 2: Channel development--both new businesses and residences and the expansion of existing businesses--to districts various which are appropriate for the various existing elements of the West Berkeley land use mix.
>
> > Policy B. Create a Mixed Manufacturing district as a general industrial district, where both heavy and light manufacturers can function, along with "biotech" industries and office users which can recycle the upper stories of buildings.

The project site is not located within any habitat conservation plan or natural community conservation plan area. As a result, the proposed project would not conflict with existing land use or planning policies of the community.

## XI. MINERAL RESOURCES

| | | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|---|
| Would the project: | | | | | |
| a) | Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State? | ❒ | ❒ | ❒ | ■ |
| b) | Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? | ❒ | ❒ | ❒ | ■ |

**No Impact.** The proposed project is located within an urban area on a developed site. There are no known mineral resources within or in the vicinity of the project site.[74] Consistent with this finding, the project would have no impact on mineral resources, as no mineral resources exist on the project site or its vicinity.

[74] City of Berkeley, 2003a. General Plan, Environmental Management Element. Adopted April 23, 2001.

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **XII. NOISE** | | | | |
| Would the project: | | | | |
| a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ❒ | ■ | ❒ | ❒ |
| b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels? | ❒ | ■ | ❒ | ❒ |
| c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? | ❒ | ❒ | ■ | ❒ |
| d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | ❒ | ■ | ❒ | ❒ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | ❒ | ❒ | ❒ | ■ |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | ❒ | ❒ | ❒ | ■ |

## Affected Environment

### General Information on Noise

Noise is commonly defined as unwanted sound that annoys or disturbs people and can have an adverse psychological or physiological effect on human health. Sound is measured in decibels (dB), which is a logarithmic scale. Decibels describe the purely physical intensity of sound based on changes in air pressure, but they cannot accurately describe sound as perceived by the human ear since the human ear is only capable of hearing sound within a limited frequency range. For this reason, a frequency-dependent weighting system is used and monitoring results are reported in A-weighted decibels (dBA). Technical terms used to describe noise are defined in Table XII-1.

It should be noted that because decibels are based on a logarithmic scale, they cannot be added or subtracted in the usual arithmetical way. For instance, if one noise source emits a sound level of 90 dBA, and a second source is placed beside the first and also emits a sound level of 90 dBA, the combined sound level is 93 dBA, not 180 dBA. When the

difference between two co-located sources of noise is 10 dBA or more, the higher noise source dominates and the lower noise source makes no perceptible difference in what people can hear or measure. For example if the noise level is 95 dBA and another noise source is added that produces 80 dBA noise, the noise level will still be 95 dBA.

**TABLE XII-1 DEFINITION OF ACOUSTICAL TERMS**

| Term | Definition |
|---|---|
| Decibel (dB) | A unit describing the amplitude of sound on a logarithmic scale. Sound described in decibels is usually referred to as sound or noise "level." This unit is not used in this analysis because it includes frequencies that the human ear cannot detect. |
| Vibration Decibel (VdB) | A unit describing the amplitude of vibration on a logarithmic scale. |
| Frequency (Hz) | The number of complete pressure fluctuations per second above and below atmospheric pressure. |
| A-Weighted Sound Level (dBA) | The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted. |
| Equivalent Noise Level (Leq) | The average A-weighted noise level during the measurement period. For this CEQA evaluation, Leq refers to a one-hour period unless otherwise stated. |
| Community Noise Equivalent Level (CNEL) | The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7 to 10 PM and after addition of 10 decibels to sound levels during the night between 10 PM and 7 AM. |
| Day/Night Noise Level (Ldn) | The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured during the night between 10 PM and 7 AM. |
| Ambient Noise Level | The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location. |
| Vibration Decibel (VdB) | A unit describing the amplitude of vibration on a logarithmic scale. |
| Peak Particle Velocity (PPV) | The maximum instantaneous peak of a vibration signal. |
| Root Mean Square (RMS) Velocity | The average of the squared amplitude of a vibration signal. |

In an unconfined space, such as outdoors, noise attenuates with distance according to the inverse square law. Noise levels at a known distance from point sources are reduced by at least 6 dBA for every doubling of that distance over hard surfaces, such as asphalt, and 7.5 dBA for every doubling of that distance over soft surfaces, such as undeveloped land. Noise levels at a known distance from line sources, such as the noise from high-volume roadways, decrease at a rate of at least 3 dBA for every doubling of the distance over hard surfaces and 3.5 dBA over soft surfaces. A greater decrease in noise levels can result from the presence of intervening structures or buffers.

An important method for determining a person's subjective reaction to a new noise is by comparing it to existing conditions. The following describes the general effects of noise on people:[75]

- A change of 1 dBA cannot typically be perceived, except in carefully controlled laboratory experiments;
- A 3-dBA change is considered a just-perceivable difference;
- A minimum of a 5-dBA change is required before any noticeable change in community response is expected; and
- A 10-dBA change is subjectively perceived as approximately a doubling (or halving) in loudness.

**General Information on Vibration**

Vibration is an oscillatory motion through a solid medium (versus noise which is an oscillatory motion through air) in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Several different methods are used to quantify vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors to vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment. Vibration amplitudes are usually expressed as either peak particle velocity (PPV) or the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous peak of the vibration signal. PPV is appropriate for evaluating potential damage to buildings, but it is not suitable for evaluating human response to vibration because it takes the human body time to respond to vibration signals. The response of the human body to vibration is dependent on the average amplitude of a vibration. The RMS of a signal is the average of the squared amplitude of the signal and is more appropriate for evaluating human response to vibration. PPV and RMS are normally described in units of inches per second (in/sec), and RMS is also often described in vibration decibels (VdB).

**Regulatory Framework**

*State*

Part 11 of the 2013 California Building Code (CBC) specifies that buildings containing non-residential uses (e.g. retail and offices spaces) that are exposed to exterior noise levels at or above 65 dBA CNEL or Ldn shall either (1) maintain interior noise levels below 50 dBA Leq in occupied areas during any hour of operation or (2) use wall and roof-ceiling assemblies with the minimum Sound Transmission Class (STC) or Outdoor-Indoor Sound Transmission Class (OITC) ratings stipulated in the CBC. Non-residential buildings with

[75] Salter, Charles M., 1998. Acoustics – Architecture, Engineering, the Environment, William Stout Publishers.

few or no occupants, or where occupants are not likely to be affected by exterior noise (e.g. factories, stadiums, storage, enclosed parking structures, and utility buildings), as determined by the enforcing agency, are exempt from this standard.

General Plan

The Environmental Management Element of the City of Berkeley General Plan[76] establishes policies and actions intended to protect the community from excessive noise. The policies and actions applicable to the project are presented below:

> Policy EM-43 Noise Reduction: Reduce significant noise levels and minimize new sources of noise.
>
> > Action A: Increase enforcement of the Noise Ordinance to reduce noise impacts.
>
> Policy EM-44 Noise Prevention and Elimination: Protect public health and welfare by eliminating existing noise problems where feasible and by preventing significant future degradation of the acoustic environment.
>
> > Action A: Incorporate noise considerations into land use planning decisions.
> >
> > Action B: Ensure the effective enforcement of City, State, and Federal noise levels by appropriate City departments.
>
> Policy EM-46 Noise Mitigation: Require operational limitations and all feasible noise buffering for new uses that generate significant noise impacts near residential, institutional, or recreational uses.
>
> > Action A: Promote use of noise insulation materials in new construction and major rehabilitation.
> >
> > Action B: Mitigate significant noise impacts on parks and public open space, whenever feasible.

City of Berkeley Municipal Code

The Community Noise Ordinance (Chapter 13.40 of the Municipal Code) establishes maximum permissible day and night noise levels based on the zoning district of the property subject to the noise, rather than the property from which the noise originates. Because the Community Noise Ordinance is based on zoning districts rather than on the land use within an individual property, it does not recognize residential properties located in non-residential zoning districts. Industrial noise limits are intended to be used at the boundary of industrial zones rather than for noise reduction within the zone. If the ambient noise levels in an area are greater than the permissible noise levels, then the maximum permissible noise level is to be adjusted to the ambient noise level.

Construction operations occurring between the hours 7 p.m. and 7 a.m. on weekdays and the hours of 8 p.m. and 9 a.m. on weekends and holidays are prohibited from generating

[76] City of Berkeley, 2003a. op. cit.

noise levels at affected properties that exceed the maximum permissible day and night noise levels specified in Sections 13.40.050 and 13.40.060 of the Community Noise Ordinance. Furthermore, where technically and economically feasible, construction operations occurring between the hours 7 a.m. and 7 p.m. on weekdays and the hours of 9 a.m. and 8 p.m. on weekends and holidays are prohibited from generating noise levels at affected properties that exceed the maximum permissible day and night noise levels specified in the Community Noise Ordinance (Tables XII-2 and XII-3).

**TABLE XII-2 MAXIMUM SOUND LEVELS FOR SHORT-TERM OPERATION (LESS THAN 10 DAYS) OF MOBILE EQUIPMENT (DBA)**

| Time Period | Single- and Two-Family Residential Zoning Districts | Multi-Family Residential Zoning Districts | Commercial and Industrial Zoning Districts |
|---|---|---|---|
| Weekdays 7 a.m. to 7 p.m. | 75 | 80 | 85 |
| Weekends 9 a.m. to 8 p.m. and Legal Holidays | 60 | 65 | 70 |

Source: City of Berkeley Municipal Code Section 13.40.070.B.7.b.

**TABLE XII-3 MAXIMUM SOUND LEVELS FOR LONG-TERM OPERATION (PERIOD OF 10 DAYS OR MORE) OF STATIONARY EQUIPMENT (DBA)**

| Time Period | Single- and Two-Family Residential Zoning Districts | Multi-Family Residential Zoning Districts | Commercial and Industrial Zoning Districts |
|---|---|---|---|
| Weekdays 7 a.m. to 7 p.m. | 60 | 65 | 70 |
| Weekends 9 a.m. to 8 p.m. | 50 | 55 | 60 |

Source: City of Berkeley Municipal Code Section 13.40.070.B.7.b.

Vibrations levels that annoy or disturb two or more "reasonable persons of normal sensitiveness" who reside in separate residences are prohibited. Stationary machinery is required to be enclosed or muffled so that noise levels in surrounding zoning districts do not exceed the thresholds specified in Sections 13.40.050 and 13.40.060 of the Community Noise Ordinance. The Environmental Health Division may issue a variance for the creation of noise that conflicts with the standards of the Community Noise Ordinance.

*Ambient Noise and Vibration Environment*

The Bayer Campus is located within an industrial zoning district and is surrounded by industrial and multi-family residential zoning districts.[77] The primary noise sources in the vicinity of the project site are: (1) the industrial buildings surrounding the proposed demolition and new building sites, which have noise-generating exhaust fans and cooling towers; (2) traffic on the Interstate-80 (I-80) highway, which runs north to south and is located approximately 1,200 feet and 1,500 feet west of the proposed demolition and new building sites, respectively; and (3) the Union Pacific Railroad (UPRR), which runs north to south and is located approximately 330 feet and 620 feet west of the proposed demolition and new building sites, respectively. The UPRR tracks are utilized by both freight trains and Amtrak trains.

The City of Berkeley General Plan[78] indicates that in 1995, ambient noise levels at the proposed demolition and new building sites ranged from 70 to 75 dBA Ldn. Noise levels in the areas surrounding the proposed demolition and new building sites ranged from less than 70 to 80 dBA Ldn. The General Plan notes that noise levels throughout the City did not change substantially between 1973 and 1995. This is because, although traffic volumes increased over time, traffic speeds decreased. This analysis assumes that noise levels at the project site and surrounding areas have not changed substantially since 1995 because (1) noise levels in the City of Berkeley have historically shown little variation over time[79] and (2) land use and the primary sources of noise in the project vicinity (as described above) have not changed substantially since 1995[80, 81, 82].

## Discussion

a) *Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

**Potentially Significant Unless Mitigation Incorporation.** Potential impacts of the exposure of receptors to construction-generated noise in excess of standards can be mitigated to a less-than-significant level, as described below.

### Noise Generated During Construction

The demolition phase of the project would demolish three buildings. The primary noise impacts of both demolition and construction activities would occur from noise generated

[77] City of Berkeley, 2014e, op. cit.
[78] City of Berkeley, 2003a. op. cit.
[79] Ibid.
[80] City of Berkeley, 2003b. General Plan, Land Use Element. Adopted December 18, 2001.
[81] City of Berkeley, 2014e. op. cit.
[82] BASELINE, 2014, op. cit.

by the operation of heavy equipment on the project site. Noise impacts would also result from trucks arriving to and departing from the site, which would be an intermittent source of noise.

Demolition and construction activities associated with the proposed project would include the collection and off-hauling of demolition debris, excavation, grading, installation of utilities, landscaping, and construction of the product testing facility. As discussed in the Project Description, pile installation, if deemed necessary for the construction of the product testing facility, would be performed through the use of augur-drilled piles rather than through pile driving. Table XII-4 shows typical noise levels associated with various types of construction equipment that may be used as part of the project. The table indicates that equipment used during demolition and construction activities could generate noise levels of up to 89 dBA at 50 feet. Based on the additive properties of noise, the combined noise levels of the two noisiest pieces of equipment could reach 92 dBA at 50 feet.[83]

The nearest receptors to the demolition site (Building #s 28, 28A and 50) are industrial buildings located approximately 50 feet north, south, and west of the demolition site. The buildings to the south and west are located on the Bayer Campus within an industrial zoning district, while the buildings to the north are not part of the Bayer complex and are located within both industrial and multi-family residential zoning districts. Based on the distances of the industrial buildings from the demolition site, heavy equipment used during demolition could generate noise levels of up to 92 dBA at these receptors. These noise levels would exceed the weekday and weekend noise thresholds of both the industrial and multi-family residential zoning districts. (See Tables XII-2 and XII-3).

The nearest receptors to the new building site (Building #88) are industrial buildings located approximately 50 feet west and north of the new building site. There are also industrial buildings located 15 feet east of the new building site; however, these buildings are vacant and will not be considered as noise receptors in this analysis. The occupied industrial buildings considered in this analysis are all located within an industrial zoning district. Based on distances of the industrial buildings from the new building site, heavy equipment used during construction of the proposed product testing facility could generate noise levels of up to 92 dBA at the nearest occupied receptors. These noise levels would exceed the weekday and weekend noise thresholds of the industrial zoning district. (See Tables XII-2 and XII-3).

[83] A general assessment of construction noise should include the two noisiest pieces of equipment expected to be used in each construction phase [Source: Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment (DTA-VA-90-1003-06)].

**TABLE XII-4 TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT (DBA)**

| Equipment | Noise Level at 50 Ft |
|---|---|
| Backhoe | 80 |
| Compactor | 82 |
| Concrete Mixer | 85 |
| Crane, Mobile | 83 |
| Dozer | 85 |
| Generator | 81 |
| Grader | 85 |
| Jack Hammer | 88 |
| Paver | 89 |
| Roller | 74 |
| Saw | 76 |
| Scraper | 89 |
| Truck | 88 |

Source: Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment (DTA-VA-90-1003-06).

Construction noise with the potential to exceed the maximum noise thresholds in the Community Noise Ordinance is required to be reduced to the extent technically and economically feasible in order to be considered compliant with the Community Noise Ordinance. The implementation of **Mitigation Measure NS-1** below, which requires the development of a noise reduction program specific to the proposed project, would reduce the adverse impacts associated construction noise to the extent and technically and economically feasible. Therefore, the potential of receptors to be exposed to noise levels in excess of standards would be less than significant.

Mitigation Measure NS-1: The applicant shall develop a project-specific noise reduction program (NRP) prepared by a qualified acoustical consultant to reduce demolition and construction noise impacts to the maximum extent that is technically and economically feasible. A qualified professional is defined as a Board Certified Institute of Noise Control Engineering member or other experienced acoustical consultant or engineer approved by the Zoning Officer. A copy of the noise control program, including a detailed description of all necessary noise control mitigation measures, shall be submitted to the City of Berkeley along with the building plans and approved

by the Zoning Officer prior to issuance of a building permit. At a minimum, the noise reduction program shall include following project-specific measures:

- All internal combustion engine-driven equipment shall be fitted with intake and exhaust mufflers that are in good condition. Good mufflers shall result in non-impact equipment generating a maximum noise level of 80 dBA when measured at a distance of 50 feet.
- Impact tools (e.g. jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed-air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, which could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible.
- Construction equipment idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes.
- All stationary noise-generating equipment, such as air compressors and portable power generators, and on-site equipment staging areas, shall be located so as to maximize the distance between the equipment and the nearest receptors to the project site. Temporary noise barriers or partial enclosures shall be constructed to provide acoustical shielding for stationary noise-generating equipment to the extent feasible.
- A “disturbance coordinator” who would be responsible for responding to any local complaints about construction noise shall be designated. The name and telephone number of the disturbance coordinator shall be provided to the City prior to the issuance of the building permit. The disturbance coordinator would determine the cause of all noise complaints (e.g., starting too early, bad muffler, etc.) and would require that reasonable measures warranted to correct the problem be implemented. The disturbance coordinator shall notify the City’s Noise Enforcement Officer of all complaints within 24 hours. In addition, the disturbance coordinator shall record all noise complaints received and actions taken in response, and submit this record to the City’s Noise Enforcement Officer upon request. The disturbance coordinator shall be trained to use a sound level meter and shall be available during all construction hours to respond to complaints.
- Signs shall be conspicuously posted at the construction site that include permitted construction days and hours, the name and telephone number of the disturbance coordinator, and the name and telephone number of the City’s Noise Enforcement Officer.

- Construction activity shall be limited to the hours between 7:00 a.m. and 7:00 p.m., Monday through Friday, and between 9:00 a.m. and 8:00 p.m. Saturday and Sunday, unless more restrictive hours are required by the City. If construction activity must extend beyond these hours, at least one week's notice shall be provided to the Zoning Officer.

A pre-construction meeting shall be held with the Noise Enforcement Officer (or his/her designee), the Zoning Officer (or his/her designee), and the general contractor/on-site project manager to review the requirements of the Noise Reduction Program and confirm that requirements applicable prior to construction (e.g. posted signs) have been completed.

**Noise Generated During Project Operation**

The implementation of the project would generate increased traffic volumes on some area roadways. However, due to the additive properties of noise, discussed above, traffic volumes would have to nearly double for a perceptible increase in noise levels to occur. A preliminary assessment of traffic volumes, provided by Stantec, indicates that the net change of 15,000 square feet of development would generate approximately 122 daily trips along Ashby Avenue and 7th Street. Daily traffic volumes on Ashby Avenue and 7th Street currently range from 11,140 along 7th Street in the northbound direction to 23,775 along Ashby Avenue in the eastbound direction. Traffic increases along these streets would therefore be less than one percent, which is well below the near 100 percent increase required for a perceptible change in noise levels to occur. Consequently, the operational phase of the proposed project would not generate additional traffic noise on area roadways.

The primary noise generation from the long-term operation of the project would occur as a result of the use of exhaust fans and a mechanical heating, ventilation, and air conditioning (HVAC) system at the product testing facility. The building exhaust and HVAC systems are required to be enclosed or muffled so that noise levels in surrounding zoning districts do not exceed the thresholds specified in sections 13.40.050 and 13.40.060 of the Municipal Code.[84] An equipment screen for these mechanical systems is proposed as part of the project design. Given the existing high ambient noise levels at the project site, including noise generated by HVAC and exhaust systems at adjacent buildings, the noise generated by the muffled or enclosed exhaust and HVAC systems at the proposed product testing facility would be less than significant.

**Noise Exposure During Project Operation**

The ambient noise levels at the proposed product testing facility range from approximately 70 to 75 dBA Ldn.[85] As discussed above, non-residential buildings exposed

[84] City of Berkeley Municipal Code Section 13.40.070.B.11.b.

[85] City of Berkeley, 2003a. op. cit.

to exterior noise levels above 65 dBA Ldn are typically subject to the noise control requirements specified in the CBC, which include (1) maintaining interior noise levels below 50 dBA Leq in occupied areas during any hour of operation or (2) using wall and roof-ceiling assemblies with the minimum Sound Transmission Class (STC) or Outdoor-Indoor Sound Transmission Class (OITC) ratings stipulated in the CBC. Compliance with the requirements of the CBC would reduce the potential exposure of workers within the proposed product testing facility to excessive noise levels to a less-than-significant level.

b) *Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?*

**Potentially Significant Unless Mitigation Incorporation.** Potential impacts of the exposure of receptors to excessive construction generated vibration levels can be mitigated to a less-than-significant level, as described below.

**Vibration Generated During Construction**

Construction activities can result in varying degrees of ground vibration, depending on the equipment, activity, and relative proximity to sensitive receptors. The vibration levels for construction equipment that could be used at the proposed demolition and new building sites are summarized in Table XII-5. Although the table provides one vibration level for each piece of equipment, it should be noted that there is considerable variation in reported ground vibration levels from construction activities, primarily due to variation in soil characteristics.

Tables XII-6 and XII-7 summarize the vibration criteria to prevent disturbance of occupants and to prevent damage to structures, respectively. In assessing freight train vibration, the FTA recommends applying the "Frequent Events" criterion to rail car vibration because rail car vibration can last several minutes.[86] In this analysis, the "Frequent Event" criterion is also conservatively applied to passenger trains.

The nearest receptors to the proposed demolition site are light industrial buildings located approximately 50 feet north, south, and west of the demolition site. The nearest receptor to the new building site is an industrial building (# 84) on the Bayer Healthcare South Properties located approximately 15 feet east of the new building site. However, this building is vacant and therefore only the potential of construction generated vibration to result in damage to the building is considered in this analysis; the potential of construction-generated vibration to disturb occupants of the building is therefore not analyzed. The nearest receptors to the proposed new building site that are occupied are industrial buildings located approximately 50 feet north and west of the new building site.

[86] Federal Transit Administration, 2006. Opop. cit.

**TABLE XII-5 VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT**

| Equipment | PPV at 15 Ft (in/sec) | PPV at 25 Ft (in/sec) | PPV at 50 Ft (in/sec) | RMS at 25 Ft (VdB) | RMS at 50 Ft (VdB) |
|---|---|---|---|---|---|
| Large bulldozer | 0.191 | 0.089 | 0.031 | 87 | 78 |
| Caisson drilling | 0.191 | 0.089 | 0.031 | 87 | 78 |
| Loaded trucks | 0.164 | 0.076 | 0.027 | 86 | 77 |
| Jackhammer | 0.075 | 0.035 | 0.012 | 79 | 70 |
| Small bulldozer | 0.006 | 0.003 | 0.001 | 58 | 49 |

Notes: Based on vibration levels at 25 feet, the following propagation adjustment was applied to estimate PPV vibration levels at 15 and 50 feet assuming:

$PPV2 = PPV1 \times (D1/D2)^{1.5}$

Where:

PPV1 is the reference vibration level at a specified distance.

PPV2 is the calculated vibration level.

D1 is the reference distance (in this case 25 feet).

D2 is the distance from the equipment to the receiver.

Based on vibration levels at 25 feet, the following propagation adjustment was applied to estimate RMS vibration levels at 50 feet assuming:

$RMS2 = RMS1 - 30 \log_{10} (D2/D1)$

Where:

RMS1is the reference vibration level at a specified distance.

RMS2 is the calculated vibration level.

D1 is the reference distance (in this case 25 feet).

D2 is the distance from the equipment to the receiver.

RMS vibration levels at 15 feet were not estimated because RMS velocity is used to evaluate the human response to vibration and the building located 15 feet from the construction site is not occupied and therefore the analysis of human response is not appropriate.

Source of PPV and RMS vibration levels at 25 feet: Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment (DTA-VA-90-1003-06).

Based on the estimated construction equipment-generated vibration levels in Table XII-5, construction-generated vibration levels at both the proposed demolition and new building sites could reach 78 RMS VdB, which would exceed the 75 RMS VdB frequent event threshold of daytime use disturbance at the nearest occupied buildings. However, the vibration levels would not exceed the 0.3 PPV in/sec threshold to prevent damage to engineered concrete and masonry structures at both the occupied and vacant buildings closest to the demolition and new building sites.

**TABLE XII-6 VIBRATION CRITERIA TO PREVENT DISTURBANCE – RMS (VDB)**

| Land Use Category | Frequent Events [1] | Occasional Events [2] | Infrequent Events [3] |
|---|---|---|---|
| Residences and buildings where people normally sleep | 72 | 75 | 80 |
| Institutional Land uses with primarily daytime use | 75 | 78 | 83 |

Notes:
1 = More than 70 vibration events of the same kind per day or vibration generated by a long freight train.
2 = Between 30 and 70 vibration events of the same kind per day.
3 = Fewer than 30 vibration events of the same kind per day.
Source: Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment (DTA-VA-90-1003-06).

**TABLE XII-7 VIBRATION CRITERIA TO PREVENT DAMAGE TO STRUCTURES**

| Building Category | PPV (in/sec) | RMS (VdB) |
|---|---|---|
| Reinforced-concrete, steel or timber (no plaster) | 0.5 | 102 |
| Engineered concrete and masonry (no plaster) | 0.3 | 98 |
| Non-engineered timber and masonry buildings | 0.2 | 94 |
| Buildings extremely susceptible to vibration damage | 0.12 | 90 |

Source: Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment (DTA-VA-90-1003-06).

At both the proposed demolition and new building sites, the vibration exposure of occupants of potentially impacted buildings would be temporary because the vibration levels would only exceed the 75 RMS VdB threshold when construction equipment is located in areas that are closest to the potentially impacted buildings. The implementation of Mitigation Measure NS-1, which limits the use of impact equipment, requires stationary noise generating equipment and staging areas to be located as far as possible from receptors that adjoin the demolition and new building sites, and requires the designation of a disturbance coordinator to address complaints, would reduce the potential of construction-generated vibration to disturb occupants of adjacent buildings to a less-than-significant level.

### Vibration Generation and Exposure During Project Operation

The long-term operation of the proposed product testing facility would not involve the use of any equipment or activities that would generate excessive vibration. The proposed

product testing facility could be exposed to vibration generated by passenger trains, freight train locomotives, and freight train cars travelling on the UPRR tracks. Measurements previously collected in the City of Berkeley (i.e., not specifically for this project) indicate that Amtrak trains generate vibration levels of 70 RMS VdB at 100 feet from track centerline.[87] Freight trains were found to generate vibration levels of 74 RMS VdB at 100 feet from track centerline.[88] Both of these vibration levels are below the 75 RMS VdB frequent event threshold of daytime use disturbance. The proposed product testing facility is located approximately 650 feet east of the UPRR tracks. At this distance, vibration levels at the proposed product testing facility would also be below the 75 RMS VdB threshold. Additionally, the occupants of the project site would not be subject to excessive vibration from traffic because highways and roads do not generate perceptible levels of vibration.[89] Therefore, the potential of the operational phase of the project to expose people to excessive vibration is less than significant.

c) *A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?*

**Less Than Significant.** Please refer to *Section XII.a*. The project would not involve any activities at the proposed demolition site after demolition is completed and would therefore not contribute to a permanent increase in ambient noise levels. The exhaust fans and HVAC systems at the proposed product testing facility would be muffled or enclosed in compliance with Community Noise Ordinance requirements, and the noise that these systems generate would be similar to those already existing in the project vicinity. In addition, the predicted increase in vehicular traffic resulting from the operation of the product testing facility would not be sufficient to result in increased traffic noise levels. Consequently, the proposed project would not result in a perceptible permanent increase in ambient noise levels and its impact would be less than significant.

d) *A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?*

**Potentially Significant Unless Mitigation Incorporated.** Please refer to *Section XII.a*. The use of heavy equipment on the demolition and new building sites could result in a substantial temporary and periodic increase in ambient noise levels (Table XII-4). Implementation of **Mitigation Measure NS-1** would decrease noise generated by construction activities to a less-than-significant level.

[87] Ambient Air Quality and Noise Consulting, 2007. Noise Impact Analysis for City of Berkeley 651 Addison Street Mixed-Use Project. December 3.
[88] Ibid.
[89] Federal Transit Administration, 2006. op. cit.

e) *For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*

**No Impact.** The project site is not located within two miles of a public airport or within an airport land use plan, and it is not located within the 65 dBA CNEL noise contours of either the San Francisco or Oakland International Airports. Consequently, people working in the project area would not be exposed to excessive aircraft noise levels.

f) *For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?*

**No Impact.** The City of Berkeley is not located within the vicinity of a private airstrip. Consequently, people working in the project area would not be exposed to excessive aircraft noise levels.

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **XIII. POPULATION AND HOUSING** | | | | |
| Would the project: | | | | |
| a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? | ❒ | ❒ | ■ | ❒ |
| b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? | ❒ | ❒ | ❒ | ■ |
| c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? | ❒ | ❒ | ❒ | ■ |

## Affected Environment

Based on the net increase of 15,000 square feet of industrial development, the project could add up to 25 new employees. There are approximately 1,300 employees that work in the existing Bayer Campus.

### Discussion

a) *Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?*

**Less Than Significant.** The project does not include the construction of any new housing units but would result in 25 new jobs. Many of these future employees likely already live in the nearby area, while other employees may choose to move and live in Berkeley or another nearby community. However, the resulting housing demand from these potential new employees is not significant and local and regional housing growth is expected to accommodate them. The project would therefore have a less-than-significant impact on housing and population growth.

b) *Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?*

**No Impact.** There are no residential units on the Bayer Campus and none are proposed as part of the project. As a result, development of the project would not result in the displacement of residential units nor necessitate construction of replacement housing elsewhere.

c) *Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?*

**No Impact.** The new building site is a vacant lot and surface parking area; no residential uses exist on the project site or the larger Bayer Campus. Development of the project would not result in the displacement of people nor necessitate construction of replacement housing elsewhere.

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **XIV. PUBLIC SERVICES** | | | | |
| Would the project: | | | | |
| a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: | | | | |
| Fire protection? | ❒ | ❒ | ■ | ❒ |
| Police protection? | ❒ | ❒ | ■ | ❒ |
| Schools? | ❒ | ❒ | ■ | ❒ |
| Parks? | ❒ | ❒ | ■ | ❒ |
| Other public facilities? | ❒ | ❒ | ❒ | ■ |

## Affected Environment

The project site is in an urban area served by existing infrastructure and public services. The following sub-sections evaluate the potential impact of the project on police and fire protection, schools, parks, and other public facilities within the City of Berkeley.

## Discussion

a) *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: fire protection, police protection, schools, parks, or other public facilities?*

**Fire Protection - Less Than Significant.** Fire protection to the project site is provided by the Berkeley Fire Department. The Fire Department operates seven fire stations in Berkeley. Station 1 is the nearest station to the project site, located at 2442 Eighth Street (approximately 0.3 miles away). The station houses one engine, one medical ambulance, and one reserve ambulance.

In 2013, the Berkeley Fire Department responded to 14,401 calls for service: 257 calls for fires and 10,063 medical calls; the remainder included calls regarding hazardous materials, water problems, and false alarms.[90]

Bayer's emergency response system includes trained Emergency Response Team (ERT) members, Security, and Health, Environmental, Safety, and Security (HESS) staff. Bayer maintains a "Pre-Fire Plan" which provides facility-wide maps showing fire hydrant locations and building-specific information regarding fire protection equipment.

Bayer's Security Department is the first point of formal contact when an incident is discovered. Upon receiving the call or alarm, the Security Department radios appropriate ERT members and HESS management. The Bayer emergency responder will initiate calls to the fire department, police, or other agency as needed. Bayer maintains a protocol for the type of emergency incidents that trigger response by the Berkeley Fire Department.[91] In addition to on-site emergency responders, Bayer has maintained a relationship with the City of Berkeley Fire Department and Police Department to coordinate emergency services. Between January 2009 and June 2014, the Fire Department received 152 calls for service to the Bayer Campus at 800 Dwight Way.[92]

No changes to these plans or protocols are anticipated as a result the project. Therefore, while implementation of the project may result in an incremental increased demand for fire protection services as a result of the incremental increase in employees and building area, the existing Bayer protocols and City Fire Department facilities are anticipated to be sufficient to meet demand. The project would not require the provision of or need for new or physically altered facilities to continue to serve the project. As a result, the project would not result in a substantial adverse physical impact nor would it substantially affect response times for fire services. The project's impact related to the provision of fire services would be less than significant.

**Police Protection - Less Than Significant.** Law enforcement services in Berkeley are provided by the Berkeley Police Department. Police headquarters are located at 2100 Martin Luther King Jr. Way, approximately less than 2 miles northwest of the project site. The Police Department currently consists of 170 sworn officers and 100 civilian staff.[93]

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[90] Berkeley, City of, 2014b. *City of Berkeley Fire Department NFPA Analysis Report* (01-01-2013 to 12/31/2013). Accessed June 24. http://www.cityofberkeley.info/uploadedFiles/Fire/Level_3_-_General/2013%20NFPA%20Report.PDF.

[91] Bayer HealthCare, 2014a. Integrated Contingency Plan. June 6.

[92] Dong, Gil, Chief, Berkeley Fire Department, 2014. Personal Communication with Urban Planning Partners. July 17.

[93] City of Berkeley, 2014a. Berkeley Police Department: Our Department. Accessed on June 24. http://www.ci.berkeley.ca.us/Police/Home/About_Our_Department.aspx

The result is a ratio of 1.46 sworn officers for every 1,000 residents (based on an estimated 116,768 residents in 2013).[94]

As described in the Fire Services section above, Bayer has a protocol for responding to emergencies and maintains a relationship with the Berkeley Police Department. Between May 2009 and June 2014, the Police Department received 89 calls for service at 800 Dwight Way.[95] Between February 2010 and June 2014, there were only 4 calls for service at 801 Grayson Street.[96]

Implementation of the project may result in an incremental increased demand for police services, but this is not expected to be substantially greater than the existing demand for police services; thus, meeting this additional demand would not require the provision of or need for new or physically altered facilities to continue to serve the project site. The project would therefore have a less-than-significant impact on police protection services.

**Schools – Less Than Significant.** The project would not involve the addition of new residents and would result in only 25 new jobs; thus the project would not likely result in an increase of students enrolled in Berkeley public schools or surrounding districts. Therefore, the project would not significantly impact schools.

**Parks – Less Than Significant.** Parks within the vicinity of the project include San Pablo Park to the east and Berkeley Aquatic Park to the west of the project site. The proposed project does not involve the construction of new housing and would only result in a minimal number of new jobs. Therefore, it would not substantially increase demand for park services. Additionally, the project includes construction of a courtyard as part of the development of Building #88, providing an opportunity for employees to have access to open space during lunch or other times.

**Other Public Facilities – No Impact.** Residents in the City of Berkeley are served by five public libraries. The closest branch of the Berkeley Public Library is the West Branch, located at 1125 University Avenue, about 1.3 miles from the Project site. However, the project would not involve the addition of new residents and would result in only 25 new jobs; thus, the project is not anticipated to increase demand on the library or other public facilities.

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[94] United States Census Bureau, 2014. QuickFacts from the US Census Bureau. Accessed June 24. http://quickfacts.census.gov/qfd/states/06/0606000.html.

[95] Note this location includes the specific address and the municipal block (i.e., the 800 block of Dwight Way). According to the Police Department, it is likely the majority of calls were associated with activities on the street rather than the Bayer Campus facility.

[96] Berkeley Police Department, 2014. "Calls for Police Service at 800 Dwight and 801 Grayson." Written Communication from Michael Meehan, Chief to Aaron Sage, Senior Planner. July 17.

## XV. RECREATION

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ❒ | ❒ | ■ | ❒ |
| b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | ❒ | ❒ | ■ | ❒ |

**Less Than Significant.** The project's use is not expected to generate any additional residents and would only result in 25 new employees; thus, it is not expected to result in a substantial amount of additional users of neighborhood and regional parks or other recreational facilities such as Aquatic Park. Therefore, the project would not require the construction or expansion of recreational facilities or contribute to substantial physical deterioration of these facilities and would have no impact. Further, the project includes development of on-site open space for use by Bayer employees as part of the planned site improvements, including site landscaping and a courtyard between the new facility and Building #83.

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **XVI. TRANSPORTATION/TRAFFIC** | | | | |
| Would the project: | | | | |
| a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit? | ❒ | ❒ | ■ | ❒ |
| b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways? | ❒ | ❒ | ■ | ❒ |
| c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks? | ❒ | ❒ | ❒ | ■ |
| d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | ❒ | ❒ | ■ | ❒ |
| e) Result in inadequate emergency access? | ❒ | ❒ | ■ | ❒ |
| f) Conflict with adopted polices, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities? | ❒ | ❒ | ■ | ❒ |

## Affected Environment

This analysis is based on the traffic study prepared by Stantec Consulting Services, Inc. (Stantec) in July 2014, which evaluated the potential impact of the project on the existing traffic and transportation system. This study is attached as Appendix C.

The analysis evaluated morning and evening peak hour traffic conditions on a typical weekday under the following five scenarios:

1. **Existing Conditions** – Current (Year 2014) traffic volumes and roadway conditions, provided for informational purposes;

2. **Existing plus Approved Projects Conditions** –"Existing Conditions," with added traffic from approved projects in the project site's vicinity; this adjusts the existing conditions to represent how conditions are anticipated to change in the near-term

based on projects that are approved and anticipated to be developed by the time the Bayer project is complete. This scenario represents a more realistic baseline from which to evaluate potential project impacts.

3. **Existing plus Approved plus Proposed Project Conditions** –"Existing plus Approved Projects Conditions," with traffic added from the proposed project.

4. **Year 2035 Conditions** – Scenario based on projections from the latest Alameda County Transportation Commission (ACTC) travel demand model; 21 year incremental traffic growth added to existing volumes to estimate cumulative 2035 conditions (without the proposed project).

5. **Year 2035 plus Proposed Project Conditions** – "Year 2035 Conditions," with the addition of proposed project traffic (cumulative conditions, with the addition of the proposed project).

After consultation with City of Berkeley staff, Stantec selected the signalized intersection at Ashby Avenue and Seventh Street for the study, since the majority of employees and visitors traveling to and from the new building are expected to pass through the intersection at Seventh Street and Ashby Avenue and the overall volumes generated are low. Additionally, consultants conducted traffic counts during weekday morning and evenings in June 2014 and determined that the AM peak hour was 8:00 a.m. to 9:00 a.m. and that the PM peak hour was from 4:45 p.m. to 5:45 p.m. Peak Hour LOS under existing conditions is shown in Table XV-1.

**TABLE XVI-1 PEAK HOUR INTERSECTION LOS AT SEVENTH STREET & ASHBY AVENUE (EXISTING)**

| | Existing | | |
|---|---|---|---|
| **Period** | **Delay** | **V/C** | **LOS** |
| AM | 47.0 | 0.88 | D |
| PM | 52.1 | 0.74 | D |

Source: Stantec, 2014.

Stantec estimated trip generation based on rates provided in Trip Generation, 9th Edition published by the Institute of Transportation Engineers. The project is expected to have trip generation patterns similar to a Research & Development Center.

## Discussion

a) *Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?*

**Less Than Significant.** The City has the following General Plan policy related to evaluating multi-modal transportation when considering impacts under CEQA.

> Policy T-18 Level of Service: When considering transportation impacts under the California Environmental Quality Act, the City shall consider how a plan or project affects all modes of transportation, including transit riders, bicyclists, pedestrians, and motorists, to determine the transportation impacts of a plan or project. Significant beneficial pedestrian, bicycle, or transit impacts, or significant beneficial impacts on air quality, noise, visual quality, or safety in residential areas, may offset or mitigate a significant adverse impact on vehicle Level of Service (LOS) to a level of insignificance. The number of transit riders, pedestrians, and bicyclists potentially affected will be considered when evaluating a degradation of LOS for motorists.
>
> Action: A. Establish new multi-modal levels of service (LOS) City standards that consider all modes of transportation, including transit, bicycles, and pedestrians in addition to automobiles.

## Vehicles

Significance thresholds are based on City's Guidelines for Development of Traffic Impact Reports. The City's level of service (LOS) standard is LOS D for signalized intersections. Intersections that operate at levels worse than LOS D are considered impacted and should be considered for mitigation.[97] Exceptions to the LOS D standard arise when the project is not expected to add more than three seconds of delay at an intersection that is operating at LOS E, or increase the volume-to-capacity (V/C) ratio by more than 0.01 at an intersection that is operating at LOS F without the proposed project.

The project, based on the net 15,000 square-foot increase in building area, is expected to generate approximately 18 trips in the AM peak hour and 16 trips in the PM peak hour. Table XVI-2 summarizes the results of the weekday intersection analysis under baseline conditions (Existing + Approved Projects) and with the addition of the project. Under baseline conditions, the study intersection is expected to operate at unacceptable service levels (LOS E) during both AM and PM peak periods. The addition of the project, contributes to the deteriorating conditions, but does not trigger the significance threshold, since LOS E is anticipated both with and without the project, and because the difference in average delay between the scenarios is less than three seconds.

[97] City of Berkeley, 2005. Office of Transportation. "Guidelines for Development of Traffic Impact Reports" September 16.

**TABLE XVI-2 PEAK HOUR INTERSECTION LOS AT SEVENTH STREET & ASHBY AVENUE (BASELINE & PLUS PROJECT SCENARIOS)**

| Period | Existing + Approved | | | Existing + Approved + Project | | |
|---|---|---|---|---|---|---|
| | Delay | V/C | LOS | Delay | V/C | LOS |
| AM | 67.0 | 1.02 | E | 68.3 | 1.02 | **E** |
| PM | 66.4 | 0.92 | E | 67.6 | 0.93 | **E** |

Note: **Bold** font indicates exceedence of LOS standard.
Source: Stantec, 2014.

For the cumulative scenario, Stantec estimated 2035 traffic forecasts by using the latest ACTC traffic and land use projections, and calculated the difference between the 2005 and 2035 model link volumes to estimate annual growth increments. Results of the cumulative analysis, with and without the project are shown in Table XVI-3.Under the Year 2035 Conditions, the intersection will operate at LOS E in the AM peak hour and at LOS F in the PM peak hour—below the City's LOS standard. With the addition of the project, during the AM peak period, the intersection would continue to operate at LOS E and the difference in average delay is less than three seconds, which is below the City's significance threshold. During the PM peak period, the intersection would continue to operate at LOS F, with the project, and the expected increase to the V/C ratio would be less than or equal to 0.01, which is below the City's significance threshold.

**TABLE XVI-3 PEAK HOUR INTERSECTION LOS AT SEVENTH STREET & ASHBY AVENUE (CUMULATIVE 2035 SCENARIOS)**

| Period | 2035 Conditions | | | 2035 Conditions + Project | | |
|---|---|---|---|---|---|---|
| | Delay | V/C | LOS | Delay | V/C | LOS |
| AM | 72.0 | 1.07 | E | 73.1 | 1.08 | **E** |
| PM | 81.1 | 1.05 | F | 82.3 | 1.06 | **F** |

Note: **Bold** font indicates exceedence of LOS standard.
Source: Stantec, 2014.

## Other Modes

The City's Guidelines for Development of Traffic Impact Reports do not specify a threshold for evaluating pedestrian, bicycle, and transit use, but do acknowledge their evaluation. Potential impacts are evaluated qualitatively below.

As described in the Project Description, the Berkeley Amtrak Station is located 1 mile north of the Bayer Campus and the Ashby BART Station is approximately 1.5 miles to the east. Bayer funds shuttles and taxis from the Ashby BART and Amtrak stations,

respectively. The Bayer Campus is also served by several AC Transit bus lines, including lines that provide access to the Downtown Berkeley and Rockridge BART Stations. Further, the City's General Plan identifies the following policies related to private employers and alternative modes:

> Policy T-14 Private Employers: Encourage private employers to reduce the demand for automobile travel through transportation demand management programs that include elements such as:
>
> 1. Trip reduction incentives such as Commuter Check and Eco-Pass.
> 2. Flexible work hours and telecommuting to reduce peak-hour commute congestion.
> 3. Carpool and vanpool incentives to reduce single-occupancy vehicle use.
> 4. Provision of mass transit pass/credit instead of free employee parking (parking "cash-out" programs).
> 5. Providing bicycle facilities.
> 6. Market pricing mechanisms for employee parking to reduce automotive use and discourage all-day parking.
> 7. Local hiring policies.
> 8. Numerical goals for trip reduction.

The project sponsor's existing Transportation Demand Management (TDM) Program addresses many of these policy items. Implementation of this program is not proposed to be altered as part of this project, though additional employees generated as part of the project will be eligible for the TDM elements.

Further, the Berkeley Bicycle Plan designates facilities around the Bayer Campus, including along Aquatic Park, a portion of Heinz Avenue, and on Ninth Street. The Berkeley Pedestrian Master Plan guides the development and enhancement of the pedestrian environment within the City and includes guidelines for private development. The up to 25 employees that may be generated as part of the project will incrementally contribute to the use of pedestrian facilities (i.e., sidewalks on Grayson and Seventh Streets), bicycle facilities, and transit. However, these modest increases will not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for these modes.

As a result of the analysis above, the potential impact of the project on applicable policies regarding the performance of the vehicular system and other circulation modes is less than significant.

b) *Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?*

**Less Than Significant.** ACTC requires the assessment of development-driven impacts to regional roadways. However, because the project would not generate more than 100 "net

new" PM peak-hour trips—the threshold for analysis—no further assessment is required. The project would not conflict with ACTC LOS standards or cause congestion of regional significant on a roadway segment on the Metropolitan Transportation System. As a result, the project would have a less-than-significant impact on consistency with ACTC standards.

c) *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?*

**No Impact.** As described in *Section XII.e*, the project site is not located near any airports nor would it change air traffic patterns that would result in safety risks.

d) *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*

**Less Than Significant.** The project is redeveloping existing properties within an industrial corporate campus, including replacing a vacant site with a new industrial building. The project proposes to include similar uses found elsewhere on the campus and does not propose to alter the circulation network or contribute any incompatible uses. Therefore, the project would not substantially increase hazards due to a design feature or incompatible uses, and the impact is less than significant.

e) *Result in inadequate emergency access?*

**Less Than Significant.** The project would not involve the construction of new entrances to the South Properties or internal driveways, or otherwise result in any changes to the circulation network. As a result, the potential impact to emergency access is less than significant.

f) *Conflict with adopted polices, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?*

**Less Than Significant.** The project does not propose to alter the existing bicycle, transit, or pedestrian networks. It is likely that the addition of up to 25 new employees as a result of the project, will add a limited number of bicyclists, transit users (including, AC Transit, BART, Amtrak, and the Bayer shuttle connection), and pedestrians to the existing network. Given the limited number of new trips via these alternate travel modes, these additional users are not expected to decrease the performance or safety of these facilities.

## Other Non-CEQA Topic: Parking Capacity

Although not currently included in CEQA Guidelines Appendix G Checklist as a significance criterion, parking capacity at the project site and across the Bayer Campus is

evaluated for informational purposes. Notably, the City may calculate parking demand and supply in a different manner for the purposes of the Use Permit review.

The Bayer Campus has approximately 1,250 parking spaces. The project would remove 29 designated stalls, resulting in a supply of 1,221 spaces. Bayer estimates that the parking demand from existing facilities is 1,003 spaces, based on parking ratios of 500 to 1,000 sq. ft./parking stall, depending on the building function. As a conservative estimate, the net new square footage could generate a demand of 30 spaces (15,000 sq. ft./500 sq. ft.). As a result, the project could increase campus-wide parking demand to 1,033 spaces, which would be accommodated within the 1,221 spaces anticipated with implementation of the project.

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **XVII. UTILITIES AND SERVICE SYSTEMS** | | | | |
| Would the project: | | | | |
| a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board? | ❒ | ❒ | ■ | ❒ |
| b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ❒ | ❒ | ■ | ❒ |
| c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ❒ | ❒ | ■ | ❒ |
| d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? | ❒ | ❒ | ■ | ❒ |
| e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | ❒ | ❒ | ■ | ❒ |
| f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? | ❒ | ❒ | ■ | ❒ |
| g) Comply with federal, State, and local statutes and regulations related to solid waste? | ❒ | ❒ | ■ | ❒ |

## Affected Environment

The project site is an urban area served by existing infrastructure and utilities. The following sub-sections provide an overview of existing conditions related to wastewater, water supply, stormwater runoff, and solid waste and the potential impacts of the project on utilities and service systems.

## Discussion

a) *Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?*

**Less Than Significant.** The City of Berkeley is located within the jurisdiction boundaries of the San Francisco Bay Regional Water Quality Control Board (Regional Water Board). The Regional Water Board provides groundwater protection, wastewater discharge regulation, site cleanups, brownfields cleanups, stormwater basin planning, water quality information, enforcement, and stream and waterway protection. Under the Regional Water

Board National Pollutant Discharge Elimination System (NPDES) permit system, all existing and future municipal and industrial discharges to surface waters within the City would be subject to regulation.

To control sanitary sewer overflows, the regional and State water boards have developed detailed requirements for sewer collection agencies, including preparation of sewer system management plans. In 2014, the City adopted an update to the 2009 Sewer System Management Plan to safely and effectively manage and operate the sewer system. Additionally, the General Plan states the following actions:

> EM-23-A. Work with the East Bay Municipal District (EBMUD) to ensure that wastewater discharges comply with the requirements of EBMUD's Wastewater Control Ordinance No. 311 to manage wastewater treatment discharges to protect San Francisco Bay.
>
> EM-24-A. Adequately fund sewer system improvements necessary to maintain water quality in natural areas and reduce public health hazards.

Wastewater from the project would be directed to existing facilities, which would continue to comply with all provisions of the NPDES program, as enforced by the Regional Water Board. Therefore, the project would not result in an exceedance of wastewater treatment requirements and the impact is less than significant. Existing regulations and permit conditions, including compliance with **Mitigation Measure HYD-1** regarding preparing of a SWPPP, would ensure that new development complies with all wastewater treatment requirements.

b) *Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?*

**Less Than Significant.** East Bay Municipal Utility District's (EBMUD) wastewater service district treats domestic, commercial and industrial wastewater in Berkeley and several surrounding communities. The City of Berkeley owns and operates approximately 254 miles of sanitary sewers, 7,200 manholes and other sewer structures, seven sewage pump stations, and approximately 31,600 service laterals. The City's sewer system is connected to trunk lines which convey flows to EBMUD's wastewater interceptors. The wastewater is then treated in EBMUD's Main Wastewater Treatment Plant located near the eastern terminus of the San Francisco-Oakland Bay Bridge.[98] The General Plan includes the following related action:

> EM-24-E. Ensure that new development pays its fair share of improvements to the storm sewerage system necessary to accommodate increased flows from the development.

[98] City of Berkeley, 2014g. Sewer System Management Plan. Adopted March.

The project would generate wastewater that would be treated by EBMUD facilities. Building #88 would be more efficient and use more water saving fixtures, such that water and wastewater would not be expected to increase substantially, if at all, compared to existing conditions. Moreover, new development is required to pay a sewer connection fee as a condition of the issuance of a building permit to fund the operation, maintenance, and capital improvements to the sanitary sewer system.[99] Therefore, the project would have a less-than-significant impact related to wastewater treatment facilities.

c) *Would the project require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?*

**Less Than Significant.** Surface runoff in Berkeley is collected in approximately 78 miles of storm drain piping and is discharged directly into the San Francisco Bay.[100] Currently, the new building site consists of a vacant lot and surface parking. Compliance with stormwater treatment requirements (**Mitigation Measure HYD-2**) and development of the courtyard as part of Building #88 would likely increase pervious areas and stormwater infiltration, thereby decreasing total runoff. Therefore, the project would not require or result in the construction of new or expansion of existing stormwater drainage facilities and the impact on stormwater drainage would be less than significant.

d) *Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?*

**Less Than Significant.** EBMUD owns, operates and maintains the water distribution system in the City. Both supply and demand vary seasonally and become critical during drought periods which can last several years. For planning purposes and looking to the year 2040, EBMUD's current water supply is sufficient to meet customer needs during normal years, but insufficient to meet demand during single- and multi-year droughts. EBMUD is pursuing a range of strategies to reduce demand and increase supply, including public outreach, leak fixes, water storage, infrastructure improvements and water conservation measures.

EBMUD also imposes a system capacity charge on new developments to fund system maintenance and the development of new water sources. The project applicant would be required to pay this fee and undertake water conservation measures such as the installation of low-flow toilets. In addition, the project would also be required to comply with Section 31 of EBMUD's Water Service Regulations, which require applicable water-

[99] City of Berkeley, 2014f. Public Works: Sewer Service Fees. Accessed June 30, 2014. http://www.ci.berkeley.ca.us/Public_Works/Sewers_-_Storm/Sewer_Service_Fees.aspx
[100] City of Berkeley, 2014h. Watershed Resources Home Page. Accessed June 27, 2014. http://www.ci.berkeley.ca.us/Public_Works/Sewers_-_Storm/Watershed_Resources.aspx.

efficiency measures be installed using equipment at the applicant's expense.[101] The project applicant also would be required to coordinate with EBMUD and the City of Berkeley Fire Department to assess fire flow requirements and comply with them as part of the project.

Recycled water use is a critical element of these water supply management policies and stretches EBMUD's limited, high-quality drinking water supply, since any demand met with recycled or non-potable water reduces the demand for potable water supply. In 2008, EDMUD began delivering recycled water to customers through the East Bayshore Recycled Water Project. A recycled pipeline runs directly west of the project site along the I-80, and supplies recycled water for landscape irrigation in areas of Oakland and Emeryville where recycled water pipelines have been installed. EBMUD also plans to expand the distribution system into Berkeley, Albany, and Alameda.[102] The recycled water demands identified by EBMUD include irrigation of medians, golf courses, parks, and schools; toilet flushing; commercial and industrial process water; decorative fountains; and cooling tower water, as discussed in the City's General Plan EIR. While the Bayer Campus does not currently utilize recycled water, nor is it proposed as part of the project, recycled water facilities may be available by EBMUD during the construction timeline.

e) *Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?*

**Less Than Significant.** As described in *Section XVII.b,* the City of Berkeley operates a municipal sewer system that conveys wastewater to EBMUD's Main Wastewater Treatment Plant. Wastewater capacity is sufficient during normal conditions, but can become inundated during prolonged wet weather conditions. The City completed a *Sewer System Hydraulic Modeling and Capacity Assessment* study in 2012 to identify potential capacity deficiencies in the system. Overflow events in the City's sewer system have generally occurred due to maintenance or construction issues rather than wet weather. However, as a result of infrastructure improvements over the last 25 years, capacity-related overflows in the system no longer occur.[103] Considering the existing infrastructure provided, the use of water saving fixtures in the proposed Building #88, and the improvements and ongoing planning by the City, this analysis determines that EBMUD and the City have adequate capacity to serve the project's projected wastewater demand. As a result, the project would have a less-than-significant impact on wastewater capacity.

[101] EBMUD, 2013. Section 31: Water Efficiency Requirements. July 1. Accessed June 30, 2014. https://www.ebmud.com/sites/default/files/pdfs/Section%2031%20Water%20Efficiency%20Requirements%20070113_0.pdf.

[102] EBMUD, 2014. East Bayshore Recycled Water Project. May.

[103] City of Berkeley, 2014g. op cit.

f) *Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?*

**Less Than Significant.** The City of Berkeley's solid waste is primarily sent to the Altamont landfill in Livermore. The Altamont Landfill facility has a total estimated capacity of 62 million cubic yards. As of 2005, the landfill's total estimated used capacity was approximately 16.3 million cubic yards, or 26 percent of the landfill's total capacity. The landfill has a permitted throughput of 11,500 tons per day[104] and is anticipated to have sufficient capacity until 2025.[105] In 2012, the City of Berkeley diverted approximately 73 percent of its solid waste from landfills through recycling and/or composting efforts, surpassing the City's General Plan goal of 64 percent.[106] The City of Berkeley has adopted a number of policies and programs through its Climate Action Plan and the General Plan to further reduce solid waste generation. General Plan policy and actions are identified below:

> Policy EM-7 Reduced Wastes: Continue to reduce solid and hazardous wastes.
>
> > Action A. Achieve a 64% diversion of waste from landfills.
> >
> > Action B. Manage wastes locally to the greatest extent feasible to minimize the export of wastes and pollution to other communities.

Similarly, Bayer has implemented a series of programs to reduce waste including reusing millions of gallons of water in cooling towers, lighting upgrades, and returning empty raw material supply containers to distributors for reuse.[107] Additional programs include Bayer's Waste Reduction Program and global Climate Program. In 2011, Bayer's Annual Report demonstrated that the company had far surpassed the Development Agreement's general mandates to develop resource reduction and recycling plans. Currently, the Bayer HealthCare site is working towards a target of 5 percent in CO2 emission reductions by 2020.[108]

Additionally, Bayer would be required to comply with the City's Construction & Demolition Debris Diversion Requirements and the Berkeley Green Code by preparing a Waste Diversion Plan prior to building or demolition of the project, which would help increase

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[104] Permitted throughput is the maximum permitted amount of waste a landfill can handle and dispose of in one day. This figure is established in the current solid waste facilities permit issued by CalRecycle.
[105] CalRecycle, 2014. Solid Waste Information System Facility/Site Listing. Accessed June 27. www.calrecycle.ca.gov/SWFacilities/Directory/search.aspx.
[106] StopWaste, 2014. 1995 to 2012 Diversion Rates by Jurisdiction. Accessed June 27. http://www.stopwaste.org/docs/diversion.pdf.
[107] Bayer's U.S. Biotechnology Center, 2009. Environmental Leadership. Accessed July 11, 2014. http://biotech.bayerhealthcare.com/company/protecting-our-planet.asp
[108] City of Berkeley, 2012, op. cit.

the solid waste diversion rate.[109] It is anticipated that the project would have sufficient capacity in existing landfills and, as a result, the potential impact on solid waste disposal is less than significant.

g) *Would the project comply with federal, State, and local statutes and regulations related to solid waste?*

**Less Than Significant.** State law requires a 50 percent diversion of solid waste from landfills. Alameda County has a more aggressive goal of 75 percent through the Source Reduction and Recycling Initiative ("Measure D") and range of programs to help achieve the diversion goal. In July 2010, the Recycling Board and Authority approved a year 2020 objective to reduce the amount of readily recyclable and compostable materials deposited in landfills to no more than 10 percent of total materials. As described in *Section XVII.f* above, in 2012 the City of Berkeley had achieved a 73 percent diversion rate.[110] The project would comply with all federal, State, and local regulations regarding solid waste and, as a result, would have a less-than-significant impact regarding compliance with solid waste requirements.

[109] City of Berkeley. 2014c. Construction & Demolition Debris Diversion Requirements (BMC 19.24). Accessed on June 27. http://www.ci.berkeley.ca.us/wastediversion/.
[110] StopWaste, 2014. op cit.

| | Potentially Significant Impact | Potentially Significant Unless Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **XVIII. MANDATORY FINDINGS OF SIGNIFICANCE** | | | | |
| a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory? | ❒ | ■ | ❒ | ❒ |
| b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.) | ❒ | ❒ | ■ | ❒ |
| c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? | ❒ | ❒ | ■ | ❒ |

## Discussion

a) *Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?*

**Potentially Significant Unless Mitigation Incorporation.** The above analysis identifies potentially significant impacts to air quality, biological resources, cultural resources, hazardous materials, geology, hydrology, and noise, which could degrade the quality of the natural environment. However, each potential impact would be mitigated to a less-than-significant level through implementation of mitigation measures identified within in each section.

As described in *Section IV: Biological Resources*, no special status wildlife or plant species have the potential to occur within the project site and there are no sensitive habitats

within or adjacent to the project site. The project site has no natural vegetation, habitat for special-status species, wetlands, or riparian habitats. Therefore, the project would not substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal.

Trees and shrubs within the project site could be suitable for nesting birds, but Mitigation Measure BIO-1 reduces this potential impact to a less-than-significant level by avoiding and/or surveying for any nesting birds during construction and responding accordingly.

There are no historic buildings or structures on the project site; thus the project would not eliminate important examples of major periods of California history or prehistory.

b) *Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)*

**Less Than Significant.** Cumulatively, the project combined with other past, present, and reasonably foreseeable future projects, as projected in the General Plan and West Berkeley Plan, would result in a physical change to the West Berkeley neighborhood by slightly increasing industrial building area and employment density. For example, the increase in employee population and building area, as discussed in *Section XIV: Public Services*, may result in increased pressure on existing police and fire services when combined with other foreseeable projects. However, with the mitigation measures recommended in this report, impacts would be individually limited and not cumulatively considerable in the context of impacts associated with other pending and planned projects.

c) *Cumulatively, Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*

**Less Than Significant.** The project would be consistent with local land use and zoning requirements, as well as State and federal requirements, as described in the preceding sections. The project would add 15,000 square feet of additional industrial space which could accommodate 25 new employees. This limited increase would not create adverse neighborhood impacts, as the proposed industrial development is compatible with the land use designations and zoning of the neighborhood, and the level of development approved in the Development Agreement between Bayer and the City of Berkeley.

The following mitigation measures have been incorporated into the project to reduce direct and indirect adverse effects on human beings:

- Mitigation Measure AQ-1 reduces air quality impacts through construction best management practices

- Mitigation Measure HAZ-1reduces potential health impacts from residual hazardous materials contamination through a soil vapor investigation and soil and groundwater management plan
- Mitigation Measure HAZ-2 requires a hazardous materials building survey and implementation of all its recommendations to ensure abatement of asbestos-containing materials and lead-based paint
- Mitigation Measure GEO-1 requires a design-level geotechnical assessment to address fill conditions and prevent hazards and damage due to liquefaction.
- Mitigation Measure HYD-1 requires compliance with the Construction General Permit, including the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP)
- Mitigation Measure HYD-2 requires compliance with with Provision C.3 of the Municipal Regional Permit and implementation of a Stormwater Control Plan (SCP).
- Mitigation Measure NS-1 requires a project-specific noise reduction program to reduce demolition and construction noise

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## APPENDIX A:

CalEEMod  Report & Health Risk Assessment Results

# Bayer Manufacturing Quality Control Testing Facility - Construction Only

**San Francisco Bay Area Air Basin, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Light Industry | 80.00 | 1000sqft | 1.20 | 80,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 64 |
| **Climate Zone** | 3 | | | **Operational Year** | 2014 |
| **Utility Company** | Pacific Gas & Electric Company | | | | |
| **CO2 Intensity (lb/MWhr)** | 641.35 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Reduced lot acreage to the approximate size of the proposed construction lot.

Construction Phase -

Demolition -

Vehicle Trips -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblLandUse | LotAcreage | 1.84 | 1.20 |

## 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 | | | | | |
| 2015 | 1.3714 | 2.8335 | 2.2866 | 3.3800e-003 | 0.0916 | 0.1801 | 0.2717 | 0.0248 | 0.1729 | 0.1976 | 0.0000 | 290.9746 | 290.9746 | 0.0542 | 0.0000 | 292.1135 |
| **Total** | **1.3714** | **2.8335** | **2.2866** | **3.3800e-003** | **0.0916** | **0.1801** | **0.2717** | **0.0248** | **0.1729** | **0.1976** | **0.0000** | **290.9746** | **290.9746** | **0.0542** | **0.0000** | **292.1135** |

### 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 | | | | | |
| 2015 | 1.3714 | 2.8335 | 2.2866 | 3.3800e-003 | 0.0916 | 0.1801 | 0.2717 | 0.0248 | 0.1729 | 0.1976 | 0.0000 | 290.9744 | 290.9744 | 0.0542 | 0.0000 | 292.1133 |
| **Total** | **1.3714** | **2.8335** | **2.2866** | **3.3800e-003** | **0.0916** | **0.1801** | **0.2717** | **0.0248** | **0.1729** | **0.1976** | **0.0000** | **290.9744** | **290.9744** | **0.0542** | **0.0000** | **292.1133** |

| | 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** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **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 | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.4052 | 1.0000e-005 | 7.7000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 1.4300e-003 | 1.4300e-003 | 0.0000 | 0.0000 | 1.5200e-003 |
| Energy | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 317.7121 | 317.7121 | 0.0120 | 3.8100e-003 | 319.1429 |
| Mobile | 0.3582 | 0.9613 | 3.9858 | 6.4800e-003 | 0.4573 | 0.0142 | 0.4715 | 0.1227 | 0.0130 | 0.1357 | 0.0000 | 543.9482 | 543.9482 | 0.0267 | 0.0000 | 544.5098 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 20.1367 | 0.0000 | 20.1367 | 1.1901 | 0.0000 | 45.1277 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 5.8692 | 29.1213 | 34.9905 | 0.6041 | 0.0145 | 52.1744 |
| **Total** | **0.7729** | **1.0466** | **4.0583** | **6.9900e-003** | **0.4573** | **0.0207** | **0.4779** | **0.1227** | **0.0195** | **0.1422** | **26.0059** | **890.7830** | **916.7889** | **1.8329** | **0.0183** | **960.9562** |

## 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 | 0.4052 | 1.0000e-005 | 7.7000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 1.4300e-003 | 1.4300e-003 | 0.0000 | 0.0000 | 1.5200e-003 |
| Energy | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 317.7121 | 317.7121 | 0.0120 | 3.8100e-003 | 319.1429 |
| Mobile | 0.3582 | 0.9613 | 3.9858 | 6.4800e-003 | 0.4573 | 0.0142 | 0.4715 | 0.1227 | 0.0130 | 0.1357 | 0.0000 | 543.9482 | 543.9482 | 0.0267 | 0.0000 | 544.5098 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 20.1367 | 0.0000 | 20.1367 | 1.1901 | 0.0000 | 45.1277 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 5.8692 | 29.1213 | 34.9905 | 0.6040 | 0.0145 | 52.1650 |
| **Total** | **0.7729** | **1.0466** | **4.0583** | **6.9900e-003** | **0.4573** | **0.0207** | **0.4779** | **0.1227** | **0.0195** | **0.1422** | **26.0059** | **890.7830** | **916.7889** | **1.8328** | **0.0183** | **960.9469** |

| | 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** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.01** | **0.16** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 1/1/2015 | 1/28/2015 | 5 | 20 | |
| 2 | Site Preparation | Site Preparation | 1/29/2015 | 1/30/2015 | 5 | 2 | |
| 3 | Grading | Grading | 1/31/2015 | 2/5/2015 | 5 | 4 | |
| 4 | Building Construction | Building Construction | 2/6/2015 | 11/12/2015 | 5 | 200 | |
| 5 | Paving | Paving | 11/13/2015 | 11/26/2015 | 5 | 10 | |
| 6 | Architectural Coating | Architectural Coating | 11/27/2015 | 12/10/2015 | 5 | 10 | |

**Acres of Grading (Site Preparation Phase): 1**

**Acres of Grading (Grading Phase): 1.5**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 120,000; Non-Residential Outdoor: 40,000 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Rubber Tired Dozers | 1 | 8.00 | 255 | 0.40 |
| Demolition | Tractors/Loaders/Backhoes | 3 | 8.00 | 97 | 0.37 |
| Site Preparation | Graders | 1 | 8.00 | 174 | 0.41 |
| Site Preparation | Rubber Tired Dozers | 1 | 7.00 | 255 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Grading | Graders | 1 | 6.00 | 174 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 6.00 | 255 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 6.00 | 226 | 0.29 |
| Building Construction | Forklifts | 1 | 6.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 1 | 6.00 | 97 | 0.37 |
| Building Construction | Welders | 3 | 8.00 | 46 | 0.45 |
| Paving | Cement and Mortar Mixers | 1 | 6.00 | 9 | 0.56 |
| Paving | Pavers | 1 | 6.00 | 125 | 0.42 |
| Paving | Paving Equipment | 1 | 8.00 | 130 | 0.36 |
| Paving | Rollers | 1 | 7.00 | 80 | 0.38 |
| Paving | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 5 | 13.00 | 0.00 | 296.00 | 12.40 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 3 | 8.00 | 0.00 | 0.00 | 12.40 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 3 | 8.00 | 0.00 | 0.00 | 12.40 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 7 | 34.00 | 13.00 | 0.00 | 12.40 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 5 | 13.00 | 0.00 | 0.00 | 12.40 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 7.00 | 0.00 | 0.00 | 12.40 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2015

**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 | | | | | 0.0320 | 0.0000 | 0.0320 | 4.8400e-003 | 0.0000 | 4.8400e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0307 | 0.2968 | 0.2206 | 2.4000e-004 | | 0.0187 | 0.0187 | | 0.0175 | 0.0175 | 0.0000 | 22.7618 | 22.7618 | 5.7700e-003 | 0.0000 | 22.8829 |
| **Total** | **0.0307** | **0.2968** | **0.2206** | **2.4000e-004** | **0.0320** | **0.0187** | **0.0506** | **4.8400e-003** | **0.0175** | **0.0223** | **0.0000** | **22.7618** | **22.7618** | **5.7700e-003** | **0.0000** | **22.8829** |

## 3.2 Demolition - 2015

### 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 | 3.9700e-003 | 0.0514 | 0.0411 | 1.1000e-004 | 2.4900e-003 | 7.7000e-004 | 3.2600e-003 | 6.8000e-004 | 7.0000e-004 | 1.3900e-003 | 0.0000 | 10.2728 | 10.2728 | 9.0000e-005 | 0.0000 | 10.2746 |
| 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 | 5.5000e-004 | 8.0000e-004 | 7.7500e-003 | 1.0000e-005 | 1.1800e-003 | 1.0000e-005 | 1.1900e-003 | 3.1000e-004 | 1.0000e-005 | 3.2000e-004 | 0.0000 | 1.1081 | 1.1081 | 6.0000e-005 | 0.0000 | 1.1095 |
| **Total** | **4.5200e-003** | **0.0522** | **0.0489** | **1.2000e-004** | **3.6700e-003** | **7.8000e-004** | **4.4500e-003** | **9.9000e-004** | **7.1000e-004** | **1.7100e-003** | **0.0000** | **11.3809** | **11.3809** | **1.5000e-004** | **0.0000** | **11.3841** |

### 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 | | | | | 0.0320 | 0.0000 | 0.0320 | 4.8400e-003 | 0.0000 | 4.8400e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0307 | 0.2968 | 0.2206 | 2.4000e-004 | | 0.0187 | 0.0187 | | 0.0175 | 0.0175 | 0.0000 | 22.7618 | 22.7618 | 5.7700e-003 | 0.0000 | 22.8829 |
| **Total** | **0.0307** | **0.2968** | **0.2206** | **2.4000e-004** | **0.0320** | **0.0187** | **0.0506** | **4.8400e-003** | **0.0175** | **0.0223** | **0.0000** | **22.7618** | **22.7618** | **5.7700e-003** | **0.0000** | **22.8829** |

## 3.2 Demolition - 2015

**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 | 3.9700e-003 | 0.0514 | 0.0411 | 1.1000e-004 | 2.4900e-003 | 7.7000e-004 | 3.2600e-003 | 6.8000e-004 | 7.0000e-004 | 1.3900e-003 | 0.0000 | 10.2728 | 10.2728 | 9.0000e-005 | 0.0000 | 10.2746 |
| 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 | 5.5000e-004 | 8.0000e-004 | 7.7500e-003 | 1.0000e-005 | 1.1800e-003 | 1.0000e-005 | 1.1900e-003 | 3.1000e-004 | 1.0000e-005 | 3.2000e-004 | 0.0000 | 1.1081 | 1.1081 | 6.0000e-005 | 0.0000 | 1.1095 |
| **Total** | **4.5200e-003** | **0.0522** | **0.0489** | **1.2000e-004** | **3.6700e-003** | **7.8000e-004** | **4.4500e-003** | **9.9000e-004** | **7.1000e-004** | **1.7100e-003** | **0.0000** | **11.3809** | **11.3809** | **1.5000e-004** | **0.0000** | **11.3841** |

## 3.3 Site Preparation - 2015

**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 | | | | | 5.8000e-003 | 0.0000 | 5.8000e-003 | 2.9500e-003 | 0.0000 | 2.9500e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.5400e-003 | 0.0269 | 0.0170 | 2.0000e-005 | | 1.4700e-003 | 1.4700e-003 | | 1.3500e-003 | 1.3500e-003 | 0.0000 | 1.6345 | 1.6345 | 4.9000e-004 | 0.0000 | 1.6448 |
| **Total** | **2.5400e-003** | **0.0269** | **0.0170** | **2.0000e-005** | **5.8000e-003** | **1.4700e-003** | **7.2700e-003** | **2.9500e-003** | **1.3500e-003** | **4.3000e-003** | **0.0000** | **1.6345** | **1.6345** | **4.9000e-004** | **0.0000** | **1.6448** |

## 3.3 Site Preparation - 2015

### 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 | 3.0000e-005 | 5.0000e-005 | 4.8000e-004 | 0.0000 | 7.0000e-005 | 0.0000 | 7.0000e-005 | 2.0000e-005 | 0.0000 | 2.0000e-005 | 0.0000 | 0.0682 | 0.0682 | 0.0000 | 0.0000 | 0.0683 |
| **Total** | **3.0000e-005** | **5.0000e-005** | **4.8000e-004** | **0.0000** | **7.0000e-005** | **0.0000** | **7.0000e-005** | **2.0000e-005** | **0.0000** | **2.0000e-005** | **0.0000** | **0.0682** | **0.0682** | **0.0000** | **0.0000** | **0.0683** |

### 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 | | | | | 5.8000e-003 | 0.0000 | 5.8000e-003 | 2.9500e-003 | 0.0000 | 2.9500e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.5400e-003 | 0.0269 | 0.0170 | 2.0000e-005 | | 1.4700e-003 | 1.4700e-003 | | 1.3500e-003 | 1.3500e-003 | 0.0000 | 1.6345 | 1.6345 | 4.9000e-004 | 0.0000 | 1.6448 |
| **Total** | **2.5400e-003** | **0.0269** | **0.0170** | **2.0000e-005** | **5.8000e-003** | **1.4700e-003** | **7.2700e-003** | **2.9500e-003** | **1.3500e-003** | **4.3000e-003** | **0.0000** | **1.6345** | **1.6345** | **4.9000e-004** | **0.0000** | **1.6448** |

## 3.3 Site Preparation - 2015

**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 | 3.0000e-005 | 5.0000e-005 | 4.8000e-004 | 0.0000 | 7.0000e-005 | 0.0000 | 7.0000e-005 | 2.0000e-005 | 0.0000 | 2.0000e-005 | 0.0000 | 0.0682 | 0.0682 | 0.0000 | 0.0000 | 0.0683 |
| **Total** | **3.0000e-005** | **5.0000e-005** | **4.8000e-004** | **0.0000** | **7.0000e-005** | **0.0000** | **7.0000e-005** | **2.0000e-005** | **0.0000** | **2.0000e-005** | **0.0000** | **0.0682** | **0.0682** | **0.0000** | **0.0000** | **0.0683** |

## 3.4 Grading - 2015

**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 | | | | | 9.8300e-003 | 0.0000 | 9.8300e-003 | 5.0500e-003 | 0.0000 | 5.0500e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 4.1300e-003 | 0.0439 | 0.0282 | 3.0000e-005 | | 2.3900e-003 | 2.3900e-003 | | 2.2000e-003 | 2.2000e-003 | 0.0000 | 2.6849 | 2.6849 | 8.0000e-004 | 0.0000 | 2.7017 |
| **Total** | **4.1300e-003** | **0.0439** | **0.0282** | **3.0000e-005** | **9.8300e-003** | **2.3900e-003** | **0.0122** | **5.0500e-003** | **2.2000e-003** | **7.2500e-003** | **0.0000** | **2.6849** | **2.6849** | **8.0000e-004** | **0.0000** | **2.7017** |

## 3.4 Grading - 2015

### 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 | 7.0000e-005 | 1.0000e-004 | 9.5000e-004 | 0.0000 | 1.5000e-004 | 0.0000 | 1.5000e-004 | 4.0000e-005 | 0.0000 | 4.0000e-005 | 0.0000 | 0.1364 | 0.1364 | 1.0000e-005 | 0.0000 | 0.1366 |
| **Total** | **7.0000e-005** | **1.0000e-004** | **9.5000e-004** | **0.0000** | **1.5000e-004** | **0.0000** | **1.5000e-004** | **4.0000e-005** | **0.0000** | **4.0000e-005** | **0.0000** | **0.1364** | **0.1364** | **1.0000e-005** | **0.0000** | **0.1366** |

### 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 | | | | | 9.8300e-003 | 0.0000 | 9.8300e-003 | 5.0500e-003 | 0.0000 | 5.0500e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 4.1300e-003 | 0.0439 | 0.0282 | 3.0000e-005 | | 2.3900e-003 | 2.3900e-003 | | 2.2000e-003 | 2.2000e-003 | 0.0000 | 2.6849 | 2.6849 | 8.0000e-004 | 0.0000 | 2.7017 |
| **Total** | **4.1300e-003** | **0.0439** | **0.0282** | **3.0000e-005** | **9.8300e-003** | **2.3900e-003** | **0.0122** | **5.0500e-003** | **2.2000e-003** | **7.2500e-003** | **0.0000** | **2.6849** | **2.6849** | **8.0000e-004** | **0.0000** | **2.7017** |

## 3.4 Grading - 2015

**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 | 7.0000e-005 | 1.0000e-004 | 9.5000e-004 | 0.0000 | 1.5000e-004 | 0.0000 | 1.5000e-004 | 4.0000e-005 | 0.0000 | 4.0000e-005 | 0.0000 | 0.1364 | 0.1364 | 1.0000e-005 | 0.0000 | 0.1366 |
| **Total** | **7.0000e-005** | **1.0000e-004** | **9.5000e-004** | **0.0000** | **1.5000e-004** | **0.0000** | **1.5000e-004** | **4.0000e-005** | **0.0000** | **4.0000e-005** | **0.0000** | **0.1364** | **0.1364** | **1.0000e-005** | **0.0000** | **0.1366** |

## 3.5 Building Construction - 2015

**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 | 0.3600 | 2.1564 | 1.5004 | 2.2000e-003 | | 0.1485 | 0.1485 | | 0.1434 | 0.1434 | 0.0000 | 186.4831 | 186.4831 | 0.0430 | 0.0000 | 187.3864 |
| **Total** | **0.3600** | **2.1564** | **1.5004** | **2.2000e-003** | | **0.1485** | **0.1485** | | **0.1434** | **0.1434** | **0.0000** | **186.4831** | **186.4831** | **0.0430** | **0.0000** | **187.3864** |

## 3.5 Building Construction - 2015

### 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 | 0.0186 | 0.1498 | 0.2061 | 3.1000e-004 | 8.3700e-003 | 2.4300e-003 | 0.0108 | 2.4000e-003 | 2.2300e-003 | 4.6300e-003 | 0.0000 | 28.4442 | 28.4442 | 2.6000e-004 | 0.0000 | 28.4496 |
| Worker | 0.0144 | 0.0209 | 0.2026 | 3.7000e-004 | 0.0308 | 2.7000e-004 | 0.0311 | 8.2000e-003 | 2.5000e-004 | 8.4500e-003 | 0.0000 | 28.9809 | 28.9809 | 1.6900e-003 | 0.0000 | 29.0164 |
| **Total** | **0.0330** | **0.1707** | **0.4088** | **6.8000e-004** | **0.0392** | **2.7000e-003** | **0.0419** | **0.0106** | **2.4800e-003** | **0.0131** | **0.0000** | **57.4251** | **57.4251** | **1.9500e-003** | **0.0000** | **57.4659** |

### 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 | 0.3600 | 2.1564 | 1.5004 | 2.2000e-003 | | 0.1485 | 0.1485 | | 0.1434 | 0.1434 | 0.0000 | 186.4829 | 186.4829 | 0.0430 | 0.0000 | 187.3862 |
| **Total** | **0.3600** | **2.1564** | **1.5004** | **2.2000e-003** | | **0.1485** | **0.1485** | | **0.1434** | **0.1434** | **0.0000** | **186.4829** | **186.4829** | **0.0430** | **0.0000** | **187.3862** |

## 3.5 Building Construction - 2015

**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 | 0.0186 | 0.1498 | 0.2061 | 3.1000e-004 | 8.3700e-003 | 2.4300e-003 | 0.0108 | 2.4000e-003 | 2.2300e-003 | 4.6300e-003 | 0.0000 | 28.4442 | 28.4442 | 2.6000e-004 | 0.0000 | 28.4496 |
| Worker | 0.0144 | 0.0209 | 0.2026 | 3.7000e-004 | 0.0308 | 2.7000e-004 | 0.0311 | 8.2000e-003 | 2.5000e-004 | 8.4500e-003 | 0.0000 | 28.9809 | 28.9809 | 1.6900e-003 | 0.0000 | 29.0164 |
| **Total** | **0.0330** | **0.1707** | **0.4088** | **6.8000e-004** | **0.0392** | **2.7000e-003** | **0.0419** | **0.0106** | **2.4800e-003** | **0.0131** | **0.0000** | **57.4251** | **57.4251** | **1.9500e-003** | **0.0000** | **57.4659** |

## 3.6 Paving - 2015

**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 | 7.0200e-003 | 0.0730 | 0.0459 | 7.0000e-005 | | 4.4600e-003 | 4.4600e-003 | | 4.1100e-003 | 4.1100e-003 | 0.0000 | 6.2708 | 6.2708 | 1.8400e-003 | 0.0000 | 6.3094 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **7.0200e-003** | **0.0730** | **0.0459** | **7.0000e-005** | | **4.4600e-003** | **4.4600e-003** | | **4.1100e-003** | **4.1100e-003** | **0.0000** | **6.2708** | **6.2708** | **1.8400e-003** | **0.0000** | **6.3094** |

## 3.6 Paving - 2015

### 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 | 2.8000e-004 | 4.0000e-004 | 3.8700e-003 | 1.0000e-005 | 5.9000e-004 | 1.0000e-005 | 5.9000e-004 | 1.6000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.5541 | 0.5541 | 3.0000e-005 | 0.0000 | 0.5547 |
| **Total** | **2.8000e-004** | **4.0000e-004** | **3.8700e-003** | **1.0000e-005** | **5.9000e-004** | **1.0000e-005** | **5.9000e-004** | **1.6000e-004** | **0.0000** | **1.6000e-004** | **0.0000** | **0.5541** | **0.5541** | **3.0000e-005** | **0.0000** | **0.5547** |

### 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 | 7.0200e-003 | 0.0730 | 0.0459 | 7.0000e-005 | | 4.4600e-003 | 4.4600e-003 | | 4.1100e-003 | 4.1100e-003 | 0.0000 | 6.2708 | 6.2708 | 1.8400e-003 | 0.0000 | 6.3094 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **7.0200e-003** | **0.0730** | **0.0459** | **7.0000e-005** | | **4.4600e-003** | **4.4600e-003** | | **4.1100e-003** | **4.1100e-003** | **0.0000** | **6.2708** | **6.2708** | **1.8400e-003** | **0.0000** | **6.3094** |

## 3.6 Paving - 2015

**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 | 2.8000e-004 | 4.0000e-004 | 3.8700e-003 | 1.0000e-005 | 5.9000e-004 | 1.0000e-005 | 5.9000e-004 | 1.6000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.5541 | 0.5541 | 3.0000e-005 | 0.0000 | 0.5547 |
| **Total** | **2.8000e-004** | **4.0000e-004** | **3.8700e-003** | **1.0000e-005** | **5.9000e-004** | **1.0000e-005** | **5.9000e-004** | **1.6000e-004** | **0.0000** | **1.6000e-004** | **0.0000** | **0.5541** | **0.5541** | **3.0000e-005** | **0.0000** | **0.5547** |

## 3.7 Architectural Coating - 2015

**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 | 0.9270 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.0300e-003 | 0.0129 | 9.5100e-003 | 1.0000e-005 | | 1.1000e-003 | 1.1000e-003 | | 1.1000e-003 | 1.1000e-003 | 0.0000 | 1.2766 | 1.2766 | 1.7000e-004 | 0.0000 | 1.2801 |
| **Total** | **0.9290** | **0.0129** | **9.5100e-003** | **1.0000e-005** | | **1.1000e-003** | **1.1000e-003** | | **1.1000e-003** | **1.1000e-003** | **0.0000** | **1.2766** | **1.2766** | **1.7000e-004** | **0.0000** | **1.2801** |

## 3.7 Architectural Coating - 2015

### 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 | 1.5000e-004 | 2.1000e-004 | 2.0900e-003 | 0.0000 | 3.2000e-004 | 0.0000 | 3.2000e-004 | 8.0000e-005 | 0.0000 | 9.0000e-005 | 0.0000 | 0.2983 | 0.2983 | 2.0000e-005 | 0.0000 | 0.2987 |
| **Total** | **1.5000e-004** | **2.1000e-004** | **2.0900e-003** | **0.0000** | **3.2000e-004** | **0.0000** | **3.2000e-004** | **8.0000e-005** | **0.0000** | **9.0000e-005** | **0.0000** | **0.2983** | **0.2983** | **2.0000e-005** | **0.0000** | **0.2987** |

### 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 | 0.9270 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.0300e-003 | 0.0129 | 9.5100e-003 | 1.0000e-005 | | 1.1000e-003 | 1.1000e-003 | | 1.1000e-003 | 1.1000e-003 | 0.0000 | 1.2766 | 1.2766 | 1.7000e-004 | 0.0000 | 1.2801 |
| **Total** | **0.9290** | **0.0129** | **9.5100e-003** | **1.0000e-005** | | **1.1000e-003** | **1.1000e-003** | | **1.1000e-003** | **1.1000e-003** | **0.0000** | **1.2766** | **1.2766** | **1.7000e-004** | **0.0000** | **1.2801** |

### 3.7 Architectural Coating - 2015

**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 | 1.5000e-004 | 2.1000e-004 | 2.0900e-003 | 0.0000 | 3.2000e-004 | 0.0000 | 3.2000e-004 | 8.0000e-005 | 0.0000 | 9.0000e-005 | 0.0000 | 0.2983 | 0.2983 | 2.0000e-005 | 0.0000 | 0.2987 |
| **Total** | **1.5000e-004** | **2.1000e-004** | **2.0900e-003** | **0.0000** | **3.2000e-004** | **0.0000** | **3.2000e-004** | **8.0000e-005** | **0.0000** | **9.0000e-005** | **0.0000** | **0.2983** | **0.2983** | **2.0000e-005** | **0.0000** | **0.2987** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | 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 | 0.3582 | 0.9613 | 3.9858 | 6.4800e-003 | 0.4573 | 0.0142 | 0.4715 | 0.1227 | 0.0130 | 0.1357 | 0.0000 | 543.9482 | 543.9482 | 0.0267 | 0.0000 | 544.5098 |
| Unmitigated | 0.3582 | 0.9613 | 3.9858 | 6.4800e-003 | 0.4573 | 0.0142 | 0.4715 | 0.1227 | 0.0130 | 0.1357 | 0.0000 | 543.9482 | 543.9482 | 0.0267 | 0.0000 | 544.5098 |

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| General Light Industry | 557.60 | 105.60 | 54.40 | 1,229,531 | 1,229,531 |
| Total | 557.60 | 105.60 | 54.40 | 1,229,531 | 1,229,531 |

### 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 |
| General Light Industry | 9.50 | 7.30 | 7.30 | 59.00 | 28.00 | 13.00 | 92 | 5 | 3 |

| LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.546249 | 0.062948 | 0.174600 | 0.125189 | 0.034587 | 0.004960 | 0.015036 | 0.022157 | 0.002053 | 0.003311 | 0.006538 | 0.000702 | 0.001670 |

## 5.0 Energy Detail

### 4.4 Fleet Mix

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | 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 | 224.8164 | 224.8164 | 0.0102 | 2.1000e-003 | 225.6819 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 224.8164 | 224.8164 | 0.0102 | 2.1000e-003 | 225.6819 |
| NaturalGas Mitigated | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.8957 | 92.8957 | 1.7800e-003 | 1.7000e-003 | 93.4611 |
| NaturalGas Unmitigated | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.8957 | 92.8957 | 1.7800e-003 | 1.7000e-003 | 93.4611 |

## 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 | | | | | |
| General Light Industry | 1.7408e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.8957 | 92.8957 | 1.7800e-003 | 1.7000e-003 | 93.4611 |
| **Total** | | **9.3900e-003** | **0.0853** | **0.0717** | **5.1000e-004** | | **6.4900e-003** | **6.4900e-003** | | **6.4900e-003** | **6.4900e-003** | **0.0000** | **92.8957** | **92.8957** | **1.7800e-003** | **1.7000e-003** | **93.4611** |

## 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 | | | | | |
| General Light Industry | 1.7408e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.8957 | 92.8957 | 1.7800e-003 | 1.7000e-003 | 93.4611 |
| **Total** | | **9.3900e-003** | **0.0853** | **0.0717** | **5.1000e-004** | | **6.4900e-003** | **6.4900e-003** | | **6.4900e-003** | **6.4900e-003** | **0.0000** | **92.8957** | **92.8957** | **1.7800e-003** | **1.7000e-003** | **93.4611** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| General Light Industry | 772800 | 224.8164 | 0.0102 | 2.1000e-003 | 225.6819 |
| **Total** | | **224.8164** | **0.0102** | **2.1000e-003** | **225.6819** |

### 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| General Light Industry | 772800 | 224.8164 | 0.0102 | 2.1000e-003 | 225.6819 |
| **Total** | | **224.8164** | **0.0102** | **2.1000e-003** | **225.6819** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | 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 | 0.4052 | 1.0000e-005 | 7.7000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 1.4300e-003 | 1.4300e-003 | 0.0000 | 0.0000 | 1.5200e-003 |
| Unmitigated | 0.4052 | 1.0000e-005 | 7.7000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 1.4300e-003 | 1.4300e-003 | 0.0000 | 0.0000 | 1.5200e-003 |

## 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 | 0.0927 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.3124 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 8.0000e-005 | 1.0000e-005 | 7.7000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 1.4300e-003 | 1.4300e-003 | 0.0000 | 0.0000 | 1.5200e-003 |
| **Total** | **0.4052** | **1.0000e-005** | **7.7000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **1.4300e-003** | **1.4300e-003** | **0.0000** | **0.0000** | **1.5200e-003** |

**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 | | | | | |
| Consumer Products | 0.3124 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 8.0000e-005 | 1.0000e-005 | 7.7000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 1.4300e-003 | 1.4300e-003 | 0.0000 | 0.0000 | 1.5200e-003 |
| Architectural Coating | 0.0927 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.4052** | **1.0000e-005** | **7.7000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **1.4300e-003** | **1.4300e-003** | **0.0000** | **0.0000** | **1.5200e-003** |

## 7.0 Water Detail

## 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 34.9905 | 0.6040 | 0.0145 | 52.1650 |
| Unmitigated | 34.9905 | 0.6041 | 0.0145 | 52.1744 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| General Light Industry | 18.5 / 0 | 34.9905 | 0.6041 | 0.0145 | 52.1744 |
| **Total** | | **34.9905** | **0.6041** | **0.0145** | **52.1744** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| General Light Industry | 18.5 / 0 | 34.9905 | 0.6040 | 0.0145 | 52.1650 |
| **Total** | | **34.9905** | **0.6040** | **0.0145** | **52.1650** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 20.1367 | 1.1901 | 0.0000 | 45.1277 |
| Unmitigated | 20.1367 | 1.1901 | 0.0000 | 45.1277 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| General Light Industry | 99.2 | 20.1367 | 1.1901 | 0.0000 | 45.1277 |
| **Total** | | **20.1367** | **1.1901** | **0.0000** | **45.1277** |

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| General Light Industry | 99.2 | 20.1367 | 1.1901 | 0.0000 | 45.1277 |
| **Total** | | **20.1367** | **1.1901** | **0.0000** | **45.1277** |

## 9.0 Operational Offroad

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

## 10.0 Vegetation

# Bayer Manufacturing Quality Control Testing Facility - Operation Only

**San Francisco Bay Area Air Basin, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Light Industry | 15.00 | 1000sqft | 0.34 | 15,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 64 |
| **Climate Zone** | 3 | | | **Operational Year** | 2014 |
| **Utility Company** | Pacific Gas & Electric Company | | | | |
| **CO2 Intensity (lb/MWhr)** | 641.35 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase -

Demolition -

Vehicle Trips - Increased WkDy Trip Rate based on traffic study

Water And Wastewater - EBMUD services at the project site and applies 100 percent aerobic process and 100 percent cogeneration

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblVehicleTrips | WD_TR | 6.97 | 8.11 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AnaDigestCogenCombDigestGasPercent | 0.00 | 100.00 |
| tblWater | AnaDigestCombDigestGasPercent | 100.00 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 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 | | | | | |
| 2015 | 0.2669 | 0.8984 | 0.5761 | 8.6000e-004 | 0.0399 | 0.0590 | 0.0989 | 7.1500e-003 | 0.0545 | 0.0617 | 0.0000 | 80.1105 | 80.1105 | 0.0187 | 0.0000 | 80.5026 |
| **Total** | **0.2669** | **0.8984** | **0.5761** | **8.6000e-004** | **0.0399** | **0.0590** | **0.0989** | **7.1500e-003** | **0.0545** | **0.0617** | **0.0000** | **80.1105** | **80.1105** | **0.0187** | **0.0000** | **80.5026** |

### 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 | | | | | |
| 2015 | 0.2669 | 0.8984 | 0.5761 | 8.6000e-004 | 0.0399 | 0.0590 | 0.0989 | 7.1500e-003 | 0.0545 | 0.0617 | 0.0000 | 80.1104 | 80.1104 | 0.0187 | 0.0000 | 80.5025 |
| **Total** | **0.2669** | **0.8984** | **0.5761** | **8.6000e-004** | **0.0399** | **0.0590** | **0.0989** | **7.1500e-003** | **0.0545** | **0.0617** | **0.0000** | **80.1104** | **80.1104** | **0.0187** | **0.0000** | **80.5025** |

| | 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** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **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 | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.0760 | 0.0000 | 1.4000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.7000e-004 | 2.7000e-004 | 0.0000 | 0.0000 | 2.8000e-004 |
| Energy | 1.7600e-003 | 0.0160 | 0.0134 | 1.0000e-004 | | 1.2200e-003 | 1.2200e-003 | | 1.2200e-003 | 1.2200e-003 | 0.0000 | 59.5710 | 59.5710 | 2.2400e-003 | 7.1000e-004 | 59.8393 |
| Mobile | 0.0776 | 0.2081 | 0.8629 | 1.4000e-003 | 0.0990 | 3.0700e-003 | 0.1021 | 0.0266 | 2.8200e-003 | 0.0294 | 0.0000 | 117.7663 | 117.7663 | 5.7900e-003 | 0.0000 | 117.8879 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 3.7756 | 0.0000 | 3.7756 | 0.2231 | 0.0000 | 8.4614 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 1.2273 | 4.9517 | 6.1789 | 4.4500e-003 | 2.7200e-003 | 7.1140 |
| **Total** | **0.1553** | **0.2241** | **0.8765** | **1.5000e-003** | **0.0990** | **4.2900e-003** | **0.1033** | **0.0266** | **4.0400e-003** | **0.0306** | **5.0029** | **182.2892** | **187.2921** | **0.2356** | **3.4300e-003** | **193.3029** |

## 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 | 0.0760 | 0.0000 | 1.4000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.7000e-004 | 2.7000e-004 | 0.0000 | 0.0000 | 2.8000e-004 |
| Energy | 1.7600e-003 | 0.0160 | 0.0134 | 1.0000e-004 | | 1.2200e-003 | 1.2200e-003 | | 1.2200e-003 | 1.2200e-003 | 0.0000 | 59.5710 | 59.5710 | 2.2400e-003 | 7.1000e-004 | 59.8393 |
| Mobile | 0.0776 | 0.2081 | 0.8629 | 1.4000e-003 | 0.0990 | 3.0700e-003 | 0.1021 | 0.0266 | 2.8200e-003 | 0.0294 | 0.0000 | 117.7663 | 117.7663 | 5.7900e-003 | 0.0000 | 117.8879 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 3.7756 | 0.0000 | 3.7756 | 0.2231 | 0.0000 | 8.4614 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 1.2273 | 4.9517 | 6.1789 | 4.4700e-003 | 2.7200e-003 | 7.1160 |
| **Total** | **0.1553** | **0.2241** | **0.8765** | **1.5000e-003** | **0.0990** | **4.2900e-003** | **0.1033** | **0.0266** | **4.0400e-003** | **0.0306** | **5.0029** | **182.2892** | **187.2921** | **0.2356** | **3.4300e-003** | **193.3048** |

| | 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** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **-0.01** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 1/1/2015 | 1/14/2015 | 5 | 10 | |
| 2 | Site Preparation | Site Preparation | 1/15/2015 | 1/15/2015 | 5 | 1 | |
| 3 | Grading | Grading | 1/16/2015 | 1/19/2015 | 5 | 2 | |
| 4 | Building Construction | Building Construction | 1/20/2015 | 6/8/2015 | 5 | 100 | |
| 5 | Paving | Paving | 6/9/2015 | 6/15/2015 | 5 | 5 | |
| 6 | Architectural Coating | Architectural Coating | 6/16/2015 | 6/22/2015 | 5 | 5 | |

**Acres of Grading (Site Preparation Phase): 0.5**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 22,500; Non-Residential Outdoor: 7,500 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Rubber Tired Dozers | 1 | 1.00 | 255 | 0.40 |
| Demolition | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Site Preparation | Graders | 1 | 8.00 | 174 | 0.41 |
| Grading | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Grading | Rubber Tired Dozers | 1 | 1.00 | 255 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 4.00 | 226 | 0.29 |
| Building Construction | Forklifts | 2 | 6.00 | 89 | 0.20 |
| Building Construction | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Paving | Cement and Mortar Mixers | 4 | 6.00 | 9 | 0.56 |
| Paving | Pavers | 1 | 7.00 | 125 | 0.42 |
| Paving | Rollers | 1 | 7.00 | 80 | 0.38 |
| Paving | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 4 | 10.00 | 0.00 | 296.00 | 12.40 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 2 | 5.00 | 0.00 | 0.00 | 12.40 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 4 | 10.00 | 0.00 | 0.00 | 12.40 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 5 | 6.00 | 2.00 | 0.00 | 12.40 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 18.00 | 0.00 | 0.00 | 12.40 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 1.00 | 0.00 | 0.00 | 12.40 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2015

### 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 | | | | | 0.0320 | 0.0000 | 0.0320 | 4.8400e-003 | 0.0000 | 4.8400e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 7.0600e-003 | 0.0597 | 0.0441 | 6.0000e-005 | | 4.3700e-003 | 4.3700e-003 | | 4.1800e-003 | 4.1800e-003 | 0.0000 | 5.4460 | 5.4460 | 1.1100e-003 | 0.0000 | 5.4694 |
| **Total** | **7.0600e-003** | **0.0597** | **0.0441** | **6.0000e-005** | **0.0320** | **4.3700e-003** | **0.0364** | **4.8400e-003** | **4.1800e-003** | **9.0200e-003** | **0.0000** | **5.4460** | **5.4460** | **1.1100e-003** | **0.0000** | **5.4694** |

### 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 | 3.9700e-003 | 0.0514 | 0.0411 | 1.1000e-004 | 2.4900e-003 | 7.7000e-004 | 3.2600e-003 | 6.8000e-004 | 7.0000e-004 | 1.3900e-003 | 0.0000 | 10.2728 | 10.2728 | 9.0000e-005 | 0.0000 | 10.2746 |
| 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 | 2.1000e-004 | 3.1000e-004 | 2.9800e-003 | 1.0000e-005 | 4.5000e-004 | 0.0000 | 4.6000e-004 | 1.2000e-004 | 0.0000 | 1.2000e-004 | 0.0000 | 0.4262 | 0.4262 | 2.0000e-005 | 0.0000 | 0.4267 |
| **Total** | **4.1800e-003** | **0.0517** | **0.0441** | **1.2000e-004** | **2.9400e-003** | **7.7000e-004** | **3.7200e-003** | **8.0000e-004** | **7.0000e-004** | **1.5100e-003** | **0.0000** | **10.6990** | **10.6990** | **1.1000e-004** | **0.0000** | **10.7013** |

## 3.2 Demolition - 2015

### 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 | | | | | 0.0320 | 0.0000 | 0.0320 | 4.8400e-003 | 0.0000 | 4.8400e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 7.0600e-003 | 0.0597 | 0.0441 | 6.0000e-005 | | 4.3700e-003 | 4.3700e-003 | | 4.1800e-003 | 4.1800e-003 | 0.0000 | 5.4460 | 5.4460 | 1.1100e-003 | 0.0000 | 5.4694 |
| **Total** | **7.0600e-003** | **0.0597** | **0.0441** | **6.0000e-005** | **0.0320** | **4.3700e-003** | **0.0364** | **4.8400e-003** | **4.1800e-003** | **9.0200e-003** | **0.0000** | **5.4460** | **5.4460** | **1.1100e-003** | **0.0000** | **5.4694** |

### 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 | 3.9700e-003 | 0.0514 | 0.0411 | 1.1000e-004 | 2.4900e-003 | 7.7000e-004 | 3.2600e-003 | 6.8000e-004 | 7.0000e-004 | 1.3900e-003 | 0.0000 | 10.2728 | 10.2728 | 9.0000e-005 | 0.0000 | 10.2746 |
| 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 | 2.1000e-004 | 3.1000e-004 | 2.9800e-003 | 1.0000e-005 | 4.5000e-004 | 0.0000 | 4.6000e-004 | 1.2000e-004 | 0.0000 | 1.2000e-004 | 0.0000 | 0.4262 | 0.4262 | 2.0000e-005 | 0.0000 | 0.4267 |
| **Total** | **4.1800e-003** | **0.0517** | **0.0441** | **1.2000e-004** | **2.9400e-003** | **7.7000e-004** | **3.7200e-003** | **8.0000e-004** | **7.0000e-004** | **1.5100e-003** | **0.0000** | **10.6990** | **10.6990** | **1.1000e-004** | **0.0000** | **10.7013** |

## 3.3 Site Preparation - 2015

### 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 | | | | | 2.7000e-004 | 0.0000 | 2.7000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 7.1000e-004 | 7.1500e-003 | 3.7000e-003 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | | 4.0000e-004 | 4.0000e-004 | 0.0000 | 0.4466 | 0.4466 | 1.3000e-004 | 0.0000 | 0.4494 |
| **Total** | **7.1000e-004** | **7.1500e-003** | **3.7000e-003** | **0.0000** | **2.7000e-004** | **4.4000e-004** | **7.1000e-004** | **3.0000e-005** | **4.0000e-004** | **4.3000e-004** | **0.0000** | **0.4466** | **0.4466** | **1.3000e-004** | **0.0000** | **0.4494** |

### 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 | 1.0000e-005 | 2.0000e-005 | 1.5000e-004 | 0.0000 | 2.0000e-005 | 0.0000 | 2.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0213 | 0.0213 | 0.0000 | 0.0000 | 0.0213 |
| **Total** | **1.0000e-005** | **2.0000e-005** | **1.5000e-004** | **0.0000** | **2.0000e-005** | **0.0000** | **2.0000e-005** | **1.0000e-005** | **0.0000** | **1.0000e-005** | **0.0000** | **0.0213** | **0.0213** | **0.0000** | **0.0000** | **0.0213** |

## 3.3 Site Preparation - 2015

### 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 | | | | | 2.7000e-004 | 0.0000 | 2.7000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 7.1000e-004 | 7.1500e-003 | 3.7000e-003 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | | 4.0000e-004 | 4.0000e-004 | 0.0000 | 0.4466 | 0.4466 | 1.3000e-004 | 0.0000 | 0.4494 |
| **Total** | **7.1000e-004** | **7.1500e-003** | **3.7000e-003** | **0.0000** | **2.7000e-004** | **4.4000e-004** | **7.1000e-004** | **3.0000e-005** | **4.0000e-004** | **4.3000e-004** | **0.0000** | **0.4466** | **0.4466** | **1.3000e-004** | **0.0000** | **0.4494** |

### 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 | 1.0000e-005 | 2.0000e-005 | 1.5000e-004 | 0.0000 | 2.0000e-005 | 0.0000 | 2.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0213 | 0.0213 | 0.0000 | 0.0000 | 0.0213 |
| **Total** | **1.0000e-005** | **2.0000e-005** | **1.5000e-004** | **0.0000** | **2.0000e-005** | **0.0000** | **2.0000e-005** | **1.0000e-005** | **0.0000** | **1.0000e-005** | **0.0000** | **0.0213** | **0.0213** | **0.0000** | **0.0000** | **0.0213** |

## 3.4 Grading - 2015

### 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 | | | | | 7.5000e-004 | 0.0000 | 7.5000e-004 | 4.1000e-004 | 0.0000 | 4.1000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.4100e-003 | 0.0119 | 8.8100e-003 | 1.0000e-005 | | 8.7000e-004 | 8.7000e-004 | | 8.4000e-004 | 8.4000e-004 | 0.0000 | 1.0892 | 1.0892 | 2.2000e-004 | 0.0000 | 1.0939 |
| **Total** | **1.4100e-003** | **0.0119** | **8.8100e-003** | **1.0000e-005** | **7.5000e-004** | **8.7000e-004** | **1.6200e-003** | **4.1000e-004** | **8.4000e-004** | **1.2500e-003** | **0.0000** | **1.0892** | **1.0892** | **2.2000e-004** | **0.0000** | **1.0939** |

### 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 | 4.0000e-005 | 6.0000e-005 | 6.0000e-004 | 0.0000 | 9.0000e-005 | 0.0000 | 9.0000e-005 | 2.0000e-005 | 0.0000 | 2.0000e-005 | 0.0000 | 0.0852 | 0.0852 | 0.0000 | 0.0000 | 0.0853 |
| **Total** | **4.0000e-005** | **6.0000e-005** | **6.0000e-004** | **0.0000** | **9.0000e-005** | **0.0000** | **9.0000e-005** | **2.0000e-005** | **0.0000** | **2.0000e-005** | **0.0000** | **0.0852** | **0.0852** | **0.0000** | **0.0000** | **0.0853** |

## 3.4 Grading - 2015

### 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 | | | | | 7.5000e-004 | 0.0000 | 7.5000e-004 | 4.1000e-004 | 0.0000 | 4.1000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.4100e-003 | 0.0119 | 8.8100e-003 | 1.0000e-005 | | 8.7000e-004 | 8.7000e-004 | | 8.4000e-004 | 8.4000e-004 | 0.0000 | 1.0892 | 1.0892 | 2.2000e-004 | 0.0000 | 1.0939 |
| **Total** | **1.4100e-003** | **0.0119** | **8.8100e-003** | **1.0000e-005** | **7.5000e-004** | **8.7000e-004** | **1.6200e-003** | **4.1000e-004** | **8.4000e-004** | **1.2500e-003** | **0.0000** | **1.0892** | **1.0892** | **2.2000e-004** | **0.0000** | **1.0939** |

### 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 | 4.0000e-005 | 6.0000e-005 | 6.0000e-004 | 0.0000 | 9.0000e-005 | 0.0000 | 9.0000e-005 | 2.0000e-005 | 0.0000 | 2.0000e-005 | 0.0000 | 0.0852 | 0.0852 | 0.0000 | 0.0000 | 0.0853 |
| **Total** | **4.0000e-005** | **6.0000e-005** | **6.0000e-004** | **0.0000** | **9.0000e-005** | **0.0000** | **9.0000e-005** | **2.0000e-005** | **0.0000** | **2.0000e-005** | **0.0000** | **0.0852** | **0.0852** | **0.0000** | **0.0000** | **0.0853** |

## 3.5 Building Construction - 2015

### 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 | 0.0727 | 0.7189 | 0.4149 | 5.7000e-004 | | 0.0500 | 0.0500 | | 0.0460 | 0.0460 | 0.0000 | 54.0547 | 54.0547 | 0.0161 | 0.0000 | 54.3936 |
| **Total** | **0.0727** | **0.7189** | **0.4149** | **5.7000e-004** | | **0.0500** | **0.0500** | | **0.0460** | **0.0460** | **0.0000** | **54.0547** | **54.0547** | **0.0161** | **0.0000** | **54.3936** |

### 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 | 1.4300e-003 | 0.0115 | 0.0159 | 2.0000e-005 | 6.4000e-004 | 1.9000e-004 | 8.3000e-004 | 1.8000e-004 | 1.7000e-004 | 3.6000e-004 | 0.0000 | 2.1880 | 2.1880 | 2.0000e-005 | 0.0000 | 2.1884 |
| Worker | 1.2700e-003 | 1.8400e-003 | 0.0179 | 3.0000e-005 | 2.7200e-003 | 2.0000e-005 | 2.7500e-003 | 7.2000e-004 | 2.0000e-005 | 7.5000e-004 | 0.0000 | 2.5571 | 2.5571 | 1.5000e-004 | 0.0000 | 2.5603 |
| **Total** | **2.7000e-003** | **0.0134** | **0.0337** | **5.0000e-005** | **3.3600e-003** | **2.1000e-004** | **3.5800e-003** | **9.0000e-004** | **1.9000e-004** | **1.1100e-003** | **0.0000** | **4.7452** | **4.7452** | **1.7000e-004** | **0.0000** | **4.7487** |

## 3.5 Building Construction - 2015

### 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 | 0.0727 | 0.7189 | 0.4149 | 5.7000e-004 | | 0.0500 | 0.0500 | | 0.0460 | 0.0460 | 0.0000 | 54.0546 | 54.0546 | 0.0161 | 0.0000 | 54.3935 |
| **Total** | **0.0727** | **0.7189** | **0.4149** | **5.7000e-004** | | **0.0500** | **0.0500** | | **0.0460** | **0.0460** | **0.0000** | **54.0546** | **54.0546** | **0.0161** | **0.0000** | **54.3935** |

### 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 | 1.4300e-003 | 0.0115 | 0.0159 | 2.0000e-005 | 6.4000e-004 | 1.9000e-004 | 8.3000e-004 | 1.8000e-004 | 1.7000e-004 | 3.6000e-004 | 0.0000 | 2.1880 | 2.1880 | 2.0000e-005 | 0.0000 | 2.1884 |
| Worker | 1.2700e-003 | 1.8400e-003 | 0.0179 | 3.0000e-005 | 2.7200e-003 | 2.0000e-005 | 2.7500e-003 | 7.2000e-004 | 2.0000e-005 | 7.5000e-004 | 0.0000 | 2.5571 | 2.5571 | 1.5000e-004 | 0.0000 | 2.5603 |
| **Total** | **2.7000e-003** | **0.0134** | **0.0337** | **5.0000e-005** | **3.3600e-003** | **2.1000e-004** | **3.5800e-003** | **9.0000e-004** | **1.9000e-004** | **1.1100e-003** | **0.0000** | **4.7452** | **4.7452** | **1.7000e-004** | **0.0000** | **4.7487** |

## 3.6 Paving - 2015

### 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 | 3.0200e-003 | 0.0289 | 0.0184 | 3.0000e-005 | | 1.8100e-003 | 1.8100e-003 | | 1.6800e-003 | 1.6800e-003 | 0.0000 | 2.4801 | 2.4801 | 6.7000e-004 | 0.0000 | 2.4943 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **3.0200e-003** | **0.0289** | **0.0184** | **3.0000e-005** | | **1.8100e-003** | **1.8100e-003** | | **1.6800e-003** | **1.6800e-003** | **0.0000** | **2.4801** | **2.4801** | **6.7000e-004** | **0.0000** | **2.4943** |

### 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 | 1.9000e-004 | 2.8000e-004 | 2.6800e-003 | 0.0000 | 4.1000e-004 | 0.0000 | 4.1000e-004 | 1.1000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 0.3836 | 0.3836 | 2.0000e-005 | 0.0000 | 0.3840 |
| **Total** | **1.9000e-004** | **2.8000e-004** | **2.6800e-003** | **0.0000** | **4.1000e-004** | **0.0000** | **4.1000e-004** | **1.1000e-004** | **0.0000** | **1.1000e-004** | **0.0000** | **0.3836** | **0.3836** | **2.0000e-005** | **0.0000** | **0.3840** |

## 3.6 Paving - 2015

### 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 | 3.0200e-003 | 0.0289 | 0.0184 | 3.0000e-005 | | 1.8100e-003 | 1.8100e-003 | | 1.6800e-003 | 1.6800e-003 | 0.0000 | 2.4801 | 2.4801 | 6.7000e-004 | 0.0000 | 2.4943 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **3.0200e-003** | **0.0289** | **0.0184** | **3.0000e-005** | | **1.8100e-003** | **1.8100e-003** | | **1.6800e-003** | **1.6800e-003** | **0.0000** | **2.4801** | **2.4801** | **6.7000e-004** | **0.0000** | **2.4943** |

### 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 | 1.9000e-004 | 2.8000e-004 | 2.6800e-003 | 0.0000 | 4.1000e-004 | 0.0000 | 4.1000e-004 | 1.1000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 0.3836 | 0.3836 | 2.0000e-005 | 0.0000 | 0.3840 |
| **Total** | **1.9000e-004** | **2.8000e-004** | **2.6800e-003** | **0.0000** | **4.1000e-004** | **0.0000** | **4.1000e-004** | **1.1000e-004** | **0.0000** | **1.1000e-004** | **0.0000** | **0.3836** | **0.3836** | **2.0000e-005** | **0.0000** | **0.3840** |

## 3.7 Architectural Coating - 2015

### 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 | 0.1738 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.0200e-003 | 6.4300e-003 | 4.7500e-003 | 1.0000e-005 | | 5.5000e-004 | 5.5000e-004 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | 0.6383 | 0.6383 | 8.0000e-005 | 0.0000 | 0.6401 |
| **Total** | **0.1748** | **6.4300e-003** | **4.7500e-003** | **1.0000e-005** | | **5.5000e-004** | **5.5000e-004** | | **5.5000e-004** | **5.5000e-004** | **0.0000** | **0.6383** | **0.6383** | **8.0000e-005** | **0.0000** | **0.6401** |

### 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 | 1.0000e-005 | 2.0000e-005 | 1.5000e-004 | 0.0000 | 2.0000e-005 | 0.0000 | 2.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0213 | 0.0213 | 0.0000 | 0.0000 | 0.0213 |
| **Total** | **1.0000e-005** | **2.0000e-005** | **1.5000e-004** | **0.0000** | **2.0000e-005** | **0.0000** | **2.0000e-005** | **1.0000e-005** | **0.0000** | **1.0000e-005** | **0.0000** | **0.0213** | **0.0213** | **0.0000** | **0.0000** | **0.0213** |

## 3.7 Architectural Coating - 2015

**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 | 0.1738 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.0200e-003 | 6.4300e-003 | 4.7500e-003 | 1.0000e-005 | | 5.5000e-004 | 5.5000e-004 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | 0.6383 | 0.6383 | 8.0000e-005 | 0.0000 | 0.6401 |
| **Total** | **0.1748** | **6.4300e-003** | **4.7500e-003** | **1.0000e-005** | | **5.5000e-004** | **5.5000e-004** | | **5.5000e-004** | **5.5000e-004** | **0.0000** | **0.6383** | **0.6383** | **8.0000e-005** | **0.0000** | **0.6401** |

**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 | 1.0000e-005 | 2.0000e-005 | 1.5000e-004 | 0.0000 | 2.0000e-005 | 0.0000 | 2.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0213 | 0.0213 | 0.0000 | 0.0000 | 0.0213 |
| **Total** | **1.0000e-005** | **2.0000e-005** | **1.5000e-004** | **0.0000** | **2.0000e-005** | **0.0000** | **2.0000e-005** | **1.0000e-005** | **0.0000** | **1.0000e-005** | **0.0000** | **0.0213** | **0.0213** | **0.0000** | **0.0000** | **0.0213** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | 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 | 0.0776 | 0.2081 | 0.8629 | 1.4000e-003 | 0.0990 | 3.0700e-003 | 0.1021 | 0.0266 | 2.8200e-003 | 0.0294 | 0.0000 | 117.7663 | 117.7663 | 5.7900e-003 | 0.0000 | 117.8879 |
| Unmitigated | 0.0776 | 0.2081 | 0.8629 | 1.4000e-003 | 0.0990 | 3.0700e-003 | 0.1021 | 0.0266 | 2.8200e-003 | 0.0294 | 0.0000 | 117.7663 | 117.7663 | 5.7900e-003 | 0.0000 | 117.8879 |

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| General Light Industry | 121.65 | 19.80 | 10.20 | 266,197 | 266,197 |
| Total | 121.65 | 19.80 | 10.20 | 266,197 | 266,197 |

### 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 |
| General Light Industry | 9.50 | 7.30 | 7.30 | 59.00 | 28.00 | 13.00 | 92 | 5 | 3 |

| LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.546249 | 0.062948 | 0.174600 | 0.125189 | 0.034587 | 0.004960 | 0.015036 | 0.022157 | 0.002053 | 0.003311 | 0.006538 | 0.000702 | 0.001670 |

### 4.4 Fleet Mix

## 5.0 Energy Detail

Historical Energy Use: N

## 5.1 Mitigation Measures Energy

| | 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 | 42.1531 | 42.1531 | 1.9100e-003 | 3.9000e-004 | 42.3154 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 42.1531 | 42.1531 | 1.9100e-003 | 3.9000e-004 | 42.3154 |
| NaturalGas Mitigated | 1.7600e-003 | 0.0160 | 0.0134 | 1.0000e-004 | | 1.2200e-003 | 1.2200e-003 | | 1.2200e-003 | 1.2200e-003 | 0.0000 | 17.4180 | 17.4180 | 3.3000e-004 | 3.2000e-004 | 17.5240 |
| NaturalGas Unmitigated | 1.7600e-003 | 0.0160 | 0.0134 | 1.0000e-004 | | 1.2200e-003 | 1.2200e-003 | | 1.2200e-003 | 1.2200e-003 | 0.0000 | 17.4180 | 17.4180 | 3.3000e-004 | 3.2000e-004 | 17.5240 |

## 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 | | | | | |
| General Light Industry | 326400 | 1.7600e-003 | 0.0160 | 0.0134 | 1.0000e-004 | | 1.2200e-003 | 1.2200e-003 | | 1.2200e-003 | 1.2200e-003 | 0.0000 | 17.4180 | 17.4180 | 3.3000e-004 | 3.2000e-004 | 17.5240 |
| **Total** | | **1.7600e-003** | **0.0160** | **0.0134** | **1.0000e-004** | | **1.2200e-003** | **1.2200e-003** | | **1.2200e-003** | **1.2200e-003** | **0.0000** | **17.4180** | **17.4180** | **3.3000e-004** | **3.2000e-004** | **17.5240** |

## 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 | | | | | |
| General Light Industry | 326400 | 1.7600e-003 | 0.0160 | 0.0134 | 1.0000e-004 | | 1.2200e-003 | 1.2200e-003 | | 1.2200e-003 | 1.2200e-003 | 0.0000 | 17.4180 | 17.4180 | 3.3000e-004 | 3.2000e-004 | 17.5240 |
| **Total** | | **1.7600e-003** | **0.0160** | **0.0134** | **1.0000e-004** | | **1.2200e-003** | **1.2200e-003** | | **1.2200e-003** | **1.2200e-003** | **0.0000** | **17.4180** | **17.4180** | **3.3000e-004** | **3.2000e-004** | **17.5240** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| General Light Industry | 144900 | 42.1531 | 1.9100e-003 | 3.9000e-004 | 42.3154 |
| **Total** | | **42.1531** | **1.9100e-003** | **3.9000e-004** | **42.3154** |

### 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| General Light Industry | 144900 | 42.1531 | 1.9100e-003 | 3.9000e-004 | 42.3154 |
| **Total** | | **42.1531** | **1.9100e-003** | **3.9000e-004** | **42.3154** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | 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 | 0.0760 | 0.0000 | 1.4000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.7000e-004 | 2.7000e-004 | 0.0000 | 0.0000 | 2.8000e-004 |
| Unmitigated | 0.0760 | 0.0000 | 1.4000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.7000e-004 | 2.7000e-004 | 0.0000 | 0.0000 | 2.8000e-004 |

## 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 | 0.0174 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.0586 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 1.0000e-005 | 0.0000 | 1.4000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.7000e-004 | 2.7000e-004 | 0.0000 | 0.0000 | 2.8000e-004 |
| **Total** | **0.0760** | **0.0000** | **1.4000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **2.7000e-004** | **2.7000e-004** | **0.0000** | **0.0000** | **2.8000e-004** |

**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 | | | | | |
| Consumer Products | 0.0586 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 1.0000e-005 | 0.0000 | 1.4000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.7000e-004 | 2.7000e-004 | 0.0000 | 0.0000 | 2.8000e-004 |
| Architectural Coating | 0.0174 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0760** | **0.0000** | **1.4000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **2.7000e-004** | **2.7000e-004** | **0.0000** | **0.0000** | **2.8000e-004** |

## 7.0 Water Detail

## 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 6.1789 | 4.4700e-003 | 2.7200e-003 | 7.1160 |
| Unmitigated | 6.1789 | 4.4500e-003 | 2.7200e-003 | 7.1140 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| General Light Industry | 3.46875 / 0 | 6.1789 | 4.4500e-003 | 2.7200e-003 | 7.1140 |
| **Total** | | **6.1789** | **4.4500e-003** | **2.7200e-003** | **7.1140** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| General Light Industry | 3.46875 / 0 | 6.1789 | 4.4700e-003 | 2.7200e-003 | 7.1160 |
| **Total** | | **6.1789** | **4.4700e-003** | **2.7200e-003** | **7.1160** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 3.7756 | 0.2231 | 0.0000 | 8.4614 |
| Unmitigated | 3.7756 | 0.2231 | 0.0000 | 8.4614 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| General Light Industry | 18.6 | 3.7756 | 0.2231 | 0.0000 | 8.4614 |
| **Total** | | **3.7756** | **0.2231** | **0.0000** | **8.4614** |

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| General Light Industry | 18.6 | 3.7756 | 0.2231 | 0.0000 | 8.4614 |
| **Total** | | **3.7756** | **0.2231** | **0.0000** | **8.4614** |

## 9.0 Operational Offroad

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

## 10.0 Vegetation

**Summary of AERSCREEN and Health Risk Assessment parameters for Construction DPM and $PM_{2.5}$ Emissions**
**Bayer South Project**

| AERSCREEN Parameters | Units | Value | Notes |
|---|---|---|---|
| Annualized DPM Emission Rate | ton/year | 0.18010 | CalEEMod $PM_{10}$ emissions |
| Annualized DPM Emission Rate | gram/second | 0.00769 | Converted $PM_{10}$ emissions |
| Annualized PM2.5 Emission Rate | ton/year | 0.17290 | CalEEMod exhaust $PM_{2.5}$ |
| Annualized PM2.5 Emission Rate | gram/second | 0.00738 | Converted exhaust $PM_{2.5}$ |
| Stack Height | meters | 3.66 | Caterpillar equipment specs |
| Inner Diameter | meters | 0.10 | Caterpillar equipment specs |
| Plume Exit Temperature | Kelvin | 700 | Caterpillar equipment specs |
| Plume Exit Flow Rate | cfm | 2000 | Caterpillar equipment specs |

| Target Receptor | Chemical | Annual Average Concentration ($\mu g/m^3$) | Excess Cancer Risk per Million | Chronic HI |
|---|---|---|---|---|
| Child under the age of 2 | DPM | 0.047 | 3.17 | 0.009 |
| All | $PM_{2.5}$ | 0.046 | --- | --- |

| Analysis | Chemical | Cancer Potency Factor $(mg/kg/day)^{-1}$ | Chronic Reference Exposure Level ($\mu g/m^3$) |
|---|---|---|---|
| Cancer Risk and Chronic HI | DPM | 1.1 | 5 |

| Exposure Parameters | Units | Child <2 | Source |
|---|---|---|---|
| Daily Breathing Rate (DBR) | L/kg-day | 658 | OEHHA, 2012 |
| Exposure Frequency (EF) | days/year | 350 | California EPA, 2003 |
| Exposure Duration (ED) | years | 0.67 | CalEEMod |
| Exposure Time (ET) | hour/24 hours | 1.00 | Project assumption |
| Conversion Factor (CF) | $m^3/L$ | 0.000001 | California EPA, 2003 |
| Averaging Time (AT) | days | 25,550 | California EPA, 2003 |
| Age Sensitivity Factor (ASF) | unitless | 10 | BAAQMD, 2011 |

Notes:
DPM = diesel particulate matter
PM2.5 = particulate matter with aerodynamic resistance diameters equal to or less than 10 microns
$\mu g/m^3$ = micrograms per cubic meter
L/kg-day = liters per kilogram-day
$m^3/L$ = cubic meters per liter
$(mg/kg/day)^{-1}$ = 1/milligrams per kilograms per day

California Environmentla Protection Agency (EPA), 2003. *Air Toxics Hot Spots Program Risk Assessment Guidelines; the Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessment* . August.
Bay Area Airy Quality Management District (BAAQMD), 2011. *Recommended Methods for Screening and Modeling Local Risks and Hazards* . May.
Office of Environmental Health Hazard Assessment (OEHHA), 2012. *Technical Support Document for Exposure Assessment and Stochastic Analysis* . August.

AERSCREEN 11126 / AERMOD 1335 07/09/14
10:06:57

TITLE: Bayer DPM

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********** STACK PARAMETERS **********

---

| | | | | |
|---|---|---|---|---|
| SOURCE EMISSION RATE: | 0.769E-02 | g/s | 0.610E-01 | lb/hr |
| STACK HEIGHT: | 3.66 | meters | 12.01 | feet |
| STACK INNER DIAMETER: | 0.100 | meters | 3.94 | inches |
| PLUME EXIT TEMPERATURE: | 700.0 | K | 800.3 | Deg F |
| PLUME EXIT VELOCITY: | 120.180 | m/s | 394.29 | ft/s |
| STACK AIR FLOW RATE: | 2000 | ACFM | | |
| RURAL OR URBAN: | URBAN | | | |
| POPULATION: | 115400 | | | |

INITIAL PROBE DISTANCE = 200. meters 656. feet

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

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NO BUILDING DOWNWASH HAS BEEN REQUESTED FOR THIS ANALYSIS

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

25 meter receptor spacing: 1. meters - 200. meters

| Zo SECTOR | ROUGHNESS LENGTH | 1-HR CONC (ug/m3) | DIST (m) | TEMPORAL PERIOD |
|---|---|---|---|---|
| 1* | 1.000 | 1.964 | 25.0 | WIN |

* = worst case flow sector

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

---

MIN/MAX TEMPERATURE: 250.0 / 310.0 (K)

MINIMUM WIND SPEED: 0.5 m/s

ANEMOMETER HEIGHT: 10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Urban
DOMINANT CLIMATE TYPE: Dry Conditions
DOMINANT SEASON: Winter

ALBEDO: 0.35
BOWEN RATIO: 2.00
ROUGHNESS LENGTH: 1.000 (meters)

METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT

| YR | MO | DY | JDY | HR |
|---|---|---|---|---|
| 10 | 04 | 25 | 25 | 01 |

| H0 | U* | W* | DT/DZ | ZICNV | ZIMCH | M-O LEN | Z0 | BOWEN | ALBEDO | REF WS |
|---|---|---|---|---|---|---|---|---|---|---|
| -64.00 | 1.206 | -9.000 | 0.020 | -999. | 3046. | 2609.5 | 1.000 | 2.00 | 0.35 | 7.00 |

| HT | REF TA | HT |
|---|---|---|
| 10.0 | 310.0 | 2.0 |

ESTIMATED FINAL PLUME HEIGHT (non-downwash): 16.2 meters

METEOROLOGY CONDITIONS USED TO PREDICT AMBIENT BOUNDARY IMPACT

| YR | MO | DY | JDY | HR |
|---|---|---|---|---|
| 10 | 02 | 10 | 25 | 12 |

| H0 | U* | W* | DT/DZ | ZICNV | ZIMCH | M-O LEN | Z0 | BOWEN | ALBEDO | REF WS |
|---|---|---|---|---|---|---|---|---|---|---|
| 331.59 | 0.193 | 1.800 | 0.020 | 670. | 196. | -2.1 | 1.000 | 4.00 | 0.18 | 0.50 |

| HT | REF TA | HT |
|---|---|---|
| 10.0 | 310.0 | 2.0 |

ESTIMATED FINAL PLUME HEIGHT (non-downwash): 142.3 meters

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

OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

| DIST (m) | MAXIMUM 1-HR CONC (ug/m3) | DIST (m) | MAXIMUM 1-HR CONC (ug/m3) |
|---|---|---|---|
| 1.00 | 0.2620E-01 | 125.00 | 0.6784 |
| 25.00 | 1.964 | 150.00 | 0.5656 |
| 50.00 | 1.157 | 175.00 | 0.4749 |
| 75.00 | 0.9545 | 200.00 | 0.4172 |
| 100.00 | 0.8060 | | |

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

| CALCULATION | MAXIMUM 1-HOUR CONC | SCALED 3-HOUR CONC | SCALED 8-HOUR CONC | SCALED 24-HOUR CONC | SCALED ANNUAL CONC |
|---|---|---|---|---|---|

| PROCEDURE | (ug/m3) | AERSCREEN (ug/m3) | (ug/m3) | (ug/m3) | (ug/m3) |
|---|---|---|---|---|---|
| FLAT TERRAIN | 5.719 | 5.719 | 5.147 | 3.432 | 0.5719 |

DISTANCE FROM SOURCE 8.00 meters

| | | | | | |
|---|---|---|---|---|---|
| IMPACT AT THE AMBIENT BOUNDARY | 0.2620E-01 | 0.2620E-01 | 0.2358E-01 | 0.1572E-01 | 0.2620E-02 |

DISTANCE FROM SOURCE 1.00 meters

AERSCREEN 11126 / AERMOD 1335 07/09/14
09:54:57

TITLE: Bayer PM2.5

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********** STACK PARAMETERS **********

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| | | | | |
|---|---|---|---|---|
| SOURCE EMISSION RATE: | 0.738E-02 | g/s | 0.586E-01 | lb/hr |
| STACK HEIGHT: | 3.66 | meters | 12.01 | feet |
| STACK INNER DIAMETER: | 0.100 | meters | 3.94 | inches |
| PLUME EXIT TEMPERATURE: | 700.0 | K | 800.3 | Deg F |
| PLUME EXIT VELOCITY: | 120.180 | m/s | 394.29 | ft/s |
| STACK AIR FLOW RATE: | 2000 | ACFM | | |
| RURAL OR URBAN: | URBAN | | | |
| POPULATION: | 115400 | | | |

INITIAL PROBE DISTANCE = 200. meters 656. feet

---

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

---

NO BUILDING DOWNWASH HAS BEEN REQUESTED FOR THIS ANALYSIS

********** PROBE ANALYSIS **********
25 meter receptor spacing: 1. meters - 200. meters

| Zo SECTOR | ROUGHNESS LENGTH | 1-HR CONC (ug/m3) | DIST (m) | TEMPORAL PERIOD |
|---|---|---|---|---|
| 1* | 1.000 | 1.885 | 25.0 | WIN |

* = worst case flow sector

---

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

---

MIN/MAX TEMPERATURE: 250.0 / 310.0 (K)

MINIMUM WIND SPEED: 0.5 m/s

ANEMOMETER HEIGHT: 10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Urban
DOMINANT CLIMATE TYPE: Dry Conditions
DOMINANT SEASON: Winter

ALBEDO: 0.35
BOWEN RATIO: 2.00
ROUGHNESS LENGTH: 1.000 (meters)

METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT

| YR | MO | DY | JDY | HR |
|---|---|---|---|---|
| 10 | 04 | 25 | 25 | 01 |

| H0 | U* | W* | DT/DZ | ZICNV | ZIMCH | M-O LEN | Z0 | BOWEN | ALBEDO | REF WS |
|---|---|---|---|---|---|---|---|---|---|---|
| -64.00 | 1.206 | -9.000 | 0.020 | -999. | 3046. | 2609.5 | 1.000 | 2.00 | 0.35 | 7.00 |

| HT | REF TA | HT |
|---|---|---|
| 10.0 | 310.0 | 2.0 |

ESTIMATED FINAL PLUME HEIGHT (non-downwash): 16.2 meters

METEOROLOGY CONDITIONS USED TO PREDICT AMBIENT BOUNDARY IMPACT

| YR | MO | DY | JDY | HR |
|---|---|---|---|---|
| 10 | 02 | 10 | 25 | 12 |

| H0 | U* | W* | DT/DZ | ZICNV | ZIMCH | M-O LEN | Z0 | BOWEN | ALBEDO | REF WS |
|---|---|---|---|---|---|---|---|---|---|---|
| 331.59 | 0.193 | 1.800 | 0.020 | 670. | 196. | -2.1 | 1.000 | 4.00 | 0.18 | 0.50 |

| HT | REF TA | HT |
|---|---|---|
| 10.0 | 310.0 | 2.0 |

ESTIMATED FINAL PLUME HEIGHT (non-downwash): 142.3 meters

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

| DIST (m) | MAXIMUM 1-HR CONC (ug/m3) | DIST (m) | MAXIMUM 1-HR CONC (ug/m3) |
|---|---|---|---|
| 1.00 | 0.2514E-01 | 125.00 | 0.6510 |
| 25.00 | 1.885 | 150.00 | 0.5428 |
| 50.00 | 1.111 | 175.00 | 0.4558 |
| 75.00 | 0.9160 | 200.00 | 0.4004 |
| 100.00 | 0.7735 | | |

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

| CALCULATION | MAXIMUM 1-HOUR CONC | SCALED 3-HOUR CONC | SCALED 8-HOUR CONC | SCALED 24-HOUR CONC | SCALED ANNUAL CONC |
|---|---|---|---|---|---|

| PROCEDURE | AERSCREEN (ug/m3) | (ug/m3) | (ug/m3) | (ug/m3) | (ug/m3) |
|---|---|---|---|---|---|
| FLAT TERRAIN | 5.489 | 5.489 | 4.940 | 3.293 | 0.5489 |

DISTANCE FROM SOURCE 8.00 meters

| | | | | | |
|---|---|---|---|---|---|
| IMPACT AT THE AMBIENT BOUNDARY | 0.2514E-01 | 0.2514E-01 | 0.2263E-01 | 0.1508E-01 | 0.2514E-02 |

DISTANCE FROM SOURCE 1.00 meters

## APPENDIX B:

Historic Resources Evaluation and Archaeological Sensitivity Assessment

August 7, 2014

Lynette Dias
AICP, President and Principal
Urban Planning Partners
505 17th Street, Second Floor
Oakland, CA 94612

RE: Historic Resources Evaluation of Buildings 28, 28A, and 50 and Archaeological Sensitivity Assessment for the Bayer Manufacturing Quality Control Testing Facility, South Properties, West Berkeley, Alameda County, CA

Dear Ms. Dias:

In accordance with our agreement, William Self Associates, Inc. (WSA) has implemented a records search, Native American Heritage Commission consultation, and archaeological sensitivity study of the proposed Bayer Manufacturing Quality Control Testing Facility South Properties in the City of Berkeley, Alameda County (Figures 1 and 2, All Figures in Appendix A). In addition, WSA has prepared a Historic Resources Evaluation of Buildings 28, 28A, and 50. The three buildings are used as laboratory and testing facilities and were built between 1956 and 1973. They are located on the north edge of the Bayer Campus and the project proponent proposes to demolish them as part of the ongoing effort to modernize laboratory facilities on the Bayer Campus.

## Project Description and Location

Bayer Healthcare proposes to construct an 80,000 square-foot Quality Control Testing Facility on the Bayer HealthCare Berkley Site South Properties. This facility is intended to replace and modernized existing facilities used for quality control and testing in order to better support biotechnology manufacturing operations. The proposed structure will be located in the southeast portion of the Bayer Campus. The modernized building will have three stories that comply with the 45-ft. allowable height limit consistent with the policies set by the Mixed Manufacturing District.

The proposed new construction will be part of Bayer's South Properties that consists of 14.4-acres of land located between Grayson and Carleton streets, west of Seventh Street. The Southern Pacific Railroad right-of-way forms the western boundary of the Bayer Campus with the Berkeley Aquatic Park adjacent to the railway line. The proposed Quality Control Testing Facility would be bounded by Carleton Street to the north, Miles Way to the west, and Thomas Way to the south. The Colgate Building (B83), a mixed-use office building, is located immediately east of the proposed construction site. Parking Lots CC and DD currently occupy the project site. Existing Buildings 28, 28A, and 50 are located north of the proposed new facility on the north edge of the Bayer Campus between Dwight Way to the north and Cutter Way to the south (Figure 3). The proposed project site is situated in Township 1 South, Range 4 West in Section 10, as depicted on the 1995 Oakland West, California 7.5-minute USGS topographic quadrangle.

## Cultural Setting

### *Prehistoric Overview*

The large prehistoric shell middens formerly situated along San Francisco Bay have been the subject of study since the late 19th century. Nels Nelson recorded hundreds of such mounds throughout the Bay Area (Nelson 1909), including the Emeryville Shellmound (CA-ALA-309) and the West Berkeley Shellmound (CA-ALA-307). The importance of his work stems mostly from his examination of the sites prior to their destruction during development of near-shore lands along the San Francisco Bay. The archaeological excavation of these and other mounds provided a framework for the study of the various prehistoric cultures that inhabited the San Francisco region as long as 12,000 years ago (Fredrickson 1974).

The Emeryville Shellmound and associated out-lying mounds (CA-ALA-310, 311, 312, and 313) were subjected to very limited yet extremely productive archaeological assessment in the early part of the 20th century. Subsequent radiocarbon dating of charcoal from these sites has yielded dates from about 2,500 to 2,300 years before the present (BP). Schenck's 1924 excavation yielded over 700 human burials in one deposit (1926). Subsequent destruction of the mounds by mass excavation has since exposed human remains and artifacts. Detailed syntheses of Bay Area prehistory can be found in Moratto (1984) and Milliken et al (2007).

### *Ethnographic Overview*

There is a considerable body of ethnographic literature on the Native American inhabitants of the project region. This section provides a brief summary of the ethnography of the area and is intended to provide a general background only. For a more extensive review of Ohlone

ethnography, see Bocek (1986), Cambra et al. (1996), Kroeber (1925), Levy (1978), Milliken (1983, 1995), and Shoup et al. (1995).

The project area lies within the region occupied at the time of historic contact by the Costanoan group of Native Americans (Kroeber 1925). Although the term Costanoan is derived from the Spanish word Costaños, or coast people, its application as a means of identifying this population is based in linguistics. The Costanoans spoke a language now considered one of the major subdivisions of the Miwok Costanoan, which belonged to the Utian family within the Penutian language stock (Shipley 1978:82 84). Costanoan refers to a family of eight languages. Of these, Chochenyo or East Bay Costanoan was the language spoken by the estimated 2,000 people who occupied the "…east shore of San Francisco Bay between Richmond and Mission San Jose, and probably also in the Livermore Valley" (Levy 1978:485).

The other seven languages of the Costanoan family were spoken by tribal groups occupying the area from the Pacific Coast to the Diablo Range, and from San Francisco to Point Sur. Modern descendants of the Costanoan prefer to be known as Ohlone. The name Ohlone is derived from the Oljon group, which occupied the San Gregorio watershed in San Mateo County (Bocek 1986:8). The two terms Costanoan and Ohlone are used interchangeably in much of the ethnographic literature.

On the basis of linguistic evidence, it has been suggested that the ancestors of the Ohlone arrived in the San Francisco Bay area about A.D. 500, having moved south and west from the Sacramento San Joaquin Delta region. The ancestral Ohlone displaced speakers of a Hokan language and were probably the producers of the artifact assemblages that constitute the Augustine Pattern, believed to be related to the period from about A.D. 500 to historic times (Levy 1978:486).

Although linguistically linked as a family, the eight Costanoan languages actually comprised a continuum in which neighboring groups could probably understand each other. However, beyond neighborhood boundaries, each group's language was unrecognizable to the other. Each of the eight language groups was subdivided into smaller village complexes or tribal groups. The groups were independent political entities, each occupying specific territories defined by physiographic features. Each group controlled access to the natural resources of their territories. Although each group had one or more permanent villages, their territory contained numerous smaller campsites used as needed during a seasonal round of resource exploitation.

Leadership was provided by a chief, who inherited the position patrilineally and who could be either a man or woman. The chief and a council of elders served mainly as community advisers. Specific responsibility for feeding visitors, providing for the impoverished and directing

ceremonies, hunting, fishing, and gathering activities fell to the chief. Only in times of warfare was the chief's role as absolute leader recognized by group members (Levy 1978:487).

Extended families lived in domed structures thatched with tule, grass, wild alfalfa, or ferns (Levy 1978). Semi subterranean sweathouses were built into pits excavated in stream banks and covered with a structure against the bank. The tule raft, propelled by double bladed paddles similar to those that were used in the Santa Barbara Channel Island region, were used to navigate across San Francisco Bay (Kroeber 1925).

Mussels were an important staple in the Ohlone diet as were acorns of the coast live oak, valley oak, tanbark oak and California black oak. Seeds and berries, roots and grasses, as well as the meat of deer, elk, grizzly, rabbit, and squirrel formed the Ohlone diet. Careful management of the land through controlled burning served to insure a plentiful and reliable source of all these foods (Kroeber 1925; Levy 1978).

The Chochenyo usually cremated a corpse immediately upon death but, if there were no relatives to gather wood for the funeral pyre, interment occurred. The personal belongings of the deceased comprised most of mortuary goods (Levy 1978:490).

The arrival of the Spanish in the San Francisco Bay Area in 1770 led to a rapid and major reduction in native California populations. Diseases, declining birth rates, and the effects of the mission system served to largely eradicate the aboriginal lifeways (which are currently experiencing a resurgence among Ohlone descendants). Brought into the missions, the surviving Ohlone, along with former neighboring groups of Esselen, Yokuts, and Miwok were transformed from hunters and gatherers into agricultural laborers (Levy 1978; Shoup et al. 1995). With abandonment of the mission system and the Mexican takeover in the 1820s, numerous ranchos were established. Generally, the few Indians who remained were then forced, by necessity, to work on the ranchos.

***Historic Overview***

The historic period in the eastern San Francisco Bay region began with the Fages-Crespi expedition of 1770. The Fages party explored the eastern shore of San Francisco Bay, eventually reaching the location of modern Fremont, where they traded with the local Costanoans. Members of the expedition eventually sighted the entrance to San Francisco Bay from the Oakland hills. In 1772, a second Fages expedition traveled from Monterey through what are now Milpitas, San Lorenzo, Oakland, and Berkeley, finally reaching the area of modern-day Pinole on March 28, 1772 (Cook 1957:131). In 1776, the Anza-Font expedition traveled through the same area and also traded with residents of native villages encountered along the way. The significant impact of

the European presence on the local California natives, however, was not felt until the Spanish missions were established in the region.

The first mission in the region was established the following year with the completion of Mission San Francisco de Asis (Mission Dolores) in San Francisco. The ensuing Mission era proved to be the downfall of the native inhabitants of the region, who were brought to the missions as conscripts for labor under the pretense of Christianization. The missions became the loci of native missionization, which brought disease, subjugation, and ultimately decimation, to the native Californian groups. It is reported that by 1810, the traditional Costanoan lifestyle ceased to exist (Levy 1978:486). Diseases introduced by the early expeditions and missionaries, and the contagions associated with the forced communal life at the missions, killed a large number of local peoples. Cook estimates that by 1832, the Costanoan population had been reduced from a high of over 10,000 in 1770 to less than 2,000 (Cook 1943:22).

In 1817, Mission Dolores began using what would become the City of Berkeley to graze sheep (Schwartz 2000:1). In 1820, Sergeant Luis Maria Peralta received a grant of 10 square leagues of land in the East Bay in recognition of his long, faithful military service in California. Peralta named his grant Rancho San Antonio. It comprised the land that lay from the water's edge to the crest of the Oakland hills between San Leandro Creek in the south and El Cerrito Creek in the north (Hendry and Bowman 1940:585), completely encompassing modern-day Oakland, Berkeley, Emeryville, Piedmont, Albany, Alameda, and a portion of San Leandro (Sher 1994:6).

By 1822, Mexico had become free of Spanish rule but was unable to give much attention to Alta California and its frontier lands. Residents began using the barter system to trade cattle hides and tallow for manufactured goods with foreign trading vessels (Schwartz 2000:1). In 1842, Peralta formally divided his holdings among his four sons. Jose Domingo Peralta, the second oldest son of Luis Peralta, received the northernmost section of his father’s land that encompassed Berkeley that he used for cattle ranching.

Following the U.S. seizure of Alta California from Mexico in 1846, rancho lands were divided up and generally were subsequently overrun by the Anglo immigration to the area coinciding with the land boom following the Gold Rush of 1849. By 1852, squatters were also grabbing Jose Domingo Peralta’s land, and his herds were dwindling due to poachers. Rancho San Antonio suffered the fate of most Mexican land grants in northern California, with squatters taking quasi-legal title to lands, and the courts denying title to the original grantees (Hendry and Bowman 1940:585).

In 1852, William Hillegass, James Leonard, Francis Kittredge Shattuck, and Shattuck’s brother-in-law, George Blake, filed claims to a square mile of land in the central section of what is now Berkeley. In 1853, Jose Domingo Peralta was forced to sell the majority of his estate to several

groups of investors. These investors split the property into lots and quickly resold them. Some of the land Peralta sold to developers eventually became sites of the state college, numerous farms, and Berkeley's first freight wharf at the foot of Delaware Street (Cerny 1994).

West Berkeley, originally known as the settlement of Ocean View, developed along a distinct economic and cultural trajectory from East Berkeley, which was clustered around the University of California two miles away. West Berkeley came to be defined by its commercial orientation toward the Bay, railroads, and working-class industries. This Bay-ward gaze created a unique mixture of varied industries and mixed-class residential neighborhoods. The residents of West Berkeley in the 1850s came from a variety of cultural and socio-economic backgrounds, from the owners of the new businesses and industrial operations, to the Irish immigrants seeking work at farms or as day laborers, to the mixture of Chinese, German, and Irish immigrants who arrived after a railroad stop for the transcontinental railroad was built in 1878.

The industrial and commercial nature of West Berkeley's economy dates back to its founding. First settled by Euro Americans in 1853, Ocean View's first industrial operation, the Pioneer Starch and Grist Mill, opened in 1855. The mill and was soon joined by the Zimri Brewer and Heywood Lumberyard (Hill 2003). The early town consisted of a wharf off the foot of Delaware Street, small farms extending east, as well as an inn, grocery store, church, and school (City of Berkeley). While industrial concerns, such as a lumberyard and gristmill, were present, the cultivation of nearby farms occupied many of the residents up until the early 1870s. Industry came to truly define West Berkeley between 1873 and 1878, when this area became home to the Standard Soap Works, Cornell Watch Company, the Wentworth Shoe Company, the California Ink Company, and the Griffin Glove and Tannery Company (Hill 2003). By that time, residents that worked in the nearby factories largely inhabited the town.

The economy and culture of West Berkeley was profoundly impacted by two events in 1878. That year, the transcontinental railroad built a station at the intersection of Third and Delaware streets. Also in 1878, to avoid annexation by Oakland, the Town of Berkeley was officially incorporated, combining the Bayside manufacturing settlement of Ocean View, which is now West Berkeley, with the small academic area of the University of California. Following these developments, services such as streetlights, telephones, and electricity came to West Berkeley. In addition to this, more industries were established. By 1885, these included the "Niehaus Planing Mill, the Standard Soap Company, a cement works, a mine reduction works, a lubricating oil and kerosene works, gunpowder factory, paraffin paint works, [and] a large lumber yard with a pier and rail spur" (Hill 2003).

The pharmaceutical industry was also established in West Berkeley at the turn-of-the-century, when Edward Cutter started Cutter Laboratories in 1897, moving to its 700-730 Parker Street location in 1903 (Cutter et al. 1975; Bayer Healthcare 2014). Cutter Laboratories would become

a major developer and manufacturer of vaccines such as an anthrax vaccine and a polio vaccine. German-based Bayer purchased Cutter in 1974 and has since expanded its facilities in West Berkeley, which now include a 43-acre campus that manufactures protein therapeutics for people living with hemophilia (Bayer Healthcare 2014).

Despite the incorporation of the Town of Berkeley, West Berkeley retained a distinct character, focused on Bay-side industry and commerce. Transportation within West Berkeley illustrates this well. In addition to the north-south (in the immediate area) trajectory of the transcontinental railroad, by 1878 a horse-drawn stage line connected West Berkeley with Oakland and Emeryville in the south (Hill 2003). The 1891 opening of a trolley line along San Pablo Avenue allowed for an influx of supplies and commodities, and more people began inhabiting the town (City of Berkeley). While another trolley opened that year running east-west along University Avenue, this was never as important as the north-south routes (City of Berkeley). By 1900, houses began replacing farms, and approximately 15,000 people lived in Berkeley, a marked increase from the 12 individuals who were recorded in the census during the time of Domingo Peralta. Working class immigrants from Finland, Scandinavia, and Germany occupied the area.

After 1906, Berkeley became one of the largest cities in California, mostly as a result of an influx of 20,000 San Francisco earthquake refugees. The construction of the Key System of ferryboats and streetcars made transportation between Oakland, Berkeley and San Francisco quick and affordable and spurred the development of residential tracts in Berkeley. This, in turn, spurred intensive commercial development in downtown Berkeley. As a result, downtown Berkeley developed into a substantial urban district with numerous large, masonry buildings and impressive public facilities. The new buildings included a new City Hall, public library, train station, and high school (Ferrier 1933:101).

The population of Berkeley continued to grow throughout the 20th century. In 1909 the Census of Manufactures listed 84 factories that increased to 173 factories by 1929, many of which were built along the railway line and the waterfront of West Berkeley. Beginning in the 1920s, complicated zoning regulations within Berkeley created a "haphazard mixture of cross-class, mixed-use buildings concentrated in a small urban area" (Hill 2003:6). Workers at the many factories often settled in close proximity to their workplaces. Damaging the character of West Berkeley, a five-square-block area was designated for disposal of solid waste in 1923, no doubt reinforcing the trend of wealthier citizens moving eastward toward the Berkeley Hills (Hill 2003).

The Great Depression caused some economic slowdown to the industry in West Berkeley and the Berkeley Aquatic Park and Eastshore Freeway were created as stimulus projects during this time (City of Berkeley). In 1940, more Italian and Mexican-born immigrants joined the largely Northern European community. The economic boom associated with World War II created an

industrial base along the shorefront that extends today from East Oakland to Richmond. The war and establishment of Camp Ashby, a training site for African-American soldiers, also shifted the demographics in West Berkley from 2% African-American in 1940 to 30% African-American in 1950 (City of Berkeley). Manufacturing in the area continued to grow until the 1970s, when residential development increased and West Berkley was re-zoned for mixed-used.

What began as a small industrial and agricultural enclave in the late-1850s, became a complicated mixture of industrial, residential, and retail zones which were the subject of the West Berkeley Master Plan in 1993. The preservation of the unique working-class, mixed-use quality of the area was at the forefront of this master plan as were the wide range of site types and buildings that underwrote the neighborhood's rich history.

## Results of the Record Search

WSA Project Director Aimee Arrigoni conducted a records search at the California Historical Resources Information System, Northwest Information Center at Sonoma State University (NWIC) on June 6, 2014 (File No. 14-1874). The record search included a review of all cultural resource and excavation reports and recorded archaeological sites in and within a ¼-mile radius of the Bayer South Properties. The study included a review of archaeological, ethnographic, historical, and environmental literature as well as records and maps on file at the California Archaeological Inventory.

No cultural resources have been recorded within the project area. Five cultural resources have been recorded within ¼ mile of the project area. These include:

- P-01-000120 (CA-ALA-390). A a partially destroyed prehistoric occupation site that has a well-developed shell midden that measures approximately 100 x 250 meters surrounded by a more extensive area with sparse shell within a 300 x 250 meter area (Banks 1967). This site may represent the southern extension of CA-ALA-307. The depth of the resource is not known. The resource is located from Addison to Dwight Way and from Fourth to Ninth streets. The southern extent of the midden was observed 30 meters north of the northern edge of project area.
- P-01-011409. A two-story, L-shaped office building at 2850 Seventh Street that was constructed in the Modern Style. Built in 1960, the structure has undergone recent alterations to the original doors and windows (Crawford 2012). The structure is located approximately 150 meters south of the southeast corner of the project area.
- P-01-010281. The Berkeley Aquatic Park that was constructed in 1937 as part of the Berkeley Waterfront Project, which was funded by the Works Progress Administration (Bradley and Corbett 1999). Berkeley Aquatic Park, a lagoon surrounded by a recreational green space, is bounded by Addison Street to the north and Potter Street to

the south. The Berkeley Aquatic Park is separated from the project area by the Southern Pacific Railway line that runs along the western border of the project area.

- P-01-010980. This resource consists of a factory, warehouse, and water tower complex that was built in 1927 by the H.J. Heinz Company (Supernowicz 2001 and URS 2009). The H.J. Heinz Company Factory's three buildings, located on a 10.5-acre lot, were built in the Spanish Colonial Revival style that drew heavily from the design of the Alhambra, the Moorish palace in Granada. The complex is situated 400 meters southeast of the southeast corner of the project area.
- P-01-010990. A two-story, Modern style commercial warehouse structure located at 2310 Fourth Street (Crawford 2009). The building was constructed in 1947 and its integrity has been compromised by recent alterations to the structure. The structure is located 320 meters north of the northwest corner of the project area.

Two cultural resource studies have been conducted within the project area (S-23386 and S-26419). Nineteen other studies have been conducted within ¼-mile of the project area and include S-4950, S-8700, S-8753, S-22100, S-22817, S-24970, S-24988, S-25107, S-33061, S-33435, S-35261, S-36526, S-36797, S-36798, S-37296, S-38251, S-39697, S-40653, and S-43360 (Table 1).

**Table 1. Cultural resources studies in and within 1/4 mile of the project boundaries.**

| Study # | Author | Date | Title |
|---|---|---|---|
| S-4950 | Buss | 1982 | Archaeological Survey Report for Proposed High Occupancy Vehicle Lanes from Bay Bridge to Carquinez Bridge |
| S-8700 | Mundie & Associates | 1986 | Draft Environmental Impact Report, Aquatic Park Center (Durkee Site) |
| S-8753 | Ananian | 1986 | Archaeological Investigations of the Durkee Site at the Foot of Heinz Avenue, Berkeley, California |
| S-22100 | Bradley and Corbett | 1999 | Historic Property Survey Report for the I-80 Bicycle/Pedestrian Overcrossing Project, Berkeley, California |
| S-22817 | Far Western Anthropological Research Group | 2000 | Cultural Resources Survey for the Level (3) Communication Long haul Fiber Optics Project, Segment WS01:Sacramento to Oakland |
| S-23386 | David Chaves & Associates | 2002 | Archaeological Resources Investigation for the EBMUD East Bayshore Recycled Water Project, Alameda County, California, Additional Pipeline Alignments |
| S-24970 | Basin Research Associates | 2000 | Archaeological Resources Assessment- The Understanding Business, 2422 Fifth Street (between Channing and Dwight Way), City of Berkeley, Alameda County, Use Permit 00-10000078 |
| S-24988 | Basin Research Associates | 2001 | Archaeological Resources Assessment 800 to 816 Bancroft Way (between Fifth and Sixth Streets) Parcels APN 56-1942-001, 56-1942-003-1, 56-1942-025, City of Berkeley, Alameda County |
| S-25107 | Earth Touch | 2002 | Archaeological Resources Assessment for Proposed Metro PCS Telecommunications Facility, Berkeley, California |
| S-26419 | David Chaves & | 2002 | Archeological Resources Investigations for the EBMUD East |

| Study # | Author | Date | Title |
|---|---|---|---|
| | Associates | | Bayshore Recycled Water Project, Alameda County, California, Additional Pipeline Alignments |
| S-33061 | Sikes et al. | 2006 | Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project, State of California |
| S-33435 | Caltrans | 1994 | Finding of Adverse Effect for the Proposed On-ramp from Bay Street to Eastbound Route 80 in the City of Berkeley, Alameda County |
| S-35261 | Jones & Stoke | 2006 | I-80/Ashby-Shellmound Interchange Project Finding of Effect, Caltrans District 4, Cities of Berkeley and Emeryville, Alameda County, California |
| S-36526 | Hatoff | 2005 | Collocation ("CO") Submission Packet, FCC FORM 621 for 1000 & 1010 Heinz Street, Berkeley, California |
| S-36797 | Michael Brandman Associates | 2009 | Cultural Resources Records Search and Site Visit Result for T-Mobile West Corporation a Delaware Corporation Candidate BA12025A (Nunes Building), 2310 4th Street, Berkeley, Alameda County, California |
| S-36798 | Michael Brandman Associates | 2009 | Direct APE Historic Architectural Assessment for T-Mobile West Corporation a Delaware Corporation Candidate BA12025A (Nunes Building), 2310 4th Street, Berkeley, Alameda County, California |
| S-37296 | Archaeological Resources Technology | 2010 | Cultural Resources Investigation for Clearwire #CA-SFO0110A: 100 Heinz Avenue, Berkley, Alameda County, California |
| S-38251 | Meyer | 2011 | Buried Archaeological Site Assessment and Extended Phase I Subsurface Explorations for the I-80 Integrated Corridor Mobility Project, Caltrans District 04, Alameda and Contra Costa Counties, California |
| S-39697 | Michael Brandman Associates | 2012 | Cultural Resources Records Search and Site visit Results fro Sprint Nextel Candidate FN03XCO16-A (Berkeley Business Center), 1099 Ashby Avenue, Berkeley, Alameda County, California |
| S-40653 | Michael Brandman Associates | 2012 | Direct APE Historic Architectural Assessment for T-Mobile West, LLC Candidate BA02015A (PL015 Ashby), 2850 7th Street, Berkeley, Alameda County, California |
| S-43360 | Michael Brandman Associates | 2013 | Cultural Resources Records Search and Site Visit Result for T-Mobile West, LCC Candidate BA12025A (Nunes Bldg), 2310 4th Street, Berkeley, Alameda County, California |

## Native American Consultation

On June 10, 2014, WSA archaeologist Ellis Powelson submitted an electronic Sacred Lands File Search Request to the Native American Heritage Commission (NAHC) in Sacramento, to request information on known Native American traditional or cultural properties within the project area, and to request a listing of individuals or groups with cultural affiliation to the project area (Appendix B). As of July 10, 2014, WSA had not received a response to that request, and as a result, submitted a second request after speaking with an NAHC staff person via telephone.

NAHC staff member Ms. Debbie Pilas-Treadway replied on July 23, 2014, stating "a record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area." Included in the NAHC response were the names of ten interested Native American contacts, which are appended to this report. On July 23, 2014, WSA sent a letter to each of the individuals on the list requesting comments regarding any knowledge they might have pertaining to cultural resources or sacred sites within the immediate vicinity of the Project parcel. To date, no responses have been received. Follow-up calls to the Native American contacts listed in the letter are planned for August 6th, after the contacts have had a chance to review the letter. WSA will forward any responses or comments to Urban Planning Partners as an addendum to this letter report.

## Archaeological Sensitivity of the South Properties Project Site

Colin J. Busby, Principal of Basin Research Associates, conducted an archaeological resources assessment for the Bayer South Properties in which he asserted that the "the archival data suggest a very low to low potential for significant subsurface archaeological resources within or adjacent to the Bayer South Properties" (2000:6). This recommendation was based on his conclusion that ALA-390, the nearest prehistoric archaeological site to the project area,[1] likely represents "transported fill from another archaeological resource used as a soil amendment" (Busby 2000:6). This statement is supported by the lack of documentation of a site in this location by Nels Nelson, 70 years before Peter Banks first recorded the deposit as a site. In addition, University of California archaeologists Robert F. Heizer and Albert Elsasser conducted site visits in the 1970s wherein they concluded that the shell remnants and artifacts recovered by residents of Alston Way represented imported midden rather than an *in-situ* occupation site (Busby 2000:3).

While ALA-390 likely consists of shell midden that has been transported from off-site, other intact prehistoric shellmounds are located within a mile of the Bayer South Property. In addition, the project area is located in close proximity to the Bay shore and active drainage channels.

[1] Located 30m north of the northern edge of the project area

Prehistoric archaeological deposits, should they be located within the South Property project area, may be buried by alluvial soils.

As a result, WSA recommends that there is a moderate potential for encountering potentially significant cultural resources within the footprint of the proposed Quality Control Facility. As discussed with the project proponent during a June 17, 2014 site visit, WSA recommends that a qualified archaeologist be present during upcoming geotechnical or environmental coring that will precede construction of the proposed Bayer Manufacturing Quality Control Testing Facility. The archaeologist will visually inspect and log the soils that underlie the project area as the cores are retrieved and will be able to quickly determine if cultural material such as prehistoric shell midden is present and will be disturbed as a result of proposed construction.

## Description of Buildings 28 and 28A

The current project proposes to demolish Building 28, 28A, and 50. While the buildings' general condition was recorded as part of the inventory done for the Berkeley Site Long Range Plan (R. Cole, 1988, excerpt provided by Aaron Sage, Senior Planner, City of Berkeley) consultation with the City of Berkeley revealed no documentation of these buildings relevant to CEQA associated with the 1991 Miles Inc./Cutter Biological Long Range Plan Environmental Impact Report or other relevant documents.

As such, it appears they have not been previously evaluated for their eligibility for listing on the California Register of Historical Resources (CRHR), nor has the City of Berkeley's Landmarks Preservation Commission reviewed their proposed demolition. The City of Berkeley's Landmarks Preservation Commission was, however, made aware of the plan to demolish two of the buildings (Building 28 and 50) through environmental review for the development agreement in 1991, and took no action to initiate them as landmarks. A physical description of each building is provided below and an evaluation of the buildings' CRHR eligibility follows.

Building 28A is a large (49,836 square foot), three-story, L-shaped building situated on the north edge of the Bayer Campus along the south side of Dwight Way (Photo 1, all photos in Appendix C). It was constructed in 1973 and is 41 years old.[2] It abuts Building 28, a small (3,440 square foot), single-story painted wood trailer that was constructed in 1967, six years prior to the construction of Building 28A. Buildings 28 and 28A are one of several quality control testing facilities on campus, and provide office and laboratory space used for raw materials testing, cell biology/virology, stability, standards and controls, and raw materials retains. The neighborhood to the north of the campus includes a mix of artisan, industrial, business, and residential uses.

[2] In an effort to determine the building's architect and/or builder, WSA staff reviewed the permits stored on microfiche on file at the City of Berkeley's Planning Department for the Bayer Property (designated 800 Dwight Way) on July 16, 2014. Permits for minor modifications to the building undertaken in the years since 1990 were identified, but the original building permit was not. It may no longer be on file with the City or may be stored under an alternate address.

The design of Building 28A reflects the Modern aesthetic popular in the 1970s (Photos 2-6). The building is made of masonry block and pre-cast concrete. Its flat concrete walls are accented with vertical concrete columns and it has a flat roof with no ledge at the roofline. The facade is accented by a tower made of masonry block that wraps around the southeast corner of the building. In addition to having an aesthetic component, the tower likely functions as a stair/elevator circulation core for the structure. The lower levels of the building have no windows, although a handful of small, square windows are evident on the upper floor of the south elevation. There is no ornamentation around window or door openings. The primary access to the building is on the east elevation and the entryway is covered with a green awning. Large rectangular vents are flush with the exterior walls and are located between vertical concrete columns. They likely provide climate and other controls for interior lab spaces. The building's expansive wall surfaces and somewhat severe appearance are likely a result of both aesthetics and the building's intended use. It appears that the architect drew from popular stylistic elements and, in addition, was designing a building intended to be used as functional, private laboratory space. Since it was constructed, Building 28A has been subject to minor interior modifications, but the exterior has not been altered.

Building 28 (refer to Photo 4) is a painted wood trailer (off-white with light blue trim). Openings once likely used for windows on the east elevation are now boarded over and painted green. The west and south sides of the building are not visible, as they about the much larger Building 28A. A blue security door on the east elevation appears to provide the primary access to the interior. The roof is flat and is dominated by the ventilation system used to ventilate the building's interior. Similarly, the east elevation is dominated by vents and electrical panels. The building is entirely functional and does not appear to have been designed with aesthetics in mind. Instead, it appears to provide mechanical support to laboratory testing and similar activities.

**Description of Building 50**

Building 50 is a 15,765 square foot, single-story, L-shaped building situated on the north edge of the Bayer Campus just east of Buildings 28/28A (Photos 7-12). The main body of the building was constructed in 1956 and is 58 years old. The rectangular portion of the building that forms the "L" at the east end was added in 1963. While the entire building is finished with plaster board, the original portion of the structure is wood frame construction and the addition is metal frame construction. Building 50 is one of several quality control testing facilities on campus, and provides office and laboratory space used for glass washing, impurity analysis, potency, protein, and characterization.

The low, horizontal building has a flat roof. Like similar laboratory buildings, the roof is dominated by ventilation and other systems that support the work being done inside. The

building's facade (south elevation) was designed with a series of repeating vertical metal windows. The upper portion of the windows appears fixed but the lower portion opens via a lever. The entry door is shaded with a blue awning. The tall vertical windows repeat on the east elevation, which is visible from Parking Lot J. The west end of the building (closest to Buildings 28/28A) has a set of recessed entry doors but the wall is unadorned and the vertical windows were not continued on this elevation. A ladder affixed to the west elevation provides rooftop access. The north elevation of the building has a wide roof overhang supported by oversized rafters and L-shaped brackets. Rectangular metal windows repeat along the north elevation, but are not as tall as those on the south and east elevations and appear to be fixed.

## Criteria for Evaluation

CEQA requires state and local public agencies to identify the environmental impacts of proposed discretionary activities or projects, determine if these impacts will be significant, and identify alternatives and mitigation measures that will substantially reduce or eliminate significant impacts to the environment.

Historical resources are considered part of the environment and a project that may cause a substantial adverse effect on the significance of a historical resource is a project that may have a significant effect on the environment. The definition of "historical resources" is contained in Section 21084.1 of the CEQA Statute as amended January 1, 2005.

For the purposes of CEQA, an “historic resource” is defined as any resource listed in, or eligible for listing in, the California Register of Historical Resources and is presumed to be historically or culturally significant. Further, resources that are listed in a local historic register or deemed significant in a historical resource survey as provided under Section 5024.1(g) are to be presumed historically or culturally significant unless “the preponderance of evidence” demonstrates they are not.

*California Register of Historical Resources*

The California Register program encourages public recognition and protection of resources of architectural, historical, archaeological and cultural significance, identifies historical resources for state and local planning purposes, determines eligibility for state historic preservation grant funding and affords certain protections under CEQA.

To be potentially eligible for individual listing on the CRHR, a structure must usually be more than 50 years old, must have historic significance, and must retain its physical integrity. Properties less than 50 years old, such as Buildings 28 and 28A, may be considered potentially eligible for listing on the CRHR if they are exceptionally significant or if enough time has passed for the property's significance to be understood. In terms of historic significance, the CRHR evaluates a resource based on the following four criteria:

- Criterion 1 (Event): Resources associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.

- Criterion 2 (Person): Resources associated with the lives of persons important to local, California or national history.

- Criterion 3 (Design/Construction): Resources that embody the distinctive characteristics of a type, period, region or method of construction, or that represent the work of a master or possess high artistic values.

- Criterion 4 (Information Potential): Resources that have yielded or have the potential to yield information important to the prehistory or history of the local area, California or the nation.

*Integrity*
According to the Office of Historic Preservation's Technical Assistance Series Bulletin #6:

> Integrity is the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Historical resources eligible for listing in the California Register must meet one of the criteria of significance described above and retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. It is possible that historical resources may not retain sufficient integrity to meet the criteria for listing in the National Register, but they may still be eligible for listing in the California Register [Office of Historic Preservation, Department of Parks and Recreation. California Register and National Register: A Comparison. Technical Assistance Series No. 6. (3.14.06)].

## Evaluation of Significance (Building 28A)

This section uses the historic context and physical description discussed above to evaluate Building 28A for historical significance, in particular its eligibility for listing in the CRHR.

### *Criterion 1 (Event)*
Criterion 1 applies to resources associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States. Building 28A was built in 1973, just a year before Bayer, a German chemicals company, acquired Cutter Laboratories and began to expand its presence at the current campus

location in Berkeley. In essence, Building 28A has been a Bayer building since the time of its construction. While Bayer Pharmaceuticals is certainly an important local business, and West Berkeley has traditionally been home to manufacturing and industrial land uses, Building 28A does not appear to be individually associated with specific events that made a significant contribution to the broad pattern of local or regional history. As a result, Building 28A is not recommended as potentially eligible to the CRHR under Criterion 1.

***Criterion 2 (Person)***

To be eligible for the CRHR under Criterion 2, the resource must be associated with the lives of persons important to local, California or national history. Research conducted to date indicates that while the building has been used as part of Bayer's bio-manufacturing and supply of protein therapeutic products, the building is not associated with the lives of persons important to local, California or national history. As such, Building 28A is not recommended as potentially eligible for the CRHR under Criterion 2.

***Criterion 3 (Design/Construction)***

Criterion 3 applies to resources that embody the distinctive characteristics of a type, period, region or method of construction, or that represent the work of a master or possess high artistic values. Building 28A reflects several elements of Modern design popular in the 1970s, including concrete walls with vertical accents and an unelaborated roofline, but it is not a distinctive example of a specific type (brutalism, formalism, etc.). It represents general trends as they were applied to a bio-manufacturing/laboratory facility, but does not represent the work of a master or possess high artistic values. As a result, Building 28A is not recommended as potentially eligible to the CRHR under Criterion 3.

***Criterion 4 (Information Potential)***

Archival research conducted within the scope of this architectural assessment provided no specific indication that Building 28A has the potential to yield exceptionally important information related to the state or nation's prehistory or history, and therefore is not recommended as potentially eligible under Criterion 4 (Criterion 4 is not typically applied to built resources and most often is applicable in the case of archaeological resources).

## Evaluation of Significance (Building 28)

This section uses the historic context and physical description discussed above to evaluate Building 28 for historical significance, in particular its eligibility for listing in the CRHR.

***Criterion 1 (Event)***

Criterion 1 applies to resources associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States. Building 28 was built in 1967, six years before Bayer, a German chemicals company, acquired Cutter Laboratories and began to expand its presence at the current campus location in Berkeley. While both Cutter was, and Bayer Pharmaceuticals continues to be an important local business, Building 28 does not appear to be associated with events that made a significant contribution to the broad pattern of local or regional history. As a result, Building 28 is not recommended as potentially eligible to the CRHR under Criterion 1.

***Criterion 2 (Person)***

To be eligible for the CRHR under Criterion 2, the resource must be associated with the lives of persons important to local, California or national history. Research conducted to date indicates that while the building may have been used short-term by Cutter Laboratories and has been used as part of Bayer's bio-manufacturing and supply of protein therapeutic products, the building is not associated with the lives of persons important to local, California or national history. As such, Building 28 is not recommended as potentially eligible for the CRHR under Criterion 2.

***Criterion 3 (Design/Construction)***

Criterion 3 applies to resources that embody the distinctive characteristics of a type, period, region or method of construction, or that represent the work of a master or possess high artistic values. Building 28 is a small, functional trailer and does not represent the work of a master or possess high artistic values, nor does it embody the distinctive characteristics of a type, period, region or method of construction. As a result, Building 28 is not recommended as potentially eligible to the CRHR under Criterion 3.

***Criterion 4 (Information Potential)***

Archival research conducted within the scope of this architectural assessment provided no specific indication that Building 28 has the potential to yield exceptionally important information related to the state or nation's prehistory or history, and therefore is not recommended as potentially eligible under Criterion 4 (Criterion 4 is not typically applied to built resources and most often is applicable in the case of archaeological resources).

## Evaluation of Significance (Building 50)

This section uses the historic context and physical description discussed above to evaluate Building 50 for historical significance, in particular its eligibility for listing in the CRHR.

***Criterion 1 (Event)***

Criterion 1 applies to resources associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States. Building 50 was built 18 years before Bayer, a German chemicals company, acquired Cutter Laboratories and began to expand its presence at the current campus location in Berkeley. While both Cutter was, and Bayer Pharmaceuticals continues to be an important local business, Building 50 does not appear to be associated with events that made a significant contribution to the broad pattern of local or regional history. As a result, Building 50 is not recommended as potentially eligible to the CRHR under Criterion 1.

***Criterion 2 (Person)***

To be eligible for the CRHR under Criterion 2, the resource must be associated with the lives of persons important to local, California or national history. Research conducted to date indicates that while the building was likely used by Cutter Laboratories and has been part of Bayer's bio-manufacturing and supply of protein therapeutic products, the building is not associated with the lives of persons important to local, California or national history. As such, Building 50 is not recommended as potentially eligible for the CRHR under Criterion 2.

***Criterion 3 (Design/Construction)***

Criterion 3 applies to resources that embody the distinctive characteristics of a type, period, region or method of construction, or that represent the work of a master or possess high artistic values. Building 50, while primarily a functional office/laboratory space, does contain some aesthetic elements such as repeating vertical windows and an exaggerated roof overhang on the north elevation, although it is not a distinctive example of a specific type, period, region or method of construction. It does not represent the work of a master or possess high artistic values. As a result, Building 50 is not recommended as potentially eligible to the CRHR under Criterion 3.

***Criterion 4 (Information Potential)***

Archival research conducted within the scope of this architectural assessment provided no specific indication that Building 50 has the potential to yield exceptionally important information related to the state or nation's prehistory or history, and therefore is not recommended as potentially eligible under Criterion 4 (Criterion 4 is not typically applied to built resources and most often is applicable in the case of archaeological resources).

***Integrity***

CRHR evaluation is generally a two-step process. A resource may be considered individually eligible for listing in the CRHR if it meets one or more of the above listed criteria for significance, and if it possesses historic integrity. Historic properties must retain sufficient historic integrity to convey their significance. The CRHR recognizes seven aspects or qualities that define historic integrity (location, design, setting, materials, workmanship, feeling, and

association). Because Buildings 28, 28A, and 50 do not meet any of the four criteria for significance, a detailed discussion of the properties' integrity is not warranted. Buildings 28, 28A, and 50 have been recorded on the appropriate DPR 523 forms (Appendix D).

Thank you for the opportunity to provide this analysis of archaeological sensitivity and historic resource evaluation. Please let me know if you have any questions on the results or need anything further.

Sincerely yours,
**WILLIAM SELF ASSOCIATES, INC.**

James M. Allan, Ph.D., RPA
Vice-President, Principal

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URS Corporation

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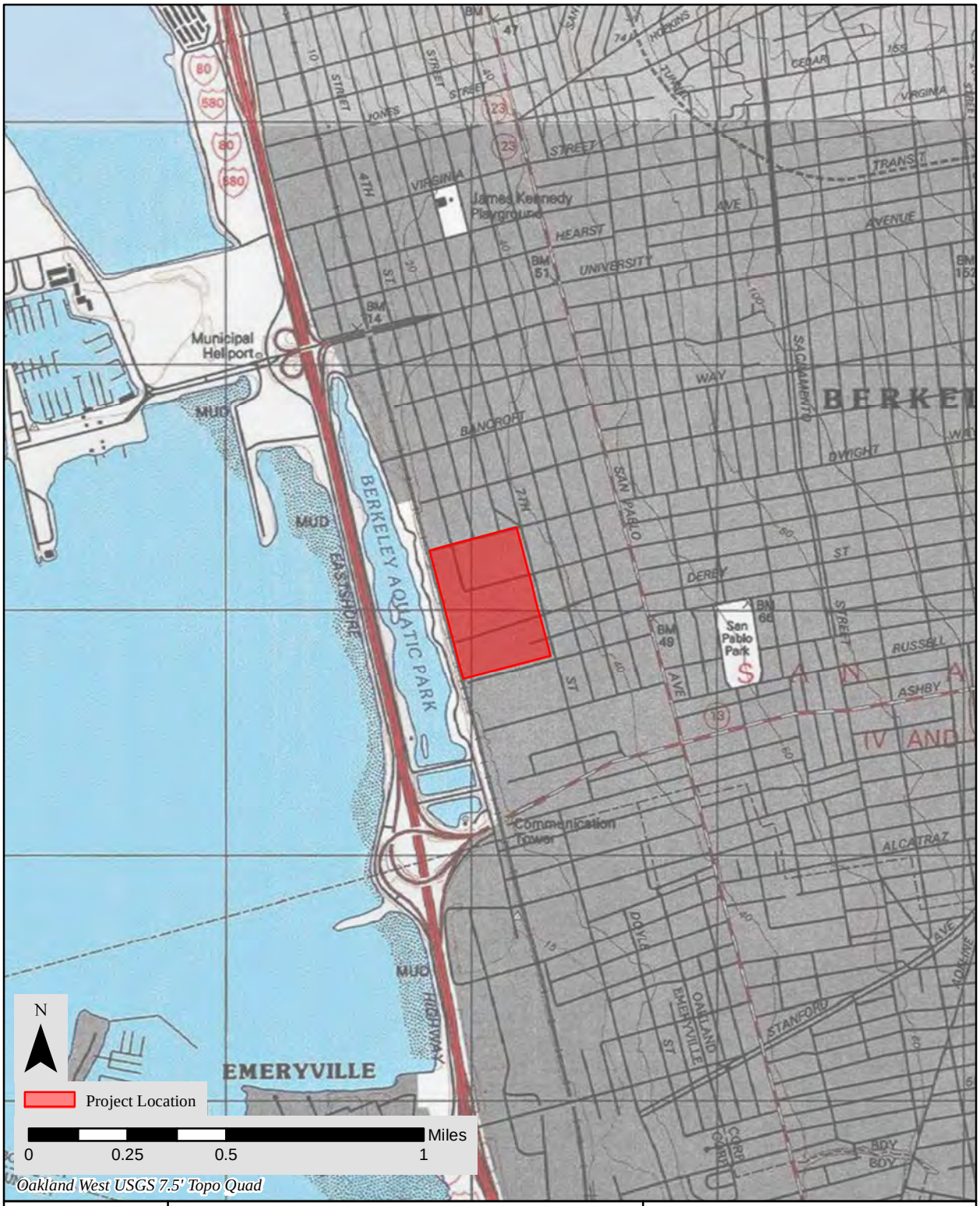
# Appendix A

## Figures

Figure 1: Project Vicinity Map
Figure 2: Project Area Map
Figure 3: Project Location Map


| | | |
|---|---|---|
| WSA | Project Vicinity Map | Figure 1<br>Urban Planning Partners<br>Bayer HealthCare<br>Berkeley, CA |


| | | |
|---|---|---|
| WSA | Project Area Map | Figure 2<br>Urban Planning Partners<br>Bayer HealthCare<br>Berkeley, CA |




WSA

Project Location Map

Figure 3
Urban Planning Partners
Bayer HealthCare
Berkeley, CA

# Appendix B

## Native American Heritage Commission Correspondence

# Additional Information

California Native Americans
Cultural Resources
Strategic Plan
Commissioners
Federal Laws and Codes
State Laws and Codes
Local Ordinances and Codes
Additional Information
Return to CNAHC Home Page

## Sacred Lands File & Native American Contacts List Request

**NATIVE AMERICAN HERITAGE COMMISSION**
915 Capitol Mall, RM 364
Sacramento, CA 95814
(916) 653-4082
(916) 657-5390 – Fax
nahc@pacbell.net

*Information Below is Required for a Sacred Lands File Search*

Project: BAYER MANUFACTURING QUALITY CONTROL TESTING FACILITY PROJECT

County Alameda

USGS Quadrangle

Name Oakland East

Township 1S Range 4W Section(s) 10

Company/Firm/Agency:
William Self Associates, Inc.

Contact Person: Aimee Arrigoni

Street Address: 61d Avenida de Orinda

City: Orinda, CA Zip: 94563

Phone: (925) 253-9070

Fax: (925) 254-3553

Email: aarrigoni@williamself.com

Project Description:

William Self Associates has been contracted by Urban Planning to prepare a Cultural Resource Assessment in relation to construction of a ~80,000-square-foot Quality Control Testing Facility. The project site is 14.4 acres located between Grayson and Carleton Streets, west of Seventh Street in the City of Berkeley, Alameda County, CA. Thank you! - Ellis Powelson

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

**NATIVE AMERICAN HERITAGE COMMISSION**
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 - Fax

July 23, 2014

Aimee Arrigoni
William Self Associates, Inc.
61-d Avenida de Orinda
Orinda, CA 94563

VIA FAX: 925-254-3553
Number of Pages: 2

Re: Bayer Manufacturing Quality Control Testing Facility project, Alameda County

Dear Ms. Arrigoni:

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 373-3713.

Sincerely,

Debbie Pilas-Treadway
Environmental Specialist III

**Native American Contacts**
**Alameda County**
**July 23, 2014**

Jakki Kehl
720 North 2nd Street
Patterson , CA 95363
(209) 892-1060
Ohlone/Costanoan

Coastanoan Rumsen Carmel Tribe
Tony Cerda, Chairperson
240 E. 1st Street
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rumsen@aol.com
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canutes@verizon.net
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Northern Valley Yokuts
Bay Miwok

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Muwekma Ohlone Indian Tribe of the SF Bay Area
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Plains Miwok
Patwin

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Ramona Garibay, Representative
30940 Watkins Street
Union City , CA 94587
soaprootmo@comcast.net
(510) 972-0645
Ohlone/Costanoan
Bay Miwok
Plains Miwok
Patwin

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed PGE project: C-312 Span 257, Line 131 MP 39.45, Alameda County

# Sample Native American Heritage Commission Letter

July 28, 2014

Ms. Jakki Kehl
720 North 2nd Street
Patterson, CA 95363

*RE: Bayer Manufacturing Quality Control Testing Facility Project, Alameda County, California*

Dear Ms. Kehl,

WSA has been contracted by Urban Planning Partners to prepare a Cultural Resources Assessment Report for the Bayer Manufacturing Quality Control Testing Facility Project (project), located in the City of Berkeley and County of Alameda. The project involves the construction of an approximate 80,000 square-foot Quality Control Testing Facility, and the demolition of facilities that the Quality Control Testing Facility would replace and modernize. The project area encompasses 14.4 acres between Grayson and Carleton Streets, west of Seventh Street in the city of Berkeley, within Township 1 South, Range 4 West, Section 10 of the Oakland East 7.5' Topographic Map.

We would appreciate receiving any comments you may have regarding cultural resources or sacred sites issues within the immediate project area. If you could provide your comments in writing to the address below, or call me, we will make sure the comments are provided to our client as part of this project.

We would appreciate a response, at your earliest convenience, should you have information relative to this request. Should you have any questions, I can be reached at (925) 253-9070.

Thank you again for your assistance.

Sincerely,

James M Allan

James Allan, Ph.D., RPA
Principal

Attachment

P.O. Box 2192
61d Avenida de Orinda
Orinda CA 94563

**William Self Associates, Inc.**

Phone: 925-253-9070
Fax: 925-254-3553
Email:wself@williamself.com

# Appendix C

## Photographs


Photo 1. Buildings 28, 28A, and 50, along the north edge of the Bayer campus, just south of Dwight Way.


Photo 2. View north of Building 28A from Miles Way.


Photo 3. View northwest of Building 28A from Cutter Way.

Photo 4. View west with Building 28 in the foreground and 28A rising behind it.


Photo 5. View southwest of Building 28A from the intersection of 5th Street and Dwight Way.

Photo 6. View southeast of Building 28A from Dwight Way.

Photo 7. View northeast of Building 50 from Cutter Way.

Photo 8. View northwest of Building 50 from Cutter Way.


Photo 9. View northwest of Building 50 from the parking area southeast of the building (Lot J).

Photo 10. View southeast of Building 50 from the access area between Buildings 28/28A.


Photo 11. View southwest of Building 50 from 6th Street.

Photo 12. View east of Building 50 from the access area between Buildings 28/28A.

# Appendix D

## DPR 523 Form

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

# PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

 **Resource Name or #:** Building 28, 28A, & 50

**P1. Other Identifier:**
**P2. Location:** ☐ **Not for Publication** ☐ **Unrestricted**
**a. County:** Alameda
**b. USGS 7.5' Quad:** Oakland West **Date:** 1995 **T1S** ; **R4W** ; **Section 10**
c. Address: 800 Dwight Way City: Berkeley Zip: 94710
d. UTM: Zone: 10N; 37859445mE / -122296395mN (G.P.S.)

**P3a. Description:**

Buildings 28, 28A, 50 are used as laboratory and testing facilities for Bayer HealthCare Pharmaceuticals. These structures were built between 1956 and 1973. They are located on the north edge of the 14.4 acre Bayer Campus and the project proponent proposes to demolish them as part of the ongoing effort to modernize laboratory facilities on the Bayer Campus. The structures are are bounded by Dwight Way to the north, Cutter Way to the south, Building 53 to the west, and Seventh Street to the east.

Building 28A is a large (49,836 square foot), three-story, L-shaped building situated on the north edge of the Bayer Campus along the south side of Dwight Way (Photo 1-5). It was constructed in 1973 and is 41 years old.[1] It abuts Building 28, a small (3,440 square foot), single-story painted wood trailer that was constructed in 1967, six years prior to the construction of Building 28A (see Continuation Sheet).

**P3b. Resource Attributes:** HP8. Industrial Buildings

**P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)


**P5b**. Description of Photo:
Building 28A with Building 28 on the right side of the photograph looking northwest from Cutter Way taken on June 19, 2014.

**P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both

**P7. Owner and Address:**
Bayer HealthCare Pharmaceuticals
800 Dwight Way
Berkeley, California 94710

**P8. Recorded by:**
Aimee Arrigoni, M.A.
William Self Associates, Inc.
61D Avenida de Orinda
Orinda, CA 94563

**P9. Date Recorded:** June 25, 2014

**P10. Survey Type:**
Historic Structure Recordation

**P11. Report Citation:** Arrigoni, Aimee and James Allan, 2014, Historic Resources Evaluation of Buildings 28, 28A, and 50 and Archaeological Sensitivity Assessment for the Bayer Manufacturing Quality Control Testing Facility, South Properties, West Berkeley, Alameda County, CA

**Attachments:** ☐None ☒Location Map ☐Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record
☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record
☐Artifact Record ☒Photograph Record ☐ Other (List):

[1] In an effort to determine the building's architect and/or builder, WSA staff reviewed the permits stored on microfiche on file at the City of Berkeley's Planning Department for the Bayer Property (designated 800 Dwight Way) on July 16, 2014. Permits for minor modifications to the building undertaken in the years since 1990 were identified, but the original building permit was not. It may no longer be on file with the City or may be stored under an alternate address.

**State of California - The Resources Agency** **Primary #** _____

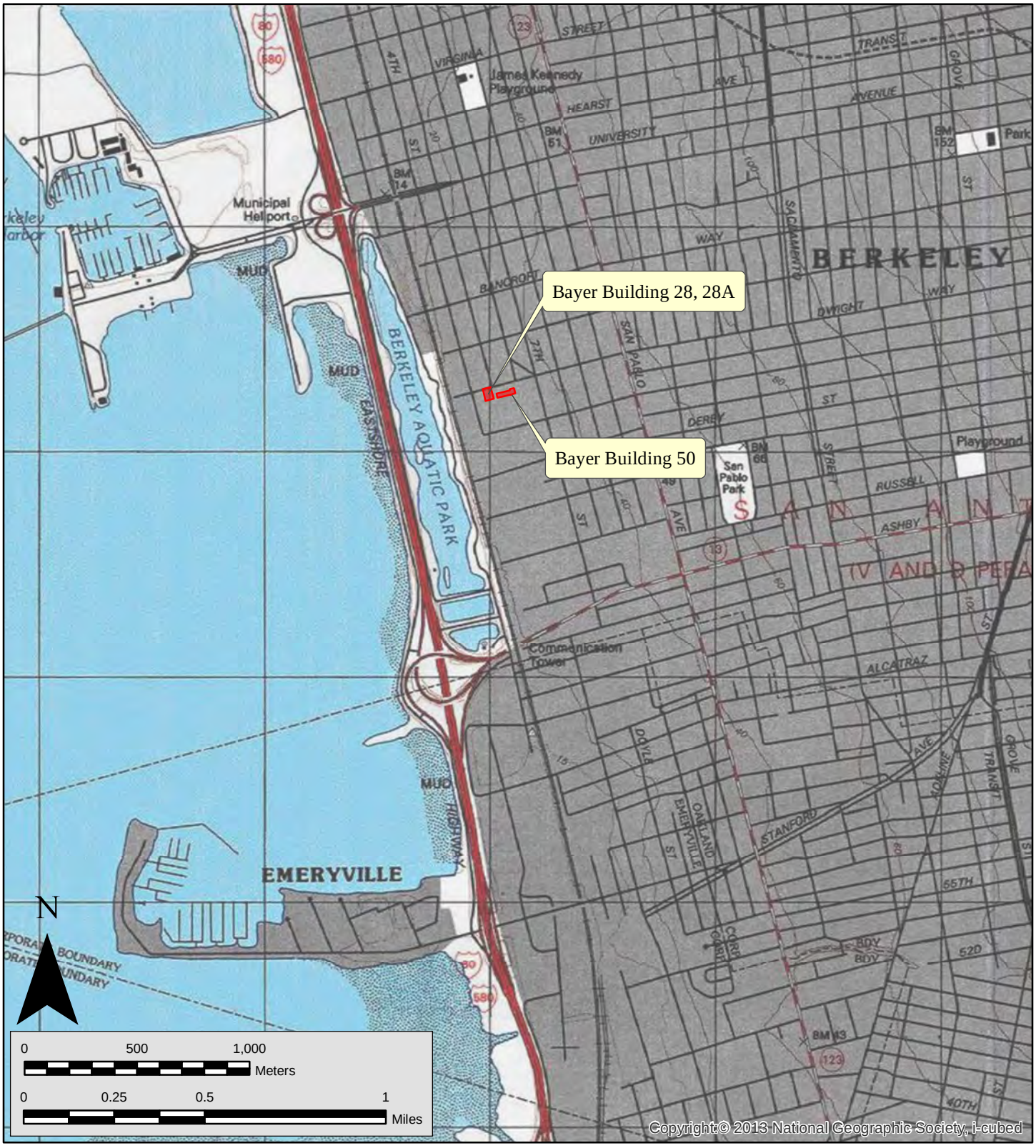
**DEPARTMENT OF PARKS AND RECREATION** **HRI #** _____

**LOCATION MAP** **Trinomial:**



Resource Name or # (Assigned by Recorder) Bayer Building 28A

*Map Name: Oakland West *Scale: 1:24000 *Date of MAP: 1995






*Required Information

[Continuation of P3a] Buildings 28 and 28A are one of several quality control testing facilities on campus, and provide office and laboratory space used for raw materials testing, cell biology/virology, stability, standards and controls, and raw materials retains. The neighborhood to the north of the campus includes a mix of artisan, industrial, business, and residential uses.

The design of Building 28A reflects the Modern aesthetic popular in the 1970s (Photos 1-5). The building is made of masonry block and pre-cast concrete. Its flat concrete walls are accented with vertical concrete columns and it has a flat roof with no ledge at the roofline. The facade is accented by a tower made of masonry block that wraps around the southeast corner of the building. In addition to having an aesthetic component, the tower likely functions as a stair/elevator circulation core for the structure. The lower levels of the building have no windows, although a handful of small, square windows are evident on the upper floor of the south elevation. There is no ornamentation around window or door openings. The primary access to the building is on the east elevation and the entryway is covered with a green awning. Large rectangular vents are flush with the exterior walls and are located between vertical concrete columns. They likely provide climate and other controls for interior lab spaces. The building's expansive wall surfaces and somewhat severe appearance are likely a result of both aesthetics and the building's intended use. It appears that the architect drew from popular stylistic elements and, in addition, was designing a building intended to be used as functional, private laboratory space. Since it was constructed, Building 28A has been subject to minor interior modifications, but the exterior has not been altered.

Building 28 (refer to Photo 2) is a painted wood trailer (off-white with light blue trim). Openings once likely used for windows on the east elevation are now boarded over and painted green. The west and south sides of the building are not visible, as they abut the much larger Building 28A. A blue security door on the east elevation appears to provide the primary access to the interior. The roof is flat and is dominated by the ventilation system used to ventilate the building's interior. Similarly, the east elevation is dominated by vents and electrical panels. The building is entirely functional and does not appear to have been designed with aesthetics in mind. Instead, it appears to provide mechanical support to laboratory testing and similar activities.

Building 50 is a 15,765 square foot, single-story, L-shaped building situated on the north edge of the Bayer Campus just east of Buildings 28/28A (Photos 6-11). The main body of the building was constructed in 1956 and is 58 years old. The rectangular portion of the building that forms the "L" at the east end was added in 1963. While the entire building is finished with plaster board, the original portion of the structure is wood frame construction and the addition is metal frame construction. Building 50 is one of several quality control testing facilities on campus, and provides office and laboratory space used for glass washing, impurity analysis, potency, protein, and characterization.

The low, horizontal building has a flat roof. Like similar laboratory buildings, the roof is dominated by ventilation and other systems that support the work being done inside. The building's facade (south elevation) was designed with a series of repeating vertical metal windows. The upper portion of the windows appears fixed but the lower portion opens via a lever. The entry door is shaded with a blue awning. The tall vertical windows repeat on the east elevation, which is visible from Parking Lot J. The west end of the building (closest to Buildings 28/28A) has a set of recessed entry doors but the wall is unadorned and the vertical windows were not continued on this elevation. A ladder affixed to the west elevation provides rooftop access. The north elevation of the building has a wide roof overhang supported by oversized rafters and L-shaped brackets. Rectangular metal windows repeat along the north elevation, but are not as tall as those on the south and east elevations and appear to be fixed.

**SITE SPECIFIC HISTORY**

West Berkeley, originally known as the settlement of Ocean View, developed along a distinct economic and cultural trajectory from East Berkeley, which was clustered around the University of California two miles away. West Berkeley came to be defined by its commercial orientation toward the Bay, railroads, and working-class industries. This Bay-ward gaze created a unique mixture of varied industries and mixed-class residential neighborhoods. The residents of West Berkeley in the 1850s came from a variety of cultural and socio-economic backgrounds, from the

owners of the new businesses and industrial operations, to the Irish immigrants seeking work at farms or as day laborers, to the mixture of Chinese, German, and Irish immigrants who arrived after a railroad stop for the transcontinental railroad was built in 1878.

The industrial and commercial nature of West Berkeley's economy dates back to its founding. First settled by Euro Americans in 1853, Ocean View's first industrial operation, the Pioneer Starch and Grist Mill, opened in 1855. The mill and was soon joined by the Zimri Brewer and Heywood Lumberyard (Hill 2003). The early town consisted of a wharf off the foot of Delaware Street, small farms extending east, as well as an inn, grocery store, church, and school (City of Berkeley). While industrial concerns, such as a lumberyard and gristmill, were present, the cultivation of nearby farms occupied many of the residents up until the early 1870s. Industry came to truly define West Berkeley between 1873 and 1878, when this area became home to the Standard Soap Works, Cornell Watch Company, the Wentworth Shoe Company, the California Ink Company, and the Griffin Glove and Tannery Company (Hill 2003). By that time, residents that worked in the nearby factories largely inhabited the town.

The economy and culture of West Berkeley was profoundly impacted by two events in 1878. That year, the transcontinental railroad built a station at the intersection of Third and Delaware streets. Also in 1878, to avoid annexation by Oakland, the Town of Berkeley was officially incorporated, combining the Bayside manufacturing settlement of Ocean View, which is now West Berkeley, with the small academic area of the University of California. Following these developments, services such as streetlights, telephones, and electricity came to West Berkeley. In addition to this, more industries were established. By 1885, these included the "Niehaus Planing Mill, the Standard Soap Company, a cement works, a mine reduction works, a lubricating oil and kerosene works, gunpowder factory, paraffin paint works, [and] a large lumber yard with a pier and rail spur" (Hill 2003).

The pharmaceutical industry was also established in West Berkeley at the turn-of-the-century, when Edward Cutter started Cutter Laboratories in 1897, moving to its 700-730 Parker Street location in 1903 (Cutter et al. 1975; Bayer Healthcare 2014). Cutter Laboratories would become a major developer and manufacturer of vaccines such as an anthrax vaccine and a polio vaccine. German-based Bayer purchased Cutter in 1974 and has since expanded its facilities in West Berkeley, which now include a 43-acre campus that manufactures protein therapeutics for people living with hemophilia (Bayer Healthcare 2014).

Despite the incorporation of the Town of Berkeley, West Berkeley retained a distinct character, focused on Bay-side industry and commerce. Transportation within West Berkeley illustrates this well. In addition to the north-south (in the immediate area) trajectory of the transcontinental railroad, by 1878 a horse-drawn stage line connected West Berkeley with Oakland and Emeryville in the south (Hill 2003). The 1891 opening of a trolley line along San Pablo Avenue allowed for an influx of supplies and commodities, and more people began inhabiting the town (City of Berkeley). While another trolley opened that year running east-west along University Avenue, this was never as important as the north-south routes (City of Berkeley). By 1900, houses began replacing farms, and approximately 15,000 people lived in Berkeley, a marked increase from the 12 individuals who were recorded in the census during the time of Domingo Peralta. Working class immigrants from Finland, Scandinavia, and Germany occupied the area.

After 1906, Berkeley became one of the largest cities in California, mostly as a result of an influx of 20,000 San Francisco earthquake refugees. The construction of the Key System of ferryboats and streetcars made transportation between Oakland, Berkeley and San Francisco quick and affordable and spurred the development of residential tracts in Berkeley. This, in turn, spurred intensive commercial development in downtown Berkeley. As a result, downtown Berkeley developed into a substantial urban district with numerous large, masonry buildings and impressive public facilities. The new buildings included a new City Hall, public library, train station, and high school (Ferrier 1933:101).

The population of Berkeley continued to grow throughout the 20th century. In 1909 the Census of Manufactures listed 84 factories that increased to 173 factories by 1929, many of which were built along the railway line and the waterfront of West Berkeley. Beginning in the 1920s, complicated zoning regulations within Berkeley created a "haphazard mixture of cross-class, mixed-use buildings concentrated in a small urban area" (Hill 2003:6). Workers at the many factories often settled in close proximity to their workplaces.

Damaging the character of West Berkeley, a five-square-block area was designated for disposal of solid waste in 1923, no doubt reinforcing the trend of wealthier citizens moving eastward toward the Berkeley Hills (Hill 2003).

The Great Depression caused some economic slowdown to the industry in West Berkeley and the Berkeley Aquatic Park and Eastshore Freeway were created as stimulus projects during this time (City of Berkeley). In 1940, more Italian and Mexican-born immigrants joined the largely Northern European community (1940 Federal Census). The economic boom associated with World War II created an industrial base along the shorefront that extends today from East Oakland to Richmond. The war and establishment of Camp Ashby, a training site for African-American soldiers, also shifted the demographics in West Berkley from 2% African-American in 1940 to 30% African-American in 1950 (City of Berkeley). Manufacturing in the area continued to grow until the 1970s, when residential development increased and West Berkley was re-zoned for mixed-used.

What began as a small industrial and agricultural enclave in the late-1850s, became a complicated mixture of industrial, residential, and retail zones which were the subject of the West Berkeley Master Plan in 1993. The preservation of the unique working-class, mixed-use quality of the area was at the forefront of this master plan as were the wide range of site types and buildings that underwrote the neighborhood's rich history.

**CRITERIA FOR EVALUATION**

CEQA requires state and local public agencies to identify the environmental impacts of proposed discretionary activities or projects, determine if these impacts will be significant, and identify alternatives and mitigation measures that will substantially reduce or eliminate significant impacts to the environment.

Historical resources are considered part of the environment and a project that may cause a substantial adverse effect on the significance of a historical resource is a project that may have a significant effect on the environment. The definition of "historical resources" is contained in Section 21084.1 of the CEQA Statute as amended January 1, 2005.

For the purposes of CEQA, an "historic resource" is defined as any resource listed in, or eligible for listing in, the California Register of Historical Resources and is presumed to be historically or culturally significant. Further, resources that are listed in a local historic register or deemed significant in a historical resource survey as provided under Section 5024.1(g) are to be presumed historically or culturally significant unless "the preponderance of evidence" demonstrates they are not.

**CALIFORNIA REGISTER OF HISTORICAL RESOURCES**

The California Register program encourages public recognition and protection of resources of architectural, historical, archeological and cultural significance, identifies historical resources for state and local planning purposes, determines eligibility for state historic preservation grant funding and affords certain protections under the California Environmental Quality Act. To be potentially eligible for individual listing on the CRHR, a structure must usually be more than 50 years old, must have historic significance, and must retain its physical integrity. Properties less than 50 years old, such as Buildings 28 and 28A, may be considered potentially eligible for listing on the CRHR if they are exceptionally significant or if enough time has passed for the property's significance to be understood. In terms of historic significance, the CRHR evaluates a resource based on the following four criteria:

**Criterion 1 (Event)**: Resources associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.

**Criterion 2 (Person)**: Resources associated with the lives of persons important to local, California or national history.

**Criterion 3 (Design/Construction)**: Resources that embody the distinctive characteristics of a type, period, region or method of construction, or that represent the work of a master or possess high artistic values.

**Criterion 4 (Information Potential)**: Resources that have yielded or have the potential to yield information important to the prehistory or history of the local area, California or the nation.

**INTEGRITY**

According to the Office of Historic Preservation's Technical Assistance Series Bulletin #6: "Integrity is the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Historical resources eligible for listing in the California Register must meet one of the criteria of significance described above and retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. It is possible that historical resources may not retain sufficient integrity to meet the criteria for listing in the National Register, but they may still be eligible for listing in the California Register [Office of Historic Preservation, Department of Parks and Recreation. California Register and National Register: A Comparison. Technical Assistance Series No. 6. (3.14.06)]."

**EVALUATION OF SIGNIFICANCE**

This section uses the historic context and physical description discussed above to evaluate Building 28, 28A, and 50 for historical significance, in particular its eligibility for listing in the CRHR.

***BUILDING 28A***

**Criterion 1 (Event)**

Criterion 1 applies to resources associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States. Building 28A was built just a year before Bayer, a German chemicals company, acquired Cutter Laboratories and began to expand its presence at the current campus location in Berkeley. In essence, Building 28A has been a Bayer building since the time of its construction.

While Bayer Pharmaceuticals is certainly an important local business, and west Berkeley has traditionally been home to manufacturing and industrial land uses, Building 28A does not appear to be associated with events that made a significant contribution to the broad pattern of local or regional history. As a result, Building 28A is not recommended as potentially eligible to the CRHR under Criterion 1.

**Criterion 2 (Person)**

To be eligible for the CRHR under Criterion 2, the resource must be associated with the lives of persons important to local, California or national history. Research conducted to date indicates that while the building has been used as part of Bayer's bio-manufacturing and supply of protein therapeutic products, the building is not associated with the lives of persons important to local, California or national history. As such, Building 28A is not recommended as potentially eligible for the CRHR under Criterion 2.

**Criterion 3 (Design/Construction)**

Criterion 3 applies to resources that embody the distinctive characteristics of a type, period, region or method of construction, or that represent the work of a master or possess high artistic values. Building 28A reflects several elements of Modern design popular in the 1970s, including concrete walls with vertical accents and an unelaborated roofline, but it is not a distinctive example of a specific type (brutalism, formalism, etc.). It represents general trends as they were applied to a bio-manufacturing/laboratory facility, but does not represent the work of a master or possess high artistic values. As a result, Building 28A is not recommended as potentially eligible to the CRHR under Criterion 3.

**Criterion 4 (Information Potential)**

Archival research conducted within the scope of this architectural assessment provided no specific indication that Building 28A has the potential to yield exceptionally important information related to the state or nation's prehistory or history, and therefore is not recommended as potentially eligible under Criterion 4 (Criterion 4 is not typically applied to built resources and most often is applicable in the case of archaeological resources).

*BUILDING 28*

**Criterion 1 (Event)**

Criterion 1 applies to resources associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States. Building 28 was built in 1967, six years before Bayer, a German chemicals company, acquired Cutter Laboratories and began to expand its presence at the current campus location in Berkeley. While both Cutter was, and Bayer Pharmaceuticals continues to be an important local business, Building 28 does not appear to be associated with events that made a significant contribution to the broad pattern of local or regional history. As a result, Building 28 is not recommended as potentially eligible to the CRHR under Criterion 1.

**Criterion 2 (Person)**

To be eligible for the CRHR under Criterion 2, the resource must be associated with the lives of persons important to local, California or national history. Research conducted to date indicates that while the building may have been used short-term by Cutter Laboratories and has been used as part of Bayer's bio-manufacturing and supply of protein therapeutic products, the building is not associated with the lives of persons important to local, California or national history. As such, Building 28 is not recommended as potentially eligible for the CRHR under Criterion 2.

**Criterion 3 (Design/Construction)**

Criterion 3 applies to resources that embody the distinctive characteristics of a type, period, region or method of construction, or that represent the work of a master or possess high artistic values. Building 28 is a small, functional trailer and does not represent the work of a master or possess high artistic values, nor does it embody the distinctive characteristics of a type, period, region or method of construction. As a result, Building 28 is not recommended as potentially eligible to the CRHR under Criterion 3.

**Criterion 4 (Information Potential)**

Archival research conducted within the scope of this architectural assessment provided no specific indication that Building 28 has the potential to yield exceptionally important information related to the state or nation's prehistory or history, and therefore is not recommended as potentially eligible under Criterion 4 (Criterion 4 is not typically applied to built resources and most often is applicable in the case of archaeological resources).

*BUILDING 50*

**Criterion 1 (Event)**

Criterion 1 applies to resources associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States. Building 50 was built 18 years before Bayer, a German chemicals company, acquired Cutter Laboratories and began to expand its presence at the current campus location in Berkeley. While both Cutter was, and Bayer Pharmaceuticals continues to be an important local business, Building 50 does not appear to be associated with events that made a significant contribution to the broad pattern of local or regional history. As a result, Building 50 is not recommended as potentially eligible to the CRHR under Criterion 1.

**Criterion 2 (Person)**

To be eligible for the CRHR under Criterion 2, the resource must be associated with the lives of persons important to local, California or national history. Research conducted to date indicates that while the building was likely used by Cutter Laboratories and has been part of Bayer's bio-manufacturing and supply of protein therapeutic products, the building is not associated with the lives of persons important to local, California or national history. As such, Building 50 is not recommended as potentially eligible for the CRHR under Criterion 2.

**Criterion 3 (Design/Construction)**

Criterion 3 applies to resources that embody the distinctive characteristics of a type, period, region or method of construction, or that represent the work of a master or possess high artistic values. Building 50, while primarily a functional office/laboratory space, does contain some aesthetic elements such as repeating vertical windows and an exaggerated roof overhang on the north elevation, although it is not a distinctive example of a specific type, period, region or method of construction. It does not represent the work of a master or possess high artistic values. As a result, Building 50 is not recommended as potentially eligible to the CRHR under Criterion 3.

**Criterion 4 (Information Potential)**

Archival research conducted within the scope of this architectural assessment provided no specific indication that Building 50 has the potential to yield exceptionally important information related to the state or nation's prehistory or history, and therefore is not recommended as potentially eligible under Criterion 4 (Criterion 4 is not typically applied to built resources and most often is applicable in the case of archaeological resources).

**INTEGRITY**

CRHR evaluation is generally a two-step process. A resource may be considered individually eligible for listing in the CRHR if it meets one or more of the above listed criteria for significance, and if it possesses historic integrity. Historic properties must retain sufficient historic integrity to convey their significance. The CRHR recognizes seven aspects or qualities that define historic integrity (location, design, setting, materials, workmanship, feeling, and association). Because Buildings 28, 28A, and 50 do not meet any of the four criteria for significance, a detailed discussion of the properties' integrity is not warranted.

**PHOTOGRAPH RECORD**


**Photo 1: Building 28A looking north from Miles Way.**

**Photo 2: Building 28A looking west from open area with Building 28 in the foreground.**

**Photo 3: Building 28A looking west from Dwight Way.**


**Photo 4: Building 28A looking southwest from Fifth Street.**

**Photo 5: Building 28A looking southeast from Dwight Way.**

**Photo 6: Building 50 looking northeast from Cutter Way.**

**Photo 7: Building 50 looking northwest from Cutter Way.**


**Photo 8: Building 50 looking west from parking lot adjacent to Seventh Street.**


**Photo 9: Building 50 looking southwest from parking lot adjacent to Seventh Street.**

**Photo 10: Building 50 looking southeast from Building 28.**

**Photo 11: Building 50 looking east from Building 28.**

**REFERENCES CITED:**

Bayer Healthcare
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B1. Historic Name:
B2. Common Name: Building 28A
B3. Original Use: Industrial
B4. Present Use: Industrial
**B5. Architectural Style:** Modern
**B6. Construction History:** The structure was constructed in 1973.
**B7. Moved?** ☒No ☐Yes ☐Unknown
**B8. Related Features:** None
B9a. Architect: Unknown
b. Builder: Unknown
**B10. Theme:** Industrial Architecture, Modern aesthetic
**Area:** West Berkeley
**Period of Significance:** 1973
**Property Type:** Industrial

Building 28A is a large (49,836 square foot), 3-story, L-shaped building situated on the north edge of the Bayer Campus along the south side of Dwight Way. Building 28A was constructed in 1973 and is 41 years old. Building 28A was built just a year before Bayer, a German chemicals company, acquired Cutter Laboratories and began to expand its presence at the current campus location in Berkeley. In essence, Building 28A has been a Bayer building since the time of its construction. It abuts Building 28, a small (3,440 square foot), single-story building that was constructed six years prior to Building 28A, in 1967. Building 28A is one of several quality control testing facilities on campus, and provides office and laboratory space used for raw materials testing, cell biology/virology, stability, standards and controls, and raw materials retains.

Building 28A reflects several elements of the Modern aesthetic popular in the 1970s, including concrete walls with vertical accents and an unelaborated roofline, but it is not a distinctive example of a specific type (brutalism, formalism, etc.). It represents general trends as they were applied to a bio-manufacturing/laboratory facility, but does not represent the work of a master or possess high artistic values. The facade is accented by a tower made of masonry block that wraps around the southeast corner of the building. In addition to having an aesthetic component, the tower likely functions as a stair/elevator circulation core for the structure.

The lower levels of the building have no windows, although a handful of small, square windows are evident on the upper floor of the south elevation. There is no ornamentation around window or door openings. The primary access to the building is on the east elevation and the entryway is covered with a green awning. Large rectangular vents are flush with the exterior walls and are located between vertical concrete columns. They likely provide climate and other controls for interior lab spaces. The building's expansive wall surfaces and somewhat severe appearance are likely a result of both aesthetics and the building's intended use. It appears that the architect drew from popular stylistic elements and, in addition, was designing a building intended to be used as functional, private laboratory space. Since it was constructed, Building 28A has had minor interior modifications.

In an effort to determine the building's architect and/or builder, WSA staff reviewed the permits stored on microfiche on file at the City of Berkeley's Planning Department for the Bayer Property on July 16, 2014. Permits for minor modifications to the building undertaken in the years since 1990 were identified, but the original building permit was not. It may no longer be on file with the City or may be stored under an alternate address. Building 28A does not meet any of the four criteria for significance on the CRHR.

B11. Additional Resource Attributes: HP8. Industrial Building
B12. References: None.
B13. Remarks: None.
**B14. Evaluator:** Aimee Arrigoni, William Self Associates, Inc.
**Date of Evaluation:** 7/21/2014

Drawing indicating major construction phases of Building 28A.

B1. Historic Name:

B2. Common Name: Building 28

B3. Original Use: Industrial

B4. Present Use: Industrial

**B5. Architectural Style:** trailer

**B6. Construction History:** The structure was constructed in 1967.

**B7. Moved?** ☒No ☐Yes ☐Unknown

**B8. Related Features:** None

B9a. Architect: Unknown

b. Builder: Unknown

**B10. Theme:** Industrial Architecture
**Area:** West Berkeley
**Period of Significance:** 1967
**Property Type:** Industrial

Building 28 is a one-story off-white with light blue trim wood trailer that abuts Building 28A located on the Bayer Campus near the intersection of Fifth Street and Dwight Way. The structure consists of a small (3,440 square foot) single-story building that was constructed in 1967, six years before Bayer, a German chemicals company, acquired Cutter Laboratories and began to expand its presence at the current campus location in Berkeley. The building may have been used short-term by Cutter Laboratories and has been used as part of Bayer's bio-manufacturing and supply of protein therapeutic products

There are three openings on the east elevation of the building that were likely used as windows, however they are currently boarded over and painted green. The west and south sides of the building are not visible, as they abut the much larger Building 28A. A blue security door on the east elevation appears to provide the primary access to the interior. The roof is flat and is dominated by the ventilation system used to ventilate the building's interior. Similarly, the east elevation is dominated by vents and electrical panels. The building is entirely functional and does not appear to have been designed with aesthetics in mind. Instead, it appears to provide mechanical support to laboratory testing and similar activities. Buildings 28 does not meet any of the four criteria for significance on the CRHR.

B11. Additional Resource Attributes: HP8. Industrial Building

B12. References: None.

B13. Remarks: None.

**B14. Evaluator:** Aimee Arrigoni, William Self Associates
**Date of Evaluation:** 7/21/2014


Drawing indicating major construction phases of Building 28

B1. Historic Name:
B2. Common Name: Building 50
B3. Original Use: Industrial
B4. Present Use: Industrial
**B5. Architectural Style:** Modern
**B6. Construction History:** The structure was constructed in 1956.
**B7. Moved?** ☒No ☐Yes ☐Unknown
**B8. Related Features:** None
B9a. Architect: Unknown
b. Builder: Unknown
**B10. Theme:** Industrial Architecture
**Area:** West Berkeley
**Period of Significance:** 1956-1963
**Property Type:** Industrial

Building 50 is a 15,765 square foot, single-story, L-shaped building situated on the north edge of the Bayer Campus just east of Buildings 28/28A. The main body of the building was constructed in 1956 and is 58 years old. The structure was built 18 years before Bayer, a German chemicals company, acquired Cutter Laboratories and began to expand its presence at the current campus location in Berkeley. The rectangular portion of the building that forms the "L" at the east end was added in 1963. While the entire building is finished with plasterboard, the original portion of the structure is wood frame construction and the addition is metal frame construction. Building 50 is one of several quality control testing facilities on campus, and provides office and laboratory space used for glass washing, impurity analysis, potency, protein, and characterization.

The low, horizontal building has a flat roof. Like similar laboratory buildings, the roof is dominated by ventilation and other systems that support the work being done inside. The building's facade (south elevation) was designed with a series of repeating vertical metal windows. The upper portion of the windows appears fixed but the lower portion opens via a lever. The entry door is shaded with a blue awning. The tall vertical windows repeat on the east elevation, which is visible from Parking Lot J. The west end of the building (closest to Buildings 28/28A) has a set of recessed entry doors but the wall is unadorned and the vertical windows were not continued on this elevation. A ladder affixed to the west elevation provides rooftop access. The north elevation of the building has a wide roof overhang supported by oversized rafters and L-shaped brackets. Rectangular metal windows repeat along the north elevation, but are not as tall as those on the south and east elevations and appear to be fixed. Buildings 50 does not meet any of the four criteria for significance on the CRHR.

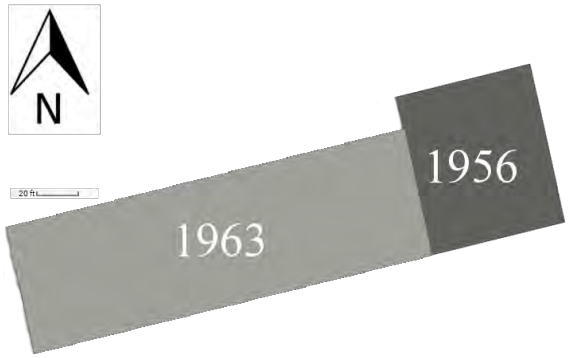
B11. Additional Resource Attributes: HP8. Industrial Building

B12. References: None.

B13. Remarks: None.

**B14. Evaluator:** Aimee Arrigoni, William Self Associates, Inc.

**Date of Evaluation:** 7/21/2014




Drawing indicating major construction phases of Building 50.

## APPENDIX C:

Traffic Impact Analysis

# Traffic Impact Study for 801 Grayson Street

Prepared for:
The City of Berkeley

Prepared by:
Stantec Consulting Services, Inc.
1340 Treat Boulevard Suite 300
Walnut Creek, CA 94597-7066

July 11, 2014

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# 1.0 INTRODUCTION AND SUMMARY

## Introduction

This report presents the results of Stantec's traffic impact analysis of the proposed Quality Control Testing Facility on Bayer's South Properties site, which is shown in Figure 1. The proposed project is located on Grayson Street between Seventh Street and the Southern Pacific Railroad right-of-way on a site that is set back from the street on the far side of a parking lot, as shown in Figure 2.

The project consists of the construction of an approximately 80,000 square foot facility that is intended to modernize and expand Bayer's existing quality control testing facilities. In conjunction with the construction of this new building, several other buildings on Bayer's South Properties site will be demolished. The net addition to the building gross square footage will be approximately 15,000 square feet.

The majority of employees and visitors traveling to and from the proposed facility are expected to pass through the intersection at Seventh Street and Ashby Avenue, the study intersection.

## Summary

The proposed project is expected to generate approximately 18 trips during the AM peak hour and 16 trips during the PM peak hour. Currently, the study intersection operates at LOS D during the AM and PM peak hours, meeting the City of Berkeley intersection LOS standards.

The LOS of the Seventh Street and Ashby Avenue intersection was studied under four additional scenarios. The second scenario consists of current conditions plus the hypothetical completion of approved projects in the study area. Under this Existing plus Approved Project Conditions scenario, the study intersection is expected to experience degraded operations and fall into LOS E.

The third scenario consists of current conditions plus the hypothetic completion of approved projects plus the hypothetical completion of the proposed project. Under the Existing plus Approved plus Project Conditions scenario, the study intersection is expected to continue to operate at LOS E. The proposed project adds less than three seconds of additional average delay at the study intersection, so per the City of Berkeley's guidelines, the proposed project is not expected to have any significant impact.

The fourth scenario consists of anticipated 2035 traffic flows that take under consideration both anticipated traffic volume growth per the Alameda County Transportation Commission (ACTC) travel demand model forecasts and current conditions. Under the 2035 Conditions scenario, the study intersection is expected to operate at LOS E and F. The fifth scenario consists of anticipated 2035 traffic flows as well as additional traffic demand generated by the proposed

project. With the 2035 Conditions plus Approved Project Conditions scenario, the study intersection is expected to continue to operate at LOS E and F. The proposed project is expected to increase the delay and V/C ratio minimally, so per the City of Berkeley's guidelines, the proposed project is not expected to have any significant impact.

**Figure 1 – Bayer's South Properties and Study Intersection**

**Figure 2 – Site Plan**

# 2.0 INTERSECTION ANALYSIS METHODOLOGY

### Study Intersection and Scenarios

The signalized intersection at Ashby Avenue and Seventh Street was selected for the study analysis after consultation with City of Berkeley staff.

This study evaluated morning and evening peak hour traffic conditions on a typical weekday under the following five scenarios:

1. *Existing Conditions* – Current (Year 2014) traffic volumes and roadway conditions
2. *Existing plus Approved Projects Conditions* – Identical to Existing Conditions, but with traffic added from approved projects in the project site's vicinity
3. *Existing plus Approved plus Proposed Project Conditions* – Identical to Existing plus Approved Projects Conditions, but with traffic added from the proposed project
4. *Year 2035 Conditions* – This scenario is based on projections from the latest Alameda County Transportation Commission (ACTC) travel demand model. Twenty-one-year incremental traffic growth was added to existing volumes to estimate 2035 traffic conditions.
5. *Year 2035 plus Proposed Project Conditions* – This scenario is identical to 2035 Conditions, but with the addition of proposed project traffic.

The approved projects are listed in Chapter 4.

### Level of Service Analysis and Methodology

Level of service (LOS) is a qualitative description of intersection operation and is reported using an A through F letter rating system to describe travel delay and congestion. LOS A indicates free flow conditions with little or no delay, and LOS F indicates jammed conditions with excessive delays and long back-ups.

Operating conditions at the study intersection were evaluated using the 2000 Highway Capacity Manual (HCM) operations methodology contained in Synchro software. Peak hour intersection conditions for signalized intersections are reported as average control delay in seconds per vehicle with corresponding levels of service.

### Impact Criteria

City's significant impact criteria are based on City's Guidelines for Development of Traffic Impact Reports. The City's level of service standard is LOS D for signalized intersections. Intersections that operate more poorly that this service levels are considered impacted and should be considered for mitigation. Exceptions to the LOS D standard arise when the project is not expected to add more than three seconds of delay at an intersection that is operating at LOS E, or increase the V/C ratio by more than 0.01 at an intersection that is operating at LOS F without the proposed project.

# 3.0 EXISTING TRAFFIC CONDITIONS

All Traffic Data (ATD) conducted weekday morning (7:00 am to 9:00 am) and evening (4:00 pm to 6:00 pm) turning movement counts at the study intersection in June 2014. The count indicated that the am peak hour was 8:00 am to 9:00 am and that the afternoon peak hour was from 4:45 pm to 5:45 pm.

Figure 3 shows the lane geometry for the study intersection and Figure 4 shows the existing turning movement counts for the peak hours at the study intersection.

**Figure 3 – Existing Lane Geometry at Ashby Avenue and Seventh Street**

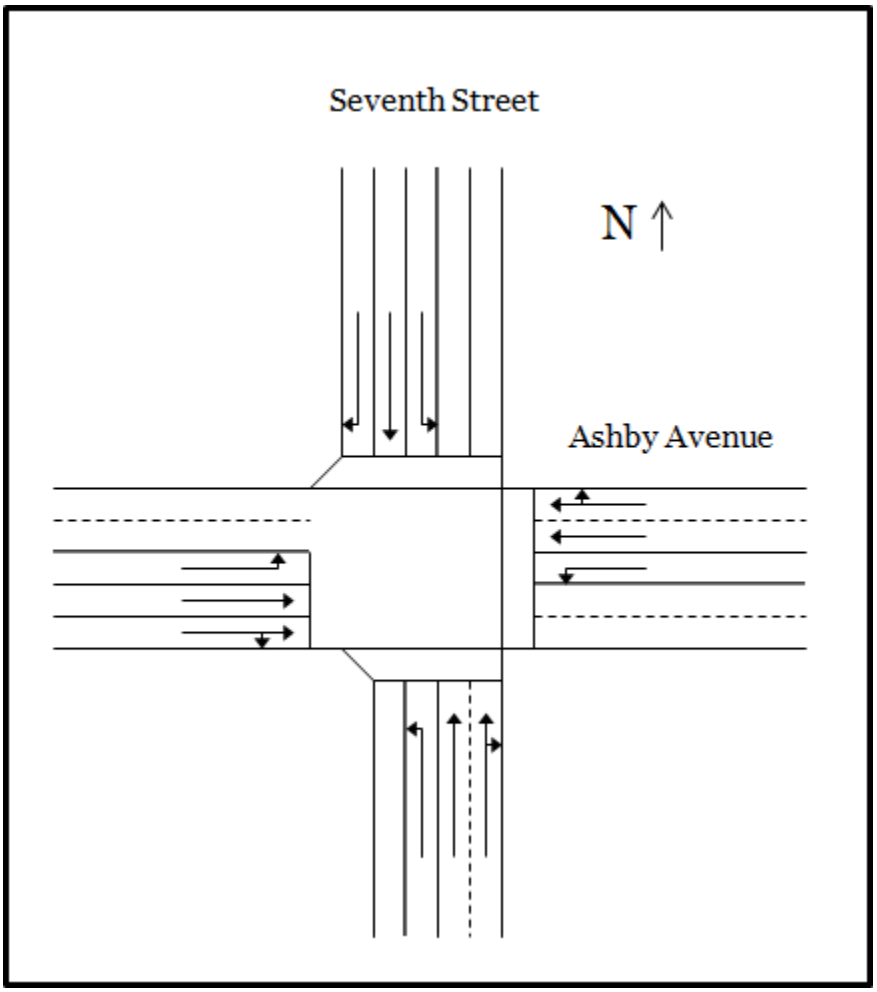
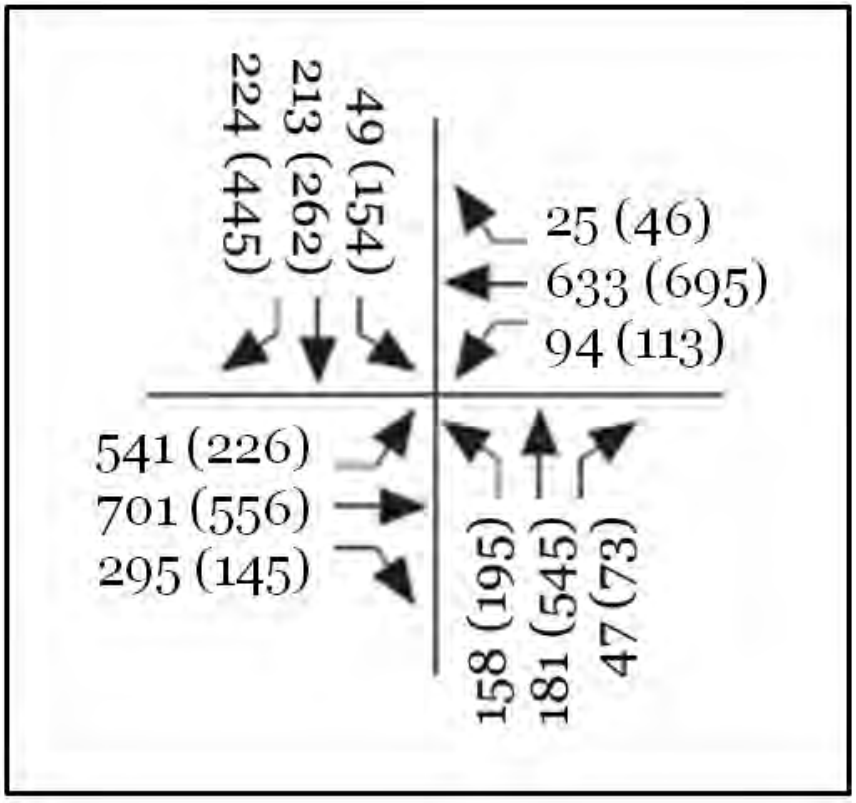


**Figure 4 – Turning Movements – Existing Conditions**




**Level of Service Analysis (Existing Traffic Conditions)**

Table 1 summarizes the results of the weekday intersection analysis under Existing Conditions. Under Existing Conditions, the study intersection operates at an acceptable service level (LOS D). Details behind this analysis are available in Appendix B.

**Table 1 – Peak Hour Intersection Levels of Service – Existing Conditions**

| ID | Intersection | Period | Existing | | |
|---|---|---|---|---|---|
| | | | Delay | V/C | LOS |
| 1 | 7th St. / Ashby Ave | AM | 47.0 | 0.88 | D |
| 1 | 7th St. / Ashby Ave | PM | 52.1 | 0.74 | D |

# 4.0 EXISTING PLUS APPROVED PROJECTS CONDITIONS

This scenario is similar to the Existing Conditions, but includes added traffic from the approved developments within the project site's vicinity.

**Approved Projects**

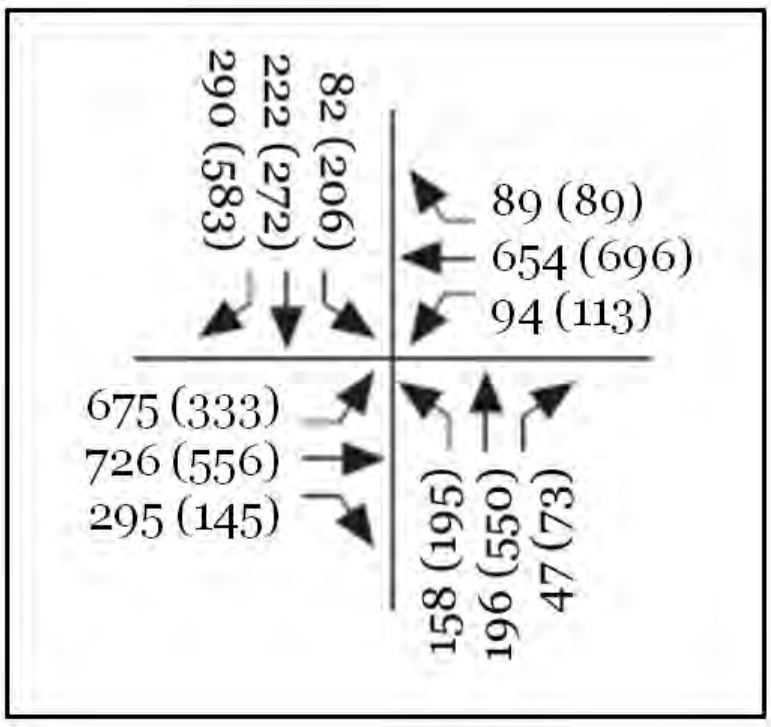
Approved projects include developments that are either under construction, built but not fully occupied, or not built but have final development approval from the City. There are six approved projects in the proposed project's vicinity that are expected to generate traffic through the study intersection. These approved projects are listed below:

1. 2748 San Pablo Avenue Project
2. 2747 San Pablo Avenue Project
3. 3020 San Pablo Avenue Project
4. 1037 Pardee Street Project
5. 2700 San Pablo Avenue Project
6. 2720 San Pablo Avenue Project

**Approved Projects Trip Generation and Trip Assignment**

Trip generation and trip assignment assumptions for the approved projects were based on the traffic study reports prepared for each project. Trips from the above developments were added to the existing intersection turning movement counts to estimate traffic volumes for Existing plus Approved Projects Conditions. The resulting turning movement volumes for this scenario are illustrated in Figure 5.

**Figure 5 – Turning Movements – Existing Plus Approved Projects**




**Level of Service Analysis (Existing Plus Approved Projects Conditions)**

Intersection LOS analysis results for Existing plus Approved Projects Conditions are shown in Table 2. Details of the Synchro analysis are available in Appendix B. Under Existing plus Approved Projects conditions, the study intersection is expected to operate at unacceptable levels of service during both am and pm peak periods.

**Table 2 – Peak Hour Intersection Levels of Service – Existing Plus Approved Projects**

| ID | Intersection | Period | Existing | | | Existing + Approved | | |
|---|---|---|---|---|---|---|---|---|
| | | | Delay | V/C | LOS | Delay | V/C | LOS |
| 1 | 7th St. / Ashby Ave | AM | 47.0 | 0.88 | D | 67.0 | 1.02 | **E** |
| 1 | 7th St. / Ashby Ave | PM | 52.1 | 0.74 | D | 66.4 | 0.92 | **E** |

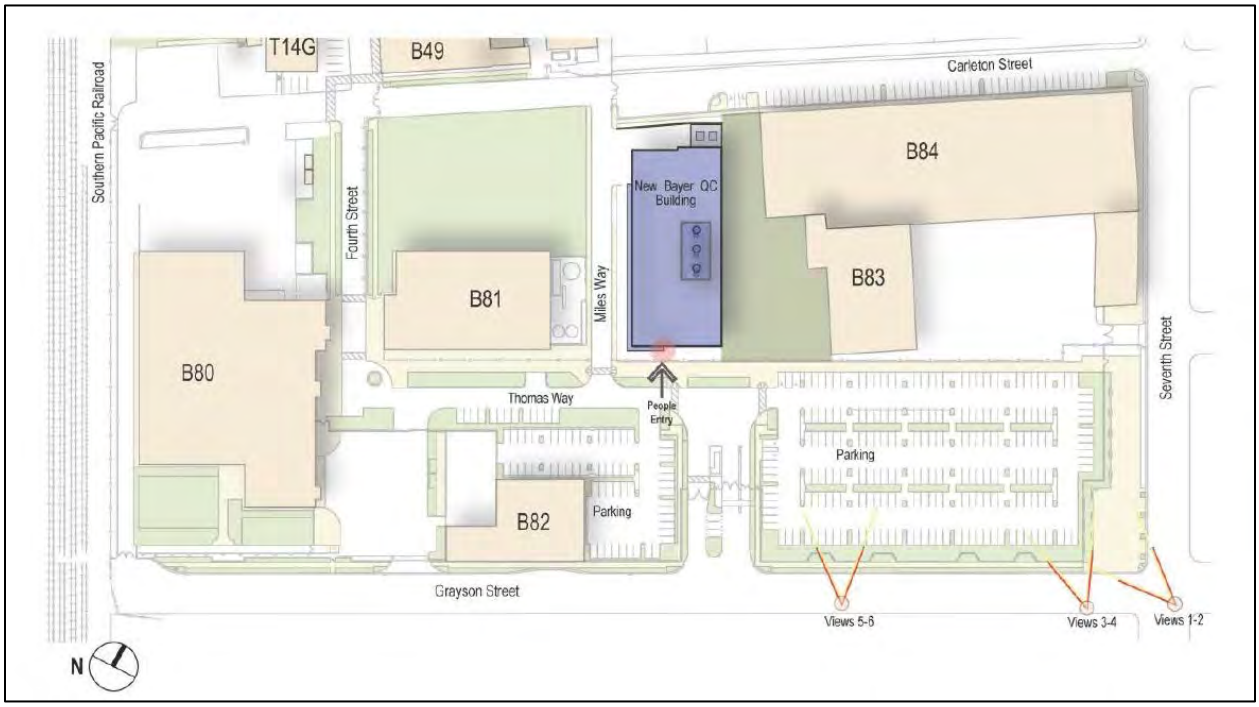
# 5.0 EXISTING PLUS APPROVED PLUS PROPOSED PROJECTS CONDITIONS

### Project Description

The project site is proposed at 810 Grayson Street in the City of Berkeley. This site is a part of Bayer's South Properties, which is located between Grayson and Carleton Streets and between Seventh Street and the South Pacific Railroad right-of-way. The proposed project would be the construction of a ~80,000 square foot Quality Control Testing Facility on the southern edge of Bayer's South Properties. This project would coincide with the demolition of approximately 65,000 square feet of old and outdated buildings on the north side of Bayer's South Properties that currently house quality control testing functions. As such, the net increase is building space is is approximately15, 000 square feet.

Figure 6 provides an illustration of the project, taken from the Bayer Healthcare, LLC Project Description.

**Figure 6 – Proposed Project**



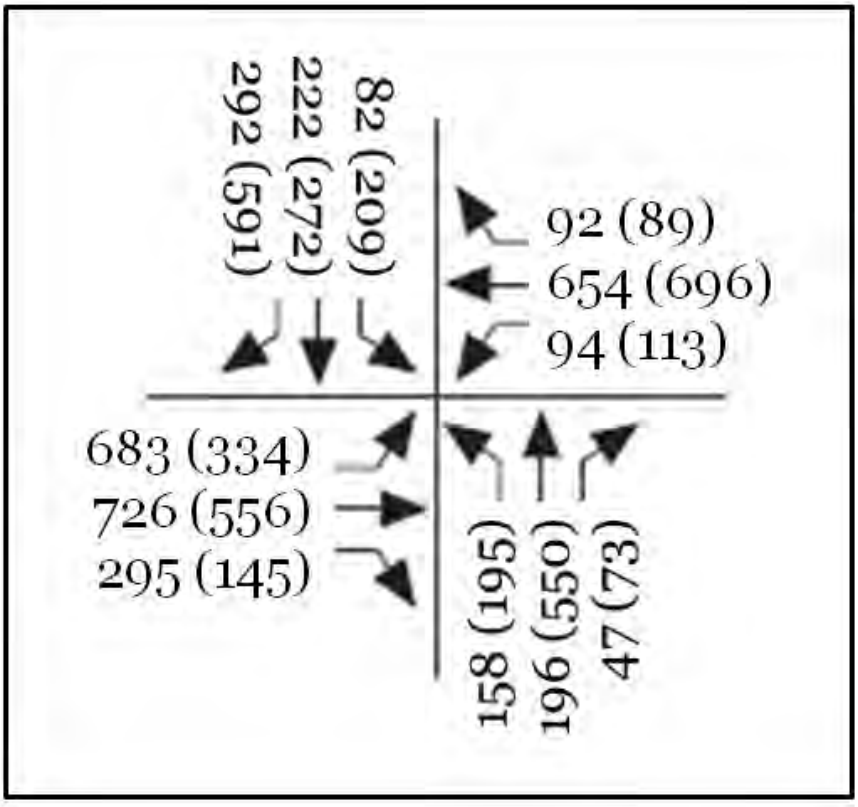
### Project Trip Generation

Trip generation of the proposed project was estimated based on rates provided in Trip Generation, 9th Edition published by the Institute of Transportation Engineers (ITE). The proposed project is expected to have trip generation patterns similar to a Research & Development (R&D) Center, which has Land Use Code 760. The proposed facility is expected to generate approximately 18 trips (15 inbound and 3 outbound) in the AM peak hour and 16 trips (2 inbound and 14 outbound) in the PM peak hour.

### Project Trip Generation and Assignment

Stantec determined Existing plus Proposed plus Proposed Projects traffic forecasts by assigning the new trips to the turning volumes developed for the Existing plus Proposed Projects Conditions scenario. Figure 7 illustrates the resulting turning movement volumes.

**Figure 7 – Turning Movements (Existing Plus Approved Plus Proposed Project Conditions)**




### Level of Service Analysis (Existing Plus Approved Plus Project Traffic Conditions)

Intersection LOS analysis results for Existing plus Approved plus Proposed Project Conditions are shown in Table 3. Additional detail is available in Appendix B.

**Table 3 – Peak Hour Intersection Levels of Service – Existing Plus Approved Plus Proposed Project**

| ID | Intersection | Period | Existing + Approved | | | Existing + Approved + Project | | |
|---|---|---|---|---|---|---|---|---|
| | | | Delay | V/C | LOS | Delay | V/C | LOS |
| 1 | 7th St. / Ashby Ave | AM | 67.0 | 1.02 | **E** | 68.3 | 1.02 | **E** |
| 1 | 7th St. / Ashby Ave | PM | 66.4 | 0.92 | **E** | 67.6 | 0.93 | **E** |

The results indicate that the project creates no significant impact because the level of service at the Ashby Avenue and Seventh Street intersection would be E both with and without the project and because the differences in average delay are less than three seconds.

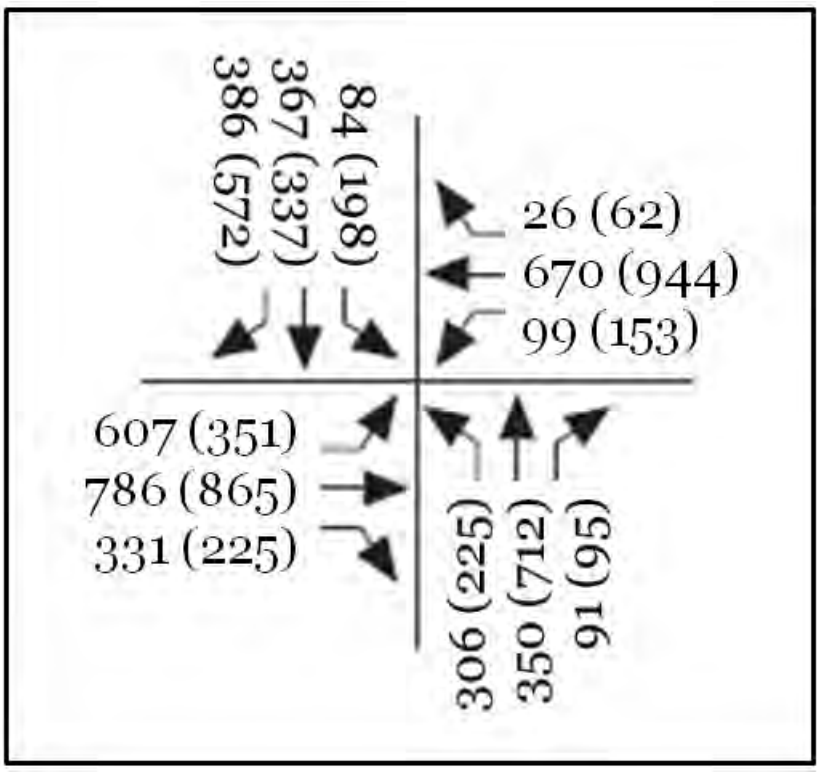
**Parking**

The Bayer Healthcare, LLC Project Description indicated that the South Properties and the main Bayer Campus located to its north have 1,250 parking spaces, which is in excess of their current demand of 1,003 spaces. Therefore, the small increase in demand that the proposed project would generate would not require additional parking supply.

# 6.0 2035 CONDITIONS

Stantec determined 2035 traffic forecasts by using the latest ACTC traffic and land use projections. Stantec calculated the difference between the 2005 and 2035 model link volumes to estimate annual growth increments. This increment was added to existing turn volumes at the study intersection to estimate 2035 turning movements. Figure 8 illustrates the resulting turning movement volumes.

**Figure 8 – Turning Movements (2035 Conditions)**




**Intersection Level of Service Analysis – 2035 Conditions**

Under the Year 2035 Conditions, the intersection will operate at LOS E in the am peak hour and at LOS F in the pm peak hour. LOS analysis results for Year 2035 Conditions are shown in Table 4. Additional detail is available in Appendix B.

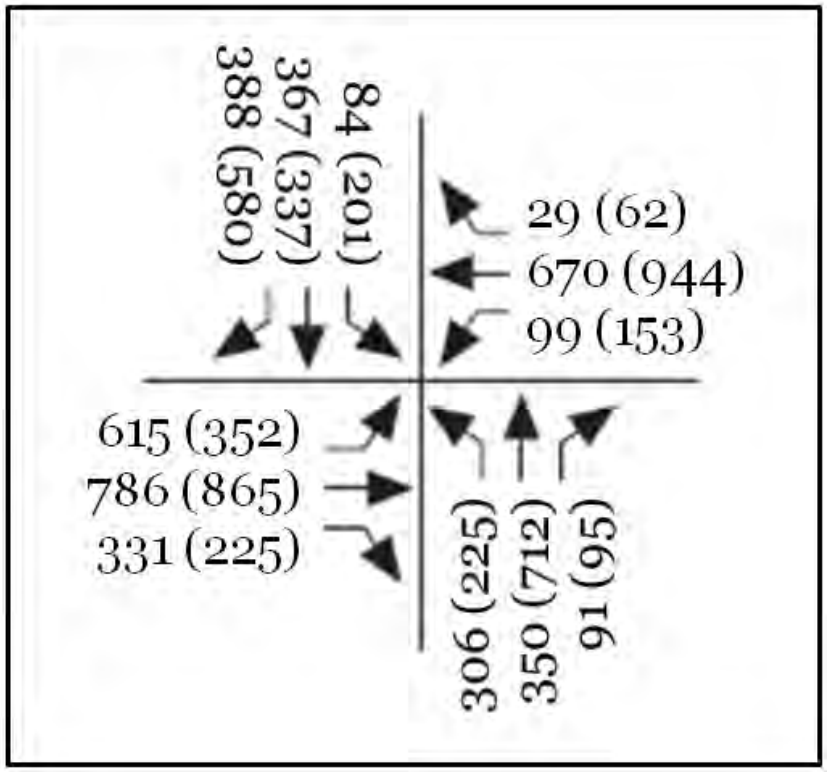
**Table 4 – Peak Hour Intersection Levels of Service – 2035 Conditions**

| ID | Intersection | Period | 2035 Conditions | | |
|---|---|---|---|---|---|
| | | | Delay | V/C | LOS |
| 1 | 7th St. / Ashby Ave | AM | 72.0 | 1.07 | **E** |
| 1 | 7th St. / Ashby Ave | PM | 81.1 | 1.05 | **F** |

# 7.0 2035 CONDITIONS PLUS PROPOSED PROJECT

Stantec determined 2035 plus Proposed Project turning movements by assigning new trips from the proposed project to the turning volumes developed for the Year 2035 Scenario. Figure 9 illustrates the resulting turning movement volumes.

**Figure 9 – Turning Movements (2035 Plus Approved Project Conditions)**




**Level of Service Analysis (2035 Plus Project Conditions)**

Intersection LOS analysis results for 2035 plus Project Conditions are shown in Table 5. Under 2035 plus Project Conditions, the study intersection will operate at the same level of service as if the proposed project was not carried out. Additional detail can be found in Appendix B.

**Table 5 – Peak Hour Intersection Levels of Service – 2035 Plus Proposed Project**

| ID | Intersection | Period | 2035 Conditions | | | 2035 plus Project Conditions | | |
|---|---|---|---|---|---|---|---|---|
| | | | Delay | V/C | LOS | Delay | V/C | LOS |
| 1 | 7th St. / Ashby Ave | AM | 72.0 | 1.07 | **E** | 73.1 | 1.08 | **E** |
| 1 | 7th St. / Ashby Ave | PM | 81.1 | 1.05 | **F** | 82.3 | 1.06 | **F** |

The results indicate that the project creates no significant impact because the level of service at the Ashby Avenue and Seventh Street intersection during the am peak period would continue operate at LOS E both with and without the project and because the difference in average delay is less than three seconds.

For an intersection operating in oversaturated conditions, which is typical for an intersection operating at LOS F, the intersection delays cannot be measured accurately using Synchro. Therefore, the threshold based on the volume-to-capacity (V/C) ratio was assessed for the study intersection during the pm peak hour. The expected increase to the V/C ratio due to the proposed project would be less than or equal to 0.01, which is below the City's significance threshold.

# 8.0 CONCLUSIONS AND RECOMMENDATIONS

Stantec has reached the following conclusions regarding the proposed 801 Grayson project.

- The proposed project is expected to generate 18 trips during the AM peak hour and 16 trips during the pm peak hour, on a typical weekday.
- Currently, the study intersection operates at LOS D during the AM and PM peak hours, which meet City of Berkeley LOS standards.
- Under Existing plus Approved Project Conditions, the study intersection is expected to experience degraded operations and fall into LOS E.
- Under Existing plus Approved plus Project Conditions, the study intersection is expected to continue to operating at LOS E. The change in average delay to the proposed project is less than three seconds, so there are no significant impacts per the City's guidelines.
- Under 2035 Conditions, the study intersection is expected to operate at unacceptable levels. With 2035 plus Approved Project Conditions, the study intersection is expected to continue to operate at LOS E in the am peak hour and LOS F in the pm peak hour. The increase in delay and V/C ratio due to the proposed project is less than significant.

# 9.0 STUDY PARTICIPANTS AND REFERENCES

**Stantec Consultants**

| | |
|---|---|
| Joy Bhattacharya | Project Manager |
| Cordelia Crockett | Project Engineer |
| Jennie Huynh | Word Processing |

**Data Collection**

All Traffic Data (ATD), June 2014

**Persons Contacted**

| | |
|---|---|
| Michael Vecchio | City of Berkeley |
| Lynette Dias | Urban Planning Partners |
| Elizabeth Boyd | Urban Planning Partners |

**References**


- Institute of Transportation Engineers, Trip Generation, 9th Edition, Washington DC, 2003.
- Transportation Research Board, Highway Capacity Manual 2000, Washington DC, 2000.

# Appendix A TURNING VOLUME COUNTS

# ALL TRAFFIC DATA

City of Berkeley
All Vehicles on Unshifted
Nothing on Bank 1
Nothing on Bank 2

**(916) 771-8700**
orders@atdtraffic.com

File Name : 14-7407-001A 7th Street-Ashby Avenue.ppd
Date : 6/10/2014

**Unshifted Count = All Vehicles**

| | 7th Street Southbound | | | | | Ashby Avenue Westbound | | | | | 7th Street Northbound | | | | | Ashby Avenue Eastbound | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| START TIME | LEFT | THRU | RIGHT | PEDS | APP.TOTAL | LEFT | THRU | RIGHT | PEDS | APP.TOTAL | LEFT | THRU | RIGHT | PEDS | APP.TOTAL | LEFT | THRU | RIGHT | PEDS | APP.TOTAL | Total | Ped Total |
| 07:00 | 8 | 11 | 19 | 0 | 38 | 7 | 90 | 4 | 3 | 101 | 17 | 14 | 1 | 2 | 32 | 92 | 124 | 76 | 0 | 292 | 463 | 5 |
| 07:15 | 11 | 25 | 38 | 1 | 74 | 12 | 123 | 5 | 2 | 140 | 14 | 17 | 10 | 0 | 41 | 90 | 145 | 72 | 0 | 307 | 562 | 3 |
| 07:30 | 9 | 30 | 34 | 1 | 73 | 16 | 110 | 5 | 1 | 131 | 27 | 29 | 9 | 0 | 65 | 128 | 187 | 82 | 0 | 397 | 666 | 2 |
| 07:45 | 17 | 32 | 40 | 0 | 89 | 11 | 136 | 4 | 2 | 151 | 28 | 32 | 14 | 1 | 74 | 122 | 192 | 98 | 0 | 412 | 726 | 3 |
| Total | 45 | 98 | 131 | 2 | 274 | 46 | 459 | 18 | 8 | 523 | 86 | 92 | 34 | 3 | 212 | 432 | 648 | 328 | 0 | 1408 | 2417 | 13 |
| 08:00 | 15 | 43 | 50 | 0 | 108 | 20 | 140 | 6 | 0 | 166 | 44 | 34 | 9 | 0 | 87 | 147 | 168 | 69 | 0 | 384 | 745 | 0 |
| 08:15 | 12 | 46 | 47 | 1 | 105 | 28 | 160 | 7 | 2 | 195 | 40 | 51 | 12 | 1 | 103 | 135 | 180 | 86 | 0 | 401 | 804 | 4 |
| 08:30 | 12 | 60 | 66 | 0 | 138 | 21 | 161 | 7 | 3 | 189 | 45 | 52 | 14 | 0 | 111 | 124 | 156 | 66 | 0 | 346 | 784 | 3 |
| 08:45 | 10 | 64 | 61 | 2 | 135 | 25 | 172 | 5 | 1 | 202 | 29 | 44 | 12 | 1 | 85 | 135 | 197 | 74 | 0 | 406 | 828 | 4 |
| Total | 49 | 213 | 224 | 3 | 486 | 94 | 633 | 25 | 6 | 752 | 158 | 181 | 47 | 2 | 386 | 541 | 701 | 295 | 0 | 1537 | 3161 | 11 |
| 16:00 | 33 | 68 | 116 | 0 | 217 | 23 | 144 | 7 | 2 | 174 | 92 | 106 | 22 | 0 | 220 | 55 | 107 | 41 | 0 | 203 | 814 | 2 |
| 16:15 | 25 | 57 | 91 | 2 | 173 | 17 | 180 | 10 | 3 | 207 | 63 | 117 | 19 | 0 | 199 | 50 | 128 | 32 | 0 | 210 | 789 | 5 |
| 16:30 | 34 | 57 | 118 | 1 | 209 | 33 | 180 | 8 | 1 | 221 | 59 | 129 | 12 | 0 | 200 | 55 | 132 | 30 | 0 | 217 | 847 | 2 |
| 16:45 | 34 | 68 | 108 | 0 | 210 | 32 | 175 | 12 | 6 | 219 | 38 | 132 | 18 | 1 | 188 | 54 | 149 | 22 | 0 | 225 | 842 | 7 |
| Total | 126 | 250 | 433 | 3 | 809 | 105 | 679 | 37 | 12 | 821 | 252 | 484 | 71 | 1 | 807 | 214 | 516 | 125 | 0 | 855 | 3292 | 16 |
| 17:00 | 34 | 62 | 112 | 2 | 208 | 27 | 181 | 13 | 1 | 221 | 56 | 124 | 19 | 2 | 199 | 57 | 145 | 44 | 0 | 246 | 874 | 5 |
| 17:15 | 54 | 74 | 110 | 1 | 238 | 31 | 160 | 7 | 7 | 198 | 46 | 140 | 19 | 1 | 205 | 55 | 135 | 46 | 0 | 236 | 877 | 9 |
| 17:30 | 32 | 58 | 115 | 0 | 205 | 23 | 179 | 14 | 1 | 216 | 55 | 149 | 17 | 1 | 221 | 60 | 127 | 33 | 0 | 220 | 862 | 2 |
| 17:45 | 29 | 62 | 96 | 1 | 187 | 31 | 157 | 11 | 3 | 199 | 47 | 132 | 19 | 2 | 198 | 84 | 140 | 29 | 0 | 253 | 837 | 6 |
| Total | 149 | 256 | 433 | 4 | 838 | 112 | 677 | 45 | 12 | 834 | 204 | 545 | 74 | 6 | 823 | 256 | 547 | 152 | 0 | 955 | 3450 | 22 |
| Grand Total | 369 | 817 | 1221 | 12 | 2407 | 357 | 2448 | 125 | 38 | 2930 | 700 | 1302 | 226 | 12 | 2228 | 1443 | 2412 | 900 | 0 | 4755 | 12320 | 62 |
| Apprch % | 15.3% | 33.9% | 50.7% | | | 12.2% | 83.5% | 4.3% | | | 31.4% | 58.4% | 10.1% | | | 30.3% | 50.7% | 18.9% | | | | |
| Total % | 3.0% | 6.6% | 9.9% | | 19.5% | 2.9% | 19.9% | 1.0% | | 23.8% | 5.7% | 10.6% | 1.8% | | 18.1% | 11.7% | 19.6% | 7.3% | | 38.6% | 100.0% | |

# ALL TRAFFIC DATA

City of Berkeley
All Vehicles on Unshifted
Nothing on Bank 1
Nothing on Bank 2

**(916) 771-8700**
orders@atdtraffic.com

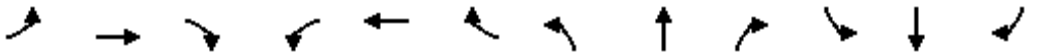
File Name : 14-7407-001A 7th Street-Ashby Avenue.ppd
Date : 6/10/2014

**Unshifted Count = All Vehicles**

| AM PEAK HOUR | 7th Street Southbound | | | | | Ashby Avenue Westbound | | | | | 7th Street Northbound | | | | | Ashby Avenue Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| START TIME | LEFT | THRU | RIGHT | PEDS | APP.TOTAL | LEFT | THRU | RIGHT | PEDS | APP.TOTAL | LEFT | THRU | RIGHT | PEDS | APP.TOTAL | LEFT | THRU | RIGHT | PEDS | APP.TOTAL | Total |
| Peak Hour Analysis From 08:00 to 09:00 | | | | | | | | | | | | | | | | | | | | | |
| Peak Hour For Entire Intersection Begins at 08:00 | | | | | | | | | | | | | | | | | | | | | |
| 08:00 | 15 | 43 | 50 | 0 | 108 | 20 | 140 | 6 | 0 | 166 | 44 | 34 | 9 | 0 | 87 | 147 | 168 | 69 | 0 | 384 | 745 |
| 08:15 | 12 | 46 | 47 | 1 | 105 | 28 | 160 | 7 | 2 | 195 | 40 | 51 | 12 | 1 | 103 | 135 | 180 | 86 | 0 | 401 | 804 |
| 08:30 | 12 | 60 | 66 | 0 | 138 | 21 | 161 | 7 | 3 | 189 | 45 | 52 | 14 | 0 | 111 | 124 | 156 | 66 | 0 | 346 | 784 |
| 08:45 | 10 | 64 | 61 | 2 | 135 | 25 | 172 | 5 | 1 | 202 | 29 | 44 | 12 | 1 | 85 | 135 | 197 | 74 | 0 | 406 | 828 |
| Total Volume | 49 | 213 | 224 | 3 | 486 | 94 | 633 | 25 | 6 | 752 | 158 | 181 | 47 | 2 | 386 | 541 | 701 | 295 | 0 | 1537 | 3161 |
| % App Total | 10.1% | 43.8% | 46.1% | | | 12.5% | 84.2% | 3.3% | | | 40.9% | 46.9% | 12.2% | | | 35.2% | 45.6% | 19.2% | | | |
| PHF | .817 | .832 | .848 | | .880 | .839 | .920 | .893 | | .931 | .878 | .870 | .839 | | .869 | .920 | .890 | .858 | | .946 | .954 |

| PM PEAK HOUR | 7th Street Southbound | | | | | Ashby Avenue Westbound | | | | | 7th Street Northbound | | | | | Ashby Avenue Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| START TIME | LEFT | THRU | RIGHT | PEDS | APP.TOTAL | LEFT | THRU | RIGHT | PEDS | APP.TOTAL | LEFT | THRU | RIGHT | PEDS | APP.TOTAL | LEFT | THRU | RIGHT | PEDS | APP.TOTAL | Total |
| Peak Hour Analysis From 16:45 to 17:45 | | | | | | | | | | | | | | | | | | | | | |
| Peak Hour For Entire Intersection Begins at 16:45 | | | | | | | | | | | | | | | | | | | | | |
| 16:45 | 34 | 68 | 108 | 0 | 210 | 32 | 175 | 12 | 6 | 219 | 38 | 132 | 18 | 1 | 188 | 54 | 149 | 22 | 0 | 225 | 842 |
| 17:00 | 34 | 62 | 112 | 2 | 208 | 27 | 181 | 13 | 1 | 221 | 56 | 124 | 19 | 2 | 199 | 57 | 145 | 44 | 0 | 246 | 874 |
| 17:15 | 54 | 74 | 110 | 1 | 238 | 31 | 160 | 7 | 7 | 198 | 46 | 140 | 19 | 1 | 205 | 55 | 135 | 46 | 0 | 236 | 877 |
| 17:30 | 32 | 58 | 115 | 0 | 205 | 23 | 179 | 14 | 1 | 216 | 55 | 149 | 17 | 1 | 221 | 60 | 127 | 33 | 0 | 220 | 862 |
| Total Volume | 154 | 262 | 445 | 3 | 861 | 113 | 695 | 46 | 15 | 854 | 195 | 545 | 73 | 5 | 813 | 226 | 556 | 145 | 0 | 927 | 3455 |
| % App Total | 17.9% | 30.4% | 51.7% | | | 13.2% | 81.4% | 5.4% | | | 24.0% | 67.0% | 9.0% | | | 24.4% | 60.0% | 15.6% | | | |
| PHF | .713 | .885 | .967 | | .904 | .883 | .960 | .821 | | .966 | .871 | .914 | .961 | | .920 | .942 | .933 | .788 | | .942 | .985 |

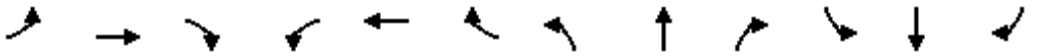
# Appendix B SYNCHRO RESULTS



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 541 | 701 | 295 | 94 | 633 | 25 | 158 | 181 | 47 | 49 | 213 | 224 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.96 | | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 3382 | | 1770 | 3516 | | 1770 | 3418 | | 1770 | 1863 | 1555 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | 3382 | | 1770 | 3516 | | 1770 | 3418 | | 1770 | 1863 | 1555 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.93 | 0.93 | 0.93 | 0.87 | 0.87 | 0.87 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 569 | 738 | 311 | 101 | 681 | 27 | 182 | 208 | 54 | 56 | 242 | 255 |
| RTOR Reduction (vph) | 0 | 41 | 0 | 0 | 2 | 0 | 0 | 21 | 0 | 0 | 0 | 218 |
| Lane Group Flow (vph) | 569 | 1008 | 0 | 101 | 706 | 0 | 182 | 241 | 0 | 56 | 242 | 37 |
| Confl. Peds. (#/hr) | 6 | | | | | 6 | 3 | | 2 | 2 | | 3 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | 6 |
| Actuated Green, G (s) | 36.5 | 51.5 | | 10.5 | 25.5 | | 16.0 | 16.0 | | 16.0 | 16.0 | 16.0 |
| Effective Green, g (s) | 36.5 | 51.5 | | 10.5 | 25.5 | | 16.0 | 16.0 | | 16.0 | 16.0 | 16.0 |
| Actuated g/C Ratio | 0.33 | 0.47 | | 0.10 | 0.23 | | 0.15 | 0.15 | | 0.15 | 0.15 | 0.15 |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 587 | 1583 | | 168 | 815 | | 257 | 497 | | 257 | 270 | 226 |
| v/s Ratio Prot | c0.32 | 0.30 | | 0.06 | c0.20 | | c0.10 | 0.07 | | 0.03 | c0.13 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.02 |
| v/c Ratio | 0.97 | 0.64 | | 0.60 | 0.87 | | 0.71 | 0.48 | | 0.22 | 0.90 | 0.16 |
| Uniform Delay, d1 | 36.2 | 22.2 | | 47.7 | 40.6 | | 44.8 | 43.2 | | 41.5 | 46.2 | 41.1 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 29.2 | 2.0 | | 5.9 | 11.9 | | 15.2 | 3.4 | | 1.9 | 33.5 | 1.6 |
| Delay (s) | 65.3 | 24.1 | | 53.7 | 52.5 | | 60.0 | 46.6 | | 43.4 | 79.7 | 42.7 |
| Level of Service | E | C | | D | D | | E | D | | D | E | D |
| Approach Delay (s) | | 38.6 | | | 52.7 | | | 52.1 | | | 59.0 | |
| Approach LOS | | D | | | D | | | D | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 47.0 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.88 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 83.7% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

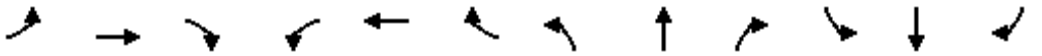
c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 226 | 556 | 145 | 113 | 695 | 46 | 195 | 545 | 73 | 154 | 262 | 445 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.97 | | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 3429 | | 1770 | 3496 | | 1770 | 3467 | | 1770 | 1863 | 1552 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | 3429 | | 1770 | 3496 | | 1770 | 3467 | | 1770 | 1863 | 1552 |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.97 | 0.97 | 0.97 | 0.92 | 0.92 | 0.92 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 240 | 591 | 154 | 116 | 716 | 47 | 212 | 592 | 79 | 171 | 291 | 494 |
| RTOR Reduction (vph) | 0 | 16 | 0 | 0 | 3 | 0 | 0 | 7 | 0 | 0 | 0 | 268 |
| Lane Group Flow (vph) | 240 | 729 | 0 | 116 | 760 | 0 | 212 | 664 | 0 | 171 | 291 | 226 |
| Confl. Peds. (#/hr) | 15 | | | | | 15 | 3 | | 5 | 5 | | 3 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | 6 |
| Actuated Green, G (s) | 22.8 | 51.1 | | 13.9 | 42.2 | | 24.0 | 36.0 | | 23.0 | 35.0 | 35.0 |
| Effective Green, g (s) | 22.8 | 51.1 | | 13.9 | 42.2 | | 24.0 | 36.0 | | 23.0 | 35.0 | 35.0 |
| Actuated g/C Ratio | 0.16 | 0.37 | | 0.10 | 0.30 | | 0.17 | 0.26 | | 0.16 | 0.25 | 0.25 |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 288 | 1251 | | 175 | 1053 | | 303 | 891 | | 290 | 465 | 388 |
| v/s Ratio Prot | c0.14 | 0.21 | | 0.07 | c0.22 | | 0.12 | c0.19 | | 0.10 | c0.16 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.15 |
| v/c Ratio | 0.83 | 0.58 | | 0.66 | 0.72 | | 0.70 | 0.74 | | 0.59 | 0.63 | 0.58 |
| Uniform Delay, d1 | 56.8 | 35.9 | | 60.8 | 43.7 | | 54.6 | 47.8 | | 54.1 | 46.7 | 46.1 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 18.3 | 2.0 | | 9.1 | 4.3 | | 12.7 | 5.6 | | 8.5 | 6.2 | 6.3 |
| Delay (s) | 75.0 | 37.8 | | 69.9 | 47.9 | | 67.3 | 53.4 | | 62.7 | 52.9 | 52.4 |
| Level of Service | E | D | | E | D | | E | D | | E | D | D |
| Approach Delay (s) | | 46.9 | | | 50.8 | | | 56.7 | | | 54.4 | |
| Approach LOS | | D | | | D | | | E | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 52.1 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.74 | | |
| Actuated Cycle Length (s) | 140.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 72.6% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

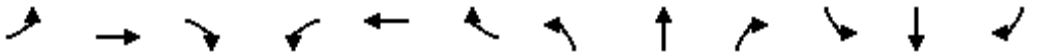
c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 675 | 726 | 295 | 94 | 654 | 89 | 158 | 196 | 47 | 82 | 222 | 290 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.96 | | 1.00 | 0.98 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 3386 | | 1770 | 3465 | | 1770 | 3426 | | 1770 | 1863 | 1555 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | 3386 | | 1770 | 3465 | | 1770 | 3426 | | 1770 | 1863 | 1555 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.93 | 0.93 | 0.93 | 0.87 | 0.87 | 0.87 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 711 | 764 | 311 | 101 | 703 | 96 | 182 | 225 | 54 | 93 | 252 | 330 |
| RTOR Reduction (vph) | 0 | 39 | 0 | 0 | 10 | 0 | 0 | 19 | 0 | 0 | 0 | 282 |
| Lane Group Flow (vph) | 711 | 1036 | 0 | 101 | 789 | 0 | 182 | 260 | 0 | 93 | 252 | 48 |
| Confl. Peds. (#/hr) | 6 | | | | | 6 | 3 | | 2 | 2 | | 3 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | 6 |
| Actuated Green, G (s) | 37.0 | 51.5 | | 10.5 | 25.0 | | 16.0 | 16.0 | | 16.0 | 16.0 | 16.0 |
| Effective Green, g (s) | 37.0 | 51.5 | | 10.5 | 25.0 | | 16.0 | 16.0 | | 16.0 | 16.0 | 16.0 |
| Actuated g/C Ratio | 0.34 | 0.47 | | 0.10 | 0.23 | | 0.15 | 0.15 | | 0.15 | 0.15 | 0.15 |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 595 | 1585 | | 168 | 787 | | 257 | 498 | | 257 | 270 | 226 |
| v/s Ratio Prot | c0.40 | 0.31 | | 0.06 | c0.23 | | c0.10 | 0.08 | | 0.05 | c0.14 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.03 |
| v/c Ratio | 1.19 | 0.65 | | 0.60 | 1.00 | | 0.71 | 0.52 | | 0.36 | 0.93 | 0.21 |
| Uniform Delay, d1 | 36.5 | 22.4 | | 47.7 | 42.5 | | 44.8 | 43.5 | | 42.4 | 46.5 | 41.4 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 103.5 | 2.1 | | 5.9 | 32.7 | | 15.2 | 3.9 | | 3.9 | 40.0 | 2.1 |
| Delay (s) | 140.0 | 24.5 | | 53.7 | 75.2 | | 60.0 | 47.4 | | 46.3 | 86.5 | 43.6 |
| Level of Service | F | C | | D | E | | E | D | | D | F | D |
| Approach Delay (s) | | 70.5 | | | 72.8 | | | 52.3 | | | 60.0 | |
| Approach LOS | | E | | | E | | | D | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 67.0 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 1.02 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 93.8% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

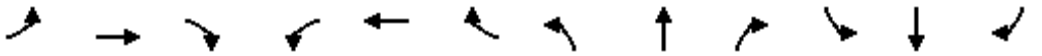
c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 333 | 556 | 145 | 113 | 696 | 89 | 195 | 550 | 73 | 206 | 272 | 583 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.97 | | 1.00 | 0.98 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 3429 | | 1770 | 3459 | | 1770 | 3467 | | 1770 | 1863 | 1552 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | 3429 | | 1770 | 3459 | | 1770 | 3467 | | 1770 | 1863 | 1552 |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.97 | 0.97 | 0.97 | 0.92 | 0.92 | 0.92 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 354 | 591 | 154 | 116 | 718 | 92 | 212 | 598 | 79 | 229 | 302 | 648 |
| RTOR Reduction (vph) | 0 | 16 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 268 |
| Lane Group Flow (vph) | 354 | 729 | 0 | 116 | 803 | 0 | 212 | 670 | 0 | 229 | 302 | 380 |
| Confl. Peds. (#/hr) | 15 | | | | | 15 | 3 | | 5 | 5 | | 3 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | 6 |
| Actuated Green, G (s) | 26.0 | 51.1 | | 13.9 | 39.0 | | 24.0 | 36.0 | | 23.0 | 35.0 | 35.0 |
| Effective Green, g (s) | 26.0 | 51.1 | | 13.9 | 39.0 | | 24.0 | 36.0 | | 23.0 | 35.0 | 35.0 |
| Actuated g/C Ratio | 0.19 | 0.37 | | 0.10 | 0.28 | | 0.17 | 0.26 | | 0.16 | 0.25 | 0.25 |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 328 | 1251 | | 175 | 963 | | 303 | 891 | | 290 | 465 | 388 |
| v/s Ratio Prot | c0.20 | 0.21 | | 0.07 | c0.23 | | 0.12 | c0.19 | | 0.13 | 0.16 | |
| v/s Ratio Perm | | | | | | | | | | | | c0.24 |
| v/c Ratio | 1.08 | 0.58 | | 0.66 | 0.83 | | 0.70 | 0.75 | | 0.79 | 0.65 | 0.98 |
| Uniform Delay, d1 | 57.0 | 35.9 | | 60.8 | 47.5 | | 54.6 | 47.9 | | 56.2 | 47.0 | 52.2 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 72.5 | 2.0 | | 9.1 | 8.4 | | 12.7 | 5.8 | | 19.3 | 6.9 | 41.0 |
| Delay (s) | 129.5 | 37.8 | | 69.9 | 55.9 | | 67.3 | 53.7 | | 75.5 | 53.9 | 93.1 |
| Level of Service | F | D | | E | E | | E | D | | E | D | F |
| Approach Delay (s) | | 67.4 | | | 57.6 | | | 56.9 | | | 79.6 | |
| Approach LOS | | E | | | E | | | E | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 66.4 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.92 | | |
| Actuated Cycle Length (s) | 140.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 83.0% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

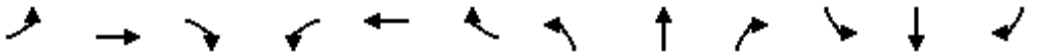
c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 683 | 726 | 295 | 94 | 654 | 92 | 158 | 196 | 47 | 82 | 222 | 292 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.96 | | 1.00 | 0.98 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 3386 | | 1770 | 3463 | | 1770 | 3426 | | 1770 | 1863 | 1555 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | 3386 | | 1770 | 3463 | | 1770 | 3426 | | 1770 | 1863 | 1555 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.93 | 0.93 | 0.93 | 0.87 | 0.87 | 0.87 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 719 | 764 | 311 | 101 | 703 | 99 | 182 | 225 | 54 | 93 | 252 | 332 |
| RTOR Reduction (vph) | 0 | 39 | 0 | 0 | 10 | 0 | 0 | 19 | 0 | 0 | 0 | 284 |
| Lane Group Flow (vph) | 719 | 1036 | 0 | 101 | 792 | 0 | 182 | 260 | 0 | 93 | 252 | 48 |
| Confl. Peds. (#/hr) | 6 | | | | | 6 | 3 | | 2 | 2 | | 3 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | 6 |
| Actuated Green, G (s) | 37.0 | 51.5 | | 10.5 | 25.0 | | 16.0 | 16.0 | | 16.0 | 16.0 | 16.0 |
| Effective Green, g (s) | 37.0 | 51.5 | | 10.5 | 25.0 | | 16.0 | 16.0 | | 16.0 | 16.0 | 16.0 |
| Actuated g/C Ratio | 0.34 | 0.47 | | 0.10 | 0.23 | | 0.15 | 0.15 | | 0.15 | 0.15 | 0.15 |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 595 | 1585 | | 168 | 787 | | 257 | 498 | | 257 | 270 | 226 |
| v/s Ratio Prot | c0.41 | 0.31 | | 0.06 | c0.23 | | c0.10 | 0.08 | | 0.05 | c0.14 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.03 |
| v/c Ratio | 1.21 | 0.65 | | 0.60 | 1.01 | | 0.71 | 0.52 | | 0.36 | 0.93 | 0.21 |
| Uniform Delay, d1 | 36.5 | 22.4 | | 47.7 | 42.5 | | 44.8 | 43.5 | | 42.4 | 46.5 | 41.5 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 108.9 | 2.1 | | 5.9 | 33.6 | | 15.2 | 3.9 | | 3.9 | 40.0 | 2.2 |
| Delay (s) | 145.4 | 24.5 | | 53.7 | 76.1 | | 60.0 | 47.4 | | 46.3 | 86.5 | 43.6 |
| Level of Service | F | C | | D | E | | E | D | | D | F | D |
| Approach Delay (s) | | 73.0 | | | 73.6 | | | 52.3 | | | 59.9 | |
| Approach LOS | | E | | | E | | | D | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 68.3 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 1.02 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 94.3% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

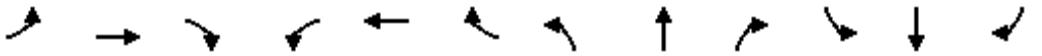
c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 334 | 556 | 145 | 113 | 696 | 89 | 195 | 550 | 73 | 209 | 272 | 591 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.97 | | 1.00 | 0.98 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 3429 | | 1770 | 3459 | | 1770 | 3467 | | 1770 | 1863 | 1552 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | 3429 | | 1770 | 3459 | | 1770 | 3467 | | 1770 | 1863 | 1552 |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.97 | 0.97 | 0.97 | 0.92 | 0.92 | 0.92 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 355 | 591 | 154 | 116 | 718 | 92 | 212 | 598 | 79 | 232 | 302 | 657 |
| RTOR Reduction (vph) | 0 | 16 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 268 |
| Lane Group Flow (vph) | 355 | 729 | 0 | 116 | 803 | 0 | 212 | 670 | 0 | 232 | 302 | 389 |
| Confl. Peds. (#/hr) | 15 | | | | | 15 | 3 | | 5 | 5 | | 3 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | 6 |
| Actuated Green, G (s) | 26.0 | 51.1 | | 13.9 | 39.0 | | 24.0 | 36.0 | | 23.0 | 35.0 | 35.0 |
| Effective Green, g (s) | 26.0 | 51.1 | | 13.9 | 39.0 | | 24.0 | 36.0 | | 23.0 | 35.0 | 35.0 |
| Actuated g/C Ratio | 0.19 | 0.37 | | 0.10 | 0.28 | | 0.17 | 0.26 | | 0.16 | 0.25 | 0.25 |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 328 | 1251 | | 175 | 963 | | 303 | 891 | | 290 | 465 | 388 |
| v/s Ratio Prot | c0.20 | 0.21 | | 0.07 | c0.23 | | 0.12 | c0.19 | | 0.13 | 0.16 | |
| v/s Ratio Perm | | | | | | | | | | | | c0.25 |
| v/c Ratio | 1.08 | 0.58 | | 0.66 | 0.83 | | 0.70 | 0.75 | | 0.80 | 0.65 | 1.00 |
| Uniform Delay, d1 | 57.0 | 35.9 | | 60.8 | 47.5 | | 54.6 | 47.9 | | 56.3 | 47.0 | 52.5 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 73.4 | 2.0 | | 9.1 | 8.4 | | 12.7 | 5.8 | | 20.3 | 6.9 | 46.5 |
| Delay (s) | 130.4 | 37.8 | | 69.9 | 55.9 | | 67.3 | 53.7 | | 76.6 | 53.9 | 99.0 |
| Level of Service | F | D | | E | E | | E | D | | E | D | F |
| Approach Delay (s) | | 67.7 | | | 57.6 | | | 56.9 | | | 83.2 | |
| Approach LOS | | E | | | E | | | E | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 67.6 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.93 | | |
| Actuated Cycle Length (s) | 140.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 83.3% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

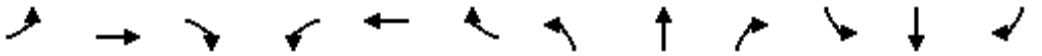
c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 607 | 786 | 331 | 99 | 670 | 26 | 306 | 350 | 91 | 84 | 367 | 386 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.96 | | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 3382 | | 1770 | 3516 | | 1770 | 3418 | | 1770 | 1863 | 1554 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | 3382 | | 1770 | 3516 | | 1770 | 3418 | | 1770 | 1863 | 1554 |
| Peak-hour factor, PHF | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Adj. Flow (vph) | 619 | 802 | 338 | 101 | 684 | 27 | 312 | 357 | 93 | 86 | 374 | 394 |
| RTOR Reduction (vph) | 0 | 38 | 0 | 0 | 2 | 0 | 0 | 20 | 0 | 0 | 0 | 322 |
| Lane Group Flow (vph) | 619 | 1102 | 0 | 101 | 709 | 0 | 312 | 430 | 0 | 86 | 374 | 72 |
| Confl. Peds. (#/hr) | 6 | | | | | 6 | 3 | | 2 | 2 | | 3 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | 6 |
| Actuated Green, G (s) | 39.0 | 52.4 | | 9.6 | 23.0 | | 20.0 | 26.0 | | 16.0 | 22.0 | 22.0 |
| Effective Green, g (s) | 39.0 | 52.4 | | 9.6 | 23.0 | | 20.0 | 26.0 | | 16.0 | 22.0 | 22.0 |
| Actuated g/C Ratio | 0.32 | 0.44 | | 0.08 | 0.19 | | 0.17 | 0.22 | | 0.13 | 0.18 | 0.18 |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 575 | 1476 | | 141 | 673 | | 295 | 740 | | 236 | 341 | 284 |
| v/s Ratio Prot | c0.35 | 0.33 | | 0.06 | c0.20 | | c0.18 | 0.13 | | 0.05 | c0.20 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.05 |
| v/c Ratio | 1.08 | 0.75 | | 0.72 | 1.05 | | 1.06 | 0.58 | | 0.36 | 1.10 | 0.25 |
| Uniform Delay, d1 | 40.5 | 28.2 | | 53.9 | 48.5 | | 50.0 | 42.1 | | 47.4 | 49.0 | 42.0 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 59.8 | 3.5 | | 15.9 | 49.4 | | 68.4 | 3.3 | | 4.3 | 77.3 | 2.1 |
| Delay (s) | 100.3 | 31.7 | | 69.8 | 97.9 | | 118.4 | 45.4 | | 51.7 | 126.3 | 44.1 |
| Level of Service | F | C | | E | F | | F | D | | D | F | D |
| Approach Delay (s) | | 55.9 | | | 94.4 | | | 75.3 | | | 80.9 | |
| Approach LOS | | E | | | F | | | E | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 72.0 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 1.07 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 102.6% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

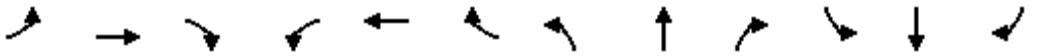
c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 351 | 865 | 225 | 153 | 944 | 62 | 255 | 712 | 95 | 198 | 337 | 572 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.97 | | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 3430 | | 1770 | 3496 | | 1770 | 3467 | | 1770 | 1863 | 1553 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | 3430 | | 1770 | 3496 | | 1770 | 3467 | | 1770 | 1863 | 1553 |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.97 | 0.97 | 0.97 | 0.92 | 0.92 | 0.92 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 373 | 920 | 239 | 158 | 973 | 64 | 277 | 774 | 103 | 220 | 374 | 636 |
| RTOR Reduction (vph) | 0 | 18 | 0 | 0 | 4 | 0 | 0 | 8 | 0 | 0 | 0 | 263 |
| Lane Group Flow (vph) | 373 | 1141 | 0 | 158 | 1033 | 0 | 277 | 869 | 0 | 220 | 374 | 373 |
| Confl. Peds. (#/hr) | 15 | | | | | 15 | 3 | | 5 | 5 | | 3 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | 6 |
| Actuated Green, G (s) | 27.0 | 50.7 | | 14.3 | 38.0 | | 20.0 | 32.0 | | 17.0 | 29.0 | 29.0 |
| Effective Green, g (s) | 27.0 | 50.7 | | 14.3 | 38.0 | | 20.0 | 32.0 | | 17.0 | 29.0 | 29.0 |
| Actuated g/C Ratio | 0.21 | 0.39 | | 0.11 | 0.29 | | 0.15 | 0.25 | | 0.13 | 0.22 | 0.22 |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 367 | 1337 | | 194 | 1021 | | 272 | 853 | | 231 | 415 | 346 |
| v/s Ratio Prot | c0.21 | 0.33 | | 0.09 | c0.30 | | 0.16 | c0.25 | | 0.12 | 0.20 | |
| v/s Ratio Perm | | | | | | | | | | | | c0.24 |
| v/c Ratio | 1.02 | 0.85 | | 0.81 | 1.01 | | 1.02 | 1.02 | | 0.95 | 0.90 | 1.08 |
| Uniform Delay, d1 | 51.5 | 36.3 | | 56.6 | 46.0 | | 55.0 | 49.0 | | 56.1 | 49.1 | 50.5 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 51.2 | 7.1 | | 22.4 | 31.2 | | 59.4 | 35.5 | | 48.1 | 25.2 | 70.4 |
| Delay (s) | 102.7 | 43.3 | | 78.9 | 77.2 | | 114.4 | 84.5 | | 104.2 | 74.3 | 120.9 |
| Level of Service | F | D | | E | E | | F | F | | F | E | F |
| Approach Delay (s) | | 57.8 | | | 77.4 | | | 91.7 | | | 103.8 | |
| Approach LOS | | E | | | E | | | F | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 81.1 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.05 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 94.7% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

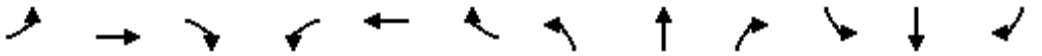
c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 615 | 786 | 331 | 99 | 670 | 29 | 306 | 350 | 91 | 84 | 367 | 388 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.96 | | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 3382 | | 1770 | 3513 | | 1770 | 3418 | | 1770 | 1863 | 1554 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | 3382 | | 1770 | 3513 | | 1770 | 3418 | | 1770 | 1863 | 1554 |
| Peak-hour factor, PHF | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Adj. Flow (vph) | 628 | 802 | 338 | 101 | 684 | 30 | 312 | 357 | 93 | 86 | 374 | 396 |
| RTOR Reduction (vph) | 0 | 38 | 0 | 0 | 2 | 0 | 0 | 20 | 0 | 0 | 0 | 323 |
| Lane Group Flow (vph) | 628 | 1102 | 0 | 101 | 712 | 0 | 312 | 430 | 0 | 86 | 374 | 73 |
| Confl. Peds. (#/hr) | 6 | | | | | 6 | 3 | | 2 | 2 | | 3 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | 6 |
| Actuated Green, G (s) | 39.0 | 52.4 | | 9.6 | 23.0 | | 20.0 | 26.0 | | 16.0 | 22.0 | 22.0 |
| Effective Green, g (s) | 39.0 | 52.4 | | 9.6 | 23.0 | | 20.0 | 26.0 | | 16.0 | 22.0 | 22.0 |
| Actuated g/C Ratio | 0.32 | 0.44 | | 0.08 | 0.19 | | 0.17 | 0.22 | | 0.13 | 0.18 | 0.18 |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 575 | 1476 | | 141 | 673 | | 295 | 740 | | 236 | 341 | 284 |
| v/s Ratio Prot | c0.35 | 0.33 | | 0.06 | c0.20 | | c0.18 | 0.13 | | 0.05 | c0.20 | |
| v/s Ratio Perm | | | | | | | | | | | | 0.05 |
| v/c Ratio | 1.09 | 0.75 | | 0.72 | 1.06 | | 1.06 | 0.58 | | 0.36 | 1.10 | 0.26 |
| Uniform Delay, d1 | 40.5 | 28.2 | | 53.9 | 48.5 | | 50.0 | 42.1 | | 47.4 | 49.0 | 42.0 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 65.1 | 3.5 | | 15.9 | 50.8 | | 68.4 | 3.3 | | 4.3 | 77.3 | 2.2 |
| Delay (s) | 105.6 | 31.7 | | 69.8 | 99.3 | | 118.4 | 45.4 | | 51.7 | 126.3 | 44.1 |
| Level of Service | F | C | | E | F | | F | D | | D | F | D |
| Approach Delay (s) | | 58.0 | | | 95.7 | | | 75.3 | | | 80.8 | |
| Approach LOS | | E | | | F | | | E | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 73.1 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 1.08 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 103.1% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 352 | 865 | 225 | 153 | 944 | 62 | 255 | 712 | 95 | 201 | 337 | 580 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 1.00 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.97 | | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 3430 | | 1770 | 3496 | | 1770 | 3467 | | 1770 | 1863 | 1553 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | 3430 | | 1770 | 3496 | | 1770 | 3467 | | 1770 | 1863 | 1553 |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.97 | 0.97 | 0.97 | 0.92 | 0.92 | 0.92 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 374 | 920 | 239 | 158 | 973 | 64 | 277 | 774 | 103 | 223 | 374 | 644 |
| RTOR Reduction (vph) | 0 | 18 | 0 | 0 | 4 | 0 | 0 | 8 | 0 | 0 | 0 | 263 |
| Lane Group Flow (vph) | 374 | 1141 | 0 | 158 | 1033 | 0 | 277 | 869 | 0 | 223 | 374 | 381 |
| Confl. Peds. (#/hr) | 15 | | | | | 15 | 3 | | 5 | 5 | | 3 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | 6 |
| Actuated Green, G (s) | 27.0 | 50.7 | | 14.3 | 38.0 | | 20.0 | 32.0 | | 17.0 | 29.0 | 29.0 |
| Effective Green, g (s) | 27.0 | 50.7 | | 14.3 | 38.0 | | 20.0 | 32.0 | | 17.0 | 29.0 | 29.0 |
| Actuated g/C Ratio | 0.21 | 0.39 | | 0.11 | 0.29 | | 0.15 | 0.25 | | 0.13 | 0.22 | 0.22 |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 367 | 1337 | | 194 | 1021 | | 272 | 853 | | 231 | 415 | 346 |
| v/s Ratio Prot | c0.21 | 0.33 | | 0.09 | c0.30 | | 0.16 | c0.25 | | 0.13 | 0.20 | |
| v/s Ratio Perm | | | | | | | | | | | | c0.25 |
| v/c Ratio | 1.02 | 0.85 | | 0.81 | 1.01 | | 1.02 | 1.02 | | 0.97 | 0.90 | 1.10 |
| Uniform Delay, d1 | 51.5 | 36.3 | | 56.6 | 46.0 | | 55.0 | 49.0 | | 56.2 | 49.1 | 50.5 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 51.9 | 7.1 | | 22.4 | 31.2 | | 59.4 | 35.5 | | 50.9 | 25.2 | 78.0 |
| Delay (s) | 103.4 | 43.3 | | 78.9 | 77.2 | | 114.4 | 84.5 | | 107.1 | 74.3 | 128.5 |
| Level of Service | F | D | | E | E | | F | F | | F | E | F |
| Approach Delay (s) | | 58.0 | | | 77.4 | | | 91.7 | | | 108.4 | |
| Approach LOS | | E | | | E | | | F | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 82.3 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.06 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 94.9% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group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