DRAFT INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Hayward Maintenance Complex Project

San Francisco Bay Area Rapid Transit District

December 2010

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Hayward Maintenance Complex Project

San Francisco Bay Area Rapid Transit District

Prepared for
San Francisco Bay Area Rapid Transit District
300 Lakeside Drive, 16th Floor
Oakland, CA 94612

Prepared by
PBS&J
475 Sansome Street, Suite 2000
San Francisco, CA 94111

December 2010

DRAFT INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Date of Publication of Draft Initial Study/Mitigated Negative Declaration: December 3, 2010

Project Title: Hayward Maintenance Complex Project
Lead Agency: San Francisco Bay Area Rapid Transit District
Agency Contact Person: Ellen Smith **Telephone:** (510) 287-4758

Project Location: City of Hayward and Union City, Alameda County; west of one existing Union Pacific Railroad (UPRR) rail line (Oakland Subdivision) and east of a second (Niles Subdivision), south of Industrial Parkway (in Hayward) extending south of Whipple Road to about D Street (in Union City).

Project Description: The San Francisco Bay Area Rapid Transit District (BART) operates and maintains 104 miles of track in revenue service and 43 stations, serving an average of 360,000 passenger trips every weekday in the counties of San Francisco, Alameda, Contra Costa, and San Mateo. The Hayward Yard is one of four BART maintenance facilities serving the BART system. Over the next 30 years, BART will require additional vehicles to meet future demand associated with regional population growth, system expansions for the Warm Springs and Silicon Valley/San Jose Extension projects, and additional riders from the Oakland Airport Connector, eBART, and Livermore projects. Accordingly, BART requires expanded maintenance and storage facilities to serve the expanded fleet. The proposed Hayward Maintenance Complex project (proposed project) would consist of acquisition and improvement to three properties on the west side of the existing Hayward Yard and the construction of additional storage tracks for a maximum of 250 vehicles on undeveloped BART property on the east side of the Hayward Yard. The project site is zoned for industrial uses and the proposed activities would be consistent with this zoning designation.

This Project Could Not Have A Significant Effect on the Environment: This finding is based upon the criteria of the Guidelines of the State Secretary for Resources, Sections 15064 (Determining Significant Effect), 15065 (Mandatory Findings of Significance), and 15070 (Decision to Prepare a Negative Declaration), and the reasons documented in the Environmental Evaluation (Initial Study) for the project, which is attached. Mitigation measures are included in this project to avoid potentially significant effects. They are identified in the attached Initial Study and summarized below.

Copies of the Initial Study/Mitigated Negative Declaration: Copies of the document can be obtained by calling the agency contact person at the following number and leaving information on how you may be contacted: (510) 287-4758. A copy of the document will be mailed to you. Copies of the Initial Study/Mitigated Negative Declaration can also be reviewed on the BART website at www.bart.gov/hmc. In addition, copies of the Initial Study/Mitigated Negative Declaration are available at the main libraries in Hayward and Union City. The locations of those libraries are:

Hayward Main Library
835 C Street
Hayward, CA 94541

Union City Library
34007 Alvarado-Niles Road
Union City, California 94587

Copies of the Initial Study/Mitigated Negative Declaration and background documents are available for review at the offices of the San Francisco Bay Area Rapid Transit District: 300 Lakeside Drive, 16th Floor, Oakland, CA 94612.

Public Meeting: BART will hold a public meeting to receive public comments on the Draft Initial Study/Mitigated Negative Declaration. The meeting will be held at the following location:

December 15, 2010
6:30 pm to 8:00 pm
New Haven Adult School
600 G Street
Union City, CA 94587

Comments on the Draft Initial Study/Mitigated Negative Declaration: The comment period is scheduled from December 3, 2010 through January 14, 2011. Comments will be received at the public hearing, in writing, by fax, and by email. Email comments will be accepted at: esmith1@bart.gov. Written comments will be accepted by fax at (510) 464-7673 or mailed to the following address:

San Francisco Bay Area Rapid Transit District
Attention: Ellen Smith
300 Lakeside Drive, 16th Floor
Oakland, CA 94612

The following mitigation measures are being incorporated into the Hayward Maintenance Complex Project:

VQ-1 *Replacement of Trees that Screen Views of Industrial Buildings*. If construction activities south of Whipple Road require removal of the existing trees near the industrial buildings west of the BART mainline, BART shall plant replacement trees at a 1:1 ratio in the area of removal, after construction activities are complete.

AQ-1 *Construction Phasing to Reduce Air Emissions*. For construction of the storage tracks in Phase 2, BART shall ensure that all work involving clearing, grubbing, grading, and fill transport associated with work on the project site north of Whipple Road not be conducted concurrently with construction work south of Whipple Road to assure that the BAAQMD NO_x construction equipment emission threshold would not be exceeded.

AQ-2 *Dust Control during Construction*. BART shall ensure implementation of the following mitigation measures during project construction, in accordance with Bay Area Air Quality Management District (BAAQMD) standard mitigation requirements:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day, or as necessary to control dust.

- 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 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as practical.
- Building pads shall be laid as soon as practical 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 [CCR]). Clear signage stating the regulations 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 mechanic and determined to be running in proper condition prior to operation.
- 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 Air District's phone number shall also be visible to ensure compliance with applicable regulations.

BIO-1 *Wetland Avoidance and Protection.* BART shall ensure that the wetlands adjacent to the east side expansion area of the project site are not affected during construction by installing orange exclusionary fence to alert construction crews that the areas are to be avoided during construction, and through compliance with applicable statewide NPDES general permits.

In addition, BART shall ensure that post installation conditions shall not cause significant changes to the pre-project hydrology, water quality, or water quantity in any wetland or other water of the U.S. that is affected by the project. This shall be accomplished through implementation of Mitigation Measures HYD-1 and HYD-2 from the Hydrology section, *Stormwater Drainage System Design*, and through compliance with applicable statewide NPDES general permits.

BIO-2 *Restrictions on Tree or Shrub Removal to Avoid Nesting Birds.* Tree or shrub removal or pruning shall be avoided from March 1 through September 15, the bird nesting period, to the extent feasible. If no tree or shrub removal or pruning is

proposed during the nesting period, no surveys or further mitigation measures are required.

BIO-3 *Pre-construction Nesting Bird Survey and Measures to Reduce Harm to Nesting Birds*. If tree and shrub removal is unavoidable during the nesting season, BART shall hire a qualified biologist to conduct a survey for nesting raptors and other birds covered by the MBTA. BART shall have a qualified biologist conduct nest surveys no more than 30 days prior to any demolition/construction or ground-disturbing activities that are within 500 feet of potential nest trees or suitable nesting habitat (i.e., trees, tule, cattails, grassland). A pre-construction survey report shall be submitted to CDFG that includes, at a minimum: (1) a description of the methodology including dates of field visits, the names of survey personnel with resumes, and a list of references cited and persons contacted; and (2) a map showing the location(s) of any bird nests observed on the project site. If no active nests of MBTA-covered species are identified, then no further mitigation is required.

If active nests of protected bird species are identified in the focused nest surveys, BART will consult with the appropriate regulatory agencies to identify project-level mitigation requirements, based on the agencies' standards and policies as then in effect. Mitigation may include the following, based on current agency standards and policies:

a) BART, in consultation with CDFG, would delay construction in the vicinity of active nest sites during the breeding season (March 1 through September 15) while the nest is occupied with adults and/or young. A qualified biologist would monitor any occupied nest to determine when the nest is no longer used. If the construction cannot be delayed, avoidance measures would include the establishment of a non-disturbance buffer zone around the nest site. The size of the buffer zone would be determined in consultation with the CDFG, but will be a minimum of 100 feet. The buffer zone would be delineated with highly visible temporary construction fencing.

b) No intensive disturbance (e.g., heavy equipment operation associated with construction, or use of cranes) or other project-related activities that could cause nest abandonment or forced fledging would be initiated within the established buffer zone of an active nest between March 1 and September 15.

c) If construction activities are unavoidable within the buffer zone, BART would retain a qualified biologist to monitor the nest site to determine if construction activities are disturbing the adult or young birds. If abandonment occurs, the biologist would consult with CDFG or USFWS (who monitor compliance with the MBTA) for the appropriate salvage measures (e.g., remove abandoned

nestlings to an agency approved wildlife care group). BART would be required to fund the full costs of the salvage measures.

d) If fully protected species are found to be nesting near the construction area, their nests would be completely avoided until the birds fledge. Avoidance would include the establishment of a non-disturbance buffer zone of 250 feet, or as determined in consultation with the CDFG.

BIO-4 *Tree Survey and Replacement of Protected Trees to be Removed.* Prior to construction, BART shall retain a certified arborist to survey trees in the project area, including potential access roads and staging areas, to identify and evaluate trees that shall be removed. A report shall be prepared and submitted to BART to document the trees that are to be removed. Mitigation shall be required for impacts to trees designated as "protected trees" in the cities of Hayward or Union City. Replacement trees will be a native tree species. Each removed tree meeting the above classifications will be replaced at a 1:1 ratio. Trees will be planted in locations suitable for the replacement species. Selection of the replacement sites and installation of replacement plantings will be supervised by a qualified botanist. Trees will be replaced as soon as practical after construction is completed. A qualified botanist will monitor newly planted trees at least once a year for 5 years. Each year during that period, any trees that do not survive will be replaced. Any trees planted as remediation for failed plantings will be planted as stipulated here for original plantings, and will be monitored for a period of 5 years following installation.

CR-1 *Avoidance of Discovered Cultural Resources and Measures to Reduce Harm.* If evidence of an archaeological site or other suspected historic resource is encountered during construction, including darkened soil representing past human activity ("midden") that could conceal material remains (e.g., worked stone, faunal bone, hearths, or storage pit), all ground-disturbing activity within 100 feet of the find shall be halted and BART notified. BART will hire an archaeologist meeting the Secretary of the Interior's Standards for Professional Archaeologist to assess the find. Impacts to any significant resources may be mitigated through avoidance, data recovery, or other methods determined adequate by the qualified archaeologist and that are consistent with the Secretary of the Interior's Standards for Archeological Documentation. Any mitigation plan developed by the qualified archaeologist shall be approved by BART prior to implementation. Project-related ground-disturbing activities shall not be continued in the vicinity of any discovered resource until the significance of the resource is resolved and mitigation action (if any) is completed.

CR-2 *Avoidance of Discovered Human Remains and Measures to Reduce Harm.* If human remains, including disarticulated or cremated remains, are discovered during any phase of construction, all ground-disturbing activities in the vicinity and

any nearby area reasonably suspected to overlie adjacent human remains shall be immediately halted. BART and the Alameda County Coroner shall be notified immediately, according to Section 5097.98 of the State Public Resources Code and Section 7050.05 of California's Health and Safety Code. If the remains are determined by the county coroner to be Native American, it is the responsibility of the county coroner to inform the Native American Heritage Commission (NAHC) within 24 hours. The guidelines of the NAHC should be adhered to in the treatment and disposition of the remains. BART shall retain a qualified archaeologist who meets the Secretary of the Interior's Standards for Professional Archaeologist and with Native American burial experience to conduct a field investigation of the specific site and consult with the person identified as the Most Likely Descendent, if any, identified by the NAHC. BART shall approve any mitigation recommended by the qualified archaeologist prior to implementation, taking account of the provisions of State law as set forth in the California Environmental Quality Act (CEQA) Guidelines Section 15064.5(e) and Public Resources Code Section 5097.98. Approved mitigation must be implemented before resumption of ground-disturbing activities in the vicinity of where the remains were discovered.

GHG-1 *Construction-Related Greenhouse Gas Best Management Practices.* BART shall ensure implementation of the following mitigation measures during project construction, in accordance with Bay Area Air Quality Management District (BAAQMD) standard mitigation recommendations which suggest:

- Use alternative-fueled (e.g., biodiesel, electric) construction vehicles/equipment for at least 15 percent of the fleet;
- Use local building materials (within 100 miles) of at least 10 percent; and
- Recycle or reuse at least 50 percent of construction waste or demolition materials.

HAZ-1 *File Review and a Phase I ESA Prior to Construction.* Prior to construction, BART shall conduct an environmental site assessment (ESA) to further analyze potential hazardous materials and waste sites around the project site. BART shall ensure that additional research, including a file review with the Alameda County Department of Environmental Health and the RWQCB and a Phase I ESA for the west side expansion area, is performed. If the file review reveals no potential impact from environmental contamination, no further action to remedy soil or groundwater contamination would be necessary.

HAZ-2 *Further Soil and Groundwater Investigations Prior to any Construction Activities.* If the file review under Mitigation Measure HAZ-1 above reveals potential environmental contamination along or beneath the proposed project's footprint or other facilities, BART shall evaluate the sites to determine the level of investigation appropriate to evaluate the possible presence of hazardous chemicals in soil and groundwater. In the event soil and/or groundwater testing is deemed appropriate,

BART shall ensure that a Phase II soil and groundwater investigation is conducted in the affected areas, including field sampling and laboratory analysis, to evaluate conditions where excavation and grading will take place. The Phase II investigation shall be completed prior to any construction or excavation work, and a schedule shall be developed in the pre-design phase of the project to ensure that a sufficient amount of time is allotted prior to site development to identify and implement actions to investigate the presence of hazardous substances in soil and groundwater, and to identify design and contingency measures in the event that the results of the investigation indicate the need for further testing, site controls, or remediation.

The number, location of field samples, and constituents tested would depend on the size of the impacted site, site activities, and possible transport or migration routes. Field samples may include soil, soil gas, or groundwater, depending on the nature of the contaminants suspected to be present. The sampling plan shall specify that all soil and groundwater chemical analyses shall be performed by a California-certified laboratory, using standard EPA and California chemical testing methods. The investigation results shall, if necessary, lead to preparation of a:

- Remedial Action Plan for soil and groundwater treatment and disposal;
- Health and Safety Risk Assessment; and
- Soil management plan with criteria for impacted soils, in consultation with DTSC and RWQCB.

If necessary, a Remedial Action Plan shall be prepared to identify options for remediation of the contaminated site. If the proposed remedial approach does not involve complete source removal, a Health and Safety Risk Assessment shall be completed. Work in impacted areas will be conducted in accordance with applicable Cal OSHA requirements.

HAZ-3 *Remediation of Contaminated Sites Prior to Construction.* If hazardous materials are identified in soil and groundwater at levels that present a risk to the public, to construction workers, or to the environment, based on the investigations described in Mitigation Measure HAZ-2 above, BART shall ensure that remediation is conducted at contaminated sites pursuant to applicable laws and regulations.

A Remedial Action Plan may be developed if warranted to address potential air and health impacts from soil excavation activities, potential transportation impacts from the removal of remedial activities, and potential risks of public upset should there be an accident at excavation sites. During excavation activities, construction workers or the public may be exposed to contaminants in the soil through ingestion, dermal contact, inhalation of fugitive dust, and inhalation of volatile emissions. The Site-Specific Health and Safety Plan will include measures to mitigate these potential impacts, such as cordoning off excavation sites to prevent

public access, water misting to control dust during removal activities, perimeter air monitoring for dust along the site boundaries both upwind and immediately downwind of site excavation and stockpiling activities, and air monitoring of volatile organic compounds (VOC). All exposed contaminated materials shall be covered at the end of each day. Excavation work shall be performed in compliance with all OSHA rules and regulations.

HAZ-4 *Discovered Environmental Contamination During Construction*. In the event that soil, groundwater or other environmental medium with suspected contamination is encountered unexpectedly during construction activities after implementation of Mitigation Measure HAZ-3, BART's contractor shall cease work in the vicinity of the suspect material, the area shall be secured as necessary, and contractor shall take all appropriate measures to protect human health and the environment. Appropriate measures shall include notification of the applicable regulatory agency(ies) as necessary, to identify the nature and extent of contamination. Work shall not resume in the area(s) affected until the measures have been implemented under the oversight of the corresponding regulatory agency(ies), as appropriate.

HYD-1 *Stormwater Drainage System Design*. Prior to final design of each phase of the proposed project, BART shall have a licensed professional engineer registered in California prepare a detailed Hydrology and Hydraulics Report that identifies flow contributing areas (catchments), flow pathways, off-site discharge locations, receiving storm drain systems, and proposed on-site flow conveyance structures and conveyance capacities.

The Hydrology and Hydraulics Report shall identify the off-site peak flow rates and flow volumes for the 100-year storm event at all proposed off-site discharge locations, retained existing on-site flow conveyance structures, and proposed on-site flow conveyance structures for both existing conditions and proposed project conditions. The detailed Hydrology and Hydraulics Report calculations shall be prepared in accordance with Alameda County Flood Control District Hydrology and Hydraulics Manual (June 2003, or later version, as applicable).

Off-site Runoff. Based on the detailed Hydrology and Hydraulics Report, BART shall design on-site detention (or retention) facilities sufficient to detain increases in 100-year runoff peak flow rates and retain increases in 100-year flow volumes at all off-site discharge locations compared to existing conditions.

BART shall submit a preliminary design, along with the Hydrology and Hydraulics Report, to the Alameda Flood Control District and City of Hayward Public Works Department for review. BART shall incorporate Alameda Flood Control District recommendations into the project design, where applicable, prior to the beginning of construction activities.

On-site Runoff. BART shall design on-site drainage in accordance with one of the following, or a combination of the following:

- BART shall design sufficient on-site detention (or retention) to detain increase in flow rates in excess of the conveyance capacity of existing downstream structures; or
- BART shall upgrade existing on-site conveyance structures to provide sufficient conveyance capacity. All proposed on-site conveyance structures shall be designed with adequate capacity to convey the 100-year storm event.

NO-1 *Construction of Sound Walls*. BART shall incorporate sound walls at the BART right-of-way line or other locations that mitigate the noise impacts indicated in Table 13 and Table 14 of this IS/MND. Implementation of sound walls will provide approximately 10 dBA reduction in overall noise levels. Concrete block masonry, poured-in-place, or pre-cast concrete walls would be acceptable as construction materials provided they have a minimum surface density of 4 lbs/ft^2. The specific location of sound walls will be addressed in final design. Sound walls will be constructed in phases as necessary to reduce noise as components of the project are constructed.

NO-2 *Installation of Building Sound Insulation Features*. For those receptors where the outdoor wayside noise from the train operations at ground level can be mitigated to achieve the FTA criteria, but the sound walls provided by Mitigation Measure NO-1 are not sufficient to mitigate noise levels at upper stories, BART will measure operational noise levels on a case-by-case basis following project implementation. Where the existing building construction does not provide interior noise levels of Ldn 45 dBA or lower, BART will quantitatively evaluate individual structures and implement a formal program of building sound insulation improvement as necessary to meet this criterion.

NO-3 *Construction Noise Best Management Practices*. BART shall incorporate the following practices into the construction documents to be implemented by the project contractor. Such practices include, but are not limited to, the following measures:

- Where feasible, BART shall require that the contractor complies with a Performance Standard of 80 dBA 8-hour L_{eq} during the daytime (7 a.m. to 10 p.m.) and 75 dBA 8-hour L_{eq} during the nighttime (10 p.m. to 7 a.m.) at the property line of the sensitive receptor.
- Prior to construction, BART shall ensure that a Noise Control and Monitoring Report is prepared. The report shall include expected construction noise levels, noise control measures, and explain how the contractor intends to monitor and document construction noise and complaints.

- Locate noisy equipment as far as possible from noise sensitive receptors. In addition, the use of temporary barriers should be employed around the equipment.
- Where construction noise impacts have been identified, use temporary noise barriers along the working area and/or project right-of-way. Barriers/curtains must achieve a Sound Transmission Class (STC) of 30 or greater in accordance with ASTM Test Method E90 and be constructed from material having a surface density of at least 4 pounds/square foot, to ensure adequate transmission loss.
- When nighttime or 24-hour construction will be required, coordinate with residents to ensure that the affected residents are fully informed about the upcoming construction. Residents will be given the option of sleeping in hotel rooms at BART expense for the duration of the nighttime construction in areas where construction is expected to exceed the FTA criterion. Residents that work nights and sleep days in locations where construction noise is expected to exceed the FTA criterion will be given the same option.
- Require ambient sensitive ("smart") backup alarms, SAE Class D, or limit to SAE Class C (97 dB) for vehicles over 2.5 cubic yards haulage capacity, or Cal-OSHA/DOSH-approved methods that avoid backup alarm noise for vehicles under 2.5 cubic yards haulage capacity.
- Fit silencers to combustion engines. Ensure that equipment has effective, quality mufflers installed, in good working condition.
- Switch off engines or reduce to idle when not in use.
- Lubricate and maintain equipment regularly.
- Route construction-related truck traffic along roadways that result in the least disturbance to sensitive receptors.

NO-4 *Vibration Reducing Technology*. BART shall incorporate vibration mitigation measures such as tire-derived aggregate (TDA) or floating slab track (FST) under the track, or other technology that may be developed to attain the FTA groundborne vibration operational criterion of 72 VdB. The general location of the mitigation measures under the track is presented in Table 22. However, the actual extent of the mitigation control would be determined during final design.

NO-5 *Construction Vibration Best Management Practices*. Where potential construction vibration impacts have been identified, the contractor shall be required to select equipment and methods that would reduce potential annoyance to nearby residents. Such practices include, but are not limited to, the following measures:

- Comply with a Performance Standard of 0.3 in/sec PPV at any building at any time.

- Minimize vibration annoyance by maintaining vibration levels at 80 VdB or less at any building at any time.
- Prior to construction, BART shall prepare a Vibration Control and Monitoring Report, in which the contractor indicates what vibration levels they expect to generate, vibration control measures they intend to implement, and how they intend to monitor and document construction vibration and complaints.
- Avoid the use of impact pile drivers, and use instead sonic or vibratory impact drivers. It is also encouraged that "quiet" or "silent" piling technologies be used, if feasible.
- When nighttime or 24-hour construction is necessary, coordinate with residents to ensure that the affected residents are fully informed about the upcoming construction. Residents will be given the option of sleeping in hotel rooms at BART expense for the duration of the nighttime construction in areas where construction is expected to exceed the FTA criterion. Residents that work nights and sleep days in locations where construction vibration is expected to exceed the FTA criterion will be given the same option.
- Monitor vibration during construction to ensure compliance with the criterion for building damage for buildings within 40 feet from construction activities. Conduct a pre-construction crack survey at these structures.
- Plan routes for hauling material out of the project site that would cause the least impact (annoyance).
- Restrict high amplitude vibration methods such as vibratory pile driving and soil compaction using large truck-mounted compactors to areas beyond 50 feet and 20 feet, respectively, of residential structures or wood-framed buildings. Otherwise, temporary accommodations away from construction shall be coordinated between BART and the residents.

TR-1 *Construction Phasing and Traffic Management Plan.* BART will ensure that a Construction Phasing and Traffic Management Plan is developed and implemented by the contractor. The plan shall define how traffic operations, including construction equipment and worker traffic, are managed and maintained during each phase of construction. The plan shall be developed in consultation with the cities of Union City and Hayward, BART, and Union City Transit Bus Lines. To the maximum practical extent, the plan shall include the following measures:

a) Specify predetermined haul routes from staging areas to construction sites and disposal areas by agreement with the cities of Union City and Hayward prior to construction. The routes shall follow streets and highways that provide the safest route and avoid congested intersections to the extent feasible.

b) Identify construction activities that, due to concerns regarding traffic safety or congestion, must take place during off-peak hours.

c) Identify a telephone number that the public can call for information on construction scheduling, phasing, and duration, as well as for complaints. Such information shall also be posted on BART's website.

TR-2 *Reconfiguration of Southbound Approach of the West Side Expansion Area Driveway*. BART will reconfigure the approach to Whipple Road for the west side expansion area driveway by narrowing the mouth of the intersection and channeling southbound traffic to approach Whipple Road at a more perpendicular angle. In addition, shrubbery/vegetation that impedes vehicle line of sight to the east will be removed.

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APPENDICES

I. BACKGROUND

1. **Project Title:** Hayward Maintenance Complex Project

2. **Lead Agency Name and Address:** San Francisco Bay Area Rapid Transit (BART) District
300 Lakeside Drive, 16th Floor
Oakland, CA 94612

3. **Contact Person and Phone Number:** Ellen Smith
(510) 287-4758

4. **Project Location:** Between two existing Union Pacific Railroad (UPRR) rail lines, and south of Industrial Parkway in Hayward and extending south of Whipple Road to about D Street in Union City.

5. **General Plan Designation:** *Industrial Corridor* in City of Hayward; *Light Industrial* in Union City

6. **Zoning:** *I* (Industrial) in City of Hayward; *ML* (Light Industrial) in Union City

7. **Description of Project:** See Section V, Project Description.

8. **Surrounding Land Uses and Setting**: See Section V, Project Description.

9. **Other Public Agencies Whose Approval is Required**: See Section V, Project Description.

II. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

Project impacts on each of the environmental factors listed below are evaluated in this Initial Study. None of the environmental factors listed below would result in any significant effects that cannot be mitigated to less-than-significant levels through project-specific mitigation measures identified in this Initial Study.

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

III. DETERMINATION

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 applicant. 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.

Ellen M. Smith
Signature

12/1/10
Date

Ellen M. Smith
Printed Name

BART
For

IV. BART SYSTEM/PURPOSE AND NEED

The San Francisco Bay Area Rapid Transit (BART) has been in operation since 1972 and currently operates in four Bay Area counties. It operates and maintains 104 miles of revenue track and 43 stations serving an average of 360,000 passenger trips every weekday in the counties of San Francisco, Alameda, Contra Costa, and San Mateo. The most recent extensions to the BART system are to Dublin/Pleasanton in eastern Alameda County, Pittsburg/Bay Point in east Contra Costa County, and San Francisco International Airport in San Mateo County, with a terminus in Millbrae. BART is currently building the first phase of the 5.4-mile Warm Springs Extension south from the Fremont Station in southern Alameda County. Other recently approved projects include extensions to Oakland International Airport (Oakland Airport Connector), eastern Contra Costa County (eBART), and Silicon Valley (Berryessa Extension). BART has also selected a preferred alignment alternative for a potential future system expansion to Livermore, but has yet to approve an extension project. The existing BART system is illustrated in Figure 1.

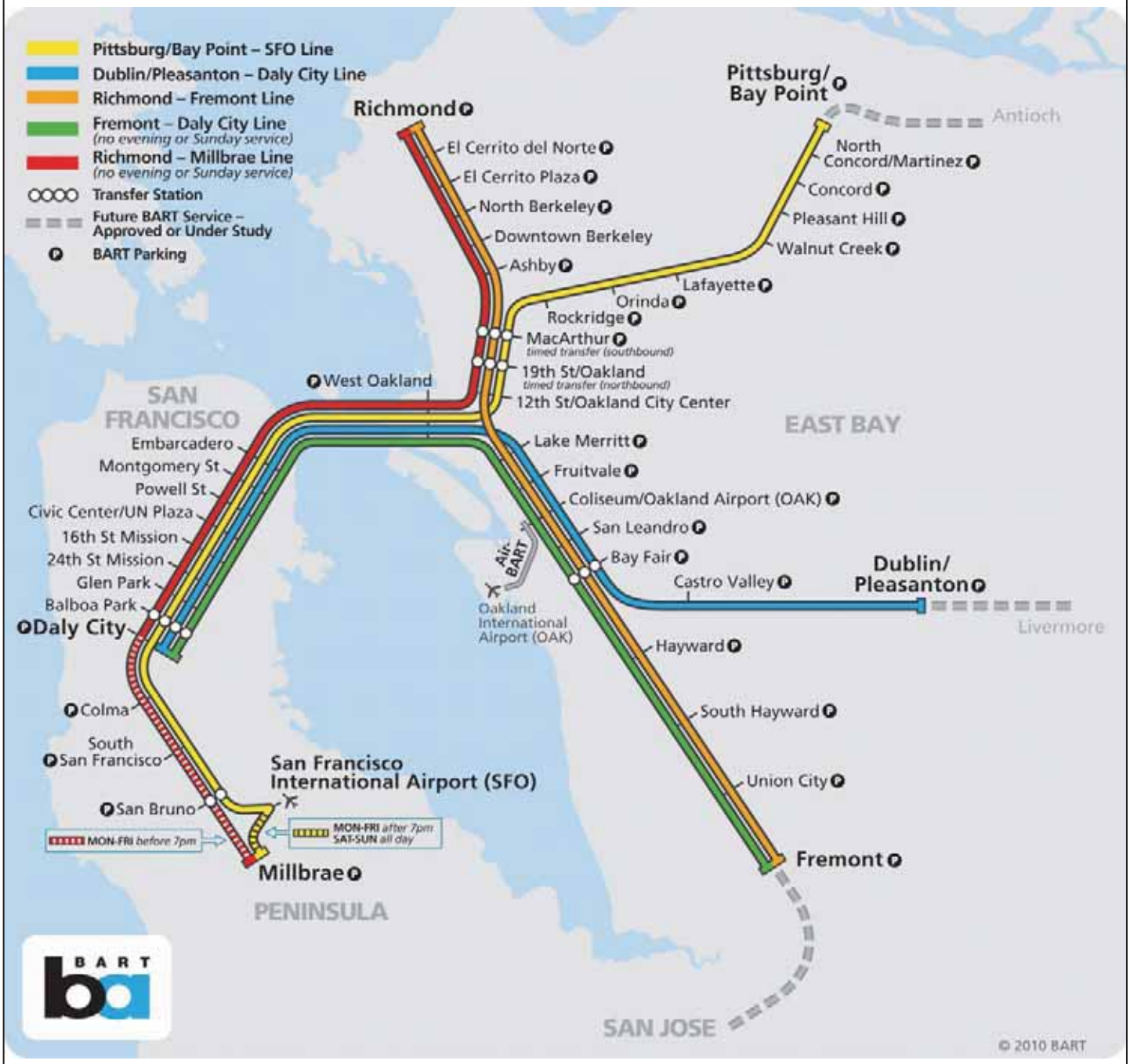
BART is currently in the process of replacing its existing fleet. Over the next 30 years, BART will require additional vehicles to meet future demand associated with regional population growth, service expansions for the Warm Springs and Silicon Valley/San Jose extension projects, and additional riders from the Oakland Airport Connector, eBART, and Livermore projects.

BART's current fleet of 669 revenue vehicles can all be stored within the four existing yards associated with the four vehicle maintenance shops. As the fleet expands to meet future needs, additional maintenance and storage will be necessary, both to accommodate the expected number of cars and to minimize non-revenue train movements[1] to initiate and end daily service.

Maintenance will also need to be expanded to ensure future reliability and performance. BART has instituted a Strategic Maintenance Program (SMP) that will provide scheduled maintenance and overhauls for the vehicle fleet. Acquisition of three properties (with four warehouses) adjacent to Hayward Yard would create an efficient complex that could provide the necessary maintenance and also allow a consolidation of existing BART services.

Undeveloped land at BART's existing Hayward Maintenance Yard provides an economical means to expand vehicle storage on a suitable piece of vacant land, which BART already owns on the east side of the Hayward Yard. The proposed facility and components are described below in the project description.

[1] Train movements without passengers that do not yield revenue are called non-revenue train movements.



NORTH
NOT TO SCALE

Source: BART, 2009.

FIGURE **1**
BART System Map

V. PROJECT DESCRIPTION

PROJECT BACKGROUND

BART currently has a fleet of 669 vehicles and expects that the total fleet requirement will be 1,000 vehicles in 2030. In order to maintain and store the new BART vehicles, BART requires expanded maintenance and storage facilities. The proposed project would provide expanded capacity for maintenance and warehouse activities for the future BART fleet on three properties to be acquired on the west side of the existing BART property and additional storage capacity within the existing BART property to the east.

PROJECT OBJECTIVES

The objectives for the proposed project are to:

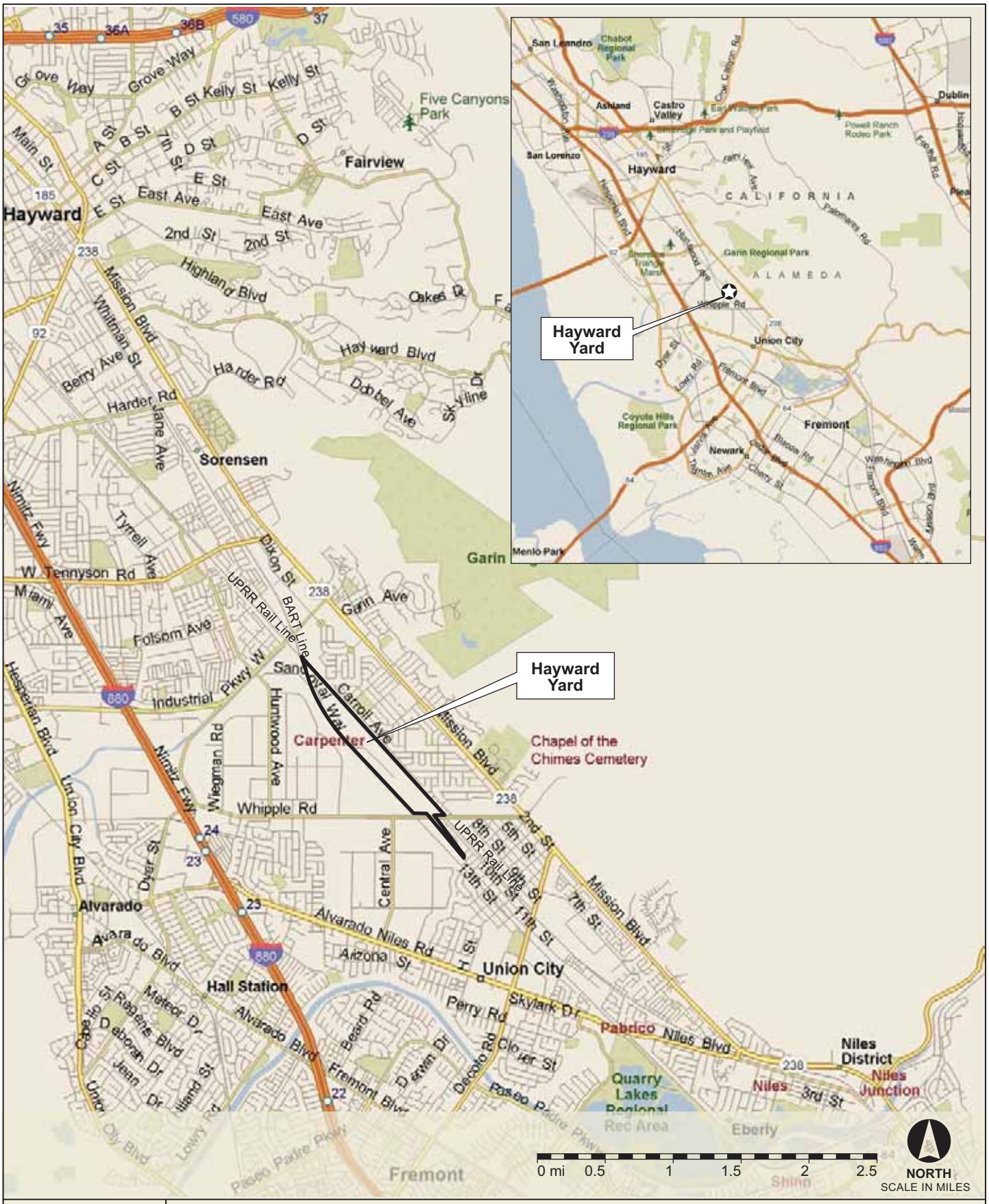
- Provide facilities for a revenue vehicle Strategic Maintenance Program (SMP) Overhaul Program.
- Provide capacity for vehicle maintenance and component repair for an expanding fleet.
- Provide a central materials warehouse.
- Provide Maintenance and Engineering (M&E) yard, shops, and storage for non-revenue maintenance equipment.
- Provide enhanced facilities for the Vehicle Inspection area.
- Provide additional storage tracks for up to 250 additional BART cars.
- Provide increased flexibility for BART operations.

EXISTING CONDITIONS

The Hayward Yard is one of four rail vehicle maintenance facilities serving the BART system (Hayward, Concord, Richmond, and Daly City) with train storage, train washing, and general maintenance facilities for the BART fleet. In addition, Hayward Yard has a parts warehouse and can provide accident and component repair, which is not available at the other BART maintenance yards.

The 88-acre Hayward Yard, including currently undeveloped BART-owned property on the east side which is being proposed for expansion, is located in the City of Hayward just north of Whipple Avenue and south of Industrial Parkway (Figure 2 and Figure 3). Tracks at the south end of the Hayward Yard extend into Union City. The yard has a long and narrow configuration and is oriented north-south along both sides of the BART mainline tracks. The yard currently has train storage tracks and maintenance facilities to the west of the BART mainline tracks and maintenance-of-way[2] materials

[2] Maintenance-of-way refers to the material, equipment, and operations necessary to maintain the track and right-of-way.



Source: Microsoft Streets and Trips, 2009.

FIGURE **2**

Project Location

FIGURE 3
Project Site and Context

Source: Environmental Data Resources, Inc., 2009; Google Earth, 2009; PBS&J, 2010.

storage to the east of the mainline tracks. Motor vehicles access the main shop and the yard west of the mainline tracks from Sandoval Way, and access the yard east of the mainline from Whipple Avenue.

The Hayward Yard is bordered on the west by industrial and warehouse development and a Union Pacific Railroad (UPRR) line (Oakland subdivision). A second UPRR line borders the yard to the east (Niles subdivision).[3] In the project vicinity, industrial uses are generally located west of the UPRR corridor and residential uses are located east of the UPRR corridor. Surrounding uses include industrial businesses and warehouses to the west, residential development to the east, and a golf driving range to the north. There are existing sound walls approximately 7 to 9 feet high along the east side of the BART corridor south of Whipple Road. There is a 7-foot tall existing chain link security fence around the BART property. The security fence also includes a wire around the top of the fence. The area proposed for expansion to the west of the Hayward Yard includes four partially occupied warehouse and light industrial buildings. The 6-acre portion of the expansion area on the southern end near Whipple Road is undeveloped.

The Hayward Yard operates 24 hours per day, 365 days per year. BART activities are cyclical and the number of employees at the Hayward Yard increases or decreases depending on various BART operations and maintenance activities occurring over the course of a day. There are approximately 280 BART employees at the Hayward Yard, distributed over 24 hours and a number of shifts. BART operates trains in the project area seven days a week with 204 daytime trains and 52 nighttime trains. Two proposed BART extension projects, the Warm Springs Project and the Silicon Valley Rapid Transit Project, are expected to increase train traffic in the project area by 59 trains daily.

Rail car storage capacity at the Hayward Yard is 218 cars, all on the yard's west side. Presently, 205 cars can be stored as complete trains of commonly scheduled lengths (twelve 10-car trains, one 8-car train, twelve 6-car trains, and one 5-car train). The remaining spaces accommodate single cars. At this time, approximately 105 cars are regularly stored overnight, and 41 cars are regularly stored midday.

Utilization of storage space has varied over the years, depending on operations and other storage locations around the BART District. (Before 2008, when the Hayward Shop was used for running repairs, 121 cars were regularly stored in the yard.) Currently, all of BART's other yards are full, so the Hayward Yard provides the only additional storage capacity in the system. This capacity is essential in cases of facility maintenance and unexpected circumstances. BART's Fleet Management Plan calls for 174 cars to be stored as complete trains on the yard's west side in 2030, leaving space for 44 single cars.

The Hayward Yard also contains the BART test track, where cars with mechanical problems are tested before being returned to service, and where new cars are delivered and tested before entering service. The test track is 2.25 miles long and extends beyond the Hayward Yard approximately 3,730 feet (0.71 miles) to the north and 1,750 feet (0.33 mile) to south. Testing hours are 8 a.m. to 4 p.m. Test track

[3] There are two sets of Union Pacific tracks that run north-south in the project vicinity. One set is immediately adjacent to the Hayward Yard on the east and the second set is approximately 850 feet to the west of the first.

hours could be longer during periods of new fleet acceptance. New cars can be delivered to the yard by either rail or flatbed semi-trailer.

PROPOSED PROJECT CHARACTERISTICS

The proposed project primarily would consist of acquisition and improvement to three properties on the west side of the existing Hayward Yard and the construction of a maximum 250-car storage area on undeveloped BART property on the east side of the Hayward Yard. Figure 4 shows the proposed site plan; there would be new facilities and yard modifications to the west of the existing yard and mainline tracks under the proposed Phase 1 expansion. Figure 5 shows the proposed site plan for the east side of the existing yard and mainline tracks under the proposed Phase 2 expansion. The various elements of the Hayward Maintenance Complex (HMC) are described below.

Proposed Phase 1 Expansion

BART would acquire three properties containing four warehouses adjacent to the west side of the existing Hayward Yard. The properties collectively total approximately 28 acres. BART would reconfigure the properties for use as an integrated maintenance complex that would include a new vehicle level overhaul shop, component repair shop, central warehouse, and maintenance and engineering shop and storage area. The properties currently have motor vehicle access from Whipple Road. A new motor vehicle connection would allow vehicle access between the new properties and Sandoval Way, the existing yard roadway. Rail car access would be added along the east side of the properties to connect them to the existing Hayward Yard. Maintenance operations and storage would move from the east side yard to the west side with the establishment of the proposed maintenance and engineering shop and storage area.

Overhaul Shop

The Overhaul Shop would be located at the site of one of the existing warehouses, an 86,400-square-foot concrete slab-on-grade structure constructed of wood columns and concrete tilt-up walls. The orientation of the existing building does not allow the introduction of rail tracks and its construction would make it difficult to retrofit as a vehicle level overhaul shop; therefore, the existing building would be demolished, and a new facility would be constructed with a different orientation. The Overhaul Shop would remove trucks[4] and other components from the rail cars for overhaul and transfer them to and from the adjacent Component Repair Shop. The new building would have a footprint approximately 210 feet by 212 feet with a height of approximately 30 feet. The building would be double-ended, with a 70-foot by 210-foot concrete apron on the east side and an open 200-foot by 100-foot transfer table on the west end. The building would have the following features:

- 12 rail car repair spots
- 100-foot-long rail vehicle transfer table at the north end
- 12 rail car hoists with two 10-ton cranes overhead

[4] "Truck" refers to the wheel assembly that supports and propels the car body on the rails. There is a truck under each end of the rail car. Each truck is composed of four wheels, two axles, two motors, and two gearboxes.

- 5-ton crane over truck storage track
- Offices, bathroom, and break rooms (second floor)
- Associated equipment to support operations in the shop: communications, traction power, closed-circuit TV, public address system, yard control systems
- Truck transfer track to/from the adjacent Component Repair Shop
- 75 auto parking spaces along the north and west perimeter of the shop

Site work and trackwork would be included for nine turnouts and spurs between the new Overhaul Shop and the existing Hayward Yard tracks. Some excavation work would be necessary to provide acceptable grades to meet track elevations at the existing yard.

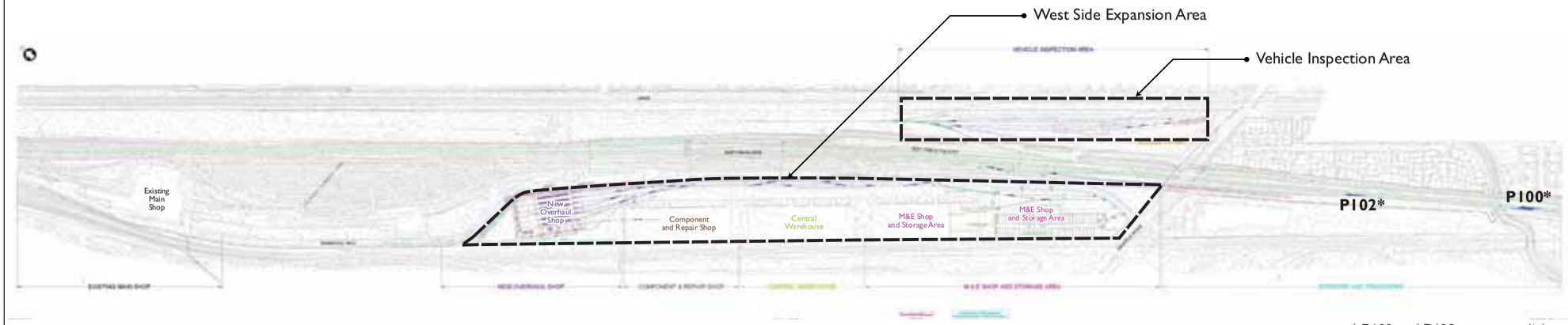
Component Repair Shop

The Component Repair Shop would be located in one of the existing buildings, a 120,000-square-foot structure constructed of concrete slab-on-grade, wood columns and laminated beams, plywood panel roof, and concrete tilt-up exterior walls. Truck loading docks are located along the structure's east side.

The structure would serve as the Component Repair Shop, with three major areas: the truck shop, electronic repair shop, and electro-mechanical repair shop. Renovations would be made within the existing building footprint, and building modifications would be minimized. The existing roof, columns, and walls would be used without major modifications to the degree possible. The existing floor area would be demolished leaving columns and footings in place and would be replaced with new concrete, equipment footings, embedded rail, pits, etc. The roof would be raised approximately 10 feet to accommodate a new 10-ton overhead crane. The structure would be upgraded to new seismic code requirements. New bathrooms and break rooms would be added to accommodate the workforce.

The Component Repair Shop would contain the following facilities:

- Truck Shop
  - one 10-ton crane, three 2-ton jib cranes
  - tracks and turntables arranged as a truck production line
- Truck Component Areas (wheel, motor, gearbox, axle build)
  - new wheel press and relocated old wheel press from existing back shop
  - four 2-ton jib and overhead cranes
- Electro-Mechanical Repair Area (heating, ventilation, and air conditioning (HVAC); hydraulics; power; etc.)
- Small Component Repair Area
- Electronics Repair Shop – electrostatic discharge (ESD)/Clean Environment

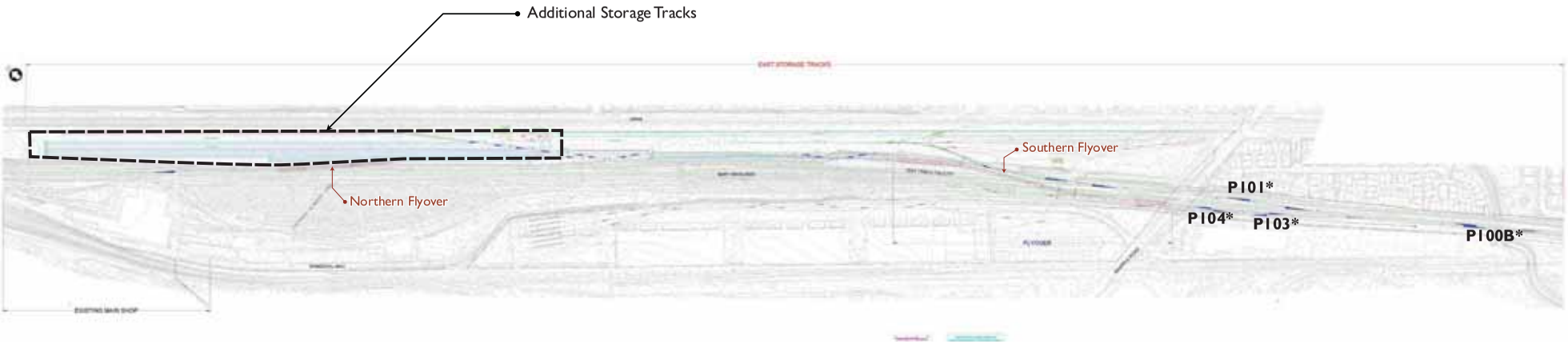


* P100 and P102 are new switches

NORTH

Source: BART, 2009.

FIGURE 4
West Side Expansion Area Site Plan



* P101, P103, P104 and P100B are new switches

NORTH

Source: BART, 2009.

FIGURE **5**

East Side Expansion Site Plan

Central Warehouse

The Central Warehouse would be located in one of the existing buildings, a 120,000-square-foot structure constructed of concrete slab-on-grade, wood columns, and laminated beams, plywood panel roof and concrete tilt-up exterior walls. Truck loading docks are located along the structure's east side.

This structure would become the parts and logistics center for an on-demand warehousing center. The building interior would be retrofitted with standard pallet racks and small parts carousel and kitting area. Existing fire protection and lighting would be modified to accommodate rack layout. The proposed project would also include seismic upgrade to the structures. The adjacent asphalt area would include stub tracks for loading material into BART non-revenue material transfer vehicles.

M&E Non-Revenue Vehicle and Storage Area

The non-revenue vehicle and storage area would be located at the site of one of the existing buildings, a 120,000-square-foot structure constructed of concrete slab-on-grade, wood columns and laminated beams, plywood panel roof and concrete tilt-up exterior walls. Truck loading docks are located along the structure's east side.

BART Maintenance and Engineering (M&E) is responsible for all BART facilities and systems other than the rail fleet. This shop would become the primary maintenance headquarters for the southern portion of the BART system. Structural improvements would be made within the existing building footprint, and the vacant 6-acre area to the south would be improved to provide outdoor storage. The entire existing floor area would be demolished, leaving columns and footings in place, and replaced with new concrete, equipment footings, embedded rail, pits, etc. Modifications would be minimized; existing columns and walls would be used without major modifications where possible. The roof would be raised approximately 10 feet to accommodate a new 10-ton overhead crane. The structure would be upgraded to new seismic code requirements.

The building's existing facilities would be modified to accommodate the following features:

- Vehicle fueling and wash areas
- Power supply, mechanical, and grounding systems for the Hi-Rail Vehicle Shop,
- Non-Revenue Vehicle Shop, and M&E Support Shops
- Mechanical and power supply facilities overhaul
- Storm drainage at all vehicle entrances and roof
- Sewer drainage for restrooms
- Locker and break rooms
- Industrial waste drainage for floor and pit drains
- Potable water system to all restrooms, locker, and break rooms

- Sprinkler and wet standpipe fire protection system
- Exhaust ventilation to extract hot air and fumes from the shops
- Compressed air system
- Motorized coiling doors at all vehicle and service equipment entrances
- Emergency bus to supply power to critical loads such as fire alarm and other fire/life/safety system
- Communication systems and traction power auxiliary power
- 48-volt DC power supply system for communication circuits
- 10-ton overhead crane in the Hi-Rail Vehicle Shop

The undeveloped area south of the building would be paved for a 6-acre outdoor storage and staging area, with individual stalls for various materials, including approximately 12 assorted types of Hi-Rail and rubber-tire vehicle equipment.

Sound Walls

Along the east side of the BART corridor south of Whipple Road, existing sound walls may be raised or new sound walls constructed, as necessary. See Section 12, Noise and Vibration, for more detail regarding new sound walls.

Programmed Station Stop

A station platform along the main line would be provided for use by HMC workers commuting by BART with regularly scheduled stops.

Cart and Pedestrian Bridge

A pedestrian bridge would be constructed over the mainline tracks so employees could reach the test track and the east side of the yard. The bridge would be capable of holding a golf cart and would be constructed over the west yard storage tracks, mainline, and test track. The bridge would be approximately 200 feet long and a have minimum width of 6 feet. It would be approximately 16 feet above the tracks. Ramps at either end of the bridge would be provided for carts to access the bridge. Cart access would expedite moving employees and supplies from the west side to the east side of the yard.

Vehicle Inspection Area

The existing Vehicle Inspection Area is a single-bay shed structure with unloading ramps located on the east side of the existing yard near the Whipple Road gate. The existing shed would be upgraded and expanded to hold four cars to accelerate the inspection process. The expanded shed structure would be approximately 200 feet long, 60 feet wide, and less than 30 feet high with concrete aprons on either end.

HMC Access Tracks (West and South of BART Yard Tracks)

One No. 10 track turnout[5] and 11 No. 8 turnouts would be installed to the east side of the maintenance complex north of Whipple Road to connect it to the existing yard tracks. Two No. 10 crossovers would be constructed to connect the HMC access tracks to the BART main line tracks south of Whipple Road.

To provide the correct grade, a retaining wall with associated excavation would be required along the west side of the tracks from approximately 400 feet north of Whipple Road to a point approximately 650 feet south of Whipple Road (see the construction scenario below).

Proposed Phase 2 Expansion

There is a 20-acre undeveloped portion of the yard in its northeast quadrant, east of the mainline and north of the maintenance-of-way storage yard. A new storage area is proposed on approximately 13 acres of this undeveloped area, which consists of a level, grassy field, with a smattering of small trees and bushes. The site is bounded by the existing UPRR rail line on the east, the BART mainline and test track to the west, and BART's existing materials storage yard to the south. In addition to the new expansion area to the east of the existing yard, a portion of the approximately 12 acres of the existing BART storage yard (which is already paved) would be reconfigured with connecting tracks.

East Side Train Storage Area

The proposed east side storage project would provide storage for a maximum of 250 vehicles and connecting trackwork. Almost all the new facilities and yard modifications would occur east of the existing yard and mainline tracks. Two new crossovers would be installed on the BART tracks south of Whipple Avenue (in the City of Union City) to provide access from the existing BART tracks via the test track to the new storage area.

Although primarily for train storage, the expansion area has been designed to allow train operations on the west side of the yard (such as train dispatch) to move to the expansion area at some time in the future; maintenance activities would remain within the existing yard to the west of the project site.

The following components are included in construction of the East Side Storage Tracks:

- Site grading.
- Underground utilities – Power, water, sanitary sewer, and communications would be extended from the existing connections to the expansion area.
- Traction power, train control, and communications systems – Embedded electrical conduit for traction power would be provided for power and communications circuits.

[5] Turnouts are switches that transfer rail vehicles from one track to another and are categorized by degree of turn provided. For example, a No. 20 turnout moves the track 1 foot over for every 20 feet forward. A No. 10 turnout moves the track 1 foot over for every 10 feet forward. Both No. 10 and No. 8 turnouts are considered low speed turnouts.

- Contact rails – Third rail to provide power to tracks and to power the vehicles would be installed.
- Traction power substation – A traction power substation would be constructed at the south end of the storage tracks area to provide power to the storage tracks.
- Storage and transfer tracks – Storage for a maximum of 250 BART cars would be provided.
- Turnouts and crossovers – A combination of turnouts and crossovers as indicated in Figure 5 would be installed. Some are north of Whipple Road, and four are south of Whipple Road.
- Drainage – A combination of pipes and open drainage would replace an existing open culvert along portions of the eastern and western perimeters of the expansion area.
- Lighting – Light poles would be added to the storage area. Light poles would be 15 to 18 feet high with shielded lamps. The new lights would not include motion detectors.
- Access road – A new 20-foot-wide, two-lane, paved road would extend north from Whipple Road to the expansion area and along the east perimeter of the expansion area to its northern boundary. It would be located on BART property between the existing maintenance-of-way material storage area and the UPRR property. Approximately 6,500 feet long, it would provide both BART access and fire and emergency access to the proposed east side expansion area.
- Cleaning supplies facility – A single-story building approximately 20 feet by 40 feet for car interior cleaning supplies would be located at the south end of the expansion area. Drains from the mop sinks would be connected to the yard's industrial waste system. An employee restroom (with separate outside access) would be attached.
- Perimeter fence – An 8-foot-high chain link security fence would be provided along the new perimeter of the expansion area.

There would be an increased level of train movement activity in the Hayward Yard related to the proposed car storage area, as eventually 60 trains could be dispatched from the east side storage tracks in the morning and returned at the end of the operating day. However, train movements in the storage area would be at low speed (30 mph or less). As noted above, current maintenance operations and storage would move from the east side yard to the west side with the establishment of the proposed M&E maintenance and storage area under Phase 1.

Flyovers

The new east side storage tracks would be connected to the mainline tracks via turnouts that use the test track as a route to the proposed train storage area. To reduce the potential disruption to test track activity and mainline traffic due to trains moving in and out of the east side storage area, two flyovers are proposed. The southern flyover would provide access from the storage area to the southbound mainline, and the northern flyover would provide direct access from the east side storage area to the northbound mainline. The two flyovers would be constructed independently of each other. Each would provide a separate and independent function for train movements in the yard.

Southern Flyover. The southern flyover would be located at the south end of the yard to provide access from the east storage area to the southbound mainline over the test track and two mainline tracks. It would also provide access to the existing west side transfer tracks and shops. The southern flyover is important for efficient yard operations and is much more likely to be built first of the two flyovers. The southern flyover would have an elevation of approximately 28 feet above grade, measured from grade to the top of a train on the flyover. Tailtracks would extend to a point approximately 1,250 feet south of Whipple Road. (Visual simulations of the southern flyover are provided below under Aesthetics.)

Northern Flyover. The northern flyover would be located toward the north end of the yard and would provide access from the east storage yard to the northbound mainline over the test track. The northern flyover would be similar in size and scale to the southern flyover.

Employees

Development of the HMC project, under Phase 1 and Phase 2, would increase employment at the Hayward Yard. Table 1 illustrates anticipated employment at each of the HMC components. Total employment is estimated to be approximately 350, with peak occupancy estimated to be approximately 165 workers. Peak occupancy would be from 8 a.m. to 4 p.m. Some of the HMC employees may be current BART employees who would be relocated to Hayward Yard as BART functions are consolidated at Hayward (Central Warehouse for example); others would be new employees as BART develops new programs, such as the SMP and vehicle level overhaul shop. For the purpose of this analysis, BART estimates that 135 of the 350 employees would be existing employees, and 215 employees would be new employees to the site.

Table 1
HMC Employees

	Total Employees	Existing Hayward Yard Employees[a]	Peak Occupancy
New Overhaul Shop	50	0	25
Component Repair Shop	150	80	75
Central Warehouse	30	30	20
M&E	100	15[b]	40
East side storage tracks	20	10	10
Total	**350**	**135**	**170**

Source: BART, August 2010.

Notes:

a. Existing Hayward Yard employees that would be relocated to the new facilities under the proposed project.

b. There would be 15 employees relocated from the Hayward Yard to the M&E facility. The remaining 85 employees would be relocated from other BART facilities outside of Hayward.

Construction Scenarios

Construction of the HMC project would be done in two distinct phases. Construction of the west side of the HMC project plus the enhanced vehicle inspection area (east side) would be conducted as Phase 1 and construction of the remaining facilities on the east side would be completed in Phase 2. Therefore, Phase 1 would include the Vehicle Level Overhaul Shop, Component Repair Shop, Central Warehouse, M&E Vehicle and Storage Area, Vehicle Inspection Area, and connecting tracks for the new activities on the west side of the yard; Phase 2 would include the east side storage tracks, flyovers, and connecting tracks for the east side of the yard.

The proposed project would require two different approaches to construction. The areas north of Whipple Road provide sufficient area and access to allow traditional construction methods. Construction of the crossovers and switches south of Whipple Road must take place in a narrow corridor adjacent to an active BART line. The constrained access creates additional challenges not present in the construction areas north of Whipple Road. Potential construction scenarios for both areas are discussed below. Final details of project construction will be determined by BART during final design.

Construction Schedule. The project schedule is contingent on funding. Each component of the HMC could be constructed independently of the others, although full use of the Vehicle Level Overhaul Shop, Component Repair Shop, and M&E Shop would require construction of HMC access tracks west and south of the existing yard tracks. Phase 1 and Phase 2 of the HMC project could be separated by many years.

Phase 1 Construction

Overhaul Shop. The existing 86,400-square-foot warehouse would be demolished, and a new Overhaul Shop would be constructed in its place. Demolition of the structure would take approximately 2 months. Demolition would require a combination of bulldozers, loaders, and trucks. Though some of the removed material would be recycled, that would not take place on site. An estimated 500 truckloads (1,000 truck trips) would be required to remove the debris. Construction of the new 44,520-square-foot Overhaul Shop would use standard construction. The new structure would be a post and beam structure with a concrete slab on-grade foundation. The walls could be tilt-up concrete or metal clad. Delivery of building materials and concrete is expected to generate up to 500 trucks loads (1,000 truck trips) over the 1 year duration of the Vehicle Level Overhaul Shop construction.[6]

The other three existing warehouse structures that are proposed for Component Repair, Central Warehouse, and M&E use would be seismically upgraded and retrofit for BART use. The existing roof, columns, and walls would be used to the degree possible. Therefore, the level of construction activity would be greatly reduced compared to the construction of a new structure.

In addition to retrofitting the structure proposed for M&E use, approximately 75 percent of the 6-acre undeveloped area to the south of the structure would be graded and paved for outdoor storage.

[6] Each truck load of material requires two truck trips: one trip in and one trip out.

Although relatively flat, the outdoor storage area would be grubbed, [7] and approximately 3,800 cubic yards would be off-hauled. Assuming a truck size of 10 cubic yards, approximately 380 truckloads (760 truck trips) would be generated. Once grubbed, site grading would be minimal.

Vehicle Inspection Area. The existing vehicle inspection area would be enlarged from one bay to four bays. The new structure would be approximately 200 feet long by 60 feet wide with concrete aprons on either end. The site is level and minimal site preparation would be necessary. The structure likely would be standard post and beam construction with metal walls. Approximately 250 truck trips would be necessary to deliver materials.

Phase 1 of the HMC would include use of typical construction equipment including trucks, water trucks, bulldozers, truck-mounted cranes, loaders, lubrication/fueling service trucks, transit-mix concrete trucks, concrete pumps, and diesel-driven generators and compressed air units for construction power, equipment, and tools.

Construction access to the HMC area north of Whipple Road, including truck access, would be primarily from Whipple Road, which connects Interstate 880 to the west and State Route 238 to the east. Areas of the existing BART storage yard on the east side and existing parking lots and proposed M&E outdoor storage area on the west side could be used as staging areas. Construction is contingent on funding, but if funding becomes available, Phase 1 could be completed in approximately 36 months.

Construction South of Whipple Road. Phase 1 construction activities south of Whipple Road include additional connecting track, track crossovers, and switches. Construction must take place in a narrow corridor adjacent to and within an active BART line.

Retaining Wall. To provide a rail connection to the west side of the HMC, new connecting track would need to be provided parallel to and west of the mainline tracks, and a retaining wall would be required along the west side of the new track. The retaining wall would extend approximately 400 feet north and 650 feet south of Whipple Road. Approximately 5,000 cubic yards of cut would be required, which could be placed on the M&E outdoor storage area to prevent any need to export the cut material.

Additional Track and Switches. Installing the mainline crossovers would include removing the existing track at the new crossover location, including ballast, ties, rails, third rail, and approximately 1.0 to 1.5 feet of dirt below the sub-ballast.[8] This would be accomplished by using an excavator and a front-end loader. The material removed (ballast, dirt, etc.) would be hauled away by truck. Approximately 100 truck trips (assuming 5 cubic yard capacity) are estimated to haul away removed material and bring in new material. A drum roller and various vibratory plates would be used to compact material. Ballast would be compacted using a ballast tamper. Cranes operating from the west side of the tracks would be used to install switches and rails. Work outside of the mainline could be conducted during normal work hours, typically between 7 a.m. and 7 p.m., without affecting mainline BART operations. However, in order to reduce impacts on BART operations, work on the proposed mainline crossovers would be

[7] Grubbing is the process of removing vegetation and organic material from the surface of a construction area.

[8] Ballast and sub-ballast refer to the crushed angular rocks that are packed below, between, and around rail ties. The use of ballast facilitates drainage as well as bearing the weight of the trains.

conducted by working 24 hours a day over weekends. Preparations for construction before and after the installation period could be conducted during a standard work day (between 7 a.m. and 7 p.m.).

Construction along the mainline track would most likely include construction of sound walls along the east side of the BART property. Depending on the type of sound wall construction, concrete transit-mix trucks and mortar and grouting pumps may be used.

Access. Primary access to the track area south of Whipple Road would be from the yard area north of Whipple Road; access is possible both east and west of the mainline tracks, including using the test track. The M&E storage area north of Whipple Road could be used as a staging area with equipment shuttling back and forth between the staging area and the work area south of Whipple Road. If necessary, alternative access could be provided via three other locations. Construction also may require some combination of these access points:

- The most likely option would be through the existing parking lot of an industrial property adjacent to BART tracks on the west. Construction at this location could require removal of trees along the fence line.
- Dry Creek service road, which is on the north side of Dry Creek, leads to a gate adjacent to the BART test track. Equipment could then reach the work areas by moving north along the test track.
- F Street, which crosses under the BART tracks approximately 0.7 miles south of Whipple Road, provides direct street access to the BART right-of-way along the west side of the mainline tracks.

Nearby Construction Efforts. Union City is planning the seismic upgrade of the Whipple Road bridge over the BART tracks. The upgrade is in the final stages of design and permitting. Because construction will occur within the BART right-of-way, BART is cooperating with the City of Union City on its construction activities. Construction of this project is anticipated to occur in early 2011 and to last for approximately 6 months.

Phase 2 Construction

Storage Tracks. The construction activities associated with the HMC north of Whipple Road would include a variety of activities: site grading, drainage improvements, underground utilities, buried duct banks (for traction power, train control, lighting, and communications), an access road, area lighting, storage and transfer tracks (including the contact rails for power), connecting turnouts and crossovers, and various signals and systems components on the track structure. Two small, one-story buildings, a traction power substation and cleaning supply room would also be constructed.

The expansion site would need to be cleared, grubbed, and graded to a fairly flat gradient to satisfy the storage track requirements. BART plans to limit the number of truck trips to and from the site during construction to the extent feasible by balancing the amount of cut and fill onsite to the degree possible. Currently, additional embankment material is expected to be necessary. Therefore, truck traffic associated with the project would be substantial.

At a minimum, the 13-acre undeveloped portion of the site would be cleared and grubbed to the depth of one-half foot, and the material would be exported. This would generate approximately 700 truckloads of material or 1,400 truck trips. A preliminary worst-case estimate indicates that 40,000 cubic yards of fill would be imported. Assuming an average truck capacity of 15 cubic yards per truck and accounting for additional 15 percent soil compaction onsite, approximately 3,100 truckloads (6,200 truck trips) of fill would be required. A total of approximately 7,600 truck trips would be necessary for this phase of construction. Assuming that grub and fill operations take place over a 3-month period (72 working days) between the hours of 7 a.m. to 7 p.m., the project would generate approximately 105 truck trips (53 truck loads) per day. In addition, one and one-half feet of ballast and sub-ballast would be imported, although this material as well as railroad ties could be delivered by rail car on existing rail lines. (BART has a spur connection to the UPRR line to the east.) Rails also could be brought in by railroad.

The work in the area may also include some minor structures such as retaining walls and a cart overpass. Concrete transit trucks would be coming and going to perform this work, but the number and frequency would depend both on the type of structures developed in final design and the schedule on which the contractor advanced the construction process.

Typical construction equipment would include dump trucks, self-propelled earth-scrapers, water trucks, bulldozers, grade-alls, truck-mounted cranes, loaders, excavators, rollers, lubrication/fueling service trucks, transit-mix concrete trucks, concrete pumps, and diesel-driven generators and compressed air units for construction power, equipment, and tools.

Construction access to the east side expansion area, including truck access, would be from the existing BART gate on Whipple Road, just east of the BART tracks. The only approach would be along Whipple Road. Areas of the existing BART storage yard or portions of the expansion area itself could be used as staging areas. Construction of the storage track area would last approximately 15 months.

Construction South of Whipple Road. Major construction activities associated with the proposed project south of Whipple Road are related to track modifications, including test track crossovers and switches. Work on the test track could be conducted from the test track itself. The BART yard north of Whipple Road could be used as a staging area with equipment shuttling back and forth between the staging area and the work area south of Whipple along the BART test track. Trucks, excavators, and other equipment could be provided on high-railers that can run on the BART tracks or from flatbed BART cars. Installing the crossover would include removing the existing test track at the new construction area including ballast, ties, rails, third rail, and approximately 1.0 to 1.5 feet of dirt below the sub-ballast. This would be accomplished by using an excavator, a front-end loader, and high-railer trucks (5 cubic-yard capacity). The material removed (ballast, dirt, etc.) would be hauled away by using high-rail trucks. A minimum of 100 truck trips are estimated to haul away removed material and bring in new material. A drum roller and various vibratory plates would be used to compact material. Ballast would be compacted using a ballast tamper. Cranes and/or hoisting from the flatcar would be used to install switches and rails.

Work outside the mainline could be conducted during normal work hours, typically between 7 a.m. and 7 p.m., without affecting mainline BART operations. In order to reduce impacts on BART operations,

work on the proposed mainline crossovers would be conducted by working 24 hours a day over weekends, if feasible. Preparations for construction before and after the installation period could be conducted during a standard work day (between 7 a.m. and 7 p.m.).

Construction along the test track would most likely include construction of sound walls near the test track. Depending on the type of sound wall construction, concrete transit-mix trucks and mortar and grouting pumps may be used.

Access. Installing the crossovers to the mainline tracks could not be conducted from the test tracks and would be more complex. Although most of the equipment and material could be supplied to the mainline crossover locations via the test track and stored at locations between test track and the mainline, equipment may be too large to fit under the Whipple Road bridge and would need another point of access. As noted for the west side construction described above, three possible access points to the mainline work areas south of Whipple Road include the industrial property along the west side of the mainline tracks just south of Whipple Road, the service road adjacent to Dry Creek, or F Street to the south. Construction also may require some combination of these three points.

Flyovers. Construction of the flyover would involve cast-in-place concrete columns[9] to support the elevated pre-cast guideway over the test track and mainline tracks. Pile driving may be required for the footings of the flyover columns. Construction would require trucks to remove excavated soil and to deliver forms, reinforcing steel, transit-mix concrete, and other materials. Approximately 150 truck loads (300 truck trips) would be necessary to remove the small amount of excavated material and bring in the materials, such as reinforcing bar and concrete, necessary to construct the flyovers. The 300 truck trips would be distributed over the approximately 6 months required to construct the flyovers. Although truck activity would be greater during certain periods, truck trips would average approximately two per day.

Additional equipment required for the aerial guideway construction could include drilling rigs, pile drivers, trucks to remove excavated soil, specialized truck trailers to deliver pre-cast concrete beams, cranes, trucks to deliver forms, reinforcing steel, pre-cast concrete post tensioning jacks, and related equipment.

REQUIRED PERMITS AND APPROVALS

The proposed project is subject to the California Environmental Quality Act (CEQA), and BART is the lead agency for the project. As such, BART must oversee environmental review of the project under CEQA prior to approving the project. In addition, if federal funding is to be obtained, the Federal Transit Administration (FTA) must make a determination whether the proposed project is exempt from the requirements of the National Environmental Policy Act (NEPA), or whether NEPA review is required.

[9] Cast-in-place concrete is transported in an unhardened state, commonly referred to as ready-mix cement. The concrete is then poured into wooden "forms" and allowed to cure on site.

The proposed project is also subject to National Pollutant Discharge Elimination System (NPDES) stormwater control requirements pursuant to the Federal Clean Water Act. The project must obtain coverage under the State Water Resources Control Board's NPDES General Permits for Industrial and Construction Stormwater Discharges and approval of its Stormwater Pollution Prevention Plan by the San Francisco Bay Regional Water Quality Control Board.

VI. ENVIRONMENTAL CHECKLIST

INTRODUCTION

The following Checklist contains the environmental checklist form from Appendix G of the CEQA Guidelines. The checklist form is used to identify the impacts of the proposed project. A discussion follows each environmental issue in the checklist to explain the rationale for determining whether there are significant impacts. Included in each discussion are project-specific mitigation measures, where appropriate, to reduce potentially significant impacts to less than significant. In addition, the analysis discussions provided below distinguish between Phase 1 and Phase 2 components of the proposed project as appropriate.

For this checklist, the following designations are used:

- **Potentially Significant Impact:** An impact that could be significant, and for which mitigation must be identified. If potentially significant impacts are identified for which mitigation is not possible, an EIR must be prepared.
- **Less than Significant With Mitigation Incorporated:** An impact that requires mitigation to reduce the impact to a less-than-significant level.
- **Less-Than-Significant Impact:** Any impact that would not be considered significant under CEQA based on established significance thresholds.
- **No Impact:** The project would not have an impact.

1. AESTHETICS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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 along a scenic highway?	❑	❑	❑	■
c. Substantially degrade the existing visual character or quality of the site and its surroundings?	❑	■	❑	❑

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
d. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?	❑	❑	■	❑

Background

The Hayward Yard is within an urbanized area and is currently developed with the existing maintenance yard, which includes storage tracks, maintenance buildings, and the BART mainline tracks, and is either paved or covered in a compacted gravel surface. The project site includes expansion on both the east side and west side of the existing Hayward Yard. The west side expansion consists of three properties covering approximately 28 acres. The east side expansion consists of an undeveloped, but highly disturbed approximately 13-acre area, characterized by flat topography, ruderal (weedy) vegetation, and a variety of fruit-bearing trees. Industrial uses, warehouses, residences (in structures of one to two stories), and UPRR tracks characterize the project area.

Discussion

a, b. **No Impact.** There are no identified scenic vistas, resources, or scenic highways in the project area.[10,11] The project site is currently within an urbanized and built-up area along the existing UPRR rail line and is surrounded by industrial uses to the west and the UPRR rail line and residences to the east. Immediate views in the project area are limited because of the flat terrain and the number of mature trees, industrial and residential buildings, and sound walls surrounding the site. Available views from the project site are largely close-up and reflect the urban and industrial character of the surroundings, which do not include scenic resources, such as significant landforms, rock outcroppings, historic resources, or architecturally or visually distinctive buildings. Some long-range views of hills beyond the residences to the east are available from within the project site; however, there are no scenic vistas in the project vicinity. There are no highways or freeways adjacent to the project area, only local roadways. No roadways adjacent to the project area or in the vicinity are designated scenic routes or state scenic highways. Therefore, the proposed project would have no impact on scenic vistas or scenic resources.

c. **Less than Significant with Mitigation Incorporated.** The west side expansion area contains four industrial buildings, and an undeveloped parcel containing ruderal (weedy) vegetation and surrounded by ornamental trees and shrubs. The east side expansion area also contains ruderal vegetation and a variety of fruit-bearing trees, which are likely associated with a former orchard at the proposed storage track portion of the site. The project area is characterized by flat topography and urbanized land surrounding the existing Hayward Yard and along the

[10] California Department of Transportation, Officially Designated Scenic Highways, Alameda County, http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm, accessed October 29, 2009.

[11] City of Hayward, *City of Hayward General Plan*, adopted March 12, 2002, amended June 27, 2006. Chapter 6: Community Facilities and Amenities, p. 6-18.

UPRR tracks. Surrounding uses include the UPRR tracks and industrial businesses to the west, residential uses to the east, and a golf driving range to the north. Views from the Hayward Yard toward the San Francisco Bay are blocked by the existing industrial buildings and mature trees in the west side expansion area.

Single-family residential neighborhoods are located east of the project site on the opposite side of the UPRR rail line (see Figure 3). The Fairway Park neighborhood in the City of Hayward is east of the project site, north of Whipple Road. Residences front onto Carroll Avenue to the east with backyards and fencing that abut the UPRR to the west. Many of these one- and two-story residences that abut the UPRR rail line are screened from the project site by backyard fencing. Since the area is generally flat, these structures on the west side of Carroll Avenue block views of the project site from residents to the east.

The City of Union City Decoto neighborhood is south of Whipple Road in the area proposed for track modifications. The portion of the neighborhood between the BART mainline and the eastern UPRR tracks consists of two-story apartments and condominiums. Whipple Road borders this neighborhood to the north, Railroad Avenue and the UPRR rail line to the east, and the south end of the project trackwork borders this neighborhood to the west. A sound wall separates the residential structures from the BART tracks.

Operations. Permanent changes in the appearance of the project site and vicinity would result from redevelopment of the existing industrial buildings in the west side expansion under Phase 1 of the project. The project would demolish one of the industrial buildings and redevelop the site with a new building in a modified configuration. The project would also raise the roof of two of the existing industrial buildings by approximately 10 feet. All other buildings would be retrofitted without major modifications to the existing roof, columns, or walls to the degree possible. Permanent changes would also result from construction of an outdoor storage area in the undeveloped parcel in the west side expansion area. Existing views of the area around the project site include industrial buildings to the west, and the existing Hayward Yard to the east. These views would not be adversely affected by the proposed building modifications and development of the undeveloped parcel at the west side expansion area.

Phase 1 of the project would also include improvements to the existing vehicle inspection area on the east side of the existing yard near the Whipple Road gate. Permanent changes in the appearance of the project site would result from expansion of the existing shed from a single-bay structure to a four-bay structure and the addition of unloading ramps. The height of the improved shed structure would be similar in scale to the existing shed. Views of the vehicle inspection area would be consistent with those of the existing uses at the Hayward Yard. The improvements within the vehicle inspection would not alter the visual appearance of the area substantially since the site already contains rail lines and maintenance structures. The existing views are not considered high quality in that they generally include the existing Hayward Yard and the industrial and warehouse buildings to the west. These views would not be adversely affected by the proposed improvements at the vehicle inspection area.

Permanent changes under Phase 2 would result from changes for the storage track area in the east side expansion area. The currently undeveloped 13-acre expansion area would be converted from ruderal vegetation and fruit-bearing trees to transportation-related uses, similar to the existing yard to the west. The east side expansion would include a new internal access road, storage tracks, a car cleaner facility for car interiors, restrooms, and a traction power substation. Generally, the buildings would be pre-engineered steel with concrete or masonry panels. Building heights would be no taller than one story. The mass and heights of these buildings would be smaller in scale than the existing maintenance yard buildings within the project area. The storage tracks would be generally the same elevation as the houses to the east, although as the grade declines gradually toward the north and the wetland area, the storage track area would be filled to maintain a steady gradient for the tracks, which would raise them somewhat in relationship to the residences to the east. Views of the maintenance yard expansion area would be similar to those of the existing uses at the Hayward Yard, and the structures and features of the new expansion area would be visually compatible and similar to the existing yard facilities. The addition of tracks would not alter the visual appearance of the area substantially since the site already contains rail lines and maintenance structures. In addition, the existing views are not considered high quality in that they generally include the existing Hayward Yard and the industrial and warehouse buildings to the west.

Mitigation Measure NO-1 of this document would require the construction of sound walls along the east side of the BART mainline tracks south of Whipple Road to mitigate potential noise impacts. In each area where noise impacts are predicted, BART would install a new sound wall between the BART tracks and the existing sound wall along the properties east of the BART tracks. While the precise design of the wall has not been delineated, the tops of the new sound walls would be between one and four feet higher than the existing wall to the east, and would be constructed approximately 5 feet west of the existing sound wall to allow for maintenance access.

Under Phase 1, two sound walls would be constructed (see Figures 13 and 14 in Section 12, Noise and Vibration). The first sound wall (SW01) would be near the residents at 11th Street and Boyle Street, and the top of the wall would be approximately 4 feet higher than the existing 9-foot sound wall. This increase in height would not result in a substantial change in the visual character of the area, since the visual character and views are already defined in part by existing sound walls. In addition, the proposed sound wall would not result in visual encroachment on the residents since they are currently separated from the existing sound wall by a roadway and the new sound wall would be constructed farther from the residents than the existing sound walls.

The second sound wall to be constructed under Phase 1 (SW02) would be for residents near Alicante Terrace and Carrara Terrace. The top of this wall would be approximately one to two feet higher than the existing 7-foot sound wall and, consequently, would not result in a substantial change in the visual character of the area. The existing sound walls in this area are very close to the residents (in some areas, only a few feet separate the sound walls from the homes). Construction of a new sound wall to protect residents from noise impacts could create a feeling of visual encroachment for these residents. However, because the new sound wall

would be built west of the existing walls (and thereby allowing some physical separation, or distance, from the residences) and the height of the new wall be no more than two feet higher than the existing wall, the visual encroachment impacts would be considered to be less than significant.

Two additional sound walls are proposed under Phase 2, one north and one south of SW02. Similar to Phase 1, the sound walls under Phase 2 would also be approximately one to two feet higher than the existing 7-foot sound wall and would result in less-than-significant impacts similar to those described above for Phase 1. Therefore, the proposed project's impact on the visual character of the area would be less than significant.

Flyovers. Phase 2 of the project would include two flyovers. Three visual simulations of the southern flyover were prepared from vantage points depicted in Figure 6. These viewpoints are from the nearby visually sensitive residential areas that could be most affected by the new structures. Figure 7 presents the views looking northwest from Whipple Road. Figure 8 and Figure 9 depict views from a residential neighborhood along Carroll Avenue looking southwest and south, respectively. As seen in Figure 8 and Figure 9, the southern flyover would be visible from the east and north and would alter the visual appearance of the area.

Although the flyovers at the north and south ends of the project site would be 28 feet in height, they would not degrade the existing visual character or quality of the site and its surroundings. As seen in Figure 7, the southern flyover would be at approximately the same elevation as the Whipple Road overpass, and would not become a visually significant element because the existing elevation of the BART mainline tracks is below that of the residential areas to the east. The design of the southern flyover would be similar to the design of the northern flyover. Thus, visual simulations of the southern flyover would be representative of the height and mass of the northern flyover. The maximum height of the northern flyover would be the same as the southern flyover and would also be visible from the south. The northern flyover would be visible from the east and north, similar to the southern flyover as shown in Figure 8 and Figure 9, and would alter the visual appearance of the area. However, existing views of the project site including both flyover locations are not considered high quality because they generally include the existing Hayward Yard and the industrial and warehouse buildings to the west. Vegetation and topography also limit visibility of the project site from off-site locations. Both flyovers would be consistent with the visual appearance of the existing infrastructure and industrial-like operations of the Hayward Yard and would not noticeably detract from the area's existing visual character, which is not considered to be highly sensitive from a visual perspective (i.e., there are no scenic views, resources, or visual attributes that distinguish the area). Therefore, the impact of the northern and southern flyovers on the visual character of the area would be less than significant.

PBS&J

FIGURE 6
Viewpoint Locations

Source: Environmental Data Resources, Inc., 2009; Google Earth, 2009; PBS&J, 2010.

***Source*:** PGH Wong, 2010.

FIGURE **7**

Viewpoint 1 - Southern Flyover from Whipple Road looking Northwest

Existing Conditions

Proposed Conditions

***Source*:** PGH Wong, 2010.

FIGURE **8**

Viewpoint 2 - Southern Flyover near Carroll Avenue looking Southwest

Existing Conditions

Proposed Conditions

***Source*:** PGH Wong, 2010.

FIGURE **9**

Viewpoint 3 - Southern Flyover near Carroll Avenue looking South

Construction. Temporary construction activities associated with the proposed project would involve the use of heavy equipment. Construction activities would be easily visible from public roadways, along the active BART line, from trains traveling along the UPRR rail line, and from the backyards of nearby residences. Views of the project construction activities would be temporary. Due to the short-term, temporary nature of construction activities, potential visual effects associated with project construction are considered less than significant.

Construction of the proposed crossover switches south of Whipple Road could require the removal of trees to the west of the BART mainline to provide track access. These trees currently screen views from residents east of the BART mainline toward the existing industrial buildings to the west. The removal of these trees could alter views from the residential area and increase the visibility of the industrial uses to the west; this would be a potentially significant impact of the project.

MITIGATION MEASURE. Mitigation Measure VQ-1 below would reduce potential impacts associated with removal of trees south of Whipple Road during construction to less than significant.

VQ-1 *Replacement of Trees that Screen Views of Industrial Buildings*. If construction activities south of Whipple Road require removal of the existing trees near the industrial buildings west of the BART mainline, BART shall plant replacement trees at a 1:1 ratio in the area of removal, after construction activities are complete.

d. Less than Significant. The project area is currently developed with industrial buildings in the west side expansion area, and the existing maintenance yard. The maintenance yard includes storage tracks, maintenance buildings, and the BART mainline tracks. Existing nightlight and glare on the project site are minimal and result primarily from trains along the BART tracks that pass through the site and by trains along the UPRR rail line. Construction of the two flyovers would result in nightlight and glare similar to that contributed by existing BART tracks and passing trains. Existing nightlight and glare in the surrounding area is primarily cast by security lighting for the maintenance yard and industrial buildings. Light sources beyond the site include roadway light fixtures along the Whipple Road overpass and vehicle headlights, and other outdoor lighting from nearby industrial and residential uses.

New exterior light associated with the proposed project would be provided on 15- to 18-foot-high poles, which would be shorter than those at the existing Hayward Yard. Shielding to direct the light downward would be provided. Motion detectors would not be used. Existing views in the project vicinity are limited, so that introduction of new lighting from the proposed project would not significantly detract from existing views or be noticeably different than under existing conditions from the current lighting system at the Hayward Yard and west side expansion area. Existing exterior lights are in and around the Hayward Yard on 40-foot-high poles. Thus, the addition of new lighting similar to the existing lighting would not create a significant new source of light and glare. Accordingly, development of the proposed project would have a less-than-significant light and glare impact.

2. AGRICULTURE AND FORESTRY RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	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 non-agricultural use?	❑	❑	❑	■
b. Conflict with existing zoning for agricultural use or conflict with 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 Government 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 that, due to their location or nature, could result in conversion of Farmland to non-agricultural use?	❑	❑	❑	■

Discussion

a-e. **No Impact.** Based on a review of maps and aerial photographs of the project area and site visits by PBS&J, both the west side and east side expansions are not on or in the vicinity of farmland, agriculturally active land, or forestry land. According to the State Department of Conservation Farmland Mapping and Monitoring Program map,[12] the project site, including the west side and east side expansion areas, is designated as Urban/Built-Up land. The project site and the area south of Whipple Road where track modifications are proposed are designated in the Hayward and Union City General Plans, respectively, as industrial and are zoned for industrial uses, which do not provide for agricultural-related or forestry-related activities.[13] The project site is not on land that is currently under a Williamson Act contract.[14] Therefore, the proposed project, including both Phase 1 and 2, would have no impact on agricultural or forestry resources.

[12] California Department of Conservation, Farmland Mapping and Monitoring Program, 2008 data. ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/2008/ala08.pdf, accessed August 10, 2010.

[13] Pursuant to California Government Code Section 53090, as a rapid transit district, BART is exempt from local land use policies, plans, and zoning ordinances. BART nevertheless provides information concerning local zoning for informational purposes.

[14] California Department of Conservation, Williamson Act Program, ftp://ftp.consrv.ca.gov/pub/dlrp/wa/Map%20 and%20PDF/Alameda/AlamedaWA_08_09.pdf, accessed October 14, 2009.

3. AIR QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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 a non- attainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	❑	■	❑	❑
d. Expose sensitive receptors to substantial pollutant concentrations?	❑	■	❑	❑
e. Create objectionable odors affecting a substantial number of people?	❑	❑	■	❑

Background

The proposed project is within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD), a state agency charged with implementing state and federal air quality standards in the San Francisco Bay Area. The BAAQMD adopted the Bay Area 1991 Clean Air Plan to implement the requirements of the California Clean Air Act of 1988, and has since then, updated and adopted the 2000 Clean Air Plan.

With the assistance of BAAQMD, the California Air Resources Board (CARB) compiles inventories and projections of emissions of major pollutants. Air quality conditions are reported in the San Francisco Bay Area for both "criteria air pollutants" and "toxic air contaminants." Criteria air pollutants refer to a group of pollutants for which regulatory agencies have adopted ambient air quality standards and pollution reduction plans. Criteria air pollutants include ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$), and lead. Reactive organic gases (ROG) and nitrogen oxides (NO_x) are regulated pollutants, because they are precursors to ozone formation. Two subsets of particulate matter are regulated as inhalable particulate matter less than ten microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). Toxic air contaminants (TACs) is a general term for a diverse group of air pollutants that can adversely affect human health, but have not had ambient air quality standards established for them. They are not fundamentally different from the pollutants discussed above, but lack ambient air quality standards for a variety of reasons (e.g., insufficient data on toxicity, association with particular workplace exposures rather than general environmental exposure, etc.). The health effects of TACs can result from either acute (severe exposure and rapid absorption) or chronic (prolonged or repeated exposures over many days, months or years) exposure; many types of cancer are associated with chronic TAC exposures.

The United States Environmental Protection Agency (USEPA) has designated the San Francisco Bay Area Air Basin (SFBAAB), which includes the project site, as nonattainment for the federal 8-hour ozone standard and the 24-hour $PM_{2.5}$ standard, meaning that the Bay Area does not meet the air quality standards for these air pollutants. The USEPA has designated the SFBAAB as unclassified for PM_{10}, and as in attainment of the federal CO, NO_X, and SO_X standards. The State has designated the SFBAAB as serious nonattainment of the State ozone standard and nonattainment of the State PM_{10} and $PM_{2.5}$ standards. The SFBAAB has also been designated as being in attainment of the State CO, NO_X, and SO_X standards. These designations are based on the latest amendments to the state and federal ambient air quality standards.

BAAQMD has adopted a number of air quality plans, and rules and regulations as needed to achieve the federal and State air quality standards and meet other air quality obligations. On November 16, 2005, BAAQMD adopted its Particulate Matter Implementation Schedule, pursuant to California Senate Bill 656, to implement further feasible measures to control emissions of particulate matter. On January 4, 2006, BAAQMD adopted the 2005 Ozone Strategy to identify further steps needed to continue reducing the public's exposure to unhealthy levels of ozone. On September 15, 2010, BAAQMD adopted its 2010 Clean Air Plan (2010 CAP). According to BAAQMD, the 2010 CAP is intended to:

- Update the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement "all feasible measures" to reduce ozone;
- Provide a control strategy to reduce ozone, particulate matter (PM), air toxics, and greenhouse gases in a single, integrated plan;
- Review progress in improving air quality in recent years; and
- Establish emission control measures to be adopted or implemented in the 2010-2012 timeframe.

The methodologies and thresholds of significance included in the BAAQMD's *CEQA Guidelines* are intended to assist local jurisdictions and agencies in the evaluation of air quality impacts under CEQA. The BAAQMD recently revised its *CEQA Guidelines* with new thresholds of significance for both construction and operational emissions of criteria air pollutants and ozone precursors, as shown in Table 2 below.

Table 2
BAAQMD CEQA Air Pollutant Thresholds of Significance

Air Pollutant	Construction Phase (lbs/day)	Operational Phase Average Daily (lbs)/Maximum Annual (tons)
ROG	54	54/10
NOx	54	54/10
PM_{10}	82*	82/15
$PM_{2.5}$	54*	54/10

Source: BAAQMD CEQA Guidelines, 2010.
Notes:
* Construction equipment exhaust only.

Land uses such as schools, hospitals, and convalescent homes are considered to be sensitive receptors to poor air quality because the very young, the old, and the infirm are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential uses are also considered sensitive because people in residential areas are often at home, and therefore exposed to pollutants, for extended periods of time. Recreational areas are considered moderately sensitive to poor air quality because vigorous exercise associated with recreation places a high demand on the human respiratory function. The project site is zoned for mixed industrial; however, to the north, northeast, and east of the project site, there are single-family residential neighborhoods and four schools within one-quarter mile, Bidwell, Hillview Crest, Treeview, and Our Lady of the Rosary.

Discussion

a-d. Less than Significant with Mitigation Incorporated. The following discussion addresses the increase in air emissions associated with the proposed project (both Phases 1 and 2) and the potential to affect sensitive receptors. Emissions during operations and construction are different and thus are presented separately.

Operational Emissions. Operation of the Hayward Yard occurs 24 hours a day. When trains assigned to this maintenance yard are not in use on the BART system, they are stored at the facility. The proposed project would increase the maintenance activities at the site under Phase 1, and would increase the yard's onsite train storage capacity and the interior cleaning activities on the trains stored there during Phase 2. Current operations at the Hayward Yard do not involve the use of equipment that emits substantial amounts of air pollutants (e.g., portable diesel powered equipment like generators, power washers, etc.); all the equipment used for train maintenance work is electrically powered. Although washing and other maintenance activities would increase with project implementation, the yard's reliance on electrically powered equipment for this maintenance work would continue. Thus, there would be no increase in air pollutant emissions from onsite use of portable powered equipment. Also, since the BART trains are electrically powered, the increased activity of trains moving into, out of or within the yard would not generate additional air pollutant emissions locally.

The work force assigned to the Hayward Maintenance Complex would be approximately 350 daily employees. However, a portion of these employees (135 employees) would be BART employees who currently work at the existing Hayward Yard. Therefore, the net increase in employment at the Hayward site would be 215 employees. The project would also include a programmed station stop at the site to allow employees to ride BART to the site. An estimated 20 percent of employees at the Hayward Yard would use BART with this programmed stop. As discussed in Section 16, Transportation/Traffic, under existing conditions, the BART Hayward Yard and the existing industrial uses in the west side expansion area generate approximately 1,436 daily trips. With implementation of the proposed project, trips to the project site associated with the existing Hayward Yard and proposed Hayward Maintenance Complex would be approximately 1,122 daily trips (a net decrease of 314 daily trips from existing conditions). Therefore, with implementation of the project, there would be a decrease in air pollutant emissions from worker motor vehicles. Therefore, the proposed project would not have significant operational air pollutant emissions.

Since project operational emissions are expected to decrease compared to existing baseline conditions, project operations would not have a significant impact on air quality, either individually or cumulatively. In addition, because the project would not generate significant air emissions, the project would also not conflict with or obstruct implementation of the air quality plans designed to bring the region into attainment.

Construction Emissions. The proposed project would generate short-term air emissions associated with construction activities. Construction of Phase 1 is scheduled to last approximately 36 months. Construction would require the use of standard heavy construction equipment, including bulldozers, loaders, and trucks for demolition and construction or retrofit of the industrial buildings on the west side. Demolition of the warehouse at the Overhaul Shop site would require removal of debris with an estimated 500 truckloads. New material for construction of the Overhaul Shop is estimated to generate up to 500 truckloads over the 1-year construction duration. Also, during the initial construction stages, the undeveloped parcel on site would be cleared, grubbed, and graded to accommodate the proposed outdoor storage area. This would require the export of about 3,800 cubic yards, for an average of 53 truck-loads a day over a 3-month period. The construction equipment and the trucks used to haul the fill during Phase 1 would emit ROG, NO_X, PM_{10}, and $PM_{2.5}$.

The project's construction-related air pollutant emissions were estimated using the URBEMIS model initialized with construction activity and phasing data provided by BART. Construction emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ for Phase 1 and Phase 2 are shown in Table 3 below. ROG, PM_{10}, and $PM_{2.5}$ for each activity area are well below the BAAQMD significance thresholds; however, there is the potential for exceedance of the NO_X threshold depending on the phasing of construction activities. For Phase 1, even if the clearing, grubbing, and grading were to occur simultaneously with the building construction, NO_X emissions would not exceed the BAAQMD's threshold of 54 pounds per day. Therefore, Phase 1 would not have the potential to exceed any BAAQMD threshold. However, there would be a potential for an exceedance of the NO_X threshold if the clearing, grubbing, grading, and fill transport activities planned for Phase 2 are conducted simultaneously with other project construction activities. Without precautionary restrictions on construction phasing, the air quality impact from construction emissions of NO_X would be potentially significant.

PM_{10} and $PM_{2.5}$ would also be generated from soil-disturbing activities. These dust emissions could impact sensitive residential receptors to the north, northeast, and east of the project site by increasing local ambient PM_{10} concentrations there. For construction-phase impacts, the BAAQMD recommends that impact significance be determined based on a commitment to implement effective dust control measures. Thus, with such controls, fugitive dust emitted during project construction phases would not have a potentially significant impact.

Table 3
Air Pollutant Emissions from Project Construction Activities (lbs/day)

Construction Phase/Activity	ROG	NOx	PM_{10}	$PM_{2.5}$
Phase 1: West Side Expansion				
Clearing, Grubbing, Grading, and Fill Transport	3.0	25.5	1.3	1.2
Building Construction	4.5	26.0	1.5	1.4
Phase 2: East Side Expansion				
Clearing, Grubbing, Grading, and Fill Transport	4.6	50.4	2.2	2.0
Underground Infrastructure and Above-ground Facilities	5.6	36.3	1.9	1.8
Switches and Crossovers	3.0	25.1	1.3	1.2

Source: PBS&J, 2010.

MITIGATION MEASURES. BART shall implement the following recommended measures to reduce air pollutant emissions during project construction.

AQ-1 *Construction Phasing to Reduce Air Emissions*. For construction of the storage tracks in Phase 2, BART shall ensure that all work involving clearing, grubbing, grading, and fill transport associated with work on the project site north of Whipple Road not be conducted concurrently with construction work south of Whipple Road to assure that the BAAQMD NO_x construction equipment emission threshold would not be exceeded.

AQ-2 *Dust Control during Construction*. BART shall ensure implementation of the following mitigation measures during project construction, in accordance with Bay Area Air Quality Management District (BAAQMD) standard mitigation requirements:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day, or as necessary to control dust.
- 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 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as practical.
- Building pads shall be laid as soon as practical 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 [CCR]). Clear signage stating the regulations 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 mechanic and determined to be running in proper condition prior to operation.
- 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 Air District's phone number shall also be visible to ensure compliance with applicable regulations.

e. Less than Significant. BART trains operating on the project site are electrically run and therefore do not emit odorous exhaust; the only odors from the site would be an occasional exposure to diesel exhaust from trucks accessing the site from public roadways and occasional odors from use of cleaning agents, solvents, and chemicals associated with cleaning and maintenance. The operation of equipment and cleaning of the vehicles can generate localized odors that are typically only noticeable by workers near these sources. Residents and businesses in close proximity to the construction areas may also experience occasional odors from diesel equipment exhaust during construction. This effect would be intermittent, would be contingent on prevailing wind conditions, and occur only during construction activities. Because the generation of odors would be periodic, and because these emissions would not affect a substantial number of people, the impact is considered less than significant during both operations and construction.

4. BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	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, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	❑	❑	❑	■

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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, marshes, vernal pools, coastal wetlands, etc.), or wetlands that are waters of the State 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?	❑	❑	❑	■

Background

Field Reconnaissance. A PBS&J biologist visited the project site and vicinity on September 24, 2009 (east side expansion area) and August 4, 2010 (west side expansion area). The purpose of the visits was to determine if any wetlands or potential habitat for special-status plant or wildlife species occur on the site that could pose constraints on the proposed expansion of the BART Hayward Yard. Prior to the site visit, queries of the California Department of Fish and Game's (CDFG) Natural Diversity Database (CNDDB) and the U.S. Fish and Wildlife Service's (USFWS) Online Threatened and Endangered Species Database[15] were conducted to identify those special-status species that have potential to occur in the project vicinity. The results of these queries are included in Appendix A of this document. The survey of the site consisted of walking the perimeter of the site, followed by walking representative transects through the site's interior, while recording plant and wildlife species, vegetation communities, and potential wetlands.

The majority of the site is in the City of Hayward with a portion (south of Whipple Road) in Union City, and is surrounded primarily by residential and industrial land uses. The majority of the approximately 28-acre west expansion area consists of existing active warehouses and adjacent parking lots, with a small area of disked ruderal grassland at the south end. Most of this undeveloped, but highly disturbed portion of the west expansion area occurs on the west side of the driveway leading to the warehouses, but a small triangular portion of undeveloped disked ruderal grassland occurs on the east side of the driveway adjacent to the existing BART right-of-way.

[15] U.S. Fish and Wildlife Service. Online Threatened and Endangered Species Database http://sacramento.fws.gov/es/spp_lists/auto_list_form.cfm, accessed October 30, 2009.

The majority of the east side expansion area consists of the existing BART storage/maintenance yard, and is either paved or covered in a compacted gravel surface. The project site consists of an undeveloped, but highly disturbed area characterized as non-native annual grassland with patches of native and non-native woody vegetation. The grassland areas are mostly flat, and are disked on an annual basis, but the patches of woody vegetation are left largely undisturbed. A large depression occurs at the north end of the site, where two patches of willows (*Salix* sp.) are present. The east side project site occurs between BART tracks to the west and UPRR tracks to the east.

Plant species observed during the September 24, 2009 field survey of the east side expansion area included coyote brush (*Baccharis pilularis*), fennel (*Foeniculum vulgare*), coast live oak (*Quercus agrifolia*), almond (*Prunus dulcis*), peach (*Prunus persica*), wild oats (*Avena fatua*), wild radish (*Raphanus sativa*), willow, toyon (*Heteromeles arbutifolia*), wild mustard (*Brassica* spp.), California poppy (*Eschscholzia californica*), and yellow star thistle (*Centaurea solstitialis*). Wildlife species observed included pigeon (*Columba livia*), mourning dove (*Zenaida macroura*), scrub jay (*Aphelocoma coerulescens*), house sparrow (*Passer domesticus*), mule deer (*Odocoileus hemionus*), and western fence lizard (*Sceloporus occidentalis*).

Two potential wetlands were observed adjacent to the east side expansion area. The first is a short segment of the narrow channel that follows the western edge of the site. While the majority of this channel contains no wetland vegetation or other wetland characteristics and no surface water was present, one portion near the northern end contains cattails (*Typha latifolia*). This area covers approximately 0.01 acre. The second potential wetland is the large depression north of the proposed storage track area. This depression is approximately 1.2 acres. BART's original plans for the expansion area encompassed this large depression. Following the field observations by the PBS&J biologist, BART modified its site plan to exclude this potential wetland from the project site. Additionally, the project design was modified to avoid direct disturbance to the drainage channel along the western edge of the site.

As stated above, the majority of the west side expansion area consists of warehouses and adjacent parking lots. The only vegetation in this portion of the area consists of ornamental landscaping in the planting beds near the warehouse buildings, and include mock orange (*Pittosporum tobira*), oleander (*Nerium oleander*), and English ivy (*Hedera helix*). In addition to the planting beds, a row of coast redwoods (*Sequoia sempervirens*) occurs along the eastern boundary of the west side expansion area, between the existing BART yard, and the warehouses. The southern, undeveloped portion of the west side expansion area appeared to have been mowed and disked at some point within the previous months, but enough portions of the existing plant species were present that they could be identified. Plant species observed during the August 4, 2010 survey of the west side expansion area included coyote brush, fennel, wild oats, prickly oxtongue (*Picris echioides*), prickly lettuce (*Lactuca serriola*), wild radish, salsify (*Tragopogon porrifolius*), California poppy (*Eschscholzia californica*), Bermuda grass (*Cynodon dactylon*), cheeseweed (*Malva parviflora*), and field bindweed (*Convolvulus arvensis*).

Special-Status Species. The potential occurrence of special-status plant and animal species within the project area and surrounding region has been determined through a review of the CNDDB, the USFWS online species list database, and the reconnaissance field surveys by PBS&J.

For the purposes of this section, special-status species include:

- species listed, proposed, or candidate species for listing as Threatened or Endangered by the USFWS pursuant to the Federal Endangered Species Act (FESA) of 1973, as amended;
- species listed as Rare, Threatened, or Endangered by the CDFG pursuant to the California Endangered Species Act (CESA) of 1984, as amended;
- species designated as Fully Protected under Sections 3511 (birds), 4700 (mammals), and 5050 (reptiles and amphibians) of the California Fish and Game Code;
- species designated by the CDFG as California Species of Special Concern;
- plant species listed as Category 1B and 2 by the California Native Plant Society (CNPS); and
- species not currently protected by statute or regulation, but considered rare, threatened, or endangered under CEQA Guidelines Section 15380.

Species identified through the above means, along with their status and likelihood of occurrence in the project area, are listed in Table 4. This list represents those species identified in the review of the CNDDB and USFWS queries having the highest likelihood to occur in the project area (i.e., within the known range, and/or with potential habitat present). Species identified by these sources as potentially occurring in the region, but for which there is no suitable habitat and the project area is outside the known range of the species, are not addressed further. Additionally, species identified in the CDFG and USFWS queries that do not meet the status criteria described above are not addressed in this document. Finally, since no aquatic habitat is present in the project area, no special-status fish species known to occur in the region are addressed in this document.

Regulatory Framework. Applicable state and federal regulations governing biological resources are described below.

Federal Endangered Species Act. The USFWS and the National Marine Fisheries Service (NMFS) implement the Federal Endangered Species Act (FESA; 16 USC 153 et seq.). Projects that would result in take of any federally-listed threatened or endangered species are required to obtain authorization from the USFWS and the NMFS through either Section 7 (interagency consultation) or Section 10(a) (incidental take permit) of FESA, depending on whether the federal government is involved in permitting or funding the project. The authorization process is used to determine if a project would jeopardize the continued existence of a listed species and the mitigation measures required to avoid jeopardizing the species.

Federal Clean Water Act, Section 404. The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Section 301 prohibits the discharge of any pollutant into the nation's waters without a permit, and Section 402 establishes the permit program. Under Section 404 of the CWA, the U.S. Army Corps of Engineers (Corps) has the authority to regulate activities that discharge fill or dredge material into wetlands or other waters of the U.S. The Corps implements the federal policy embodied in Executive Order 11990, which is intended to result in no-net-loss of wetland values or acres.

Table 4
Special Status Species Potentially Occurring in the Project Vicinity

Common Name	Scientific Name	Status[1] Fed/CA/Other	Habitat and Seasonal Distribution in California	Likelihood of Occurrence Within the Project Vicinity[2]
Fragrant fritillary	*Fritillaria liliacea*	none/none/1B.2	Cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland habitats often in association with serpentine soils. 3 – 410 m. Blooms February – April.	**Not Likely.** Long-term disking of the project area renders habitat unsuitable.
Diablo helianthella	*Helianthella castanea*	none/none/1B.2	Found in broad-leafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, and valley and foothill grassland habitats. 60 – 1300 m. Blooms March – June.	**Not Likely.** Long-term disking of the project area renders habitat unsuitable.
Santa Cruz tarplant	*Holocarpha macradenia*	FT/SE/1B.1	Found in coastal prairie, valley and foothill grasslands at elevation ranging from 10-220 m. Blooms from June – Oct.	**Not Likely.** Long-term disking of the project area renders habitat unsuitable.
Most beautiful jewel-flower	*Streptanthus albidus ssp. Peramoenus*	none/none/1B.2	Chaparral, cismontane woodland, valley and foothill grasslands, often on serpentine soils. 110 – 1000 meters. Blooms April – June.	**Not Likely.** Long-term disking of the project area renders habitat unsuitable.
Monarch butterfly	*Danaus plexippus*	Wintering sites protected by CDFG	Eucalyptus groves used as winter roost sites.	**Not Likely.** No suitable habitat in the project area.
California red-legged frog	*Rana aurora draytonii*	FT/CSC/none	Slow-flowing portions of perennial streams, ephemeral streams, and hillside seeps that maintain pool environments (including ponds) or saturated soils throughout the summer months	**Not Likely.** No suitable habitat in the project area.
Alameda whipsnake [=striped racer]	*Masticophis lateralis euryxanthus*	FT/ST/none	Scrub and chaparral habitats in Alameda and Contra Costa counties but may occur in any inner Coast Range plant communities, including grasslands, open woodlands, rocky slopes, and along open streams and arroyos near scrub and chaparral.	**Not Likely.** No suitable habitat in the project area. Project area highly disturbed, and isolated from known occurrences by urban development.
Northern harrier	*Circus cyaneus*	none/CSC/MBTA	Grasslands and open habitats; typically nests on the ground in dense vegetation.	**Moderate.** Could forage in the project area, but no nesting habitat is present due to disking.
White-tailed kite	*Elanus leucurus*	none/CFP/MBTA	Preferred habitat is marshes and waste fields in the Central Valley and coastal plains of California.	**Moderate.** Could forage in the project area, but no nesting habitat is present.
Pallid bat	*Antrozous pallidus*	none/CSC/none	Found in deserts, grasslands, shrublands, woodlands and forests. Roosts in rock crevices, buildings, and bridges in arid regions.	**Moderate.** Could forage in the project area, but no roosting habitat is present.

Table 4
Special Status Species Potentially Occurring in the Project Vicinity

Source: California Department of Fish and Game's Natural Diversity Database (CNDDB), September 7, 2010. United States Fish and Wildlife Service online threatened and endangered species database (http://sacramento.fws.gov/es/spp_lists/auto_list_form.cfm), September 7, 2010

Notes:

Federal

FE	Federally listed as Endangered
FT	Federally listed as Threatened
MBTA	Protected under the Migratory Bird Treaty Act
BCC	USFWS Bird of Conservation Concern

State

SE	State listed as Endangered
ST	State listed as Threatened
SR	State Recovered
CR	California rare
CSC	California Department of Fish and Game designated "Species of Special Concern"

CNPS

1A	Presumed extinct
1B	California Native Plant Society (CNPS) Ranking. Defined as plants that are rare, threatened, or endangered in California and elsewhere.
2	California Native Plant Society (CNPS) Ranking. Defined as plants that are rare, threatened, or endangered in California, but more common elsewhere.
3	Needs more review

CNPS Threat Code Extension

1	Species seriously endangered in California
2	Species fairly endangered in California
3	Species not very endangered in California

2-Likelihood of Occurrence: CDFG Natural Diversity Database (CNDDB) California Natural Diversity Database, 2007.
Likelihood of occurrence evaluations:

- A rating of "known" indicates that the species has been observed on the site.
- A rating of "high" indicates that the species has not been observed, but sufficient information is available to indicate suitable habitat and conditions are present on-site and the species is expected to occur on-site.
- A rating of "moderate" indicates that it is not known if the species is present, but suitable habitat exists on-site.
- A rating of "low" indicates that species was not found during biological surveys conducted to date on the site and may not be expected given the species' known regional distribution or the quality of habitats located on the site.
- A rating of "not likely" indicates that the taxa would not be expected to occur on the project site because the site does not include the known range or does not support suitable habitat.

Federal Clean Water Act, Section 401 and Porter-Cologne Water Quality Control Act. The State Water Resources Control Board (SWRCB) has authority over federally jurisdictional wetlands through Section 401 of the CWA, which requires that an applicant for a Section 404 permit (to discharge dredged or fill material into waters of the United States) obtain certification from the appropriate state agency stating that the fill is consistent with the State's water quality standards. In California, the authority to certify permits is delegated by the SWRCB to the nine regional boards. The San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) is the appointed authority for Section 401 compliance in the project area. A request for certification is submitted to the regional board at the same time that an application is filed with the Corps. Because no Corps permit is valid under the CWA unless "certified" by the state, these boards may effectively veto or add conditions to any Corps permit. In addition, the SWRCB and SFBRWQCB have authority over wetlands that are not federally

jurisdictional under the Porter-Cologne Water Quality Control Act, which requires a permit for discharges to "waters of the State."

Migratory Bird Treaty Act (MBTA). The MBTA regulates or prohibits the taking, killing, possession of, or harm of migratory bird species listed in Title 50 Code of Federal Regulations (CFR) Section 10.13. It implements an international treaty for the conservation and management of bird species that migrate through more than one country and is enforced in the United States by the USFWS. Hunting of specific migratory game birds is permitted under the regulations listed in Title 50 CFR 20.

California Endangered Species Act. The CDFG derives its authority from the Fish and Game Code of California, which implements the California Endangered Species Act 1985 (CESA; Fish and Game Code Section 2050 et seq.). CESA prohibits the "take" of listed threatened or endangered species. Take under CESA is restricted to the direct killing of a listed species and does not prohibit indirect harm by way of habitat modification.

Fish and Game Code - Sections 3503, 3503.5, and 3513. Fish and Game Code Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Fish and Game Code Section 3503.5 protects all birds-of-prey (raptors) and their eggs and nests. Section 3513 states that it is unlawful to take or possess any migratory nongame bird as designated in the MBTA. These regulations could require that elements of the proposed project (particularly vegetation removal or construction near nest trees) be reduced or eliminated during critical phases of the nesting cycle unless surveys by a qualified biologist demonstrate that nests, eggs, or nesting birds will not be disturbed, subject to approval by CDFG and/or USFWS.

Fish and Game Code - Sections 3511, 4700, 5050, and 5515. Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the California Fish and Game Code designate certain species as "fully protected." Fully protected species, or parts thereof, may not be taken or possessed at any time, and no provision of the California Fish and Game Code or any other law may be construed to authorize the issuance of permits of licenses to take any fully protected species. No such permits or licenses heretofore issued may have any force or effect for any such purpose, except that the California Fish and Game Commission may authorize the collecting of such species for necessary scientific research. Legally imported and fully protected species or parts thereof may be possessed under a permit issued by CDFG.

Tree Protection Regulations. California Government Code Section 53090 exempts rapid transit districts such as BART from complying with local land use plans, policies, and zoning ordinances. Nevertheless, this section identifies local policies and standards for the cities of Hayward and Union City governing protection of trees for informational purposes.

<u>City of Hayward Municipal Code, Article 15, Tree Preservation.</u> Article 15 of the City of Hayward's Municipal Code states that: "No person shall remove, destroy, perform cutting of branches over one inch in diameter, or disfigure or cause to be removed or destroyed or disfigured any Protected Tree without having first obtained a permit to do so... All Protected Trees shall require a permit for removal, relocation, cutting or reshaping. All removed or disfigured trees shall also require

replacement with like-size, like-kind trees or an equal value tree or trees as determined by the City's Landscape Architect…The replacement trees shall be located on site wherever possible…"

The City's ordinance defines Protected Trees as:

1) Trees having a minimum trunk diameter of eight inches measured 54 inches above the ground. When measuring a multi-trunk tree, the diameters of the largest three trunks shall be added together.
2) Street trees or other required trees such as those required as a condition of approval, Use Permit, or other Zoning requirement, regardless of size.
3) All memorial trees dedicated by an entity recognized by the City, and all specimen trees that define a neighborhood or community.
4) Trees of the following species that have reached a minimum of four inches diameter trunk size:
    a) Big Leaf Maple (*Acer macrophylla*)
    b) California Buckeye (*Aesculus californica*)
    c) Madrone (*Arbutus menziesii*)
    d) Western Dogwood (*Cornus nuttallii*)
    e) California Sycamore (*Platanus racemosa*)
    f) Coast Live Oak (*Quercus agrifolia*)
    g) Canyon Live Oak (*Quercus chrysolepis*)
    h) Blue Oak (*Quercus douglasii*)
    i) Oregon White Oak (*Quercus garryana*)
    j) California Black Oak (*Quercus kelloggii*)
    k) Valley Oak (*Quercus lobata*)
    l) Interior Live Oak (*Quercus wislizenii*)
    m) California Bay (*Umbellularia californica*)
5) A tree or trees of any size planted as a replacement for a Protected Tree. Trees located on a developed single-family residential lot that cannot be further subdivided are exempt unless they have been required or protected as a condition of approval.

City of Union City Tree Ordinance. The City of Union City's tree ordinance (Ordinance #318-89) is intended to provide a comprehensive plan for the design and installation of public trees and to limit the removal of significant trees. Title 12, Chapter 12.16.170 Tree conservation, states that: "The preservation of trees is necessary for the health and welfare of the citizens of the City in order to preserve the scenic beauty, prevent erosion of topsoil, protect against flood hazards and risk of landslides, counteract the pollutants in the air, maintain the climatic balance and decrease wind velocities, contributing greatly to the value of land in the City." This chapter also a states that: "It is unlawful for any person to trim or remove a tree covered by this section without a permit…a condition on which a permit is granted that one or more replacement trees of a species and a size designed by the Public Works Director…"

The City's ordinance defines protected trees as:

a) All trees which have a thirty-five-inch or greater circumference of a trunk, or in the case of multi-trunk trees, a total of seventy inches or more of the circumference of all trunks, where such trees are located on residential property;

b) All trees which have a twelve-inch or greater circumference of any trunk, when removal relates to any transaction for which zoning approval or subdivision approval is required;

c) Any tree that existed at the time of a zoning approval or subdivision approval and was a specific subject of such approval or otherwise covered by paragraph (b) of this subdivision;

d) Any tree that was required to be planted by the terms of a zoning approval or a subdivision approval;

e) All trees which have a twelve-inch or greater circumference of any trunk and are located on a vacant lot or undeveloped property;

f) All trees which have a twelve-inch or greater circumference of any trunk and are located on commercial, office or industrial developed property.

Discussion

a. **No Impact.** Although portions of the project site are undeveloped, they are subject to regular disturbance due to annual disking. As such, the project site does not contain habitat for any of the special-status species known from the region. The portion of the proposed project south of the Whipple Road, where trackwork would be modified, is used extensively for train operations and likewise does not contain habitat. Additionally, both areas are isolated from areas where these and other special-status species are known to occur by rail lines and residential and industrial development. Therefore, it is highly unlikely that any of the special-status species known from the region would occur at the project site, and there would be no impact on these resources from the proposed project under both Phases 1 and 2.

b. **No Impact.** The project site and the trackwork area south of Whipple Road do not contain any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Since none of these resources are present where the proposed project would alter the existing setting under both Phases 1 (west side expansion area) and 2 (east side expansion area), implementation of the proposed project would not result in the loss of any riparian habitat or other sensitive natural communities. Therefore, there would be no impact on these resources.

c. **Less than Significant with Mitigation Incorporated.** No potential wetlands occur in the west side expansion area, so no impacts on wetlands resources would occur as a part of Phase 1 of the project.

Two potential wetlands occur adjacent to the east side expansion area. The first occurs along a narrow, artificial drainage channel that follows the western edge of the site adjacent to the eastern edge of the BART tracks. The majority of this channel contains no wetland vegetation

or other wetland characteristics. However, one segment of this potential wetland, covering approximately 0.01 acre, contains wetland vegetation, although no surface water was present. The second potential wetland is the approximately 1.2-acre depression north of the project site. No other federally jurisdictional wetlands or "waters of the State" occur in the project area.

Under current project designs of Phase 2, both the drainage channel and the approximately 1.2–acre wetland north of the project site would be avoided. However, the project could disturb these wetlands during construction or change the hydrology, water quality, or water quantity in those wetlands after the project's completion, thus resulting in an indirect effect. The loss of wetlands or other waters of the U.S. is a potentially significant impact.

MITIGATION MEASURE. Implementation of the following measure would reduce this impact to a less-than-significant level.

BIO-1 *Wetland Avoidance and Protection.* BART shall ensure that the wetlands adjacent to the east side expansion area of the project site are not affected during construction by installing orange exclusionary fence to alert construction crews that the areas are to be avoided during construction, and through compliance with applicable statewide NPDES general permits.

In addition, BART shall ensure that post installation conditions shall not cause significant changes to the pre-project hydrology, water quality, or water quantity in any wetland or other water of the U.S. that is affected by the project. This shall be accomplished through implementation of Mitigation Measures HYD-1 and HYD-2 from the Hydrology section, *Stormwater Drainage System Design*, and through compliance with applicable statewide NPDES general permits.

d. Less than Significant with Mitigation Incorporated. Trees and shrubs found within both the east side and west side expansion areas could provide nesting habitat for a wide variety of native birds. Nesting birds, including raptors, are protected by the California Department of Fish and Game Code 3503, which reads, "It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." Passerines and non-passerine land birds are further protected under the MBTA. As such, the CDFG typically recommends pre-construction surveys for potentially suitable nesting habitat that will be directly (actual removal of trees/vegetation) or indirectly (noise disturbance) impacted by construction-related activities. Implementation of the proposed project (both Phases 1 and 2) would require tree and shrub removal in preparation for project construction and at the potential access point at the industrial property along the west side of the mainline tracks just south of Whipple Road. Tree and shrub removal during the nesting season (March 1 to September 15) could result in the loss of active bird nests. The loss of active nests due to tree and shrub removal is a potentially significant impact.

MITIGATION MEASURES. Mitigation Measures BIO-2 and BIO-3 below, to be implemented by BART, would reduce the proposed project's impact on nesting migratory birds to a less-than-significant level.

BIO-2 *Restrictions on Tree or Shrub Removal to Avoid Nesting Birds*. Tree or shrub removal or pruning shall be avoided from March 1 through September 15, the bird nesting period, to the extent feasible. If no tree or shrub removal or pruning is proposed during the nesting period, no surveys or further mitigation measures are required.

BIO-3 *Pre-construction Nesting Bird Survey and Measures to Reduce Harm to Nesting Birds*. If tree and shrub removal is unavoidable during the nesting season, BART shall hire a qualified biologist to conduct a survey for nesting raptors and other birds covered by the MBTA. BART shall have a qualified biologist conduct nest surveys no more than 30 days prior to any demolition/construction or ground-disturbing activities that are within 500 feet of potential nest trees or suitable nesting habitat (i.e., trees, tule, cattails, grassland). A pre-construction survey report shall be submitted to CDFG that includes, at a minimum: (1) a description of the methodology including dates of field visits, the names of survey personnel with resumes, and a list of references cited and persons contacted; and (2) a map showing the location(s) of any bird nests observed on the project site. If no active nests of MBTA-covered species are identified, then no further mitigation is required.

If active nests of protected bird species are identified in the focused nest surveys, BART will consult with the appropriate regulatory agencies to identify project-level mitigation requirements, based on the agencies' standards and policies as then in effect. Mitigation may include the following, based on current agency standards and policies:

e) BART, in consultation with CDFG, would delay construction in the vicinity of active nest sites during the breeding season (March 1 through September 15) while the nest is occupied with adults and/or young. A qualified biologist would monitor any occupied nest to determine when the nest is no longer used. If the construction cannot be delayed, avoidance measures would include the establishment of a non-disturbance buffer zone around the nest site. The size of the buffer zone would be determined in consultation with the CDFG, but will be a minimum of 100 feet. The buffer zone would be delineated with highly visible temporary construction fencing.

f) No intensive disturbance (e.g., heavy equipment operation associated with construction, or use of cranes) or other project-related activities that could cause nest abandonment or forced fledging would be initiated within the established buffer zone of an active nest between March 1 and September 15.

g) If construction activities are unavoidable within the buffer zone, BART would retain a qualified biologist to monitor the nest site to determine if construction activities are disturbing the adult or young birds. If abandonment occurs, the biologist would consult with CDFG or USFWS (who monitor compliance with the MBTA) for the appropriate salvage measures (e.g., remove abandoned

nestlings to an agency approved wildlife care group). BART would be required to fund the full costs of the salvage measures.

h) If fully protected species are found to be nesting near the construction area, their nests would be completely avoided until the birds fledge. Avoidance would include the establishment of a non-disturbance buffer zone of 250 feet, or as determined in consultation with the CDFG.

e. Less than Significant with Mitigation Incorporated. As stated previously, pursuant to California Government Code Section 53090, as a rapid transit district, BART is exempt from local land use policies, plans, and zoning ordinances. BART nevertheless provides information concerning local regulations for informational purposes. The City of Hayward's Tree Preservation Ordinance (Municipal Code, Article 15) prohibits the removal of any trees meeting the criteria of protected tree as outlined under the regulatory setting above. Trees present in the east side expansion area consist of non-native ornamental trees, volunteer orchard trees (e.g., almonds, peaches, olives), and a few small coast live oaks. None of these trees are greater than 8 inches diameter at 54 inches above the ground, or are designated as street trees, memorial trees, or replacement trees. The coast live oak is a species listed in Section 10-15.11–4f. However, these individuals are seedling trees that have not yet reached 4 inches in diameter. None of these trees meet the criteria of Protected Tree under the City of Hayward's Tree Preservation Ordinance; therefore, there would be no impact as a result of the proposed project.

Trees in the west side expansion area also include ornamental species in the planting beds adjacent to the existing warehouses, and a row of coast redwoods east of the warehouses (approximately 100 trees), adjacent to the existing BART yard. These coast redwoods range between 6 and 12 inches in diameter at 54 inches above ground, and would be considered protected trees under the City of Hayward's Tree Preservation Ordinance. Some of these trees would be removed when the connecting tracks for the west side are built.

Tree removal could also be required at the potential access point from the industrial property along the west side of the mainline tracks just south of Whipple Road in Union City. Construction access points would not be determined until construction plans are final. Therefore, the number and type of trees that would be removed is not known at this time. Although BART is not legally required to comply with local ordinances, BART considers this impact potentially significant.

MITIGATION MEASURES. Mitigation Measure BIO-4 below, to be implemented by BART, would reduce the proposed project's impact resulting from tree removal to a less-than-significant level.

BIO-4 *Tree Survey and Replacement of Protected Trees to be Removed.* Prior to construction, BART shall retain a certified arborist to survey trees in the project area, including potential access roads and staging areas, to identify and evaluate trees that shall be removed. A report shall be prepared and submitted to BART to

document the trees that are to be removed. Mitigation shall be required for impacts to trees designated as "protected trees" in the cities of Hayward or Union City. Replacement trees will be a native tree species. Each removed tree meeting the above classifications will be replaced at a 1:1 ratio. Trees will be planted in locations suitable for the replacement species. Selection of the replacement sites and installation of replacement plantings will be supervised by a qualified botanist. Trees will be replaced as soon as practical after construction is completed. A qualified botanist will monitor newly planted trees at least once a year for 5 years. Each year during that period, any trees that do not survive will be replaced. Any trees planted as remediation for failed plantings will be planted as stipulated here for original plantings, and will be monitored for a period of 5 years following installation.

f. **No Impact**. The project area is not located within the boundaries of any adopted Habitat Conservation Plan (HCP) or Natural Community Conservation Plan (NCCP). The nearest adopted HCPs are the San Francisco Alameda Watershed Habitat Conservation Plan and the East Contra Costa County Habitat Conservation Plan. However, as stated above, the project area is not located within the boundaries of either of these plans. Since the proposed project (including both Phase 1 and 2) is not within the boundaries of any adopted HCP or NCCP, there would be no conflicts with such plans. Therefore, there would be no impact on any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

5. CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	❑	❑	❑	■
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 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?	❑	■	❑	❑

Background

The following analysis was prepared using background information obtained from *Cultural Resources Survey Report for the BART Hayward Maintenance Complex, Hayward, Alameda County, California*.[16]

The San Francisco Bay Area was the most densely populated region in California prior to European contact. The project area is located on the traditional territory of the Ohlone/Costanoan Native American tribe. The San Francisco Bay Area has a long and complex history of Native American habitation that dates to at least 10,000 years ago. From approximately 10,000 to 2,500 years ago, archaeological studies indicate that prehistoric groups employed a generalized mobile forager pattern. Populations are thought to be sparse and highly mobile, and groups moved to new resource catchment areas as old ones became depleted. Movement was seasonal to exploit resources as they became available. Winters were spent in base camps along the coast; during the summer, groups moved to the interior valleys and hills.[17]

Between 2,500 and 1,750 years ago, there were drastic changes in ornamental items and ceremonial systems throughout California. Several new artifact types also entered the archaeological record in the San Francisco Bay Area. Groups are thought to have been semi-sedentary or sedentary.

The next 800 years was a time of dramatic changes in mortuary practices and ornaments. Mobility patterns do not appear to have varied from the preceding period. The beginning of the Upper Middle Period also saw the abandonment of over half the known archaeological sites occupied during previous intervals. Many researchers have interpreted this as indicative of a drop in population level. There is a large increase in the amount of sea-otter bone in sites that were still occupied during this period, which may signal an intensification of resource extraction practices. Acorn remained an important resource. The frequency of seeds recovered from midden deposits also increase at some sites.

Between 950-450 years ago, there is an increase in cultural complexity. Populations became more sedentary and many open coastal residential sites were abandoned. There continued to be a heavy reliance on marine resources, but they were exploited from specialized processing and camp sites.

Artifacts that appear during this period include the flanged pipe, banjo effigy ornaments, and bow and arrow technology. The banjo effigy ornaments may be the precursor to the ethnographically documented Kuksu cult, a widespread ceremonial system practiced by various language groups around the San Francisco Bay Area. An important technological breakthrough during this period was the adoption of the bow and arrow.

The region also has a rich history of Spanish, Mexican, and American exploration, settlement, and development. Alameda County takes its name from Alameda Creek. *Alameda* is a Spanish word meaning "place where the poplar trees grow" but can be used to reference any tree-shaded area. In the fall of 1769, Gaspar de Portolá sent out an expedition led by José Francisco de Ortega to find an overland route up to the eastern shore of the newly discovered San Francisco Bay to Point Reyes. In

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16 PBS&J. *Cultural Resources Survey Report for the BART Hayward Maintenance Complex*. Hayward, Alameda County, California, August, 2010.

17 Moratto, M.J., *California Archaeology*. Stanford University Press, Stanford, California. 2004 reprint.

early November 1769, the party crossed Alameda Creek into what would become Alameda County. A second expedition, this one led by Pedro Fages, crossed into the future Alameda County on April 1, 1772, again attempting to find a land route to Point Reyes; this endeavor was successful. No further record of Spanish exploration of Alameda is on record until 1795 when Sergeant Pedro Amador visited southern Alameda County in search of a suitable location to found Mission San Jose.

The modern city of Hayward is located on one of two divisions of Rancho San Lorenzo. The division containing Hayward (and Castro Valley) was awarded to Guillermo Castro in 1841 by Governor Juan B. Alvarado. Castro sold a large tract of land to William Hayward who built a general store and lodging house at present day A and Main Streets. This was located near the intersection of the main roads from Oakland to San Jose and Castro to Livermore Valleys. A settlement grew around these establishments and was initially called Haywards and then later shortened to Hayward.

The area around the settlement had rich soil and plentiful water to support farming and ranching industries. Several farms and ranches were established in the area, most ranging in size from 100 to 500 acres, though a few encompassed 1,000 acres or more.

Railroad development helped urban and agricultural growth in the region. A local rail line was established in 1865 with service between Hayward and Alameda, where trains connected with ferries to San Francisco. The line was bought by the Central Pacific Railroad and by 1869 transcontinental trains began running through Hayward. In 1878 a second railroad began service along the bayshore with a station at Eden Point.

Hayward was incorporated in 1876. At that time, the town plat extended east from the vicinity of present-day Mission Boulevard to Fourth Street; A Street marked Hayward's northern boundary; E Street and Jackson Street the southern boundary. These boundaries would remain relatively unchanged for the next 30 to 40 years. The 1920s were prosperous for Hayward as the population increased to 5,000 and the city grid was again expanded. By the time the United States entered World War II in 1941, the city's population had grown to 7,000, but was still an agricultural town.

Hayward's population doubled in less than a decade from 1941 to 1950. Housing tracts were built at the periphery of the city limits, which now extended to Tennyson Road to the south and to the Southern Pacific railroad tracks to the west.[18]

John M. Horner purchased 110 acres from Agustin Alviso in 1850, platting a townsite, which he called Union City. Horner named the place after his river steamer, called the *Union*, made in Union City, New Jersey, which he used to haul agricultural produce to San Francisco. Henry C. Smith bought another 465 acres in December 1850 from Alviso and Tomas Pacheco adjacent to Union City, selling lots and founding a town called New Haven. A third town, called Alvarado, was established in 1852 on another 750 acres bought from Alviso, which were adjacent to the first two towns. In March 1853, Alameda County was carved out of parts of Contra Costa and Santa Clara Counties, and New Haven was designated as the first county seat and Alvarado the judicial seat. New Haven, however, soon thereafter seems to have taken the name of Alvarado. Alvarado did not long remain the county seat, as

[18] City of Hayward, *City of Hayward General Plan 2002*, amended 2006.

it was moved to San Leandro in 1855. In 1958 there was an amalgamation of Alvarado and the town of Decoto, located a few miles to the east, with the new incorporation taking the old name of Union City.

The early success of Union City and Alvarado in the mid-1850s was due both to their location as a shipping place (Alameda Creek was still navigable to that point) and to the fact that farmers were rapidly settling the Alameda plain to the east. Accompanying flour and sugar mills were erected and the town undoubtedly became both a produce shipping and supply point for a good part of the county. Another extremely important industry that kept the town prosperous was its solar salt industry. The solar salt industry in the area began in 1862, when John Quigley, one of the pioneering salt producers in Alameda County, began operations at Alvarado or Union City.

The Quigley works operated until the 1890s. There was apparently no production at the Quigley works from 1899 to 1907, when the facility was sold to the West Shore Salt Company. This company was disincorporated in 1911 and its plant taken over by the San Francisco Salt Refinery, an affiliate of the Stauffer Chemical Company. Stauffer was in turn taken over by Leslie Salt Company in 1942. Cargill Corporation later acquired the Leslie Salt Company in 1978. The salt industry was a main employer for residents of the old towns of Union City and Alvarado.

After many years of limited development, the environs of old Union City have been urbanizing rapidly in recent years. Many new subdivisions have filled the space formerly occupied by farming.

Discussion

a. **No Impact.** Research performed by the Northwestern Information Center (NWIC) of the California Historical Information System did not indicate the presence of known historical resources recorded within the project site or within a ½-mile radius of the project site and the trackwork area south of Whipple Road. Historic maps and aerials of the project site do not indicate historic-era structures within the project Area of Potential Effect (APE) and the pedestrian survey conducted for the project did not encounter any historic-era resources. The APE includes the west side and east side portions of the proposed project.

b. **Less than Significant with Mitigation Incorporated.** The NWIC records search did not identify any prehistoric cultural resources within a ½-mile radius of the project site and the Native American Heritage Commission (NAHC) sacred lands data base has no recorded Native American cultural resources in the project vicinity. A pedestrian archaeological survey conducted for the project on September 24, 2009 and on August 4, 2010 did not identify any prehistoric cultural resources. Sites in the area are often located near natural drainages or consist of mounds; neither landform type is present in the project APE.

It is unlikely that prehistoric cultural resources are located within the project site. The region, however, has a long and rich record of prehistoric use. The absence of surface indicators does not preclude the possibility of buried prehistoric archaeological deposits. If any prehistoric resources are located subsurface within the project area, project-related ground-disturbing activities could potentially cause a significant impact to those resources.

MITIGATION MEASURE. The impacts to any discovered resources would be reduced to a less-than-significant level with implementation of Mitigation Measure CR-1. Mitigation Measure CR-1 ensures that any discovered resources are examined by qualified professionals and appropriate action is taken.

CR-1 *Avoidance of Discovered Cultural Resources and Measures to Reduce Harm.* If evidence of an archaeological site or other suspected historic resource is encountered during construction, including darkened soil representing past human activity ("midden") that could conceal material remains (e.g., worked stone, faunal bone, hearths, or storage pit), all ground-disturbing activity within 100 feet of the find shall be halted and BART notified. BART will hire an archaeologist meeting the Secretary of the Interior's Standards for Professional Archaeologist to assess the find. Impacts to any significant resources may be mitigated through avoidance, data recovery, or other methods determined adequate by the qualified archaeologist and that are consistent with the Secretary of the Interior's Standards for Archeological Documentation. Any mitigation plan developed by the qualified archaeologist shall be approved by BART prior to implementation. Project-related ground-disturbing activities shall not be continued in the vicinity of any discovered resource until the significance of the resource is resolved and mitigation action (if any) is completed.

c. **No Impact.** Paleontological resources are non-renewable fossilized evidence of previous animal and plant life found in the geologic record. This evidence contains the remains or traces of the past life that has existed during the 600 million year geological history of the San Francisco Bay region. A review of the geologic map of the San Francisco Bay Region[19] indicates the region is underlain by Holocene alluvium in the northern portion of the project area and Pleistocene alluvium in the southern end of the project area. Both formations have a low potential to contain significant paleontological resources. Accordingly, the proposed project (Phases 1 and 2) would not be expected to affect significant paleontological resources.

d. **Less than Significant with Mitigation Incorporated.** The NWIC records search did not identify any prehistoric cultural resources within a ½-mile radius of the project site (and the trackwork area south of Whipple Road) and the NAHC sacred lands database has no record of cemeteries or other sacred lands in the project vicinity. The pedestrian survey did not identify any evidence of prehistoric activity within the project area.

Nonetheless, during certain intervals in prehistory, Native American groups placed burials distant from residential areas. These types of sites have only been encountered in the last 25 years with modern development spreading to increasingly remote areas. It is unlikely that human remains are present within the project APE, but the absence of surface indicators does not preclude the possibility of buried human remains being present. It is therefore possible that project-related ground-disturbing activities (in both the west side and east side portions of the

[19] R.W. Graymer, B.C. Moring, G.J. Saucedo, C.M. Wentworth, E.E. Brabb, and K.L. Knudsen, *Geologic Map of the San Francisco Bay Region*. 2006.

project) could disturb or destroy any human remains that are present within the project area, causing a significant impact.

MITIGATION MEASURE. The impacts due to the discovery of human remains would be reduced to a less-than-significant level with implementation of Mitigation Measure CR-2. Mitigation Measure CR-2 ensures that the NAHC be notified, that potential human remains are examined by qualified professionals, and that appropriate action is taken.

CR-2 *Avoidance of Discovered Human Remains and Measures to Reduce Harm.* If human remains, including disarticulated or cremated remains, are discovered during any phase of construction, all ground-disturbing activities in the vicinity and any nearby area reasonably suspected to overlie adjacent human remains shall be immediately halted. BART and the Alameda County Coroner shall be notified immediately, according to Section 5097.98 of the State Public Resources Code and Section 7050.05 of California's Health and Safety Code. If the remains are determined by the county coroner to be Native American, it is the responsibility of the county coroner to inform the Native American Heritage Commission (NAHC) within 24 hours. The guidelines of the NAHC should be adhered to in the treatment and disposition of the remains. BART shall retain a qualified archaeologist who meets the Secretary of the Interior's Standards for Professional Archaeologist and with Native American burial experience to conduct a field investigation of the specific site and consult with the person identified as the Most Likely Descendent, if any, identified by the NAHC. BART shall approve any mitigation recommended by the qualified archaeologist prior to implementation, taking account of the provisions of State law as set forth in the California Environmental Quality Act (CEQA) Guidelines Section 15064.5(e) and Public Resources Code Section 5097.98. Approved mitigation must be implemented before resumption of ground-disturbing activities in the vicinity of where the remains were discovered.

6. GEOLOGY AND SOILS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	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.	❑	❑	❑	■

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
ii. Strong seismic groundshaking?	❑	❑	■	❑
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 California Building Code (1998), 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?	❑	❑	❑	■

Discussion

a.(i) **No Impact.** The project site is not within an Alquist-Priolo Earthquake Fault Zone.[20] The closest active fault is the southern segment of the Hayward Fault, approximately 3,000 feet (0.57 mile) east of the project site. Consequently, the proposed buildings and facilities included under the west side and east side expansion areas are not expected to expose people or structures to adverse effects caused by the rupture of a known fault. There would be no impact associated with fault rupture.

a.(ii) **Less than Significant.** Studies by the United States Geological Survey (USGS) indicate that there is a 62 percent probability of a major, damaging earthquake occurring in the Bay Area between 2002 and 2031. Although there are numerous regional faults, including the San Andreas fault, that could cause such an earthquake that could affect the project site, USGS considers the most hazardous fault system in the Bay Area to be the Hayward-Rogers Creek fault.[21] The southern Hayward fault ruptured in a magnitude (M) 6.8 earthquake in 1868 and caused extensive damage to man-made structures in downtown Hayward, and there is a 27 percent likelihood of a magnitude 6.7 or greater earthquake on the southern segment of the

[20] California Department of Conservation, California Geological Survey, Alquist-Priolo Earthquake Fault Zones, Table 4, Cities and Counties Affected by Alquist-Priolo Earthquake Fault Zones as of May 1, 1999, updated from the 1997 edition of Special Publication 42 (Fault Rupture Hazard Zones in California, by Earl W. Hart and William A. Bryant), http://www.conservation.ca.gov/cgs/rghm/ap/Pages/affected.aspx,

[21] Working Group on California Earthquake Probabilities, *Earthquake Probabilities in the San Francisco Bay Region: 2002 to 2031*, United States Geological Survey Open File Report 03-214, 2003, Chapter 1, page 1, Chapter 7, page 4.

Hayward fault in the next 30 years. Under the Association of Bay Area Government's (ABAG's) planning scenario, such an event could result in Modified Mercalli Intensity (MMI) shaking ranging from VIII (very strong) to X (very violent).[22] MMI VIII is characterized by damage to engineered structures, and MMI X is characterized by serious damage and destruction.

Although there is a potential for strong seismic groundshaking (and possible ground failure – see Item a.(iii) below) to occur at the site, the risk of excessive permanent damage would be reduced because the new buildings and facilities proposed under the Phase 1 and Phase 2 expansion would comply with seismic safety standards per BART Facilities Standards. The general design policy of BART Facilities Standards Structural Criteria for Seismic Design incorporates the relevant seismic safety provisions of the California Building Code (CBC) and the California Department of Transportation Bridge Design Specifications (CBDS) along with other professional industry standards. BART Design Criteria requires that all operating facilities be designed to withstand the effects of the Maximum Credible Earthquake without significant degradation of structural integrity.

Consequently, the proposed project is not expected to expose people or structures to risks associated with strong groundshaking that could not be mitigated through standard engineering design. The impact would be less than significant.

a.(iii) Less than Significant. The project site is in an active seismic region with potential for strong groundshaking that could cause liquefaction. According to California Geological Survey (CGS) mapping under the Seismic Hazards Zone mapping program (Newark Quadrangle, July 2003),[23] there is a small area in the northernmost part of the project site that requires special study for liquefaction hazard. Under the Seismic Hazards Mapping Act, appropriate site-specific geologic or geotechnical investigations must be performed, and measures to reduce potential damage have been incorporated into project design. Compliance with this requirement would be demonstrated through implementation of the general design policy of BART Facilities Standards Structural Criteria for Seismic Design.

In locations susceptible to liquefaction, the primary hazards are seismic induced settlement and temporary increase in lateral earth pressures on below-grade structures. Methods used on recent BART projects include in-situ treatment/densification with vibro-replacement stone columns; load transfer to underlying bearing layers, which are non-liquefiable with soil/cement columns; and the overexcavation method via removal and replacement with compacted engineered fill. Methods considered to eliminate or minimize the effects of seismic liquefaction include, but are not limited to, in-situ densification with stone columns, dynamic compaction, vibro-compaction, surcharging, and/or compaction grouting. The exact methodologies to be used will be determined during final engineering. These design

[22] Association of Bay Area Governments (ABAG), ABAG Earthquake Protection Program, ABAG Earthquake Shaking Scenario: south Hayward earthquake – magnitude 6.7. Available at http://quake.abag.ca.gov. Accessed November 2, 2009.

[23] California Geological Survey, *Seismic Hazard Zone Report of the Newark 7.5-Minute Quadrangle*, Alameda County, California, CGS Seismic Hazard Zone Report 090.

requirements would reduce the potential exposure of people to hazard from seismic risk associated with liquefaction.

Lateral spreading involves the lateral displacement of surficial blocks of sediment (e.g., alluvium) as a result of liquefaction in a subsurface layer. The surficial mass moves toward an unconfined area, such as a descending slope, and can occur on slope gradients as gentle as one degree.[24] Given the potential for liquefaction in at least a portion of the site, lateral spreading is a potential hazard that would require site-specific evaluation and mitigation if any deep excavations are constructed.

Prior to final design of the project, a site-specific geotechnical study would be prepared to identify site-specific liquefaction and lateral spreading hazard mitigation, which would be implemented pursuant to the BART Facilities Standards. Consequently, the new buildings and facilities proposed under the west side and east side expansion are not expected to expose people or structures to seismic-related ground failure associated with liquefaction or lateral spreading. The impact would be less than significant.

a.(iv) **No Impact.** The project site is located in a flat area, and is not identified by the CGS as a seismically induced landslide hazard zone requiring special study.[25] Consequently, the proposed project (both west side and east side expansion) would not expose people or structures to landslides, and there would be no impact associated with landslide risk.

b. **Less than Significant.** Construction activity anticipated for the project components would temporarily cause soil disturbance that could be subject to wind or water erosion. Section 1.08 – Erosion and Sediment Control – of the BART Facilities Standards Standard Specifications (Section 01-57-00, Temporary Controls) identifies specific methods that would be used to prevent erosion of excavated areas, embankments, stockpiled earth materials, and other erodible construction areas. To minimize erosion potential and to protect construction workers from potential hazards associated with excavations, BART Facilities Standards Standard Specifications require excavations to be shored (Section 31-50-00, Excavation Support and Protection). In accordance with BART Facilities Standards Standard Specifications (Section 31-00-00, Earthwork), any salvaged topsoil from stripped and excavated areas would be stockpiled on the site at appropriate locations and protected to prevent contamination by other materials. Stockpiled topsoil would be placed in areas to be landscaped. With implementation of these specifications, there would be no substantial soil erosion or loss of topsoil, and impacts of the proposed project under Phases 1 and 2 would be less than significant.

c. **Less than Significant.** See Item a.(iii), above, regarding lateral spreading and liquefaction. The project site is underlain by Quaternary alluvium (Qal), soils, and artificial fill. Sandy

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[24] Youd, T., et. al., "Mapping liquefaction induced ground failure potential", in Proceedings of American Society of Civil Engineers, Journal of the Geotechnical Engineering Division, 1978; Tinsley, J., et.al., Evaluating Liquefaction Potential. In *Evaluating Earthquake Hazards in the Los Angeles Region—an Earth Science Perspective*, USGS Professional Paper 1360, 1985, p. 263-315.

[25] California Geological Survey, *Seismic Hazard Zone Report of the Newark 7.5-Minute Quadrangle*, Alameda County, California, CGS Seismic Hazard Zone Report 090.

portions of the subsurface materials (alluvium, fill) could be subject to compression, causing settlement. Settlement occurs in areas prone to different rates of ground surface sinking and densification (differential compaction), and are underlain by sediments that differ laterally in composition or degree of existing compaction. Differential settlement can damage structures and other subsurface features. Strong groundshaking can also cause soil settlement by vibrating sediment particles into more tightly compacted configurations, thereby reducing pore space. Unconsolidated, loosely packed alluvial deposits and sand are especially susceptible to this phenomenon. Poorly compacted artificial fills may experience seismically induced settlement. BART Facilities Standards Facility Design – Guidelines and associated Criteria require that loads resulting from estimated amounts of differential settlement must be accounted for in project design.

When weak soils are re-engineered specifically for stability prior to use, these potential effects can be reduced or eliminated. An acceptable degree of soil stability could be achieved for expansive or compressible soils through routine soil treatment programs (replacement, grouting, compaction, drainage control, etc.). Properly designing buildings and roads can offset the limited ability of the soil to support a load. All buildings and roads would be constructed in accordance to the BART Facilities Standards, which would ensure that impacts associated with on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse are less than significant. Project impacts related to unstable soils under both the west side and east side expansion would be less than significant.

d. **Less than Significant.** Soils at the project site (Rincon clay loam, 0-2% slopes; Clear Lake clay, 0-2% slopes, drained) have a high shrink-swell potential.[26] Expansive soils could potentially damage foundations, pavements, and other rigid structures installed as part of the project. BART Facilities Standards would require that proposed structures be designed to account for potential soil expansion. Standard engineering practices will be implemented where necessary to minimize the potential for damage from expansive soils. The specific practices used will be selected during the final design stages of the project, but may involve the treatment of expansive soils with lime to reduce expansion potential, the installation of structures that can withstand pressures generated by expansive soils, and/or the replacement of expansive soils with non-expansive fill material. Because of the practices and standards set forth in the BART Facility Standards, impacts from the proposed project would be less than significant.

e. **No Impact.** The proposed project would not involve the use of septic systems. There would thus be no impact associated with septic systems.

[26] U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Alameda County, California, Western Part, 1981, pp.10, 23.

7. GREENHOUSE GAS EMISSIONS

Would the project:	Significant or Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	❑	■	❑	❑
b. Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	❑	❑	■	❑

Background

The Earth's climate is changing because human activities, primarily the combustion of fossil fuels, are altering the chemical composition of the atmosphere through the buildup of greenhouse gases (GHGs). GHGs allow the sun's radiation to penetrate the atmosphere and warm the Earth's surface, but do not let the infrared radiation emitted from the Earth to escape back into space. As a result, global temperatures are predicted to increase over the next century. In particular, if climate change remains unabated, Earth's surface temperatures are expected to increase anywhere from 1.4 to 5.8 degrees Fahrenheit by the end of the century. Not only would higher temperatures directly affect the health of individuals through greater risk of dehydration, heat stroke, and respiratory distress, higher temperatures may increase ozone formation, thereby worsening air quality. Rising temperatures could also reduce the snow pack, which would increase the risk of water shortages. Higher temperatures along with reduced water supplies could reduce the quantity and quality of agricultural products. In addition, there could be an increase in wildfires and a shift in distribution of natural vegetation throughout the State. Global warming could also increase sea levels and coastal storms resulting in greater risk of flooding.

Emissions of carbon dioxide (CO_2) are the leading cause of global warming, with emissions of other substances such as methane, nitrous oxide, and hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride also contributing. The magnitude of impact on global warming differs among the GHGs. However, CO_2 has the greatest impact on global warming because of the relatively large quantities of CO_2 emitted into the atmosphere. For example, the Bay Area Air Quality Management District (BAAQMD) estimates that in 2007 CO_2 made up about 91 percent of the total Bay Area emissions of the six gases listed above. Global CO_2 concentrations, which ranged from 265 parts per million (ppm) to 280 ppm over the last 10,000 years, began rising in the last 200 years to current levels of 365 ppm, a 30 percent increase.

In the Bay Area, GHG emissions result mainly from combustion of fossil fuels such as gasoline, diesel, and natural gas used in mobile sources and energy-generation-related activities. BAAQMD estimated that transportation, industrial/commercia1, and power plants generated 41 percent, 34 percent, and 15 percent, respectively, of the total GHG emissions in the Bay Area. Seventeen percent of these emissions originate in Alameda County.

Federal and State legislation, regulations, and guidance documents regarding GHG emissions continue to evolve, but no specific emission standards have yet been established other than emission standards for certain new motor vehicles, beginning in 2011.

In California, on June 1, 2005, Governor Schwarzenegger signed Executive Order S-3-05 establishing the following GHG emission reduction targets for California:

- By 2010, reduce GHG emissions to 2000 emission levels
- By 2020, reduce GHG emissions to 1990 emission levels
- By 2050, reduce GHG emissions to 80 percent below 1990 levels

Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, codified the state's goal to reduce statewide GHG emissions to 1990 levels by the year 2020. This reduction will be accomplished through a statewide cap on GHG emissions beginning in 2012, with yearly reductions in the level of the cap until the 1990 emissions level is reached in 2020. AB 32 directs the California Air Resources Board (CARB) to establish a mandatory reporting system to track and monitor global warming emissions levels, and to develop appropriate regulations to achieve the final cap level of emissions by 2020. CARB estimates that California GHG emissions must be reduced by about 173 million metric tons of carbon dioxide equivalent (CO_2e) to meet the cap for 2020.

AB 32 also required that CARB adopt a Scoping Plan by January 1, 2009, indicating how GHG emissions reductions will be achieved via regulations, voluntary actions, monetary and nonmonetary incentives, market mechanisms, and other actions. CARB adopted the final Scoping Plan in November 2008. Among the various measures included to achieve the targeted GHG emission reductions by 2020, the Scoping Plan identifies reductions of approximately 2 million metric tons of CO_2e from local and regional government actions, including regional transportation planning to establish preferred land use and transportation scenarios.

The State has not identified significance thresholds for GHG emissions from projects. However, on June 2, 2010, BAAQMD adopted an updated CEQA guidance document entitled California Environmental Quality Act Air Quality Guidelines (BAAQMD CEQA Guidelines), which includes thresholds of significance for GHG emissions. The BAAQMD CEQA Guidelines specify that projects other than permitted stationary sources will be considered to have significant operational GHG emissions impacts if (i) a locally-adopted Qualified Greenhouse Gas Reduction Strategy exists, and the project does not comply with it; or (ii) project operation will emit more than 1,100 metric tons of CO_2e per year or more than 4.6 metric tons of CO_2e per Service Population (residents + employees) per year. The guidelines also provide that "If a proposed project involves the removal of existing emission sources, BAAQMD recommends subtracting the existing emissions levels from the emissions levels estimated for the new proposed land use." However, BAAQMD did not adopt a numeric GHG significance threshold for construction activities.

The BAAQMD CEQA Guidelines include screening criteria, which "provide lead agencies and project applicants with a conservative indication of whether the proposed project could result in potentially significant air quality impacts. If all of the screening criteria are met by a proposed project, then the lead agency or applicant would not need to perform a detailed air quality assessment of their project's

air pollutant emissions."[27] The BAAQMD CEQA Guidelines do not identify any screening criterion for transportation maintenance facilities; however, there are criteria for similar land uses. For the purposes of this analysis, the proposed project is reviewed relative to the screening criterion of 121,000 square feet for general light industry.

Discussion

a. **Less Than Significant With Mitigation Incorporated.** The warehouse and shop activities planned for the proposed project would take place in three existing buildings totaling approximately 360,000 square feet, and one new building of approximately 44,500 square feet on the site of an existing building that will be demolished. These activities would replace existing warehouse and light industry activities in space totaling approximately 446,400 square feet, of which 314,400 square feet is currently occupied. Since the proposed project would increase the space used for maintenance (light industrial) activities by about 90,100 square feet (total project floor area of 404,500 square feet less existing occupied floor area of 314,400 square feet), the proposed project is below the BAAQMD GHG screening criterion of 121,000 square feet, and therefore would not have significant operational GHG-related impacts.

In addition, construction of the proposed project would generate short-term GHG emissions. These emissions are estimated to be 786 tons CO_2/year (in the year of maximum construction activity) using the URBEMIS model, based on construction activity and phasing information provided by BART. The BAAQMD CEQA Guidelines do not include quantitative significance criteria for construction-related GHG emissions. However, BAAQMD encourages lead agencies to quantify and disclose GHG emissions from construction activities. To mitigate construction-related GHG emissions, BAAQMD suggests the implementation of best management practices (BMPs). With implementation of these BMPs, project construction would not be considered to have a significant GHG-related impact.

MITIGATION MEASURES. BART shall implement the following recommended measures to reduce GHG emissions during project construction.

GHG-1 *Construction-Related Greenhouse Gas Best Management Practices.* BART shall ensure implementation of the following mitigation measures during project construction, in accordance with Bay Area Air Quality Management District (BAAQMD) standard mitigation recommendations which suggest:

- Use alternative-fueled (e.g., biodiesel, electric) construction vehicles/equipment for at least 15 percent of the fleet;
- Use local building materials (within 100 miles) of at least 10 percent; and
- Recycle or reuse at least 50 percent of construction waste or demolition materials.

[27] BAAQMD CEQA Guidelines, p. 3-1.

b. **Less Than Significant.** As described under Item a above, the HMC project would not exceed the screening criterion for light industrial uses nor would it result in adverse effects related to construction. Accordingly, the proposed project would have a less-than-significant effect on efforts to comply with regional and state GHG emission reduction plans, policies, or regulations.

8. HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Significant or Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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 involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	❑	❑	■	❑
d. Be located on a site that 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. Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?	❑	❑	❑	■
f. Be located within the vicinity of a private airstrip and 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?	❑	❑	❑	■

Discussion

a. **Less than Significant.** Day-to-day operations at the HMC would range from integrated maintenance activities to cleaning car interiors and equipment. Specifically, the west side expansion area would include similar operations to the existing Hayward Yard, but at a larger capacity. Operations at the west side expansion area would include train and track maintenance, overhaul activities, storage, and cleaning.

Currently, the main Hayward Yard stores chemicals associated with day-to-day maintenance and train-washing and cleaning operations, including hydraulic/motor oil; solvents; lubricant grease; chemicals such as sodium hydroxide, sulfuric acid, trichlorofouromethane, chlorodiflouromethane, among others; train batteries; oxygen and compressed nitrogen; and paints and varnishes.[28] Because the types of activities at the west side expansion area would be similar to current operations at the existing Hayward Yard, it is expected that the same chemicals listed above would be used and stored at the proposed vehicle level overhaul shop, repair shop, central warehouse, and maintenance and engineering shop and storage area.

Operations on the east side expansion area would be limited to car storage and car interior cleaning. Therefore, it is anticipated that operations at the east side expansion would include storage of cleaning compounds and solvents used to wash interiors and equipment.

Construction and site preparation for the proposed project would involve the use of heavy equipment and vehicles containing fuel, oil, and grease, as well as materials such as concrete, asphalt, paints, and solvents. Fluids such as oil or grease could leak from construction vehicles or be inadvertently released in the event of an accident, potentially releasing petroleum compounds laden with metals and other pollutants.

All activities associated with the proposed project could result in accidental spills of hazardous materials during operations and/or construction activities. These accidental spills could adversely affect the health and safety of individuals working at the facility and individuals at adjacent land uses. In the event of a release or accidental spill, BART would adhere to and comply with the existing Health and Safely Plan for the Hayward Yard. The plan was prepared in compliance with California Health and Safety Code, Section 25503.5, and includes an inventory statement, a site map showing the location of hazardous materials, an emergency response and contingency plan, an employee training plan, and general facility information.

In addition, BART would follow the Spill Prevention and Emergency Response Plan for the existing Hayward Yard.[29] The plan identifies emergency procedures in the event of a hazardous materials spill, and ways to contain any potential contamination. Specifically, the plan calls for protecting all storm drain and sewer inlets in and near the release site using plugs or spill booms; isolating the spill by placing booms or absorbent material around the edges of the spill to prevent further spread; stopping the source of the release by plugging the leak; placing the

[28] San Francisco Bay Area Rapid Transit District, Hazardous Materials Business Plan Chemical Inventory Sheet. Hayward Yard. March 2000.

[29] San Francisco Bay Area Rapid Transit District, Spill Prevention and Emergency Response Plan for Hayward Shop. February 15, 2005.

leaking container on or in secondary containment, or transferring the material to a new container; absorbing the released material using spill booms or diatomaceous earth; and containing the spill clean-up waste in appropriate containers for disposal.

By adhering to the existing Health and Safety Plan and Spill Prevention and Emergency Response Plan for the existing Hayward Yard, future accidental spills or releases from day-to-day operations at the expanded HMC would be contained, recycled, and disposed of properly, in compliance with federal, State, and local regulations. Therefore, procedures at the expansion areas would be the same as the procedures that BART already follows at the existing Hayward Yard, and such procedures would reduce potential hazards with routine use of hazardous materials to less than significant.

Additionally, operations associated with the proposed project would not involve the routine transport of hazardous materials. Disposal of chemicals and any hazardous materials used in the day-to-day operations would adhere to hazardous materials handling and disposal regulations set forth under the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the California Hazardous Waste Control Law. Overall, the proposed project is not expected to create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Accordingly, this impact would be less than significant.

b, d. Less than Significant with Mitigation Incorporated. A search of regulatory agency databases listing hazardous material sites within a half mile of the project site was requested from Environmental Data Resources, Inc. (EDR) for this analysis. The EDR report indicates three sites designated pursuant to Government Code Section 65962.5, also referred to as the Cortese List. The project site (including the existing Hayward Yard and the proposed west side expansion area) is not on the Cortese List. The Cortese database identifies public drinking water wells with detectable levels of contamination, hazardous substance sites selected for remedial action, sites with known toxic material identified through the abandoned site assessment program, sites with Underground Storage Tanks (USTs) having a reportable release, and all solid waste disposal facilities from which there is known migration. Of the three sites listed in Table 5 below (see Figure 10), two of the cases are closed.

One site, Univar USA, Inc., is listed as an open case under the Cortese database. As described by the San Francisco Bay Regional Water Control Board,[30] the site occupies approximately five acres in the South Hayward Industrial Park. Two-thirds of the site is paved with concrete or covered with office and storage buildings. The southern one-third is not paved and includes the former underground storage tank area. In 1989, ChemCentral discovered soil and groundwater pollution due to leakage and spillage of chemicals stored in USTs. ChemCentral reported soil and groundwater contamination from VOCs, including trichloroethene, tetrachlorothene, cis-1,2 dichloroethene, 1,1,1 – trichloroethane, 1,1-dichloroehtene, benzene, toluene, ethyl benzene, xylenes, acetone, and methyl ethyl ketone. In the 1990s, all USTs were removed.

[30] State Regional Water Quality Control Board, San Francisco Bay Region. Soil and Groundwater Cleanup Activities. At Former Univar USA, Inc. Facility (Formerly ChemCentral Corporation). 31702 Hayman Street, Hayward. September 2009.

Subsequent investigations have concluded that VOC impacts to soil are confined to on-site areas, primarily near the former tank area, whereas VOCs in groundwater have migrated offsite. ChemCentral began site cleanup in 1999. Univar upgraded its vapor extraction system in May 2009. On- and off-site groundwater and soil vapor monitoring program will continue until final cleanup standards are met.

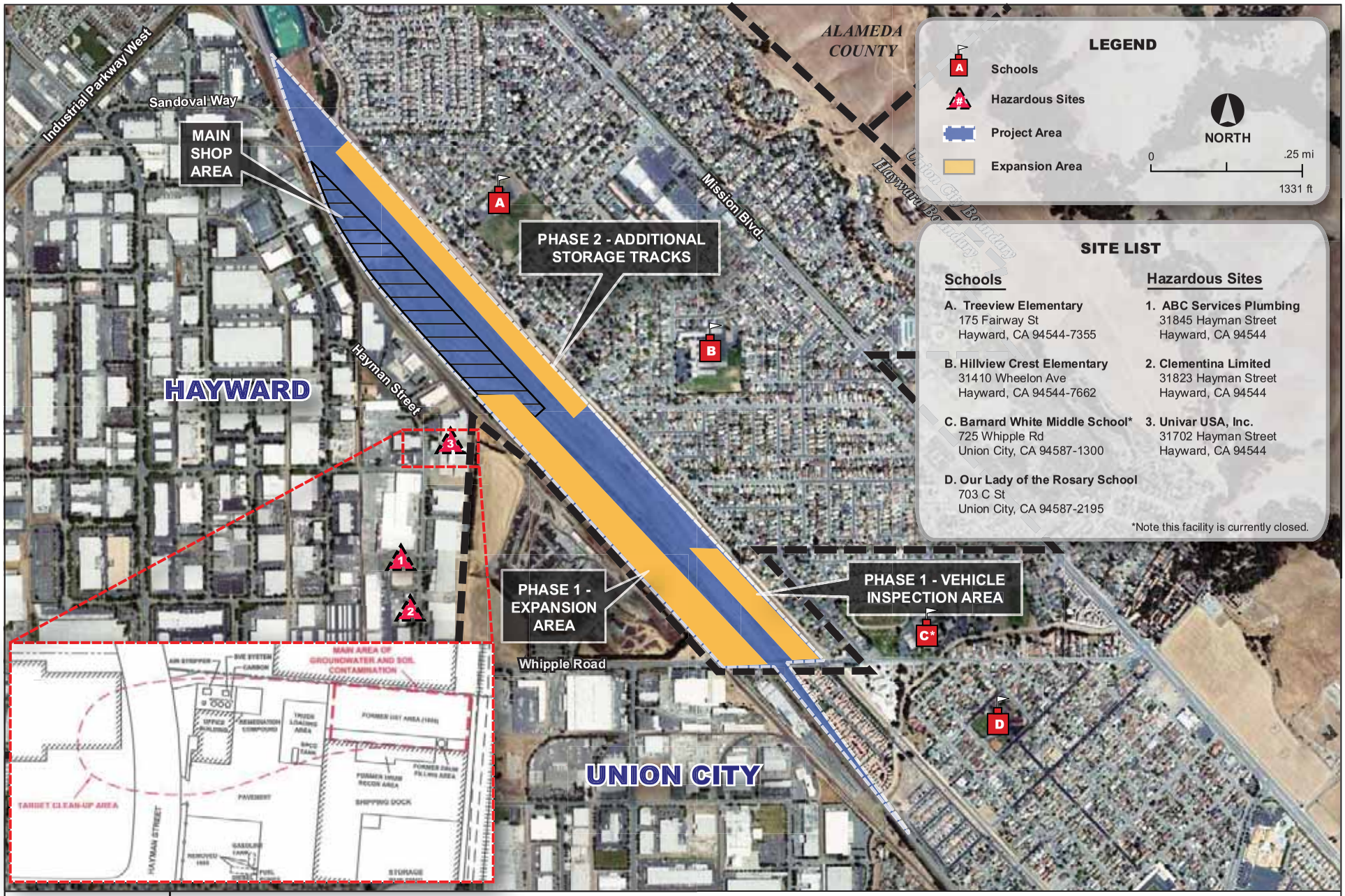
Table 5
Hazardous Materials Sites Listed under Cortese Database with Potential to Affect the Project Area

Map ID - Figure 10	Site Name	Address	Approximate Distance from Project Site	Summary of Environmental Conditions
1	Univar USA, Inc. Facility (formerly ChemCentral Corporation)	31702 Hayman Street, Hayward	Approximately 1/8 to ¼ mile south/ southwest	The site is listed as having soil and groundwater pollution due to leakage and/or spillage of chemicals stored in underground storage tanks (USTs). Volatile organic compounds (VOCs) are reported as the main pollutant. Case is currently open.
2	Clementina Limited	31823 Hayman Street, Hayward	Approximately ¼ to ½ mile; south/ southwest	Case is closed.
3	ABC Services Plumbing	31845 Hayman Street, Hayward	Approximately ¼ to ½ mile; south/ southwest	Case is closed.

Source: Environmental Data Resources, Inc., December 2009.

Operations of the proposed project would not entail potential exposure to contaminated materials. However, construction of the proposed project would involve excavation and site grading to accommodate the various project buildings and facilities. As described in the above paragraph, VOC contaminated soils are confined to on-site areas of the Univar property, and as such, no soil contamination from the Univar property is expected to be encountered during HMC construction activities. As depicted in Figure 10, the known subsurface contaminated groundwater plume lies adjacent to the western boundary of the project area, and extends west/northwest, following groundwater trends. The known groundwater contamination plume on the neighboring Univar site is therefore moving away from, rather than toward, the proposed project site. Nevertheless, the potential of encountering unknown contaminated material (both groundwater and soil) still exists, given the proximity to the known groundwater contamination.

The west side expansion area is not listed on the Cortese List; however, the area is currently used for warehouse and light industrial uses. These uses may presently or previously have included the storage and/or use of chemicals associated with these activities. Given the history of warehouse and light industrial land uses at the site, it is possible that unreported releases of hazardous materials may have occurred. Based on these findings, there may be a potential to



Source: Environmental Data Resources, Inc., 2009; Google Earth, 2009; PBS&J, 2010.

FIGURE **10**

Schools and Hazardous Sites within 1/4 Mile of Hayward Yard

encounter contaminated soils at the project site during excavation. If found, contamination could potentially pose a health risk to construction workers at the project site, and may require special soil management and disposal procedures to ensure that contaminated soil and/or groundwater are managed in accordance with applicable laws and regulations. Exposing workers and employees during construction to any contaminated materials would be a potentially significant impact.

MITIGATION MEASURE. The following measures would reduce the significant accidental release of hazardous materials impacts during construction to less than significant. (LTS).

HAZ-1 *File Review and a Phase I ESA Prior to Construction.* Prior to construction, BART shall conduct an environmental site assessment (ESA) to further analyze potential hazardous materials and waste sites around the project site. BART shall ensure that additional research, including a file review with the Alameda County Department of Environmental Health and the RWQCB and a Phase I ESA for the west side expansion area, is performed. If the file review reveals no potential impact from environmental contamination, no further action to remedy soil or groundwater contamination would be necessary.

HAZ-2 *Further Soil and Groundwater Investigations Prior to any Construction Activities.* If the file review under Mitigation Measure HAZ-1 above reveals potential environmental contamination along or beneath the proposed project's footprint or other facilities, BART shall evaluate the sites to determine the level of investigation appropriate to evaluate the possible presence of hazardous chemicals in soil and groundwater. In the event soil and/or groundwater testing is deemed appropriate, BART shall ensure that a Phase II soil and groundwater investigation is conducted in the affected areas, including field sampling and laboratory analysis, to evaluate conditions where excavation and grading will take place. The Phase II investigation shall be completed prior to any construction or excavation work, and a schedule shall be developed in the pre-design phase of the project to ensure that a sufficient amount of time is allotted prior to site development to identify and implement actions to investigate the presence of hazardous substances in soil and groundwater, and to identify design and contingency measures in the event that the results of the investigation indicate the need for further testing, site controls, or remediation.

The number, location of field samples, and constituents tested would depend on the size of the impacted site, site activities, and possible transport or migration routes. Field samples may include soil, soil gas, or groundwater, depending on the nature of the contaminants suspected to be present. The sampling plan shall specify that all soil and groundwater chemical analyses shall be performed by a California-certified laboratory, using standard EPA and California chemical testing methods. The investigation results shall, if necessary, lead to preparation of a:

- Remedial Action Plan for soil and groundwater treatment and disposal;

- Health and Safety Risk Assessment; and
- Soil management plan with criteria for impacted soils, in consultation with DTSC and RWQCB.

If necessary, a Remedial Action Plan shall be prepared to identify options for remediation of the contaminated site. If the proposed remedial approach does not involve complete source removal, a Health and Safety Risk Assessment shall be completed. Work in impacted areas will be conducted in accordance with applicable Cal OSHA requirements.

HAZ-3 *Remediation of Contaminated Sites Prior to Construction.* If hazardous materials are identified in soil and groundwater at levels that present a risk to the public, to construction workers, or to the environment, based on the investigations described in Mitigation Measure HAZ-2 above, BART shall ensure that remediation is conducted at contaminated sites pursuant to applicable laws and regulations.

A Remedial Action Plan may be developed if warranted to address potential air and health impacts from soil excavation activities, potential transportation impacts from the removal of remedial activities, and potential risks of public upset should there be an accident at excavation sites. During excavation activities, construction workers or the public may be exposed to contaminants in the soil through ingestion, dermal contact, inhalation of fugitive dust, and inhalation of volatile emissions. The Site-Specific Health and Safety Plan will include measures to mitigate these potential impacts, such as cordoning off excavation sites to prevent public access, water misting to control dust during removal activities, perimeter air monitoring for dust along the site boundaries both upwind and immediately downwind of site excavation and stockpiling activities, and air monitoring of volatile organic compounds (VOC). All exposed contaminated materials shall be covered at the end of each day. Excavation work shall be performed in compliance with all OSHA rules and regulations.

HAZ-4 *Discovered Environmental Contamination During Construction.* In the event that soil, groundwater or other environmental medium with suspected contamination is encountered unexpectedly during construction activities after implementation of Mitigation Measure HAZ-3, BART's contractor shall cease work in the vicinity of the suspect material, the area shall be secured as necessary, and contractor shall take all appropriate measures to protect human health and the environment. Appropriate measures shall include notification of the applicable regulatory agency(ies) as necessary, to identify the nature and extent of contamination. Work shall not resume in the area(s) affected until the measures have been implemented under the oversight of the corresponding regulatory agency(ies), as appropriate.

c. **Less than Significant**. The project site would be located within ¼ mile of four schools. The schools are Hillview Crest Elementary School (approximately ¼ miles east), Barnard-White

Middle School (approximately 1,000 feet east),[31] Treeview Elementary School – Bidwell Campus (approximately 1,000 feet east), and Our Lady of the Rosary School (approximately 1,200 feet east/southeast). Day-to-day operations, such as train maintenance and repair, train washing, equipment cleaning, or other maintenance activities may result in accidental spills and release of hazardous materials related to cleaning compounds.

The west side expansion area would include uses such as train repair overhaul and other maintenance activities. The east side expansion area would be used for storage of BART cars. These activities have the potential to incrementally increase use of hazardous materials. Compliance with the existing Health and Safety Plan for the Hayward Yard would adequately reduce potential releases (that could result in the unlikely event of a spill) from the project site. The current Health and Safety Plan for the Hayward Yard was prepared in compliance with California Health and Safety Code, Section 25503.5, and includes an inventory statement, a site map showing the location of hazardous materials, an emergency response and contingency plan, an employee training plan, and general facility information. As such, hazardous material impacts to schools located within ¼ of a mile of the project site would be less than significant.

e, f. **No Impact.** The project site is not in the vicinity of a public or private airport or within an airport land use plan. Hayward Executive Airport is the closest airport, approximately five miles northwest of the project site. No other private airstrips are in the vicinity of the proposed project. Therefore, airport and aircraft operations would not pose a safety hazard for people working on the project site.

g. **Less than Significant.** The proposed west side expansion would occupy three properties containing four warehouses adjacent to the west side of the existing Hayward Yard. The proposed east side expansion would take place within an undeveloped property owned by BART northeast of the existing Hayward Yard operations, between the active BART line and the UPRR tracks. The trackwork area south of Whipple Road is in an area already developed with tracks and would not interfere with local streets and emergency access routes.

The west side expansion area would have access to fire and emergency vehicles via an existing driveway from Whipple Road into the project site. The west side and east side expansion areas would also connect to the existing Hayward Yard through interior access roads. Access to the Hayward Yard is currently through Sandoval Way. Therefore, with the proposed interior connections, fire and emergency vehicles would have access to the existing Hayward Yard and the west side expansion from both Whipple Road and Sandoval Way. Emergency access to the east side expansion area would be from Whipple Road. The existing exterior streets that would be used to access the project site are built to City of Hayward or Union City standards, and the new interior access road would be constructed to appropriate standards, thereby ensuring that emergency vehicles can readily and easily access the project buildings and activities. Therefore, the proposed project would not impair the implementation of, or interfere with, an

[31] At the time of preparation of this document, the Barnard-White Middle School was closed. It was unknown whether this school would be reopened in the future.

adopted emergency response plan or emergency evacuation plan, and impacts to emergency response would be less than significant

h. **No Impact.** The project site is in an urbanized area within the City of Hayward and the City of Union City and is not adjacent to wildlands. As such, the proposed project (both the west side and east side expansion areas) would not be subject to wildland fire risks.

9. HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	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, resulting in 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 that 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 that would result in substantial erosion or siltation onsite or offsite?	❑	❑	■	❑
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 that would result in flooding onsite or offsite?	❑	■	❑	❑
e. Create or contribute runoff water that 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 structures within a 100-year flood hazard area that would impede or redirect flood flows?	❑	❑	❑	■

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	❑	■	❑	❑
j. Contribute to inundation by seiche, tsunami, or mudflow?	❑	❑	■	❑

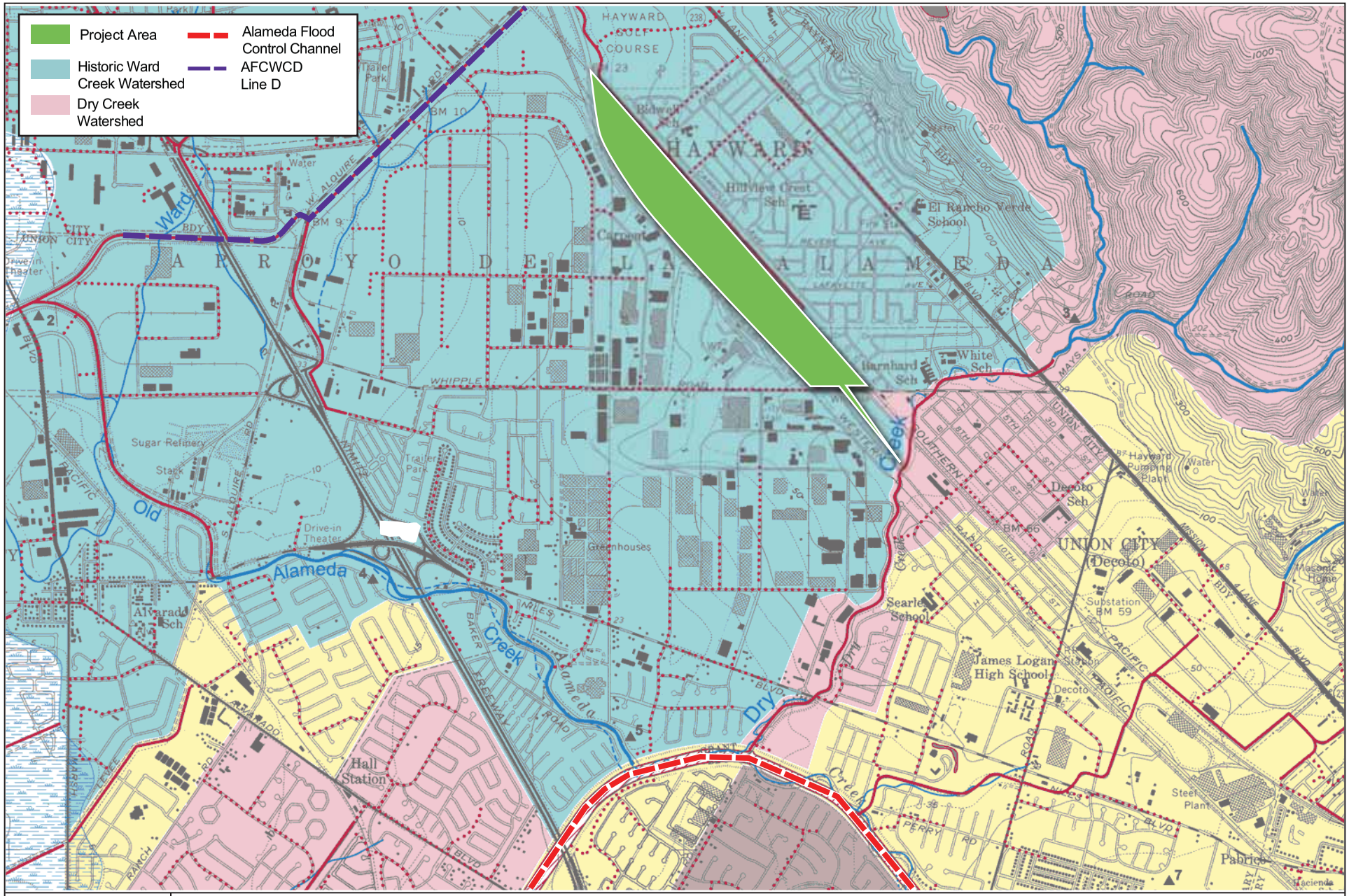
Discussion

a, c, e. Less than Significant. The following discussion addresses potential water quality impacts related to HMC operational stormwater runoff and construction-related activities.

The majority of the project site is within the historic Ward Creek watershed and the track extension southeast of Whipple Road is within the Dry Creek watershed. The majority of project site runoff flows northwest to on-site retention areas, an engineered channel system at Industrial Boulevard (Alameda Flood Control and Water Conservation District [AFCWCD] Line D channel) that comprises the historic Ward Creek drainage system, or to a 1.2-acre wetland (refer to Section 4, Biological Resources) north of the proposed train storage area. A small portion of the southwest area of the west site, north of Whipple Road, may flow to an underground storm drain in Whipple Road, which also discharges to the AFCWCD Line D channel. The Line D channel flows southwestwardly and discharges to the Old Alameda Creek channel at a location about 800 feet west of I-880. The Old Alameda Creek channel discharges to the Lower San Francisco Bay. The project site track area extending southeast of Whipple Road drains to the Dry Creek watershed, which crosses the track area about 250 feet west of the southeast boundary (refer to Figure 11, Figure 11 Regional Hydrology). Dry Creek flows primarily southward and discharges to the Alameda Flood Control Channel, which outlets to the Lower San Francisco Bay.

The relevant water quality standards are listed in the Basin Plan.[32] The applicable waste discharge requirements for the Hayward Yard are contained in the National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities (SWRCB Order No. 97-03-DWQ, NPDES No. CAS000001 [Industrial General Permit]) and the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (SWRCB Order No. 2009-0009-DWQ, NPDES No. CAS000002 [Construction General Permit]), adopted September 2, 2009. In addition, the SWRCB adopted a Municipal Regional Permit (MRP) in October 2009 that consolidates individual municipal stormwater permits (from 77 permittees) into one regional Bay Area permit to ensure a consistent level of implementation and reporting of stormwater runoff control and management.

[32] California Regional Water Quality Control Board, San Francisco Bay Region. 2007. *Water quality standards in the San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan)*. Incorporating all amendments approved by the Office of Administrative Law as of January 18, 2007.



Source: Creek & Watershed Map of Fremont & Vicinity, 1999.

FIGURE **11**

Regional Hydrology

Alameda Creek beneficial uses listed in the Basin Plan include agriculture supply, groundwater recharge, warm and cold freshwater habitat, fish migration and spawning, wildlife habitat, and water contact and non-contact water recreation. Lower San Francisco Bay beneficial uses listed in the Basin Plan include industrial service supply, commercial fishing, shellfish harvesting, estuarine habitat, fish migration, wildlife habitat, water contact and non-contact water recreation, and navigation. The Lower San Francisco Bay is also listed as potentially supporting fish spawning. There are no designated beneficial uses listed in the Basin Plan for the historic Ward Creek (AFCWCD Line D), Dry Creek, or the Alameda Flood Control Channel. As such, the applicable water quality standards are those for Alameda Creek and the Lower San Francisco Bay.

The Lower San Francisco Bay is listed as impaired (2006 Clean Water Act section 303(d)) by a number of pollutants from non-point sources[33] including mercury, polychlorinated biphenyls (PCBs), dioxin-like PCBs, and pesticides (dieldrin, chlordane, and dichlorodiphenyl trichloroethane [DDT]). Both the Lower San Francisco Bay and Alameda Creek are also proposed by the San Francisco Bay Regional Water Quality Control Board (RWQCB) for listing as impaired by trash, but the State Water Resources Control Board (SWRCB) and US EPA have not yet approved these listings.

Operations. Operation of the proposed project during Phase 1 and 2 would consist mainly of vehicle level overhaul, train storage, materials storage, and train maintenance. As proposed, the project would include additional storage track for up to a maximum of 250 cars as well as renovation of existing buildings for car maintenance, a new materials storage area, associated infrastructure, and tracks to accommodate transfer of cars between facilities. Grading and installation of facilities and features would alter the local drainage patterns and increase stormwater runoff by up to 3.49 cubic feet per second (cfs) for the 10-year storm event during Phase 1.[34] This increased runoff to creeks and channel could cause or contribute to stream bed or bank erosion and degradation of creek habitat. The additional impervious surfaces associated with the Phase 1 materials storage area (about 1.96 acres) could also collect pollutants from atmospheric deposition or operational activities. Pollutants on impervious surfaces are more susceptible to transport in stormwater runoff. The proposed project would also result in the storage and use of cleaning compounds, corrosives, metals, adhesives, and solvents used to wash interiors and equipment. Release of these types of substances could enter the stormwater sewer system or local drainages in the event of a spill or leaking container. Unless properly managed, such releases could result in adverse human health or environmental effects. See Item 8a, above, for a discussion of handling hazardous materials during project operations.

The proposed project would comply with all substantiative requirements of the MRP and implement operational controls to protect water quality. The MRP, as adopted, aims at

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[33] "Non-point sources" refer to those pollutants that are generated over a diffuse area, such as urban stormwater runoff.

[34] Calculated using the Hydrology and Hydraulics Manual, Alameda County Flood Control District, June 2003 Modified Rational Method.

implementing controls to reduce pollutants in stormwater runoff to the maximum extent practicable through implementation of Low Impact Development (LID)[35] stormwater quality best management practices (BMPs) and prohibition of non-stormwater discharges to manage pollutant contributions to prevent violation of water quality standards. The Alameda Countywide Clean Water Program (ACCWP) is responsible for the overall coordination and implementation of the MRP through its Storm Water Management Plan (SWMP). The MRP requires that all Regulated Projects, such as the proposed project, must implement onsite source control and site design measures that at a minimum shall include the following LID practices (Provision C.3.c):

- Minimization of stormwater pollutants of concern in urban runoff through measures that may include plumbing of the following discharges to the sanitary sewer, subject to the local sanitary sewer agency's authority and standards:
  - Discharges from indoor floor mat/equipment/hood filter wash racks or covered outdoor wash racks for restaurants;
  - Dumpster drips from covered trash, food waste and compactor enclosures;
  - Discharges from covered outdoor wash areas for vehicles, equipment, and accessories;
  - Swimming pool water, if discharge to onsite vegetated areas is not a feasible option; and
  - Fire sprinkler test water, if discharge to onsite vegetated areas is not a feasible option;
- Properly designed covers, drains, and storage precautions for outdoor material storage areas, loading docks, repair/maintenance bays, and fueling areas;
- Properly designed trash storage areas;
- Landscaping that minimizes irrigation and runoff, promotes surface infiltration, minimizes the use of pesticides and fertilizers, and incorporates other appropriate sustainable landscaping practices and programs such as Bay-Friendly Landscaping;
- Efficient irrigation systems;
- Storm drain system stenciling or signage;
- Require each Regulated Project to implement at least the following design strategies onsite:
  - Limit disturbance of natural water bodies and drainage systems; minimize compaction of highly permeable soils; protect slopes and channels; and minimize impacts from stormwater and urban runoff on the biological integrity of natural drainage systems and water bodies;
  - Conserve natural areas, including existing trees, other vegetation, and soils;

[35] The goal of LID is to reduce runoff and mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating stormwater runoff close to its source. LID employs principles such as preserving and recreating natural landscape features and minimizing imperviousness to create functional and appealing site drainage that treats stormwater as a resource, rather than a waste product. Practices used to adhere to these LID principles include measures such as rain barrels and cisterns, green roofs, permeable pavement, preserving undeveloped open space, and biotreatment through rain gardens, bioretention units, bioswales, and planter/tree boxes.

- Minimize impervious surfaces;
- Minimize disturbances to natural drainages; and
- Minimize stormwater runoff by implementing one or more of the following site design measures:
  - Direct roof runoff into cisterns or rain barrels for reuse.
  - Direct roof runoff onto vegetated areas.
  - Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas.
  - Direct runoff from driveways and/or uncovered parking lots onto vegetated areas.
  - Construct sidewalks, walkways, and/or patios with permeable surfaces.
  - Construct driveways, bike lanes, and/or uncovered parking lots with permeable surfaces.

- Require each Regulated Project to treat 100% of the amount of runoff identified in Provision C.3.d for the Regulated Project's drainage area with LID treatment measures onsite or with LID treatment measures at a joint stormwater treatment facility.
  - LID treatment measures are harvesting and re-use, infiltration, evapotranspiration, or biotreatment.
  - A properly engineered and maintained biotreatment system may be considered only if it is infeasible to implement harvesting and re-use, infiltration, or evapotranspiration at a project site.
  - Infeasibility to implement harvesting and re-use, infiltration, or evapotranspiration at a project site may result from conditions including the following:
    - Locations where seasonal high groundwater would be within 10 feet of the base of the LID treatment measure.
    - Locations within 100 feet of a groundwater well used for drinking water.
    - Development sites where pollutant mobilization in the soil or groundwater is a documented concern.
    - Locations with potential geotechnical hazards.
    - Smart growth and infill or redevelopment sites where the density and/or nature of the project would create significant difficulty for compliance with the onsite volume retention requirement.
    - Locations with tight clay soils that significantly limit the infiltration of stormwater.

The MRP also requires that stormwater quality treatment BMPs are numerically sized in accordance with specific flow rate or volume treatment requirements, depending upon the type of BMP; hydrograph modification[36] controls where increases in runoff could cause or

[36] 'Hydrograph modification' refers to an alteration in the storm event flow regime of a watercourse such as increases in peak flow rates, longer duration of storm flow, and higher storm flow volume. If runoff to the watercourse increases, or the timing of runoff changes, this could cause a change in the watercourse storm event flow. Hydrograph modification controls are controls designed to maintain the flow regime for small storm events.

contribute to bed and bank erosion in susceptible receiving waters; and implementation of total maximum daily load (TMDL) requirements. Applicable TMDLs would include the San Francisco Bay mercury TMDL, the San Francisco Bay PCB TMDL, and the Urban Creeks Pesticide Toxicity TMDL. Compliance with the MRP would reduce the potential for pollutants in stormwater runoff to reach receiving waters.

In accordance with the Construction General Permit, disturbed areas would be stabilized following construction, which would minimize the potential for erosion and sediment transport. The project site is not located in an area where hydrograph modification controls could be required because it does not drain to a channel(s) susceptible to bed or bank erosion. Compliance with these requirements and would ensure that potential off-site erosion and siltation would not be substantial.

Because the proposed project is a vehicle maintenance facility, BART would also be required to obtain coverage under the statewide Industrial General Permit. Industrial facility operators must comply with all of the conditions of the Industrial General Permit, including preparation of an operational Stormwater Pollution Prevention Plan (SWPPP) emphasizing BMPs. The SWPPP has two major objectives: (1) to help identify the sources of pollution that affect the quality of industrial storm water discharges and authorized non-storm water discharges, and (2) to describe and ensure the implementation of BMPs to reduce or prevent pollutants in industrial storm water discharges and authorized non-storm water discharges. One of the major elements of the SWPPP is the elimination of unauthorized non-storm water discharges to the facility's storm drain system. Noncompliance constitutes a violation of the CWA and Porter-Cologne Act, and is grounds for (a) enforcement action; (b) Industrial General Permit termination, revocation and reissuance, or modification; or (c) denial of an Industrial General Permit renewal application.

This Industrial General Permit has been prepared by SWRCB and RWQCB to be protective of water quality standards. BART Facility Standards require compliance with all applicable federal, state, and local laws, order, and regulations concerning the prevention, control, and abatement of water pollution (BART Facility Standards Section 01 57 00 1.08.A.4.). As such, the proposed project would not violate waste discharge requirements or water quality standards and operational impacts on erosion and siltation and polluted runoff would be less than significant.

Construction. Construction of the proposed project under both Phases 1 and 2 would include site improvements such as clearing and grubbing, excavations, installation of ballast and tracks, pavement removal, grading, and paving. Construction would also include installing power, signal and communication systems, renovation of existing buildings to support operations, building demolition and construction, cleaning facilities, sound wall improvements, lighting, and security fencing. All construction would result in earthmoving activities that would alter drainage patterns and expose soil, which could increase the potential of erosion and sediment transport to existing stormwater drainage systems, including creeks and channels. Construction and site preparation for the proposed project would involve the use of heavy equipment and vehicles containing fuel, oil, and grease, as well as materials such as concrete, asphalt, paints,

and solvents. Fluids such as oil or grease could leak from construction vehicles or be inadvertently released in the event of an accident, potentially releasing petroleum compounds laden with metals and other pollutants. No deep excavations are planned for construction of the proposed project; therefore, substantial dewatering is not expected.

The SWRCB permits all regulated construction activities under the statewide Construction General Permit. Every construction project that disturbs one or more acres of land surface or that are part of a common plan of development or sale that disturbs more than one acre of land surface would require coverage under this Construction General Permit. To obtain coverage under this Construction General Permit, the landowner or other applicable entity must file Permit Registration Documents prior to the commencement of construction activity, which include a Notice of Intent, construction SWPPP, and other documents required by the RWQCB or SWRCB, and mail the appropriate permit fee to the SWRCB. Because the proposed project would cumulatively disturb more than one acre, construction of the proposed project would be subject to the Construction General Permit requirements, which include specific minimum BMPs. The Construction General Permit mandates specific minimum BMPs during construction, depending on the project's sediment risk level, to protect water quality during construction activities. Specific minimum BMPs required for all projects, including the proposed project, are:

- Specific good site management (i.e., "housekeeping") measures for construction materials that could potentially be a threat to water quality if discharged
- Specific good housekeeping measures for waste management, including a spill response and implementation element
- Specific good housekeeping for vehicle storage and maintenance
- Specific good housekeeping for landscape materials
- Specific good housekeeping measures on the construction site to control the air deposition of site materials and from site operations
- Non-stormwater management BMPs (e.g., measures to control all non-stormwater discharges during construction)
- Erosion control measures
- Sediment controls
- Run-on and runoff controls
- Monitoring and reporting requirements including development and implementation of a written site-specific Construction Site Monitoring Program (CSMP) in accordance with the requirements of the Construction General Permit.

The Construction General Permit has been developed to be protective of water quality during construction activities. The RWQCB enforces compliance with the Construction General Permit through site inspections and fines. Implementation of the required specific BMPs would minimize the potential for pollutants in stormwater runoff and pollutant transport to Old Alameda Creek and the Lower San Francisco Bay during construction activities. Construction

General Permit required erosion, sediment, and run-on and runoff controls would also minimize the potential for on- and off-site erosion and sediment transport.

Furthermore, BART Facility Standards Section 01 57 00 (Temporary Controls, 1.08 - Erosion and Sediment Control, 1.09 - Dust Control, and 1.10 - Mud Control)) and Section 31 00 00 (Earthwork, 1.11 - Site Conditions and 3.03 - Earthwork General Requirements) includes requirements for erosion and sediment controls from construction operations, including an Erosion and Sediment Control Plan, and Section 01 57 00 (Temporary Controls, 1.07 – Pollution Abatement) requires BMPs to minimize pollution potential. Where natural drainage ways are intercepted by construction activities, BART Facility Standards require that such drainage ways shall be protected so that runoff from the site or water from construction activities is not allowed to enter the natural drainage way (Section 01 57 00 Temporary Controls, 1.08.C.-Prevention of Erosion). Section 01 71 13 (Mobilization, 1.09 – Demobilization) and Section 31 11 00 (Clearing and Grubbing, 1.06 - Jobsite Conditions) require restoration of the construction area after completion of construction activities. BART Facility Standards Section 32 84 00 (Planting Irrigation) and Section 32 90 00 (Planting) ensure adequate establishment of permanent vegetative cover to protect surfaces from erosion. Compliance with these requirements would ensure that the proposed project would not violate WDRs or water quality standards and construction impacts on erosion and siltation and polluted runoff would be less than significant.

b. **Less than Significant.** The Santa Clara Valley East Bay Plain, which is a subbasin of the Santa Clara Groundwater Basin, underlies the project area. The East Bay Plain Subbasin is a northwest trending alluvial plain bounded on the north by San Pablo Bay, on the east by the contact with Franciscan Basement rock, and on the south by the Niles Cone Groundwater Basin. The East Bay Plain Basin extends beneath San Francisco Bay to the west.[37]

The project site is located in the San Lorenzo Sub-Area of the San Francisco Basin of the East Bay Plain.[38] The San Lorenzo Sub-Area is primarily filled with alluvial fans.[39] It has been proposed that a clay layer forms an extensive east-west aquitard[40] across this basin. [41] However, the project site is not likely located over the aquitard and, therefore, groundwater recharge from infiltration is possible. Sources of groundwater recharge in the San Lorenzo Sub-Area have been identified as rainfall infiltration, stream seepage, pipe leakage, agriculture return water, and subsurface inflow, with rainfall infiltration comprising about 18.3 percent

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[37] California Department of Water Resources. *Santa Clara Valley Groundwater Basin, East Bay Plain Subbasin. Bulleting 118*. February 2004.

[38] California Regional Water Quality Control Board San Francisco Bay Region, Groundwater Committee. *East Bay Plain Groundwater Beneficial Use Groundwater Evaluation Report*, Alameda and Contra Costa Counties, CA. Prepared June 1999. p. 32

[39] Ibid. p. 40

[40] An "aquitard" is a restrictive layer that impedes the free flow of water across the aquifer and creates confined or semi-confined aquifer conditions.

[41] California Regional Water Quality Control Board San Francisco Bay Region, Groundwater Committee. *East Bay Plain Groundwater Beneficial Use Groundwater Evaluation Report*, Alameda and Contra Costa Counties, CA. Prepared June 1999. p. 40

(3,700 acre-feet per year) of recharge in the 114 square miles of the Alameda County portion of the East Bay Plain. [42]

The City of Hayward historically operated a wellfield near Hesperian and Industrial Boulevards, over one mile west of the project site. This wellfield was phased out of service starting in 1962, when Hetch Hetchy water became available. Groundwater is not a substantial water supply for the City of Hayward; the City of Hayward depends on the San Francisco Public Utilities Commission's Hetch Hetchy aqueduct for its municipal water supply. However, since a major earthquake could disrupt this supply for periods of days, Hayward has installed an emergency water supply well system. In the event of an earthquake, the wells are expected to be in use for no more than 7 days. Hayward overlies the San Lorenzo Cone, which contains an upper and a lower aquifer. The emergency water supply well screens are generally perforated across several intervals in the Lower Hayward Aquifer, between 350 and 550 feet below grade. Wells near or within the former wellfield are used for the emergency water supply. [43]

No permanent groundwater wells would be developed as part of the proposed project. As reported in the EDR, Inc. documents (see Section 8, Hazards and Hazardous Materials), groundwater can be found at approximately 36 feet below the surface in the area of the proposed project. [44] The maximum groundwater levels at Industrial Boulevard, just north of the project site, have been measured at about 25 feet below the lowest elevation of the project site. [45] No deep excavations are planned for the proposed project that would extend to more than 20 feet below ground surface and most excavations would not exceed 2 feet in depth. Construction ground disturbance activities would entail grading and paving; installing power, signal and communication systems; renovation of existing buildings to support operations; building demolition and construction; installation of cleaning facilities; sound wall improvements; lighting; and security fencing, none of which would require deep excavations. As such, construction activities are not expected to encounter groundwater and groundwater dewatering would not occur during construction or operation. Overall, the proposed project would have no direct effect on the local groundwater table and no effect on lowering of groundwater supplies.

The proposed project would increase impervious surfaces by about 1.96 acres, which could impede groundwater recharge from rainfall percolation and affect the emergency water supply. However, as mentioned above, rainfall percolation accounts for only 18.3 percent of the recharge in the Alameda County portion of the East Bay Plain, which encompasses 114 square miles. At best, only about 25 percent of this area would be able to contribute to groundwater recharge from rainfall percolation (land surface portion). An additional 1.96 acres of

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42 Ibid. p. 41

43 Ibid. p. 70-71

44 Environmental Data Resources, Inc. BART Hayward Railyard Extension. Inquire Number: 2616157.2s. October 15, 2009.

45 California Department of Water Resources. n.d. Groundwater Level Data for Well 03S02W35R001M, October 1958 through May 1997. Available at: http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/report_html.cfm?wellNumber=03S02W35R001M. Accessed September 7, 2010.

impervious surfaces from the proposed project would reduce potential recharge area by about 0.01 percent and indirect effects on groundwater levels and water supplies would not be substantial.

Pollutants in stormwater runoff from the project site could contribute pollutants to groundwater resources, affect groundwater quality, and therefore groundwater supplies as polluted runoff percolates through pervious surfaces to groundwater. However, as noted above, the depth to shallow groundwater is more than 20 feet below the ground surface. Additionally, the construction SWPPP-required BMPs, industrial SWPPP BMPs, and MRP would regulate the pollutants in runoff. Furthermore, the MRP requires that use of any infiltration BMPs to treat stormwater runoff would not degrade groundwater quality. BART Facility Standards also require BMPs to minimize pollution potential (Section 01 57 00 Temporary Controls, 1.07 – Pollution Abatement) and prevent stormwater run-on into excavated pits and trenches (31 23 19 Dewatering, 1.08 – Site Conditions; 31 00 00 Earthwork, 3.06 – Excavation). Compliance with these requirements would ensure that potential indirect effects on groundwater recharge and groundwater quality would have a less-than-significant impact on local groundwater levels and groundwater supplies.

d. Less than Significant with Mitigation Incorporated. The proposed project during Phase 1 and 2 would result in a net increase in impervious surface at the Hayward Yard, which would change existing runoff characteristics on the project site. The increase in impervious surfaces (i.e., access road, cleaning facility, etc.) would increase the flow and volume of stormwater during a storm event. This could result in on- or off-site increases in the rate and amount of stormwater entering local drainages and the stormwater system that could result in on- or off-site flooding by exceeding the existing stormwater drainage system capacity.

The majority of project site off-site discharges are to the AFCWCD Line D, Sandoval Way where it crosses under the existing BART tracks, and the wetland area north of the project site. Drainage pipes and ditches would also be added along the northeastern perimeter of the expansion area.

If runoff to the wetland area increases, potential effects would not be substantial and may be beneficial. However, increased runoff to either Sandoval Way, the AFCWCD Line D channel, or under the UPPR track embankment could have substantial effects on off-site flooding. The 100-year event flows are not contained in the AFCWCD Line D and the downstream Old Alameda Creek; levees are over-topped and substantial flooding occurs during a 100-year flood event.[46] Sandoval Way crosses the project site beneath the railroad tracks through a localized topographic depression. Runoff from the project site could contribute to localized flooding of Sandoval Way, which generally flows from southeast to northwest towards the Sandoval Way crossing. The channel and area east of the UPPR tracks (AFCWCD Line N) is subject to flooding during a 500-year flood event and ties into the constrained AFCWCD Line D.

[46] Federal Emergency Management Agency. 2009. *FIRM Flood Insurance Rate Map, Alameda County, California and Incorporated Areas*. Panels 427, 431, and 432 of 725; Community Numbers 060001, 065033, and 060014; Map Numbers 06001C0427G, 06001C0431G, and 06001C0432G effective date August 3, 2009

Increased project site runoff to offsite areas could have a potentially significant effect on off-site flooding and exceed the capacity of the existing storm drain system. The proposed project could increase runoff to these systems by up to 5.20 cfs for the 100-year storm event. Because these systems are already constrained, an increase in 100-year runoff could have a substantial effect on off-site flooding. Figure 11 depicts surface water drainage within the project area.

On-site flooding could also occur with implementation of the proposed project. However, on-site flooding would occur in the depressed area between tracks. Flooding between tracks would not contribute to a substantial effect except where drainage is routed through culverts and pipes beneath project site facilities. If new or existing culverts are not adequate to convey the additional 100-year flows, flows could back up and on-site flooding would be potentially significant.

MITIGATION MEASURE. Implementation of the following measures would require BART to retain or detain the increase in runoff from the 100-year storm event onsite and to adequately size new culverts and pipes to convey 100-year storm flows. This mitigation measure would reduce this impact to a less-than-significant level.

HYD-1 *Stormwater Drainage System Design*. Prior to final design of each phase of the proposed project, BART shall have a licensed professional engineer registered in California prepare a detailed Hydrology and Hydraulics Report that identifies flow contributing areas (catchments), flow pathways, off-site discharge locations, receiving storm drain systems, and proposed on-site flow conveyance structures and conveyance capacities.

The Hydrology and Hydraulics Report shall identify the off-site peak flow rates and flow volumes for the 100-year storm event at all proposed off-site discharge locations, retained existing on-site flow conveyance structures, and proposed on-site flow conveyance structures for both existing conditions and proposed project conditions. The detailed Hydrology and Hydraulics Report calculations shall be prepared in accordance with Alameda County Flood Control District Hydrology and Hydraulics Manual (June 2003, or later version, as applicable).

Off-site Runoff. Based on the detailed Hydrology and Hydraulics Report, BART shall design on-site detention (or retention) facilities sufficient to detain increases in 100-year runoff peak flow rates and retain increases in 100-year flow volumes at all off-site discharge locations compared to existing conditions.

BART shall submit a preliminary design, along with the Hydrology and Hydraulics Report, to the Alameda Flood Control District and City of Hayward Public Works Department for review. BART shall incorporate Alameda Flood Control District recommendations into the project design, where applicable, prior to the beginning of construction activities.

On-site Runoff. BART shall design on-site drainage in accordance with one of the following, or a combination of the following:

- BART shall design sufficient on-site detention (or retention) to detain increase in flow rates in excess of the conveyance capacity of existing downstream structures; or
- BART shall upgrade existing on-site conveyance structures to provide sufficient conveyance capacity. All proposed on-site conveyance structures shall be designed with adequate capacity to convey the 100-year storm event.

f. **No Impact.** As discussed under Item 9a, b, c, and e above**,** the proposed project would not otherwise substantially degrade water quality.

g, h. **No Impact.** The proposed project is not located within a 100-year flood hazard area.[47] Although the proposed project would cross Dry Creek and add soundwalls adjacent to the Dry Creek 100-year floodplain, the proposed project would not encroach upon the floodplain. Existing tracks are elevated above the floodplain and track modifications near Dry Creek would only involve installation of rail turnouts. As such, there would be no 100-year floodplain impacts.

i. **Less than Significant Impact with Mitigation.** The project site is not located in an area subject to dam failure inundation; therefore, there would be no dam failure inundation impacts.[48] The project site is not located within an area protected by levees.[49] However, drainage from the project site is routed to the AFCWCD Line D and Old Alameda Creek channels, both of which are partially leveed to protect adjacent areas from 100-year flooding. In many areas, the levees are provisionally accredited or do not contain the entire 100-year flood event. As such, increases in 100-year flow to these channels could contribute to or exacerbate a levee failure resulting in more off-site flooding. This is a potentially significant impact.

MITIGATION MEASURE. Implementation of Mitigation Measure HYD-1 would ensure that no increase in flood flows over existing conditions would occur with implementation of the proposed project. Potential off-site flooding impacts would thus be reduced to less-than-significant levels.

j. **Less than Significant Impact.** The project area is located approximately five miles inland from the eastern boundary of the San Francisco Bay. It is not located in an area subject to

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[47] Federal Emergency Management Agency. *FIRM Flood Insurance Rate Map, Alameda County, California and Incorporated Areas*. Panels 427, 431, and 432 of 725; Community Numbers 060001, 065033, and 060014; Map Numbers 06001C0427G, 06001C0431G, and 06001C0432G. August 3, 2009

[48] City of Hayward. *City of Hayward General Plan,* Safety Element Update, Appendix L Geologic and Seismic Hazards Maps: Plate 6 Tsunami and Dam Failure Inundation Hazards Map, p. L-4. General Plan adopted by City Council March 22, 2002 as amended through June 22, 2010 (Resolution 10-106).

[49] Federal Emergency Management Agency. *FIRM Flood Insurance Rate Map, Alameda County, California and Incorporated Areas*. Panels 427, 431, and 432 of 725; Community Numbers 060001, 065033, and 060014; Map Numbers 06001C0427G, 06001C0431G, and 06001C0432G. August 3, 2009

tsunamis,[50] nor is the project site down gradient of any large enclosed or semi-enclosed water bodies that could be subject to seiche effects.[51] As such, the proposed project would not be affected by a tsunami or a seiche. Additionally, the project site is not located near areas with steep slopes that would create mudflows; the project site is located over 900 feet down gradient of the nearest steep slopes and there is residential development between the project site and nearest steep slopes.[52] Although locally steep slopes exist on the project site to support tracks, these berms are engineered fill material and gravel ballast and are not subject to mudflows. Therefore, the potential for inundation by mudflows is low and the impact related to these hazards would be less than significant.

10. LAND USE AND PLANNING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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, a 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?	❑	❑	❑	■
d. Result in land use/operational conflicts between existing and proposed on-site or off-site land uses?	❑	❑	■	❑

Discussion

a. **No Impact.** Existing land uses in the project vicinity are industrial, parks and recreation, and low density residential. The west side expansion area is currently developed with industrial uses, and most of the east side expansion area is currently undeveloped. Both expansion areas are adjacent to UPRR rail lines and the BART Hayward Yard. Commercial and industrial properties border the project site to the south and west, industrial and open space to the north, and residential to the east. Redevelopment of the west side expansion area buildings and construction of storage tracks would not introduce a new physical barrier that would divide a neighborhood or business community with established physical connectivity and social/business interactions, since the project area is already divided by the BART mainline tracks, yard, and

[50] City of Hayward. *City of Hayward General Plan,* Safety Element Update, Appendix L Geologic and Seismic Hazards Maps: Plate 6 Tsunami and Dam Failure Inundation Hazards Map, p. L-4. General Plan adopted by City Council March 22, 2002 as amended through June 22, 2010 (Resolution 10-106).

[51] While the San Francisco Bay could also be subject to seiches, the effect would not be as great as a tsunami.

[52] USGS. *Topographic Map, Union City, California* 1:24,000 scale. Updated July 1, 1998.

UPRR tracks. Therefore, the proposed project under both Phase 1 and 2 would have no impact in terms of physically dividing an established community.

b. **No Impact.** Even though this section describes the proposed project's consistency with local policies, California Government Code Section 53090 exempts rapid transit districts like BART from complying with local land use plans, policies, and zoning ordinances. Information from the local policy documents is presented here for informational purposes. The City of Hayward General Plan designates the project site including both the west side and east side expansion areas as an Industrial Corridor, which allows planned business and industrial parks along with supporting office and commercial uses.[53] The Union City General Plan designates the portion of the project area south of Whipple Road as Light Industrial which provides space for manufacturing and industrial uses which evidence no or very low nuisance characteristics. Rail and truck facilities are also allowed under this designation.[54] The project site is zoned as Industrial by the City of Hayward and the trackwork area south of Whipple Road is zoned Light Industrial by the City of Union City. The proposed project's maintenance and vehicle storage areas would be consistent with the land use designations and zoning. Therefore, there would be no impact to applicable adopted plans.

c. **No Impact.** The project site and vicinity are not included in either a habitat conservation plan or natural community conservation plan. Because such plans do not exist in the project area, there would be no impact.

d. **Less than Significant.** The project site and the trackwork area south of Whipple Road area are surrounded by a variety of uses, including commercial, industrial, and residential. Typical industrial uses include processing and manufacturing operations, warehouses, research laboratories, and wholesale establishments. The proposed project under both Phase 1 and 2 would be compatible with these uses and the proposed new storage tracks on the east side would not introduce new uses that would conflict with the operations of these uses. Activities associated with the project site include the storage, cleaning, and maintenance of BART vehicles and facilities. Activities associated with the trackwork area south of Whipple Road would be the same as currently exist. Impacts that are associated with land use character are addressed in other parts of this checklist: see Section 1, Aesthetics; Section 3, Air Quality; Section 12, Noise and Vibration; and Section 16, Transportation/Traffic. Based on the discussion under these sections, along with the discussion here in this section, the project including Phases 1 and 2 would not be expected to cause land use/operational conflicts and thus would result in a less-than-significant land use impact.

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[53] City of Hayward, *City of Hayward General Plan*, Amended 2006, Appendix C: General Plan Land Use Map, pg. C-3. http://gis.hayward-ca.gov/pdf-maps/COH_General_Plan.pdf

[54] City of Union City, *2002 General Plan Policy Document*, http://www.union-city.ca.us/pdf_large/general_plan02/land%20use% 204%20updated%20to%20AG-05-04,%20AG-01-05.pdf, accessed August 10, 2010.

11. MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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?	❑	❑	❑	■

Discussion

a, b. No Impact. The state requires local jurisdictions to protect areas with economically significant mineral resources from incompatible development. The California Division of Mines and Geology (under the authority of the Surface Mining and Reclamation Act of 1975) has classified aggregate mineral zones throughout the state. The only designated "sector" of regional significance in Hayward and Union City is La Vista Quarry, located in the unincorporated area east of Mission Boulevard and Tennyson Road.[55] This quarry is located approximately 1.14 miles from the project site. In addition, the California Division of Mines and Geology has classified the project site as Mineral Resource Zone (MRZ) 1. MRZ-1 is defined as "an area where adequate information indicated that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence."[56] Therefore, no significant aggregate or mineral resources are located in either city, and therefore the proposed project would have no impact related to mineral resources.

12. NOISE AND VIBRATION

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance?	❑	■	❑	❑
b. Expose persons to or generate excessive groundborne vibration or groundborne noise levels?	❑	■	❑	❑
c. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	❑	■	❑	❑

[55] City of Hayward, *City of Hayward General Plan*, Amended June 2006, page 7-5.

[56] California Department of Conservation, Division of Mines and Geology, *Mineral Land Classification Map*, Newark Quadrangle.

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
d. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	❑	■	❑	❑
e. Be located within an airport land use plan area, or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?	❑	❑	❑	■
f. Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	❑	❑	❑	■

Background

Noise Characteristics and Metrics. The principal source of noise in the study area is vehicular traffic from automobiles, buses, and trucks, and from BART train passbys and the nearby freight/Amtrak track. Noise has the potential to interrupt ongoing activities and result in community annoyance, especially in residential areas. Most noticeably, annoyance occurs when noise interferes significantly with activities such as sleeping, talking, and listening to the television, radio, or music. Transportation noise has been ranked among the most significant causes of community dissatisfaction.[57]

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is typically considered to be unwanted sound. Humans are affected by three basic parameters of noise: amplitude, frequency, and time patterns. The amplitude, or loudness, of a sound depends on the fluctuations associated with a particular sound wave. Amplitude is expressed in terms of decibels (dB), with human hearing ranging from 20 dB to 120 dB. Typically, a change in sound level of 10 dB is perceived as doubling (or halving) the loudness.

The frequency, or tone or pitch, of a sound is described in terms of cycles per second or Hertz (Hz). The range of human hearing is between 20 Hz to 20,000 Hz with frequencies below 250 Hz and above 10,000 Hz being harder to hear. To account for this variation, three categories, or weighted curves, are used to represent how humans respond to normal, very loud, and extremely loud sounds (A-, B- and C-weighted curves, respectively). Typically, environmental noise falls into the "normal" category so the A-weighted curve is most widely accepted as the proper unit of measurement to represent the human response to environmental noise. A-weighted decibel sound levels are denoted as dBA.

[57] Federal Transportation Authority (FTA). *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.

The fluctuation of noise levels with respect to time variations is the third parameter. Environmental noise is typically a conglomeration of distant noise sources which result in a low-level background noise from which no individual noise source is prevalent or identifiable. The background noise remains relatively constant from moment to moment; however, it may vary from hour to hour as changes in human activity patterns occur. Loud, relatively brief noise from identifiable sources such as aircraft flyovers, screeching of brakes, and other short-term events, will cause the noise level to fluctuate distinctively from moment to moment.

Because of these fluctuations over time, it is common practice to combine all this information into a single value. To determine cumulative noise levels for residential land uses, the L_{dn} or Day-Night Sound Level is used. The L_{dn} is an A-weighted 24-hour L_{eq} which is adjusted by a 10 dB increase for all noise which occurs during the nighttime hours from 10:00 p.m. to 7:00 a.m. when sensitivity to noise is heightened.[58]

Vibration Characteristics and Metrics. Groundborne vibration is an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration of the motion. When evaluating human response, groundborne vibration is usually expressed in terms of decibels.[59] To avoid confusion with sound decibels, the abbreviation VdB is used for vibration decibels.

The perception level for humans is approximately 65 VdB, with the typical background vibration velocity in residential areas of 50 VdB. The range of vibration velocity that is of interest is between approximately 50 VdB and 100 VdB. Although perceptible at 65 VdB, typically vibration is not considered significant until it exceeds 70 VdB. Under ideal conditions, rapid transit systems typically generate vibration levels of 70 VdB or more near their tracks. However, wheel flats, uneven or rough track, and geologic conditions can increase vibration levels by up to 10 VdB; therefore, the upper range for rapid transit vibration is around 80 VdB; for commuter rail, 85 VdB.

Activities such as construction, including blasting and pile-driving, buses on rough roads, and trains can result in groundborne vibration. Annoyance from vibration can occur when the vibration is only marginally perceptible, and is well below the damage threshold for normal buildings. Although there has been relatively little research into human and building response to groundborne vibration from construction, there is substantial experience with vibration from rail systems. In general, the collective experience indicates that:

- Groundborne vibration from rail systems almost never results in building damage, even minor cosmetic damage. The primary consideration, therefore, is whether vibration will be intrusive to building occupants or will interfere with sensitive interior activities or machinery.
- The threshold for human perception is approximately 65 VdB. Vibration levels in the range of 70 to 75 VdB are often noticeable but acceptable. Above 80 VdB, vibration levels are often considered unacceptable.

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58 The L_{eq} is an average or constant sound level over a given period that would have the same sound energy as the time-varying A-weighted sound over the same period. The period is typically taken over 1 hour and represented as Leq(h).

59 All vibration decibels in this report use a decibel reference of 1 micro-inch/second (μin/sec), where one μin/sec = 10^{-6} in/sec.

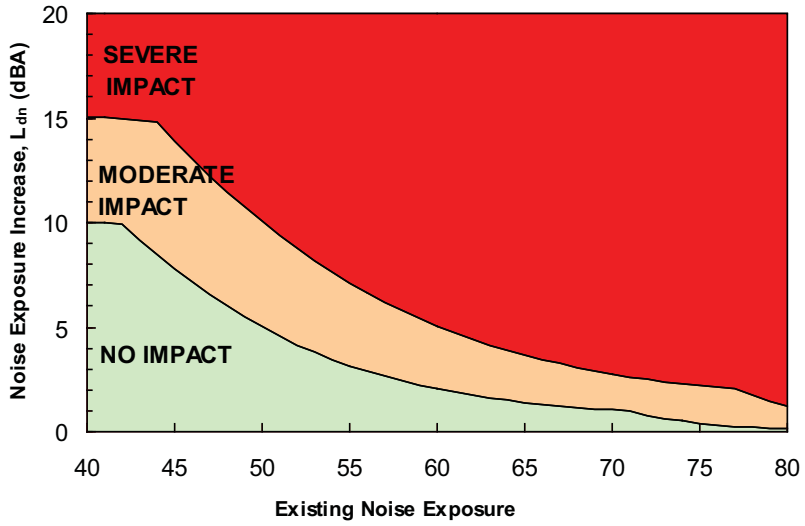
- There is a relationship between the number of daily events and the degree of annoyance caused by groundborne vibration. Transit operations are classified as having frequent events (>70 trains/day), occasional events (30-70 trains/day), or infrequent events (<30 trains/day).[60] Those systems with more events have more stringent (lower) impact thresholds. BART is considered a system with frequent events.

Noise and Vibration Criteria. BART has adopted the FTA thresholds for noise and vibration impacts as part of the BART Facilities Standards.

Noise. There are no FTA criteria for construction noise impacts and no limits on construction noise. However, the FTA guidance suggests that noise impacts will occur in residential areas if construction noise causes daytime 8-hour L_{eq} to exceed 80 dBA or the nighttime 8-hr L_{eq} to exceed 70 dBA.[61]

For operational noise, the delineation of noise impacts represented graphically in Figure 12 from the FTA Guidance Manual and numerically in Table 6 applies to all rail projects, including rail rapid transit, light rail transit, commuter rail, and automated guideway transit, as well as fixed facilities such as storage, maintenance yards, passenger stations and terminals, parking facilities, and substations. As seen in Table 6 and Figure 12, noise impacts are based on a comparison of existing outdoor noise levels and future outdoor noise levels from the proposed project. Furthermore, the criteria for noise impacts allow for a project to generate more noise in areas with lower existing noise levels, before triggering an adverse human response.

Figure 12 FTA Noise Impact Criteria for Transit Projects



Source: FTA, *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006, pp. 3-6.

60 FTA. *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.
61 FTA. *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.

Table 6
Noise Levels Defining Impact for Transit Projects

Existing Noise Exposure[1] L_{eq}(h) or L_{dn} (dBA)	Project Noise Impact Exposure, L_{eq}(h) or L_{dn} (dBA)[1]					
	Category 1 or 2 sites[2]			Category 3 Sites[2]		
	No Impact	Moderate Impact	Severe Impact	No Impact	Moderate Impact	Severe Impact
59	< 58	58-63	> 63	< 63	63-68	> 68
60	< 58	58-63	> 63	< 63	63-68	> 68
61	< 59	59-64	> 64	< 64	64-69	> 69
62	< 59	59-64	> 64	< 64	64-69	> 69
63	< 60	60-65	> 65	< 65	65-70	> 70
64	< 61	61-65	> 65	< 66	66-70	> 70
65	< 61	61-66	> 66	<66	66-71	> 71
66	< 62	62-67	> 67	< 67	67-72	> 72
67	< 63	63-67	> 67	< 68	68-72	> 72
68	< 63	63-68	> 68	< 68	68-73	> 73

Source: FTA, *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006, pp. 3-4.

1. L_{dn} is used for land use where nighttime sensitivity is a factor; L_{eq} during the hour of maximum transit noise exposure is used for land use involving only daytime activities.
2. Category 1 sites where quiet is essential, such as outdoor amphitheaters; Category 2 sites include residences and buildings where people normally sleep such as homes, hospitals, and hotels; Category 3 sites include schools, libraries, and churches where quiet in outdoor spaces in important.

The FTA defines three levels of noise impact: no impact, moderate, and severe. In accordance with the FTA Guidance Manual, noise mitigation must be investigated for moderate and severe impacts. The Manual also states that for severe impacts "… there is a presumption by the FTA that mitigation will be incorporated in the project unless there are truly extenuating circumstances which prevent it." The FTA allows more discretion for mitigation of moderate impacts, based on consideration of factors that include cost, number of sensitive receptors affected, community views, the amount that the predicted levels exceed the impact threshold, and the sensitivity of the affected receptors. The FTA noise impact criteria are given in tabular format in Table 7 with the thresholds rounded off to the nearest decibel.

Table 7
Noise Impact Criteria: Effect on Cumulative Noise Exposure

L_{dn} or L_{eq} in dBA (rounded to the nearest whole decibel)			
Existing Noise Exposure	Allowable Project Noise Exposure	Allowable Combined Total Noise Exposure	Allowable Noise Exposure Increase
45	51	52	7
50	53	55	5
55	55	58	3
60	57	62	2
65	60	66	1
70	64	71	1
75	65	75	0

Source: FTA, *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006, pp. 3-7.

Vibration. The FTA vibration impact criteria are based on the maximum indoor vibration level as a train passes. There are no impact criteria for outdoor spaces such as parks. Table 8 shows the FTA General Assessment criteria for groundborne vibration from rail transit systems. With greater than 70 trains per day (estimated over 300 cumulative for the project), the threshold for residential buildings (Category 2) is 72 VdB.

The FTA vibration thresholds do not specifically account for existing vibration. Although arterial roadways in the study area have substantial volumes of vehicular traffic including trucks and buses, rubber-tired vehicles rarely generate perceptible ground vibration unless there are irregularities in the roadway surface, such as potholes or wide expansion joints. As such, it is expected that there are few if any locations along the project site where traffic-generated groundborne vibration is perceptible.

Table 8
FTA Impact Thresholds for Groundborne Vibration

	Groundborne Vibration (VdB re 1 micro inch/sec)		
Land Use Category[1]	**Frequent Events[2]**	**Occasional Events[3]**	**Infrequent Events[4]**
Category 1. Buildings where vibration would interfere with interior operations.	65 VdB	65 VdB	65 VdB
Category 2. Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3. Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Source: FTA, *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006, pp. 8-3.

Notes:

1. Note that the FTA land use categories for vibration impacts are different than the land use categories for noise impacts. The primary difference applicable to this project is that noise Category 3 includes outdoor land uses, such as parks, and vibration Category 3 applies exclusively to indoor land uses. This is because vibration is an issue only for building occupants. Train vibration is rarely intrusive to observers who are outdoors.
2. Frequent events are defined as more than 70 vibration events per day.
3. Occasional events are defined as between 30 and 70 events per day.
4. Infrequent events are defined as less than 30 events per day.

For the evaluation of construction vibration impacts, BART follows criteria developed by the FTA. These criteria are reported in Table 9.

Table 9
Vibration Damage Impact Criteria during Construction

Land Use	Acceptable Vibration Levels (VdB)	Acceptable Peak Particle Velocity (in/sec)
Reinforced-concrete, steel or timber (no plaster)	102	0.5
Engineered concrete and masonry (no plaster)	98	0.3
Non-Engineered timber and masonry buildings	94	0.2
Buildings extremely susceptible to vibration damage	90	0.12

Source: FTA, *Transit Noise and Vibration Impact Assessment, Final Report*, May 2006.

Discussion

a, c, d. Less than Significant with Mitigation Incorporated. Increases in ambient noise levels are anticipated during construction and post-construction of the HMC project.

BART operates trains in the project area seven days a week with 204 daytime trains and 52 nighttime trains. Two proposed BART extension projects, the Warm Springs Project and the Silicon Valley Rapid Transit Project, are expected to increase train traffic in the project area by 59 trains daily. The noise analysis is based on these future train volumes. The impact assessment is based on a comparison of the increased levels (L_{dn}) associated with BART operations and the FTA impact thresholds.

Noise from BART operations as part of the proposed project includes BART train movements on proposed tracks and crossovers, and a power substation proposed at the south end of the project site (east side) to provide power to the storage tracks. The reference sound exposure level (SEL) specified in the FTA guidance manual is 118 dBA for 20 train movements during peak hour activities. The east side expansion project proposes adding 40 train movements per day and 20 movements during night hours to the existing train movements at the Hayward Yard. The unshielded noise levels from the traction power substation were projected to nearby residences. The reference SEL used in the calculation for the traction power substation was 99 dBA at 50 feet, based on FTA guidelines.[62]

Operational Noise from Train Movements South of Whipple Road. Table 9 and Table 10 show the projected cumulative noise levels from train operations and the proposed project under Phase 1 and Phase 2, respectively. Projected noise levels in the tables include the effect of BART train operations on the mainline (future schedule), and BART operations on the new crossovers (including future test track operations). The discussion below is based on the *Noise and Vibration Technical Report* by Wilson, Ihrig & Associates, Inc.[63]

Phase 1. There would be a potential for moderate impacts on three single-family residences located on 11th Street due to the proximity to crossover P100 in the track modification area south of Whipple Road (see Figure 13). There would also be a potential for moderate impacts to 14 single-family residences located on Alicante Terrace and Carrara Terrace due to the proximity to crossover P102. Potential noise increases at Alicante Terrace and Carrara Terrace would be between 2.0 to 2.7 dBA L_{dn} above ambient conditions (see Table 10). This would constitute a significant impact.

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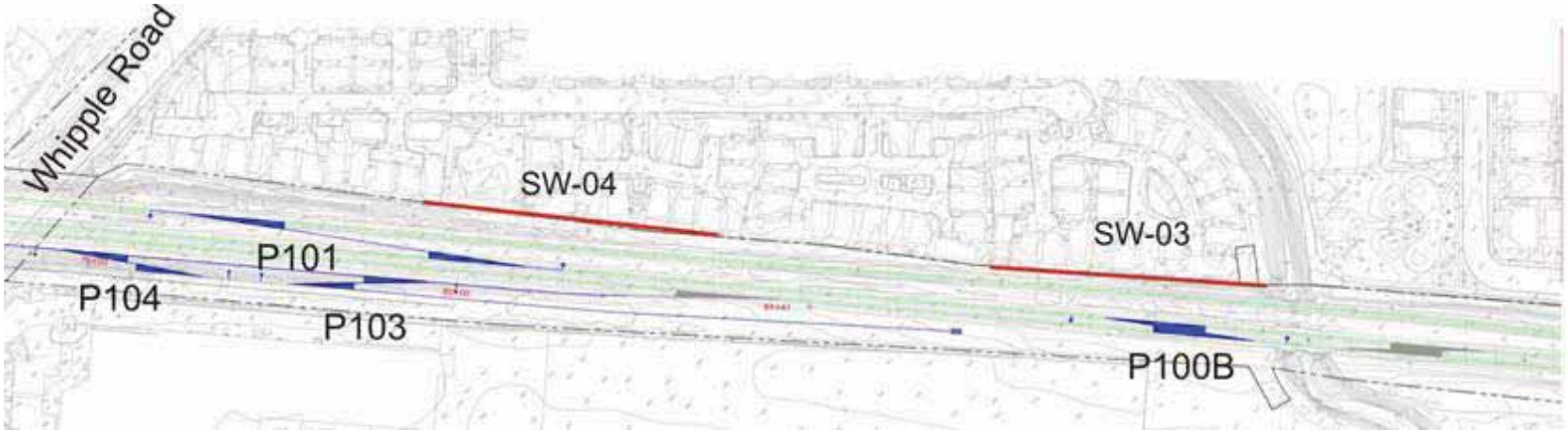
[62] BART specifications for their substations follow the National Electrical Manufacturers Association (NEMA) rating. The maximum NEMA ratings, which are specified in terms of the average sound level, are 60 dBA for a self-cooled ventilated system, 59 dBA for a self-cooled sealed system, and 67 dBA for a ventilated forced-air cooled system. These sound levels are quieter than those specified in the FTA guidance. Therefore, following the FTA procedure results in a more conservative analysis for the project.

[63] Wilson, Ihrig & Associates, Inc. *BART-Hayward Maintenance Complex Noise and Vibration Technical Report*, November 22, 2010.

Phase 1

Phase 2



Source: WIA, 2010.

FIGURE 13

Location and Minimum Recommended Extent of Sound Wall for Phase 1 and Phase 2

Table 10
Noise Impacts from Phase 1 South of Whipple Road

Location	Distance[1] (ft)	Ambient Level (L_{dn}/L_{eq})[2]	FTA Criteria[3] M / S	Projected L_{dn}/L_{eq} (dBA)[2,4]	Increase (dBA)	Impact (Number of Buildings with Impact)
11th Street between Stone Street and Boyle Street	135 xo	60	2.0/5.0	62	2.0	Less than Significant
11th Street and Boyle Street	140 xo	60	2.0/5.0	63	2.7	Potentially Significant (3)
Dry Creek Park	120 xo	60	4.6/9.0	63	2.8	Less than Significant
La Brea Terrace	75	62	1.7/4.4	64	1.6	Less than Significant
Alicante Terrace	75 xo	62	1.7/4.4	65	2.7	Potentially Significant (7)
Carrara Terrace	80 xo	62	1.7/4.4	64	2.0	Potentially Significant (7)
Messina Terrace	85	62	1.7/4.4	63	0.5	Less than Significant
La Bonita Terrace	90	63	1.6/4.1	63	0.0	Less than Significant

Source: Wilson, Ihrig & Associates, Inc., 2010.

Notes:

1. Distance from residential land use to centerline of nearest track. If the track involves a crossover switch, the distance is measured to the crossover which is designated as "xo."
2. L_{dn} is the metric for FTA Category 2 sensitive receptors. L_{eq} is the metric for FTA Category 3 sensitive receptors.
3. Threshold increase in decibels for (M)oderate and (S)evere impacts.
4. Projected noise includes noise levels from future BART trains on mainline, crossover, and test track.

Phase 2. There would be a potential for severe impacts on nine single-family residences located on La Brea Terrace due to the noise increase associated with the BART trains from crossover P100B and the distance from the crossover to the residences. Additionally, there would be a potential for moderate impacts to six single-family homes located on Carrara Avenue due to crossover P101 that would connect to the northbound mainline with the test track. Potential noise increases to residences on La Brea Terrace and Carrara Avenue would be between 2.5 to 4.7 dBA L_{dn} above ambient conditions (see Table 11). This would constitute a significant impact.

Additional homes on Messina Terrace and La Bonita Terrace are sufficiently near the crossover to be impacted; however, noise levels from the operation of crossover 101 would be less than significant because of the existing sound wall. Therefore, no noise impact is anticipated to Messina Terrace and La Bonita Terrace residences.

North of Whipple Road, the project would slightly increase the cumulative noise levels at nearby single-family residences due to trains on the aerial flyover. However, the increase would be below the threshold for moderate impacts. As a result, BART operations on the aerial guideway would be less than significant.

Table 11
Noise Impacts from Phase 2 South of Whipple Road

Location	Distance[1] (ft)	Ambient Level (L_{dn}/L_{eq})[2]	FTA Criteria[3] M / S	Projected L_{dn}/L_{eq} (dBA)[2,4]	Increase (dBA)	Impact (Number of Buildings with Impact)
11th Street between Stone Street and Boyle Street	135 xo	60	2.0/5.0	61	1.4	Less than Significant
11th Street and Boyle Street	140 xo	60	2.0/5.0	62	1.7	Less than Significant
Dry Creek Park	120 xo	60	4.6/9.0	62	1.8	Less than Significant
La Brea Terrace	75 xo	62	1.7/4.4	67	4.7	Potentially Significant (9)
Alicante Terrace	75 xo	62	1.7/4.4	64	1.5	Less than Significant
Carrara Terrace	80 xo	62	1.7/4.4	65	2.5	Potentially Significant (6)
Messina Terrace	85 xo	62	1.7/4.4	63	1.4	Less than Significant
La Bonita Terrace	90 xo	63	1.6/4.1	63	0.4	Less than Significant

Source: Wilson, Ihrig & Associates, Inc., 2010.

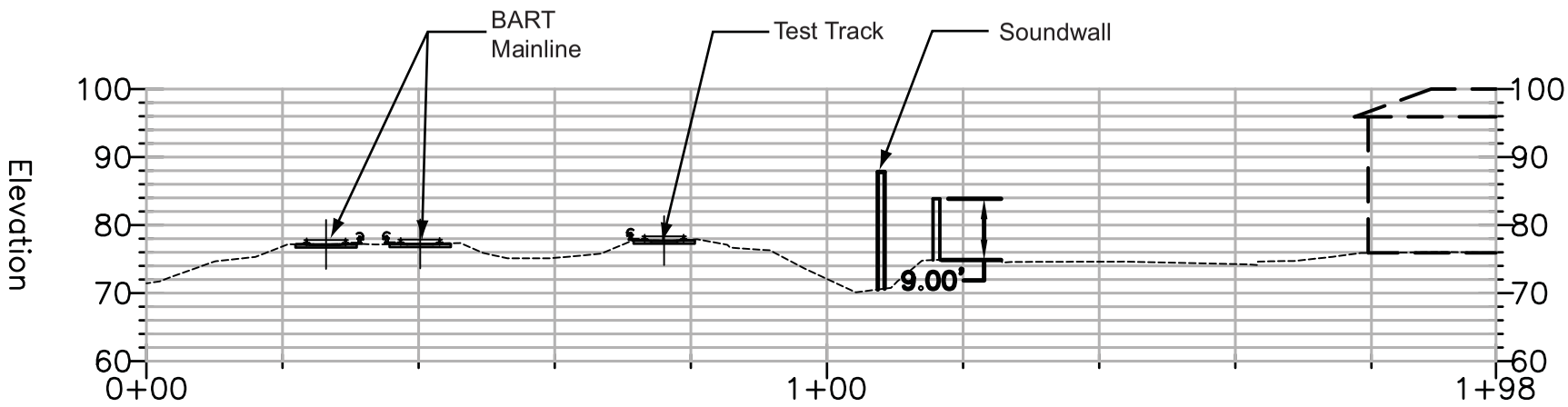
Notes:

1. Distance from residential land use to centerline of nearest track. If the track involves a crossover switch, the distance is measured to the crossover which is designated as "xo."
2. L_{dn} is the metric for FTA Category 2 sensitive receptors. L_{eq} is the metric for FTA Category 3 sensitive receptors.
3. Threshold increase in decibels for (M)oderate and (S)evere impacts.
4. Projected noise includes noise levels from future BART trains on mainline, crossover, and test track.

Operational Noise from Facilities North of Whipple Road (Train Storage, West Side Expansion, Traction Power Substation, and enhanced Vehicle Inspection Area) under Phase 1 and Phase 2. The assessment of cumulative noise impact resulting from the proposed project is presented in Table 12. Noise levels for this analysis account for train movements at lower speed during storage, noise from the power substation, operations on the aerial structures for the dispatch flyover, operations at the west side expansion area, and operations at the enhanced Vehicle Inspection Area. Due to BART operations on the proposed storage tracks and other tracks associated with it, there would be a slight increase in noise levels for nearby residences, between 0.1 and 1.1 dBA over the existing ambient noise. Because the increase would not exceed the threshold of significance for these residences, the impact would be less than significant.

MITIGATION MEASURES. The two primary factors that reduce levels of environmental sounds are increasing the distance between the sound source and the receiver and/or having intervening obstacles such as walls, buildings, or terrain features block the direct path between the sound source and the receiver. Mitigation Measure NO-1 recommends the construction of sound walls to mitigate noise for ground-level receptors. Figure 13 illustrates the probable location of sound walls according to the preliminary noise analysis. Figure 14 illustrates the conceptual cross-section for sound walls under Phase 1. Sound walls under Phase 2 would be similar to the sound walls presented for Sound Wall 2 (SW02) under Phase 1. Final height and location of sound walls would be determined during final design.

SW01 Profile



SW02 Profile

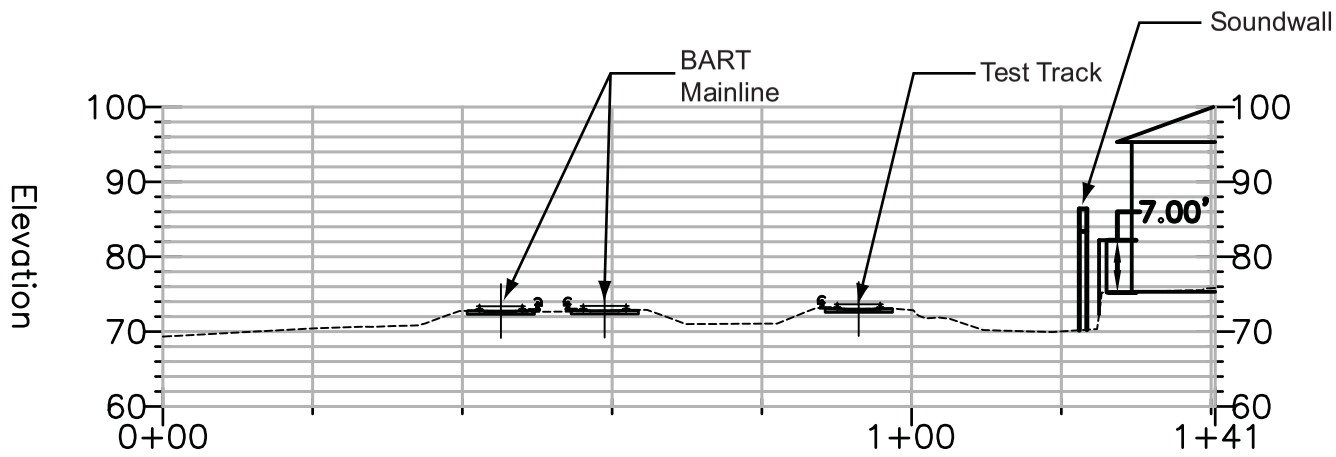


FIGURE **14**

Conceptual Cross-Sections for Proposed Sound Walls under Phase 1

Source: BART, 2010.

Table 12
Noise Impacts from Train Storage, West Side Expansion, and Traction Power Substation for Phase 1 and Phase 2 North of Whipple Road

Location	Distance[1] (ft)	Ambient Level (L_{dn})	FTA Criteria[2] M / S	Projected[3] L_{dn} (dBA)	Increase (dBA)	Impact (Number of Buildings with Impact)
Ithaca Avenue between Whipple Road and Troy Place	630 – 2,900	70	1.0/2.8	70	0.1	Less than Significant
Carroll Avenue between Troy Place and Gresel Street	320 – 1,400	69	1.1/2.9	69	0.3	Less than Significant
Carroll Avenue between Gresel Street and Becker Place	170 – 1,100	67	1.2/3.1	68	1.1	Less than Significant
Carroll Avenue between Becker Place and Fairway Street	200 – 1,400	67	1.2/3.1	68	1.0	Less than Significant
Carroll Avenue north of Fairway Street	370 – 2,500	67	1.2/3.1	67	0.2	Less than Significant

Source: Wilson, Ihrig & Associates., Inc., 2010.

Notes:

1. Range of typical distance from residential land use to nearest track.
2. Threshold increase in decibels for (M)oderate and (S)evere impacts.
3. Projected noise includes noise levels from future BART trains on mainline, crossover, and test track.

Mitigation Measure NO-2 recommends additional mitigation measures to reduce interior noise levels for the upper stories of the residential homes, if that proves necessary. The interior noise levels for residents south of Whipple Road with two or more stories that are facing the BART right-of-way would potentially remain exposed to noise levels higher than 45 dBA L_{dn} even with the recommended sound walls in Tables 13 and 14. These residences should be considered for building noise insulation as additional mitigation. To achieve an interior noise level equivalent to 45 dBA L_{dn} or less, the window(s) must provide a sound transmission class (STC) greater than 27. Based on field observations, the current construction elements of the residential structures south of Whipple Road may provide an STC rating greater than 27. Therefore, future train operations from the proposed project may comply with the indoor 45 dBA L_{dn} and additional sound insulation may not be necessary. Since it is not possible to verify this condition at the present time, BART would evaluate compliance with the proposed indoor criteria once the proposed project has been implemented. The following mitigation measures would reduce operational noise impacts from train movements to less than significant.

NO-1 *Construction of Sound Walls.* BART shall incorporate sound walls at the BART right-of-way line or other locations that mitigate the noise impacts indicated in Table 13 and Table 14 of this IS/MND. Implementation of sound walls will provide approximately 10 dBA reduction in overall noise levels. Concrete block masonry, poured-in-place, or pre-cast concrete walls would be acceptable as construction materials provided they have a minimum surface density of 4 lbs/ft^2. The specific location of sound walls will be addressed in final design. Sound walls

will be constructed in phases as necessary to reduce noise as components of the project are constructed.

NO-2 *Installation of Building Sound Insulation Features*. For those receptors where the outdoor wayside noise from the train operations at ground level can be mitigated to achieve the FTA criteria, but the sound walls provided by Mitigation Measure NO-1 are not sufficient to mitigate noise levels at upper stories, BART will measure operational noise levels on a case-by-case basis following project implementation. Where the existing building construction does not provide interior noise levels of Ldn 45 dBA or lower, BART will quantitatively evaluate individual structures and implement a formal program of building sound insulation improvement as necessary to meet this criterion.

Table 13
Sound Wall Mitigation – Phase 1

	SW #	SW[1] Height (ft)	SW length (ft)	FTA Criteria[2] M/S	Projected[3] L_{dn} (dBA)	Increase (dBA)	Residual Impact after Mitigation
11th Street between Stone Street and Boyle Street	---	---	---	2.0 /5.0	---	---	---
11th Street and Boyle Street	SW01	10	320	2.0 /5.0	62	1.7	Less than Significant
Dry Creek Park	---	---	---	4.6/9.0	---	---	---
La Brea Terrace	---	---	---	1.7/4.4	---	---	---
Alicante Terrace	SW02	10	320	1.7/4.4	64	1.7	Less than Significant
Carrara Terrace	SW02	13	340	1.7/4.4	63	1.3	Less than Significant
Messina Terrace	---	---	---	1.7/4.4	---	---	---
La Bonita Terrace	---	---	---	1.6/4.1	---	---	---

Source: Wilson, Ihrig & Associates, Inc., 2010.

Notes:

1. Approximate height from BART top-of-rail.
2. Threshold increase in decibels for (M)oderate and (S)evere impacts.
3. Projected noise includes noise levels from future BART trains on mainline, crossover, and test track.

Table 14
Sound Wall Mitigation – Phase 2

	SW #	SW[1] Height (ft)	SW length (ft)	FTA Criteria[2] M/S	Projected[3] L_{dn} (dBA)	Increase (dBA)	Residual Impact after Mitigation
11th Street between Stone Street and Boyle Street	---	---	---	2.0 / 5.0	---	---	---
11th Street and Boyle Street	---	---	---	2.0 / 5.0	---	---	---
Dry Creek Park	---	---	---	4.6/9.0	---	---	---
La Brea Terrace	SW03	9	380	1.7/4.4	64	1.4	Less than Significant
Alicante Terrace	---	---	---	1.7/4.4	---	---	---
Carrara Terrace	SW04	14	410	1.7/4.4	63	1.3	Less than Significant
Messina Terrace	---	---	---	1.7/4.4	---	---	---
La Bonita Terrace	---	---	---	1.6/4.1	---	---	---

Source: Wilson, Ihrig & Associates, Inc., 2010.

Notes:

1. Approximate height from BART top-of-rail.
2. Threshold increase in decibels for (M)oderate and (S)evere impacts.
3. Projected noise includes noise levels from future BART trains on mainline, crossover, and test track.

Construction Noise. Construction would temporarily increase noise levels at the adjacent land uses. Noise impacts resulting from construction activities depend on the various pieces of construction equipment, timing, duration of activities, and distance between noise sources and receptors. Highest noise levels typically occur during excavation, grading, and pile driving activities, with lower noise levels during building construction and paving. It is estimated that noise levels during project construction with the use of heavy equipment would typically range between 61 to 85 dBA, depending on the distance of the construction activity to the noise sensitive receptor. Table 15 and Table 16 show the projected range of noise levels expected from the use of heavy equipment during construction and track installation for the project during Phase 1 and Phase 2, respectively. The tables present the range of noise levels expected for each group of receptors. Results of the analysis show that residential receptors located within 75 feet of heavy equipment during daytime construction would be exposed to a potentially significant noise impact. This distance would be extended to 110 feet (unobstructed) if construction activities are conducted during nighttime.

During Phase 1, the typical noise levels from heavy equipment would range from 54 to 72 dBA at the location of sensitive receptors. As presented in Table 15, with the existing sound walls at Innovation Homes,[64] residences would experience less-than-significant construction noise impacts. Additionally, residences along 11th Street would experience less-than-significant noise impacts during construction of Phase 1.

[64] Innovation Homes is the single-family community in Union City east of the BART racks, south of Whipple Road and north of Dry Creek.

During Phase 2, the use of heavy equipment during construction would also generate less-than-significant noise impacts on residences in the Innovation Homes development, and along Ithaca Street and Carroll Avenue.

The use of ballast tamping and ballast regulators (for track installation) would generate potentially significant noise impacts during Phase 1 at three single-family homes along 11th Street, nine residences along Alicante Terrace, and eight residences along Carrara Terrace during nighttime construction. These homes would experience noise levels up to 77 dBA. During Phase 2, activities involving track installation would be carried out at night and temporary impacts would occur for residences within 190 feet. An estimated 32 single-family homes at the Innovation Homes development could be significantly impacted by nighttime construction.

Construction of the flyovers would take place during Phase 2 and could include the use of sonic or vibratory pile drivers, which in general produce lower noise levels than an impact pile driver. However, vibratory pile drivers can generate high levels of noise if not shielded properly. The noise levels presented in Table 16 include the noise from pile driving for the aerial structures.

Pile driving is expected to exceed the FTA noise criterion for residential receptors within 140 feet of operation. If pile driving is scheduled at night (between the hours of 10:00 p.m. to 7:00 a.m.) the area of impact could be extended up to 240 feet from the alignment right-of-way. However, based on the alignment for the flyovers, pile driving would occur 400 feet or more from the residential homes, which would result in a less-than-significant impact.

Staging areas are proposed on the expansion area and on the existing storage area south and west of the project site. Noise from the staging areas would potentially cause a significant impact for homes within 70 feet of the staging area's property line during daytime hours and 110 feet during nighttime. The closest homes to either staging area would be at least 150 feet from the nearest property line. As a result, construction noise impacts from the staging areas would be less than significant.

Trucks would be required to transport equipment and supplies. The California Vehicle Code limits vehicle noise emission levels of new highway trucks built after 1987 to 80 dBA at a distance of 50 feet from the centerline of travel under any condition of operation, including acceleration and deceleration, in any gear. Older, noisier trucks may still be in use, but it is reasonable to assume that contractor's trucks meet current regulations for new trucks.

Generally, trucks would access the project site from Whipple Road east of the BART mainline tracks, which is approximately 150 feet from residences along Ithaca Street. Noise levels at residences could reach up to 63 dBA resulting in a less-than-significant impact. For the purpose of this assessment, about 20 trucks per hour (1 minute each) were assumed. It was also assumed that trucks would idle for no more than 5 minutes consistent with Mitigation Measure AQ-2 for mitigation of construction air quality impacts.

Table 15
Projected Construction Noise Impacts – Phase 1

Location	Distance to Construction (ft)		Criteria		Projected Noise Levels from Heavy Equipment Construction and Track Installation Without Noise Control, L_{eq} (dBA)									
					Heavy Equipment					Track Installation				
							Impact Type					Impact Type		
	Nearest	Farthest	Day	Night	Nearest	Farthest	Day	Night	# Impacts	Nearest	Farthest	Day	Night	# Impacts
11th Street between D Street and Stone Street	500	500	80	75	62	62	LTS	LTS	0	66	66	LTS	LTS	0
11th Street between Stone Street and Boyle Street	400	400	80	75	64	64	LTS	LTS	0	68	68	LTS	LTS	0
11th Street and Boyle Street	150	300	80	75	72	66	LTS	LTS	0	77	71	LTS	PS	3
La Brea Terrace	170	550	80	75	64	54	LTS	LTS	0	69	59	LTS	LTS	0
Alicante Terrace	85	550	80	75	70	54	LTS	LTS	0	75	59	LTS	PS	9
Carrara Terrace	85	500	80	75	70	55	LTS	LTS	0	75	60	LTS	PS	8
Messina Terrace	120	250	80	75	67	61	LTS	LTS	0	72	66	LTS	LTS	0
La Bonita Terrace	150	350	80	75	65	65	LTS	LTS	0	70	63	LTS	LTS	0
Ithaca Street between Whipple Road and Carroll Avenue	540	650	80	75	61	59	LTS	LTS	0	66	64	LTS	LTS	0
Carroll Avenue between Troy Place and Gresel Street	540	650	80	75	61	59	LTS	LTS	0	66	64	LTS	LTS	0
Carroll Avenue between Gresel Street and Becker Place	540	650	80	75	61	59	LTS	LTS	0	66	64	LTS	LTS	0
Carroll Avenue between Becker Place and Fairway Street	660	660	80	75	59	59	LTS	LTS	0	64	64	LTS	LTS	0
Carroll Avenue north of Fairway Street	660	660	80	75	59	59	LTS	LTS	0	64	64	LTS	LTS	0

Source: Wilson, Ihrig & Associates, Inc., 2010.

Notes:

Day: from 7 am to 10 pm.

Night: from 10 pm to 7 am.

Impacts = # of residences affected

PS: Potentially Significant Impact

LTS: Less than Significant Impact

Table 16
Projected Construction Noise Impacts - Phase 2

Location	Distance to Construction (ft)		Criteria		Projected Noise Levels from Heavy Equipment Construction and Track Installation Without Noise Control, L_{eq} (dBA)									
					Heavy Equipment					Track Installation				
							Impact Type					Impact Type		
	Nearest	Farthest	Day	Night	Nearest	Farthest	Day	Night	# Impacts	Nearest	Farthest	Day	Night	# Impacts
11th Street between D Street and Stone Street	500	500	80	75	62	62	LTS	LTS	0	66	66	LTS	LTS	0
11th Street between Stone Street and Boyle Street	320	320	80	75	66	66	LTS	LTS	0	70	70	LTS	LTS	0
11th Street and Boyle Street	350	500	80	75	65	62	LTS	LTS	0	69	66	LTS	LTS	0
La Brea Terrace	75	250	80	75	71	61	LTS	LTS	0	76	66	LTS	LTS	0
Alicante Terrace	180	300	80	75	64	59	LTS	LTS	0	69	64	LTS	PS	9
Carrara Terrace	80	300	80	75	71	59	LTS	LTS	0	76	64	LTS	PS	8
Messina Terrace	60	300	80	75	73	59	LTS	LTS	0	78	64	LTS	PS	7
La Bonita Terrace	60	250	80	75	73	61	LTS	LTS	0	78	66	LTS	PS	8
Ithaca Street between Whipple Road and Carroll Avenue	150	400	80	75	72	64	LTS	LTS	0	77	68	LTS	N/A	0
Carroll Avenue between Troy Place and Gresel Street	150	350	80	75	72	65	LTS	LTS	0	77	69	LTS	N/A	0
Carroll Avenue between Gresel Street and Becker Place	200	300	80	75	70	66	LTS	LTS	0	74	71	LTS	N/A	0
Carroll Avenue between Becker Place and Fairway Street	150	400	80	75	72	64	LTS	LTS	0	77	68	LTS	N/A	0
Carroll Avenue north of Fairway Street	150	350	80	75	72	65	LTS	LTS	0	77	69	LTS	N/A	0

Source: Wilson, Ihrig & Associates, Inc., 2010.

Notes:

Day: from 7 am to 10 pm.

Night: from 10 pm to 7 am.

Impacts = # of residences affected

PS: Potentially Significant Impact

LTS: Less than Significant Impact

N/A: Not Applicable. Since track installation would not affect the mainline and would be conducted during the daytime, no nighttime noise impacts have been evaluated.

For construction activities occurring south of Whipple Road or for equipment too large to go under the Whipple Road Bridge, access is being considered at three locations. Assuming five to six trucks per day accessing the site, the residences north of Dry Creek would experience noise levels of approximately 57 dBA or lower, which is not a significant impact. If the F Street access option is selected, a temporary access road may need to be constructed along the west side of the BART mainline. The nearest sensitive receptors would be 50 feet or more from this road, resulting in a noise level below 50 dBA and, therefore, no impact would occur.

Audible backup alarms on moving equipment may generate neighborhood complaints because the sound of the alarm is tonal, since it is meant to be heard and to attract attention. Backup alarms for haul trucks must be audible above the surrounding ambient noise level at a distance of up to 200 feet.[65] Many alarms are preconfigured to be higher than a worst-case construction/industrial operating environment by 10 to 15 dBA. Since the construction noise environment at 50 feet behind any piece of moving machinery may be as high as 70 to 90 dBA, backup alarms are typically designed to emit a sound as loud as 85 to 115 dBA. This would be a potentially significant impact of the project.

MITIGATION MEASURE. Mitigation Measure NO-3 below would reduce construction noise to less than significant.

NO-3 *Construction Noise Best Management Practices.* BART shall incorporate the following practices into the construction documents to be implemented by the project contractor. Such practices include, but are not limited to, the following measures:

- Where feasible, BART shall require that the contractor complies with a Performance Standard of 80 dBA 8-hour L_{eq} during the daytime (7 a.m. to 10 p.m.) and 75 dBA 8-hour L_{eq} during the nighttime (10 p.m. to 7 a.m.) at the property line of the sensitive receptor.
- Prior to construction, BART shall ensure that a Noise Control and Monitoring Report is prepared. The report shall include expected construction noise levels, noise control measures, and explain how the contractor intends to monitor and document construction noise and complaints.
- Locate noisy equipment as far as possible from noise sensitive receptors. In addition, the use of temporary barriers should be employed around the equipment.
- Where construction noise impacts have been identified, use temporary noise barriers along the working area and/or project right-of-way. Barriers/curtains must achieve a Sound Transmission Class (STC) of 30 or greater in accordance with ASTM Test Method E90 and be constructed from material having a surface density of at least 4 pounds/square foot, to ensure adequate transmission loss.

[65] California Occupational Safety and Health Administration, Title 8, Section 1592(a)

- When nighttime or 24-hour construction will be required, coordinate with residents to ensure that the affected residents are fully informed about the upcoming construction. Residents will be given the option of sleeping in hotel rooms at BART expense for the duration of the nighttime construction in areas where construction is expected to exceed the FTA criterion. Residents that work nights and sleep days in locations where construction noise is expected to exceed the FTA criterion will be given the same option.
- Require ambient sensitive ("smart") backup alarms, SAE Class D, or limit to SAE Class C (97 dB) for vehicles over 2.5 cubic yards haulage capacity, or Cal-OSHA/DOSH-approved methods that avoid backup alarm noise for vehicles under 2.5 cubic yards haulage capacity.
- Fit silencers to combustion engines. Ensure that equipment has effective, quality mufflers installed, in good working condition.
- Switch off engines or reduce to idle when not in use.
- Lubricate and maintain equipment regularly.
- Route construction-related truck traffic along roadways that result in the least disturbance to sensitive receptors.

b. Less than Significant with Mitigation Incorporated. As with the noise assessment, vibration from operational activities are evaluated first, followed by construction activities. The impact assessment is based on the overall vibration levels associated with BART operations projected to sensitive receptors. When vibration levels exceed 72 VdB, the FTA threshold for frequent events, a vibration impact is identified. The discussion below is based on the *Noise and Vibration Technical Report* by Wilson, Ihrig & Associates, Inc.[66]

Operational Vibration. The vibration analysis for all components of Phases 1 and 2 indicates that the highest levels of vibration would occur near the proposed crossovers south of Whipple Road. Vibration impacts from these crossovers are presented in Table 17 and Table 18 below for residential uses. Recreational uses such as Dry Creek Park are not considered vibration-sensitive receptors, since these are not areas where people would sleep. Impacts from all other proposed project components would be less than presented in Table 17 and Table 18.

Phase 1. As presented in Table 17, there would be less-than-significant vibration impacts from train operations on the proposed single crossover P100 along 11th Street. Vibration sensitive receptors would be located far enough away that the vibration levels would be below the 72 VdB criterion. Therefore, no vibration mitigation measures would be needed. However, in the vicinity of the crossover P102, vibration levels associated with trains crossing the crossover would be 6 to 7 VdB in excess of the FTA criterion, resulting in potentially significant vibration impacts at six residences on Alicante Terrace and four residences on Carrara Terrace.

[66] Wilson, Ihrig & Associates, Inc., *BART-Hayward Maintenance Complex Noise and Vibration Technical Report*, November 22, 2010.

Table 17
Vibration Impacts from Train Movements – Phase 1

Location	Distance to Crossover (ft)	FTA Criterion	GBV from Crossover	Impact	Number of Buildings with Impact
11th Street between Stone Street and Boyle Street	200	72	62	LTS	0
11th Street and Boyle Street	150	72	68	LTS	0
La Brea Terrace	170	72	65	LTS	0
Alicante Terrace	85	72	79	PS	6
Carrara Terrace	90	72	78	PS	4
Messina Terrace	---	72	---	LTS	0
La Bonita Terrace	---	72	---	LTS	0

Source: Wilson, Ihrig & Associates, Inc., 2010.

Notes:

GBV: Groundborne Vibration

LTS = Less-than-Significant (No Impact as defined by FTA).

PS = Potentially Significant (Moderate or Severe Impact as defined by FTA).

Phase 2. As presented in Table 18, vibration levels associated with trains crossing the crossover would be 8 to 12 VdB in excess of the FTA criterion, resulting in potentially significant vibration impacts at eight single-family homes at La Bonita Terrace and seven at Carrara Terrace. Mitigation measures are recommended to reduce these impacts to less than significant. In addition, vibration impacts are expected at receptors located within 130 feet from turnout P100B. The overall vibration criterion would be exceeded by up to 4 VdB at nine single-family residences on La Brea Terrace. Vibration mitigation measures for crossover P100B would be required to reduce the level of impact to less than significant.

Vibration levels from BART train operation on crossovers P103 and 104 would be below the FTA criterion and, thus, no vibration mitigation measures would be necessary. Lower vibration levels from these crossovers are due to the distance to and from residences, and the slower train operational speed on the dispatch track.

With respect to future activities from BART trains within the existing Hayward Yard and the additional storage tracks on the east side of the Hayward Yard, train movements are expected to occur at a lower speed, and the vibration levels adjusted for these reduced speeds would be below the FTA criterion. Therefore, vibration impacts for activities proposed at the east storage yard would be less than significant.

Table 18
Vibration Impacts from Train Movements – Phase 2

Location	Distance to Crossover (ft)	FTA Criterion	GBV from Crossover	Impact	Number of Buildings with Impact
11th Street between Stone Street and Boyle Street	---	72	---	LTS	0
11th Street and Boyle Street	---	72	---	LTS	0
La Brea Terrace	100	72	76	PS	9
Alicante Terrace	220	72	59	LTS	0
Carrara Terrace	80	72	80	PS	7
Messina Terrace	120	70	70	LTS	0
La Bonita Terrace	60	72	84	PS	8

Source: Wilson, Ihrig & Associates, Inc., 2010.

Notes:

GBV: Groundborne Vibration

LTS = Less-than-Significant (No Impact as defined by FTA).

PS = Potentially Significant (Moderate or Severe Impact as defined by FTA).

Construction Vibration. Construction activities can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance.

Table 19 shows the equipment assumed for this analysis. Vibration reference levels are presented in terms of the peak-particle velocity (PPV) and their approximate vibration level (i.e., in VdB), at a reference distance of 25 feet. The table only shows the equipment expected to have the greatest impacts.

Two types of potential construction-induced vibration effects were evaluated: annoyance and building damage. The criterion used in assessing annoyance is contained in the FTA guidance manual and presented earlier in Table 8 and Table 9. The criteria relating to potential cosmetic damage (i.e., cracking) due to building vibration is 0.3 in/sec PPV based on the FTA guidelines.

Table 19
Typical Construction Equipment Vibration Levels

Equipment	PPV at 25 feet (in/sec)	Approximate Vibration Velocity Level at 25 feet, VdB
Pile Driver (sonic)	0.730	105
Vibratory Roller	0.200	94
Hoe Ram	0.089	87
Large Bulldozer	0.090	87
Caisson Drilling	0.089	87
Jack Hammer	0.035	79

Source: FTA Transit and Vibration Impact Assessment, May 2006; Wilson, Ihrig & Associates, Inc., 2010.

Table 20 and Table 21 show the expected vibration levels from construction activities using heavy equipment during Phase 1 and Phase 2, respectively. Annoyance from construction activities would likely occur at 41 sensitive receptors in the vicinity of the project that are located within 100 feet of any heavy equipment. Specifically, vibration annoyance would be expected during installation of crossover P100 and P102 at 26 residences on La Brea Terrace, Alicante Terrace, and Carrara Terrace during Phase 1. During Phase 2, vibration annoyance would be expected to occur during installation of crossovers P100B, P101, P103, and P104 at 32 residences on Carrara Terrace, Messina Terrace, and La Bonita Terrace.

The use of heavy equipment during construction would generate peak velocity levels that would be well below the threshold of cosmetic damage. Consequently, construction of the project would result in no vibration impact from equipment or activities that would potentially cause building damage.

Table 20
Projected Construction Vibration Impacts from Heavy Equipment – Phase 1

		Vibration Criteria		Projected Maximum Vibration during Heavy Equipment Construction				
				Bldg Damage			Annoyance	
Location	Distance (feet)	Building Damage (in/sec)	Annoyance VdB, re: 1 micro-in/sec	PPV (in/sec)	Impact Type	# of Imp.	Vibration Level, VdB	Exceed Criterion
11th Street between D Street and Stone Street	500	0.3	80	< 0.01	LTS	0	58	No
11th Street between Stone Street and Boyle Street	400	0.3	80	< 0.01	LTS	0	61	No
11th Street and Boyle Street	150	0.3	80	< 0.01	LTS	0	74	No
La Brea Terrace	170 – 550	0.3	80	< 0.03	LTS	0	57 – 72	Yes
Alicante Terrace	85 – 550	0.3	80	< 0.03	LTS	0	57 – 81	Yes
Carrara Terrace	85 – 500	0.3	80	< 0.03	LTS	0	58 – 81	Yes
Messina Terrace	120 – 250	0.3	80	< 0.02	LTS	0	67 – 77	No
La Bonita Terrace	150 – 350	0.3	80	< 0.01	LTS	0	63 – 74	No
Ithaca Street between Whipple Road and Carroll Avenue	540 – 660	0.3	80	< 0.01	LTS	0	55 – 57	No
Carroll Avenue between Troy Place and Gresel Street	540 – 660	0.3	80	< 0.01	LTS	0	56 – 57	No
Carroll Avenue between Gresel Street and Becker Place	540 – 660	0.3	80	< 0.01	LTS	0	55 – 57	No
Carroll Avenue between Becker Place and Fairway Street	660	0.3	80	< 0.01	LTS	0	54	No
Carroll Avenue north of Fairway Street	660	0.3	80	< 0.01	LTS	0	45	No

Source: Wilson, Ihrig & Associates, Inc., 2010.

LTS = Less than Significant (No Impact as defined by FTA).

Table 21
Projected Construction Vibration Impacts from Heavy Equipment – Phase 2

		Vibration Criteria		Projected Maximum Vibration during Heavy Equipment Construction				
				Bldg Damage			Annoyance	
Location	Distance (feet)	Building Damage (in/sec)	Annoyance VdB, re: 1 micro-in/sec	PPV (in/sec)	Impact Type	# of Imp.	Vibration Level, VdB	Exceed Criterion
11th Street between D Street and Stone Street	500	0.3	80	< 0.02	LTS	0	58	No
11th Street between Stone Street and Boyle Street	320	0.3	80	< 0.02	LTS	0	64	No
11th Street and Boyle Street	350 – 500	0.3	80	< 0.02	LTS	0	58 – 63	No
La Brea Terrace	75 – 250	0.3	80	< 0.04	LTS	0	65 – 83	Yes
Alicante Terrace	180 – 300	0.3	80	< 0.01	LTS	0	65 – 71	No
Carrara Terrace	80 – 300	0.3	80	< 0.03	LTS	0	65 – 82	Yes
Messina Terrace	60 – 300	0.3	80	0.01 – 0.05	LTS	0	67 – 86	Yes
La Bonita Terrace	60 – 250	0.3	80	0.01 - 0.05	LTS	0	67 – 86	Yes
Ithaca Street between Whipple Road and Carroll Avenue	150 – 400	0.3	80	< 0.01	LTS	0	61 – 74	No
Carroll Avenue between Troy Place and Gresel Street	150 – 350	0.3	80	< 0.01	LTS	0	63 – 74	No
Carroll Avenue between Gresel Street and Becker Place	200 – 300	0.3	80	< 0.01	LTS	0	65 – 70	No
Carroll Avenue between Becker Place and Fairway Street	150 – 400	0.3	80	< 0.01	LTS	0	61 – 74	No
Carroll Avenue north of Fairway Street	150 – 350	0.3	80	< 0.01	LTS	0	63 – 74	No

Source: Wilson, Ihrig & Associates, Inc., 2010.

LTS = Less than Significant (No Impact as defined by FTA).

MITIGATION MEASURES. The following measures would reduce the vibration effects of the proposed project to less than significant.

NO-4 *Vibration Reducing Technology*. BART shall incorporate vibration mitigation measures such as tire-derived aggregate (TDA) or floating slab track (FST) under the track, or other technology that may be developed to attain the FTA groundborne vibration operational criterion of 72 VdB. The general location of the mitigation measures under the track is presented in Table 22. However, the actual extent of the mitigation control would be determined during final design.

Table 22
Vibration Mitigation

Crossover #	Mitigation Required for Phase 1	Mitigation Required for Phase 2
P100B	No	Yes[1]
P100	No	No
P101	No	Yes [1]
P102	Yes[1]	No
P103	No	No
P104	No	No

Source: WIA 2010

Notes:

1. Mitigation extent will be determined during final design.

NO-5 *Construction Vibration Best Management Practices*. Where potential construction vibration impacts have been identified, the contractor shall be required to select equipment and methods that would reduce potential annoyance to nearby residents. Such practices include, but are not limited to, the following measures:

- Comply with a Performance Standard of 0.3 in/sec PPV at any building at any time.
- Minimize vibration annoyance by maintaining vibration levels at 80 VdB or less at any building at any time.
- Prior to construction, BART shall prepare a Vibration Control and Monitoring Report, in which the contractor indicates what vibration levels they expect to generate, vibration control measures they intend to implement, and how they intend to monitor and document construction vibration and complaints.
- Avoid the use of impact pile drivers, and use instead sonic or vibratory impact drivers. It is also encouraged that "quiet" or "silent" piling technologies be used, if feasible.
- When nighttime or 24-hour construction is necessary, coordinate with residents to ensure that the affected residents are fully informed about the upcoming

construction. Residents will be given the option of sleeping in hotel rooms at BART expense for the duration of the nighttime construction in areas where construction is expected to exceed the FTA criterion. Residents that work nights and sleep days in locations where construction vibration is expected to exceed the FTA criterion will be given the same option.

- Monitor vibration during construction to ensure compliance with the criterion for building damage for buildings within 40 feet from construction activities. Conduct a pre-construction crack survey at these structures.
- Plan routes for hauling material out of the project site that would cause the least impact (annoyance).
- Restrict high amplitude vibration methods such as vibratory pile driving and soil compaction using large truck-mounted compactors to areas beyond 50 feet and 20 feet, respectively, of residential structures or wood-framed buildings. Otherwise, temporary accommodations away from construction shall be coordinated between BART and the residents.

e, f. **No Impact.** The project area is not located within two miles of a public airport, private airstrip, or airport land use plan. Thus, there would be no impact from air traffic noise.

13. POPULATION AND HOUSING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	❑	❑	❑	■
b. Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere?	❑	❑	❑	■
c. Displace a substantial number of people, necessitating the construction of replacement housing elsewhere?	❑	❑	❑	■

Discussion

a. **No Impact.** The proposed project under both Phase 1 and 2 would not include the construction of residential units, and thus would not directly induce population growth. The proposed project would expand the existing BART storage yard so that additional maintenance and storage track facilities could accommodate more BART vehicles. Phase 1 and 2 of the proposed project would require 350 employees for operation (see Table 1 above). It is estimated that of those, 135 employees would be existing employees at the Hayward Yard that would be relocated to the new west side expansion area, and 215 employees would be new employees to the site. Approximately 85 of the new employees at the Hayward Yard would be

existing BART employees from other BART maintenance yards that would be relocated to the site. According to ABAG 2009 Projections, the cities of Hayward and Union City project an increase of 1,190 and 1,940 employees, respectively, between the years 2010 and 2015.[67] The increase in employment in the area of 215 new employees anticipated under the proposed project represent approximately 7 percent of the anticipated employment growth in the area. This projected increase in employment at the maintenance complex would not create a substantial direct or indirect demand for housing in the project vicinity or region. This negligible increase in employment would be accommodated by the existing housing supply in the project vicinity or within the region. Therefore, the proposed project would not directly or indirectly induce population growth.

b, c. **No Impact.** The west side expansion area would redevelop an existing industrial site with maintenance and warehouse uses. The proposed train storage yard would include additional train tracks on a site that is undeveloped. The project would not remove any existing housing units and therefore would not displace existing housing units or people. As a result, the proposed project would have no impact on displacing housing or people.

14. PUBLIC SERVICES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a 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 following public services:				
a. Fire protection?	❑	❑	■	❑
b. Police protection?	❑	❑	■	❑
c. Schools?	❑	❑	❑	■
d. Parks?	❑	❑	❑	■
e. Other public facilities?	❑	❑	❑	■

Discussion

a. **Less Than Significant.** The project site and trackwork area south of Whipple Road is served by the Hayward and Union City fire departments for fire protection and emergency medical services. Hayward Fire Department Station 3 at 31982 Medinah Street is the closest fire station to the Hayward portion of the site and would provide first response emergency services. Union City Fire Department Station 1 at 33555 Central Avenue is the closest fire station to the Union City portion of the site. In 2008 there was a fire in the Hayward Yard. The fire

[67] ABAG, Projections and Priorities, 2009.

occurred during a period when there were multiple construction projects in the yard. There was an electric short in the high voltage power system that burned cables and damaged the yard's traction power and communication systems. As a result, BART has strengthened its construction safety procedures and project coordination. Although the proposed project would increase the footprint of the Hayward Yard, it would also provide an upgrade to some of BART's electrical systems. Therefore, the impact to fire protection from expansion of the Hayward Yard would be less than significant.

b. **Less Than Significant.** Common police-related offenses that may occur in connection with the proposed project are vandalism and criminal trespass. BART has its own police department to investigate crimes and provide law enforcement on BART properties, such as the Hayward Yard. Local police departments respond to calls in surrounding areas and occasionally support BART Police by responding to calls on BART property. The local police departments that would be affected by the proposed project are the Hayward Police Department and the Union City Police Department. Historically, local police forces have seen a relatively low increase in demand for police services with regard to BART projects.[68] Therefore, the proposed project would have a less-than-significant impact on the local police departments.

c-e. **No Impact.** As described above under Section 13, Population and Housing, the proposed project would not substantially increase the number of residents, since the project would not include residential units. There may be an indirect growth in residents associated with the 215 new jobs at the site; however, only a portion of those employees would live in the surrounding area. Because the demand for schools, park services, and other public facilities is driven by population, the proposed project would not substantially increase demand for those services. As a result, the proposed project would result in no impact to these services.

15. RECREATION

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	❑	❑	❑	■

Discussion

a, b. **No Impact.** Because the proposed project would not substantially increase population directly or indirectly, the proposed project would not generate a substantial demand for recreational

[68] San Francisco Bay Area Rapid Transit District, *BART to Livermore Extension Draft Program EIR*, November 2009, page 3.13-14.

facilities. Thus, the proposed project would not affect use of existing facilities, nor would it require the construction or expansion of existing recreational facilities. Therefore, the proposed project would have no impact on recreational facilities.

16. TRANSPORTATION/TRAFFIC

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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 intersection, streets, highway 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 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 because of 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 policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	❑	❑	❑	■

Background

Major highways in the vicinity of Hayward and Union City include Interstate 880, approximately 1.5 miles west of the project site, and State Route 238, approximately one-half mile to the east. Within the project area, Industrial Parkway to the north and Whipple Road to the south are the major arterial roadways. In December 2009, Industrial Parkway had a daily traffic volume of approximately 28,500 vehicles in the vicinity of the proposed project. In August 2007, Whipple Road had a daily traffic volume of approximately 39,600 vehicles in the vicinity of the proposed project.

The 116-acre project site (includes the 88-acre existing Hayward Yard and 28-acre west side expansion) is in the City of Hayward just north of Whipple Avenue and south of Industrial Parkway. The existing project site includes four industrial buildings totaling 446,400 square feet of industrial

uses. Of this total, approximately 132,000 square feet (or 30 percent) is vacant as of October 2010.[69] These buildings house industrial uses including a mix of service and warehouse facility activities. The City of Hayward designates this area as "Industrial Corridor".[70]

Existing vehicle access to the Hayward Yard is from two access roads. Vehicle access to the main shop and the yard west of the mainline tracks is from Sandoval Way just south of Industrial Parkway. Access to the yard east of the mainline is from a BART access road, north of Whipple Avenue. The west side expansion area is currently fenced off from the Hayward Yard and there is no vehicular or pedestrian access between the two. Vehicular access to the west side expansion area is through a private driveway, north of Whipple Avenue and west of the BART mainline.

Based on 24-hour passenger vehicle and truck counts collected on a typical weekday (Thursday, October 7, 2010), there were 710 daily vehicle trips accessing the warehouses in the west side expansion area. During the AM peak hour (8:00 a.m. to 9:00 a.m.), there were 62 vehicles utilizing the west side expansion area driveway (44 entering and 18 exiting) north of Whipple Road. During the PM peak hour (4:00 p.m. to 5:00 p.m.), there were 51 vehicles utilizing the west side expansion area driveway (7 entering and 44 exiting). The peak vehicle activity occurred during the midday between 11:00 a.m. and 12:00 p.m. with 66 vehicles entering/exiting the warehouse area. Based on the total number of vehicles counted during the 24-hour period, approximately 52 percent were passenger vehicles, 16 were delivery/mail trucks, and the remaining 32 percent were trucks with two or more axles and six or more tires.

At the Sandoval Way entrance, there were 726 daily vehicle trips accessing the main shop and the yard west of the mainline tracks. During the AM peak hour (8:00 a.m. to 9:00 a.m.), 22 vehicles were counted at the Sandoval Way entrance (17 entering and 5 exiting). During the PM peak hour (4:00 p.m. to 5:00 p.m.), 66 vehicles were counted at this location (12 entering and 54 exiting). The peak vehicle activity at this location occurred during the afternoon between 3:00 p.m. and 4:00 p.m. with 84 vehicles entering/exiting the driveway. Based on the total number of vehicles counted during the 24-hour period, approximately 62 percent of all vehicles were passenger vehicles, 24 percent were delivery/mail trucks, and the remaining 14 percent were trucks with two or more axles and six or more tires.

Discussion

a. **Less than Significant with Mitigation.** The proposed project's land use activities would consist of activities similar to those at the existing Hayward Yard. As such, a daily vehicle trip generation rate for the existing uses was calculated using the total number of existing BART employees employed at the site and the 24-hour vehicle counts. This trip generation rate was then used to determine the future vehicles trips that would be generated by the proposed project. Proposed project employee information was provided by BART (see Table 1 in the

[69] Based on information provided by real estate brokers Colliers International, Oakland.

[70] City of Hayward, *City of Hayward General Plan*, Appendix C: Land Use Map.

Project Description).[71] The percentage of vehicle trips generated during the AM and PM peak hours were also based on the existing vehicle counts.

As part of the proposed project, a new BART programmed station stop at the Hayward Yard would be provided for Hayward Yard employees. BART proposes that stops at this location coincide with employee shifts. Based on information from BART, there would be five stops in the morning and five stops in the evening and about 20 percent of the BART Yard employees would be expected to use the programmed station stop. Table 23 below presents the weekday daily and peak hour vehicle trip generation under the proposed project.

Table 23
Vehicle Trip Generation

	Number of Employees[1]	Daily Vehicle Trip Rate	Daily Vehicle-Trips	AM Peak Hour - % of Daily	AM Peak Hour Trips[2]	PM Peak Hour - % of Daily	PM Peak Hour Trips[2]
Existing Facilities[3]							
BART Hayward Yard	280	2.6/employee	726	6.6%	48	3.3%	24
Warehouse Facilities	--	--	710	6.5%	46	5.2%	37
Total	--	--	*1,436*	--	*94*	--	*61*
Proposed Project							
BART Hayward Yard	280	2.6/employee	726	6.6%	48	3.3%	24
BART Hayward Maintenance Complex	215	2.6/employee	559	6.6%	37	3.3%	18
20% Reduction w/ new BART Programmed Station Stop[4]	--	--	-163	6.6%	-11	3.3%	-5
Total	*495*	--	*1,122*	--	*74*	--	*37*
Net Change in Vehicle Trips[5]			**-314**		**-20**		**-24**

Source: PBS&J, 2010.

Notes:

1. The number of employees at existing and future BART facilities was supplied by BART; employee information for existing warehouse facilities is not available.
2. Based on existing count data, 73% of vehicles enter and 27% exit during the AM peak hour and 16% of vehicles enter and 84% exit during the PM peak hour.
3. 24-hour traffic counts conducted in October 2010 at existing facilities were used to establish the employee vehicle trip rate and the AM and PM peak hour vehicle trip factors.
4. This reduction was only applied to auto trips because trucks do not transport employees for home-to-work or work-to-home trips.
5. Net change in vehicle trips comparing the proposed project to vehicle trips for existing uses.

[71] The project description indicates the proposed project would have 350 total employees, of which 135 employees would be relocated from the existing Hayward Yard to the new facilities. Therefore, for transportation analysis purposes, a total of 215 future new employees was used in the trip generation assessment.

As shown in Table 23, the proposed project would result in a decrease in daily, AM, and PM peak hour traffic volumes, compared to existing trips. The proposed project would provide a vehicular connection within the project site to connect the existing Hayward Yard to the west side expansion area. This internal connection would result in a redistribution of the trips accessing the site. In order to understand circulation patterns and potential circulation impacts from the proposed project, a vehicle trip distribution analysis was conducted based on current BART employee residential data.

Based on the residential zip code information for existing BART employees at the Hayward facility, approximately 27 percent of employees reside south of the project site and would be expected to access the project site via Whipple Road. Approximately 73 percent of employees reside north of the project site and would be expected to access the project site via Sandoval Way. Figure 15 illustrates the project trip distribution to/from the project site.

By applying the employee trip distribution to the proposed project vehicle trips, approximately 54 vehicles (39 enter/15 exit) would access the site via Sandoval Way in the AM peak hour, which represents an increase of approximately 44 percent over existing conditions. During the PM peak hour, approximately 28 vehicles (4 enter/24 exit) would access the site via Sandoval Way, which represents a decrease of approximately 47 percent over existing conditions. These vehicles would travel through the nearby intersections of Huntwood Avenue/Sandoval Way and Industrial Parkway/Huntwood Avenue, which currently operate at LOS F and D, respectively, during the AM peak hour, and LOS D and F, respectively, during the PM peak hour.[72] When added to and subtracted from the corresponding movements at these intersections, the additional trips or decrease in trips generated by the proposed project would not cause an intersection to operate at LOS F or cause an increase in delay per vehicle of four seconds or more at an intersection already operating at LOS F.[73] As such, the proposed project would have a less-than-significant impact on traffic operations at the two intersections that would be affected by increased vehicle trips accessing the project site via Sandoval Way.

Approximately 20 vehicles (15 enter/5 exit) would access the site via Whipple Road during the AM peak hour, and 10 vehicles (2 enter/8 exit) would access the site via Whipple Road during the PM peak hour. With the proposed onsite connection of the Hayward Yard with the west side expansion area and the employee trip distribution favoring the Sandoval Way entrance, the number of vehicle trips accessing the site via Whipple Road would be less than under existing conditions; therefore, traffic impacts at this location would be less than significant.

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72 City of Hayward, *RSTP 2009 Grant – Synchro analysis* (see Appendix B).

73 Based on the City of Hayward's significance standards, an impact would occur if a project causes an intersection to operate at LOS F or causes an increase in delay per vehicle of four seconds or more at an intersection already operating at LOS F.

FIGURE **15**

Project Trip Distribution

Source: PBS&J, 2010.

Construction. As described in the Project Description, most construction activities would take place on the project site in two phases. Phase 1 is anticipated to be completed in approximately 36 months and includes the Vehicle Level Overhaul Shop, Component Repair Shop, Central Warehouse, M&E Vehicle and Storage Area, Vehicle Inspection Area, and connecting tracks for new activities on the west side of the yard. Phase 2 is anticipated to be completed in approximately 21 months and includes the east side storage tracks, flyovers, and connecting tracks for the east side of the yard.

Phase 1 construction activities would generate approximately 3,110 construction truck trips to support demolition of existing structures, delivery of building materials and concrete, and retrofitting of three existing warehouse structures. Primary access would be from Whipple Road connecting to/from Interstate 880 to the west and State Route 238 to the east. South of Whipple Road, a minimum of 100 truck trips are estimated for the construction of the mainline crossovers. Primary access to this site would be from the yard area north of Whipple Road (both east and west of the mainline tracks including the test track). The M&E storage area north of Whipple Road could be used as a staging area with equipment shuttling back and forth between the staging area and the work area south of Whipple Road. If necessary, alternative access could be provided via three other locations: the industrial property along the west side of the mainline tracks just south of Whipple Road; the Dry Creek service road on the north side of Dry Creek that leads to a gate adjacent to the BART test track; or from F Street which crosses under the BART tracks approximately 0.7 miles south of Whipple Road (provides direct street access to the BART right-of-way along the west side of the mainline tracks).

Phase 2 construction activities would generate approximately 7,600 construction truck trips (estimated 105 daily truck trips) to support construction of storage tracks over a peak three-month construction period. Primary access would be from Whipple Road connecting to/from Interstate 880 to the west and State Route 238 to the east. For construction activities south of Whipple Road, a minimum of 100 truck trips are estimated to haul away removed material and bring in new material for the construction of test track crossovers and switches. Although most of the equipment and material could be supplied to the mainline crossover locations via the test track and stored at locations between the test track and the mainline, equipment may be too large to fit under the Whipple Road bridge and would need another point of access. Similar to Phase 1, alternative access could be provided via three other locations: industrial property along the west side of the mainline tracks just south of Whipple Road, the service road adjacent to Dry Creek, or from F Street to the south.

Other construction impacts would result from the movement of construction equipment and construction workers' vehicles on and off the project site. Traffic construction effects around the project site and the track work area south of Whipple Road would be a temporary situation, but it would be a daily occurrence during certain portions of the construction period. It is likely that construction equipment would be transported to the site and be stored on site. Since equipment would primarily remain on site, it would be unlikely to interfere with traffic.

Whipple Road currently handles approximately 23,900 vehicles per day between Amaral Street and Railroad Avenue. Between Railroad Avenue and Mission Boulevard, the average daily vehicle trips drops to approximately 10,300. While the precise traffic volumes on Whipple Road at the project site driveway is unknown, it is expected to be closer to the 10,300 documented for the segment between Railroad Avenue and Mission Boulevard because much of the traffic exits from/enters onto Whipple Road at Central Avenue, which is west of the project site driveway.[74] Assuming approximately 100 to 105 daily truck trips are temporarily generated under each phase and a passenger car equivalent (PCE) rate of 2.0,[75] there would be a minimum of 200 to 210 vehicle trips during peak construction activity. The existing warehouse facilities generate approximately 710 daily vehicle trips with up to 32 percent (about 225 truck trips) being 2-axle trucks with 6 tires or larger and travel on Whipple Road to the project site. Therefore, the proposed project's construction-related truck traffic is likely to be less than the existing warehouse truck activity. However, the daily scheduling of truck trips is unknown at this time. Whether the peak construction activity would occur during the AM and PM peak hours or be continuous throughout the course of the day can affect existing roadway facilities. Since project-specific daily construction truck activity is undetermined at this time, construction-related traffic impacts could be potentially significant.

MITIGATION MEASURE. The following measure would reduce construction-related traffic impacts to less than significant.

TR-1 *Construction Phasing and Traffic Management Plan.* BART will ensure that a Construction Phasing and Traffic Management Plan is developed and implemented by the contractor. The plan shall define how traffic operations, including construction equipment and worker traffic, are managed and maintained during each phase of construction. The plan shall be developed in consultation with the cities of Union City and Hayward, BART, and Union City Transit Bus Lines. To the maximum practical extent, the plan shall include the following measures:

d) Specify predetermined haul routes from staging areas to construction sites and disposal areas by agreement with the cities of Union City and Hayward prior to construction. The routes shall follow streets and highways that provide the safest route and avoid congested intersections to the extent feasible.

e) Identify construction activities that, due to concerns regarding traffic safety or congestion, must take place during off-peak hours.

f) Identify a telephone number that the public can call for information on construction scheduling, phasing, and duration, as well as for complaints. Such information shall also be posted on BART's website.

[74] City of Union City, 2008 traffic counts.

[75] Assumes 2.0 passenger vehicles are equivalent to one truck trip.

b. **Less than Significant.** A traffic analysis was performed to quantify the proposed project's net change in traffic volumes and the potential traffic impacts on the regional roadways or highways under the Alameda County Congestion Management Agency (ACCMA).

As stated previously, the proposed project would result in a reduction in the number of vehicle trips traveling to and from the project site. This includes a reduction in existing vehicles traveling on major highways and regional roadways within the study area. Therefore, operation-related traffic impacts to regional roadways or highways under ACCMA would be less than significant.

Potential construction impacts are temporary and would not significantly affect regional roadways or highways for more than the proposed 36-month construction period of Phase 1 or the 21-month construction period of Phase 2. Therefore construction-related traffic impacts to regional roadways or highways under ACCMA would be less than significant.

c. **No Impact.** The nearest airport (Hayward Executive Airport) is located approximately six miles from the project site. The proposed project would include low-rise structures approximately one-story high that would not interfere with air traffic patterns. As a result, there would be no impact on air safety.

d. **Less than Significant with Mitigation.** To determine if any significant queuing could occur from the existing driveway at the west side expansion area onto Whipple Road and affect the crossing at the existing UPRR track (approximately 150 feet west of the driveway), queuing and safety observations were conducted at the intersection of the west side expansion area driveway and Whipple Road.

Based on observations, the westbound spillback at the intersection occurs as a result of vehicles queuing from Central Avenue during the AM peak hour (the first intersection to the west from the west side expansion area driveway). Southbound left-turning vehicles and eastbound left-turning vehicles at the intersection must wait until a driver allows them to enter the traffic stream along Whipple Road due to the lack of any adequate gaps in the through east/west traffic flow. Eastbound spillback at the intersection also occurs as a result of the Railroad Avenue/at-grade train crossing (UPRR/Amtrak)/Ithaca Street intersection (east of the west side expansion area driveway) during the AM peak hour. One train was observed during the AM peak hour and was the primary cause of the observed spillback queuing. No trains were observed at the nearby (150 feet to the west) at-grade crossing during the AM peak hour and there was a low volume (approximately 18 vehicles) of eastbound vehicles/trucks turning left in to the west side expansion area driveway. No queues were observed that extended to the at-grade railroad crossing at any time during the AM peak hour.

In terms of sight distance safety hazards, there is an existing safety issue for southbound vehicles turning right from the west side expansion area driveway to go westbound onto Whipple Road. The wide configuration of the roadway allows drivers turning right on Whipple Road to approach Whipple Road at an angle where they are looking back over their left shoulder rather than having a more direct view of traffic approaching from the left. The

situation is exacerbated by the presence of tall shrubbery growing over the fence that borders the eastern side of the driveway, which may obscure oncoming traffic.The sight distance safety hazards could be mitigated by narrowing the mouth of the intersection so that vehicles approach Whipple Road at a more perpendicular angle and by removing some of the existing vegetation/shrubbery at the intersection that screens view of oncoming traffic from the east.

The existing UPRR crossing to the west of the west side expansion area driveway is inadequately striped, the crossing arms may need to be relocated further away from the crossing, and signage/lane markings should be upgraded. Improvements at this crossing location should be made by UPRR and the California Public Utility Commission (CPUC). The Capitol Corridor has prepared a Program Environmental Assessment (EA) and a related grant application with the Federal Railroad Administration in the railroad corridors adjacent to the project site. The new EA is consistent with the Union City Intermodal Final Environmental Impact Report and Dumbarton Rail Project plans which have proposed some significant service changes to the UPRR rail corridor along the west side of the HMC project site. Improvements related to the Whipple Road grade crossing are included and evaluated as part of the EA.

Since the proposed project may need reconfiguration at the intersection of Whipple Road to mitigate sight distance safety hazards, project design impacts could be potentially significant.

MITIGATION MEASURE. The following measure would reduce sight distance safety impacts to less than significant.

TR-2 *Reconfiguration of Southbound Approach of the West Side Expansion Area Driveway*. BART will reconfigure the approach to Whipple Road for the west side expansion area driveway by narrowing the mouth of the intersection and channeling southbound traffic to approach Whipple Road at a more perpendicular angle. In addition, shrubbery/vegetation that impedes vehicle line of sight to the east will be removed.

e. **No Impact.** The proposed project would use existing driveways for access to the site through Sandoval Way and from Whipple Road into the west side expansion area. These driveways currently provide fire and emergency access to the existing structures and would continue to meet all applicable regulations and requirements for fire and emergency access under future conditions. The proposed project would also include a new access road for the east side storage tracks that would extend north from Whipple Road to the expansion area and along the east perimeter of the expansion area to its northern boundary. The 20-foot-wide, two-lane, paved road would provide both BART access and fire and emergency access to the proposed east side expansion area. The design of this access road would meet all applicable regulations and requirements for such an access. The proposed project would result in no impacts to emergency access to the site.

f. **No Impact.** Both the City of Hayward and the City of Union City include policies in their general plans that are supportive of non-motorized (pedestrian and bicycle) and public transportation. Specific policies include planning methods that promote transportation alternatives to automobiles and place high density and commercial development near inter-

modal transit facilities, to provide for mass public transit systems such as buses and trains, and to provide safe bicycle access and facilities. Although the specific policies are not relevant to the proposed project, the project would enhance BART's maintenance capabilities, which would support public transportation in the cities of Hayward and Union City and throughout the BART District. The proposed project would not conflict with any bus service, bicycle paths, or pedestrian paths in the area. For these reasons, there would be no impact to alternative transportation modes.

17. UTILITIES AND SERVICE SYSTEMS

Would the project:	Significant or Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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 stormwater 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 would new or expanded entitlements be needed?	❑	❑	■	❑
e. Result in a determination by the wastewater treatment provider that 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?	❑	❑	■	❑

Discussion

a. Less than Significant. Wastewater collection and treatment for the existing Hayward Yard is provided by the City of Hayward. The City's wastewater treatment plant treats dry weather flow of 11.9 million gallons per day (mgd) and has a capacity of 16.5 mgd. For the west side expansion area, wastewater collection and treatment is provided by the Union Sanitary District, which serves the cities of Fremont, Newark, and Union City. Wastewater treatment for the Union Sanitary District is provided by the Alvarado Wastewater Treatment Plant. The Alvarado Wastewater Treatment plant has a permitted capacity of 30 mgd, and in 2009 had an

average dry weather flow of 24.49 mgd.[76] The City of Hayward and Union Sanitary District are part of the East Bay Dischargers Authority (EBDA), which is a Joint Powers Agency consisting of five local agencies. The effluent from both the City of Hayward wastewater treatment plant and the Alvarado Wastewater Treatment Plant are pumped to the EBDA's "super sewer" for final disposal in the deeper waters of the San Francisco Bay west of San Leandro. The combined effluent meets all the requirements of the EBDA's NPDES permit.

BART provides industrial waste drainage at certain locations around the existing Hayward Yard, where certain activities require it, such as train washing and the blow down pit. These industrial waste drainage units are not directly connected to the sanitary sewer system. In some cases (like the train wash facility), after the wash water has gone through on-site treatment (and most recycled), some of it may be released to the sanitary sewer system. Proposed uses in the Hayward Maintenance Complex that require industrial waste drainage would have on-site pre-treatment or collection. The four warehouses to be acquired have existing sanitary sewer hookups, which would continue to be employed by BART. The project would result in a slight increase in the demand for wastewater treatment associated with routine maintenance activities and to support the on-site staff (see Item b, below, regarding increased water usage), but would not exceed the wastewater treatment requirements of the San Francisco RWQCB. As described above, the wastewater treatment plants that service the project site have existing system capacity to accommodate future growth within the service areas. Therefore, any increase in the demand for wastewater treatment associated with the project would be within the available capacity.

Please refer to Items 9a and 9f under the Hydrology and Water Quality section of this checklist for a discussion of issues related to waste discharge requirements. BART would adhere to the Municipal Regional Stormwater NPDES Permit (MRP), adopted in October 2009 ([MRP], Order No. R2-2009-0074), statewide NPDES General Permit for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities (SWRCB Order No. 97-03-DWQ, NPDES No. CAS000001 [Industrial General Permit]), and the statewide NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002 [Construction General Permit]), adopted September 2, 2009. All of these permits set forth water quality parameters and requirements that protect water quality.

Furthermore, BART Facility Standards Section 01 57 00 (Temporary Controls, 1.08 - Erosion and Sediment Control, 1.09 - Dust Control, and 1.10 - Mud Control)) and Section 31 00 00 (Earthwork, 1.11 - Site Conditions and 3.03 - Earthwork General Requirements) includes requirements for erosion and sediment controls from construction operations, including an Erosion and Sediment Control Plan, and Section 01 57 00 (Temporary Controls, 1.07 – Pollution Abatement) requires BMPs to minimize pollution potential. Where natural drainage ways are intercepted by construction activities, BART Facility Standards require that such drainage ways shall be protected so that runoff from the site or water from construction activities is not allowed to enter the natural drainage way (Section 01 57 00 Temporary

[76] Union Sanitary District, http://www.unionsanitary.com/mission.htm, accessed October 14, 2010.

Controls, 1.08.C.-Prevention of Erosion). Section 01 71 13 (Mobilization, 1.09 – Demobilization) and Section 31 11 00 (Clearing and Grubbing, 1.06 - Jobsite Conditions) require restoration of the construction area after completion of construction activities. BART Facility Standards Section 32 84 00 (Planting Irrigation) and Section 32 90 00 (Planting) ensures adequate establishment of permanent vegetative cover to protect surfaces from erosion. As such, the proposed project would not exceed wastewater treatment requirements of the San Francisco RWQCB, and potential wastewater impacts would be less than significant.

b, d, e. Less than Significant. The existing BART Hayward Yard consumes water for the routine maintenance activities and to support the on-site staff. For train cleaning, BART typically uses approximately 80 gallons of water per BART car per day twice a week. BART Facility Standards require that approximately 60 percent of the water be recycled. Given the proposed addition of a maximum of 250 vehicles, it is conservatively estimated that approximately 20,000 gallons of water per day twice a week would be required for exterior car washing, assuming no recycling (or 2,080,000 gallons per year). Train washing water usage would be reduced to 8,000 gallons twice per week or 832,000 gallons per year with the implementation of the 60 percent water recycling requirement. This is equivalent to the amount of water consumed by approximately two average households in California.[77] For this reason, water demand from the proposed project would be a less-than-significant impact.

Water usage in the four-building maintenance complex would be limited to showers, lavatory faucets, water closets, break room faucets, washdown, irrigation, and miscellaneous applications. It is estimated that the total additional water demand would be 10,142 gallons per day and the total average sanitary sewer load would be 8,621 gallons per day. It is important to note that these are conservative estimates given that the four buildings sited for the proposed maintenance complex are currently in use for industrial purposes and therefore have an existing water demand and wastewater discharge requirements associated with those uses. The City of Hayward has a water delivery capacity of 32 million gallons per day and an average demand of approximately 18.5 million gallons per day. The City operates its own Water Pollution Control Facility with a rated capacity of 16.5 million gallons per day and the average dry weather flow is between 13 and 14 million gallons per day.[78] There is ample capacity at the City's water supply and wastewater facilities to absorb the additional water demand and sanitary waste generated by the proposed project using existing infrastructure.

c. Less than Significant. BART would adhere to the Municipal Regional Stormwater NPDES Permit (MRP), adopted in October 2009 ([MRP], Order No. R2-2009-0074), statewide NPDES General Permit for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities (SWRCB Order No. 97-03-DWQ, NPDES No. CAS000001 [Industrial General Permit]), and the statewide NPDES General Permit for Storm Water

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[77] The average household in California consumes between one half acre foot (approximately 163,000 gallons) and one acre-foot of water a year (approximately 326,000 gallons).

[78] City of Hayward, *City of Hayward General Plan,* Public Utilities and Services, March 12, 2002, *http://www.hayward-ca.gov/about/generalplan/Chapter08-Public_Utilities_and_Services.pdf,* accessed August 16, 2010.

Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002 [Construction General Permit]), adopted September 2, 2009. In order to meet the NPDES requirements, the proposed project would require the construction of new onsite stormwater drainage facilities. However, the construction of these facilities would be completed as part of the proposed project and would be subject to the same BART Facilities Standards and mitigation measures presented in this document as other construction activities under the proposed project (see Item 9a, c, and e of this checklist). Therefore, the construction of these facilities would not cause significant environmental effects.

f, g. **Less than Significant.** Solid waste collected at the project site would be sent to the Davis Street Transfer Station in San Leandro. From there, it is transferred to the Vasco Road Sanitary Landfill in Livermore. This landfill has available capacity (currently at 70.1 percent of capacity) and is not expected to close until 2019.[79] For this reason, the proposed project would have a less-than-significant impact on solid waste generation, and the expansion of existing or construction of new solid waste facilities would not be necessary.

18. MANDATORY FINDINGS OF SIGNIFICANCE

Would the project:	Significant or Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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 that will cause substantial adverse effects on human beings, either directly or indirectly?	❑	■	❑	❑

Discussion

a. **Less than Significant with Mitigation Incorporated.** As described in Section 4, Biological Resources, the project site does not provide habitat for any fish or wildlife species, nor does it

[79] California Integrated Waste Management Board, *Active Landfills Profile for Vasco Road Sanitary Landfill (01-AA-0010)*, http://www.ciwmb.ca.gov/Profiles/Facility/Landfill/LFProfile1.asp?COID=1&FACID=01-AA-0010, accessed October 14, 2010.

support special-status plant types. However, there are nearby water features (an engineered channel and a low-lying area north of the project site) that include wetland attributes. Mitigation has been proposed to reduce potential impacts to these areas to less than significant. Section 5, Cultural Resources, describes the cultural resources that may be present on the project site. The project site may contain subsurface historical resources or unique archaeological resources. Mitigation has been proposed that would reduce potential impacts to these cultural resources to a less-than-significant level.

b. **Less than Significant.** The proposed project is surrounded by existing developed areas. The Whipple Road bridge, adjacent to the project site, is planned for retrofit by Union City. As noted in the project description, construction activities would be within the BART right-of-way, and BART is cooperating with Union City on the construction activities. However, the schedule for construction of the bridge retrofit project is anticipated to occur in early 2011 and to last for approximately 6 months,[80] and would be expected to be completed prior to the start of construction for the proposed project. Therefore, there would be no cumulative impacts associated with construction of the Whipple Road bridge and the proposed project.

Also, there are proposed changes to the rail service along the adjacent UPRR rail corridors along the east and west sides of the project site. Recent environmental documents for projects in the area, including the Capital Corridor Program Environmental Assessment, the Union City Intermodal Final Environmental Impact Report, and the Dumbarton Rail Project plans have indicated significant service changes to the UPRR rail corridor along the west side of the project site. Review of these plans indicate that changes are proposed for the existing Whipple Road grade crossing (e.g., new gates, roadway median). As described in Section 16, Transportation/Traffic, the proposed project would not result in conflicts at the UPRR grade crossing from traffic accessing the site. In addition, improvements planned for the rail crossing would enhance the existing safety measures for vehicles crossing the UPRR tracks.

Other than the projects listed above, which would not generate new traffic or other population-driven impacts, there are no known foreseeable developments in the project vicinity, the impacts of which could cumulate with those of the proposed project. Moreover, the level of activity at the project site is expected to generate minimal traffic and no employment-related impacts. As a result, the project would result in less than cumulatively considerable impacts for these environmental topics. Because there is no foreseeable development, cumulative impacts are not anticipated. The proposed expansion of the Hayward Yard would incrementally increase the use of hazardous materials, contribute to stormwater runoff, remove vegetation, and potentially disturb cultural resources. However, existing regulations and permits governing these hazards and resources would apply to development in the area and would reduce the contribution from each to less than cumulatively considerable, and thus cumulative impacts would be less than significant.

c. **Less than Significant with Mitigation Incorporated.** The proposed project's potential to impact human beings is addressed in various topics included in the checklist. As identified in

[80] Personal communication with Michael Renk, Union City Public Works Department, November 3, 2010.

Section 8, Hazards and Hazardous Materials, the project site is located next to an area that contains contaminated soil and could be disturbed during construction activities. Mitigation has been proposed to ensure that human beings are not adversely affected. In addition, impacts to human beings due to changes in Air Quality (Section 3) or the Noise environment (Section 12) would be less than significant with the recommended mitigation measures.

Appendix A

Biological Database Query

CNDDB Query

California Department of Fish and Game
Natural Diversity Database
BART Hayward
CNDDB Query for the Newark and Hayward 7.5 minute USGS topographic quadrangles

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1	***Accipiter striatus*** sharp-shinned hawk	ABNKC12020			G5	S3	
2	***Agelaius tricolor*** tricolored blackbird	ABPBXB0020			G2G3	S2	SC
3	***Antrozous pallidus*** pallid bat	AMACC10010			G5	S3	SC
4	***Aquila chrysaetos*** golden eagle	ABNKC22010			G5	S3	
5	***Ardea herodias*** great blue heron	ABNGA04010			G5	S4	
6	***Astragalus tener var. tener*** alkali milk-vetch	PDFAB0F8R1			G1T1	S1.1	1B.2
7	***Athene cunicularia*** burrowing owl	ABNSB10010			G4	S2	SC
8	***Atriplex joaquiniana*** San Joaquin spearscale	PDCHE041F3			G2	S2	1B.2
9	***Balsamorhiza macrolepis var. macrolepis*** big-scale balsamroot	PDAST11061			G3G4T2	S2.2	1B.2
10	***Centromadia parryi ssp. congdonii*** Congdon's tarplant	PDAST4R0P1			G4T3	S3.2	1B.2
11	***Charadrius alexandrinus nivosus*** western snowy plover	ABNNB03031	Threatened		G4T3	S2	SC
12	***Circus cyaneus*** northern harrier	ABNKC11010			G5	S3	SC
13	***Danaus plexippus*** monarch butterfly	IILEPP2010			G5	S3	
14	***Dendroica petechia brewsteri*** yellow warbler	ABPBX03018			G5T3?	S2	SC
15	***Elanus leucurus*** white-tailed kite	ABNKC06010			G5	S3	
16	***Eumops perotis californicus*** western mastiff bat	AMACD02011			G5T4	S3?	SC
17	***Fritillaria liliacea*** fragrant fritillary	PMLIL0V0C0			G2	S2.2	1B.2
18	***Geothlypis trichas sinuosa*** saltmarsh common yellowthroat	ABPBX1201A			G5T2	S2	SC
19	***Helianthella castanea*** Diablo helianthella	PDAST4M020			G3	S3.2	1B.2
20	***Holocarpha macradenia*** Santa Cruz tarplant	PDAST4X020	Threatened	Endangered	G1	S1.1	1B.1
21	***Lasiurus cinereus*** hoary bat	AMACC05030			G5	S4?	
22	***Lasthenia conjugens*** Contra Costa goldfields	PDAST5L040	Endangered		G1	S1.1	1B.1
23	***Laterallus jamaicensis coturniculus*** California black rail	ABNME03041		Threatened	G4T1	S1	

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
24	***Masticophis lateralis euryxanthus*** Alameda whipsnake	ARADB21031	Threatened	Threatened	G4T2	S2	
25	***Melospiza melodia pusillula*** Alameda song sparrow	ABPBXA301S			G5T2?	S2?	SC
26	***Microcina lumi*** Lum's micro-blind harvestman	ILARA47050			G1	S1	
27	***Monardella villosa ssp. globosa*** robust monardella	PDLAM180P7			G5T2	S2.2	1B.2
28	***Neotoma fuscipes annectens*** San Francisco dusky-footed woodrat	AMAFF08082			G5T2T3	S2S3	SC
29	***Northern Coastal Salt Marsh***	CTT52110CA			G3	S3.2	
30	***Oncorhynchus mykiss irideus*** steelhead - central California coast DPS	AFCHA0209G	Threatened		G5T2Q	S2	
31	***Plagiobothrys glaber*** hairless popcorn-flower	PDBOR0V0B0			GH	SH	1A
32	***Potamogeton filiformis*** slender-leaved pondweed	PMPOT03090			G5	S1S2	2.2
33	***Rallus longirostris obsoletus*** California clapper rail	ABNME05016	Endangered	Endangered	G5T1	S1	
34	***Rana draytonii*** California red-legged frog	AAABH01022	Threatened		G4T2T3	S2S3	SC
35	***Reithrodontomys raviventris*** salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered	G1G2	S1S2	
36	***Riparia riparia*** bank swallow	ABPAU08010		Threatened	G5	S2S3	
37	***Sorex vagrans halicoetes*** salt-marsh wandering shrew	AMABA01071			G5T1	S1	SC
38	***Sternula antillarum browni*** California least tern	ABNNM08103	Endangered	Endangered	G4T2T3Q	S2S3	
39	***Streptanthus albidus ssp. peramoenus*** most beautiful jewel-flower	PDBRA2G012			G2T2	S2.2	1B.2
40	***Valley Needlegrass Grassland***	CTT42110CA			G1	S3.1	

USFWS Query

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 100907030728

Database Last Updated: April 29, 2010

Quad Lists

Listed Species

Invertebrates

Branchinecta lynchi
- vernal pool fairy shrimp (T)

Lepidurus packardi
- vernal pool tadpole shrimp (E)

Fish

Acipenser medirostris
- green sturgeon (T) (NMFS)

Hypomesus transpacificus
- delta smelt (T)

Oncorhynchus kisutch
- coho salmon - central CA coast (E) (NMFS)

Oncorhynchus mykiss
- Central California Coastal steelhead (T) (NMFS)
- Central Valley steelhead (T) (NMFS)
- Critical habitat, Central California coastal steelhead (X) (NMFS)

Oncorhynchus tshawytscha
- Central Valley spring-run chinook salmon (T) (NMFS)
- winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Ambystoma californiense
- California tiger salamander, central population (T)

Rana draytonii
- California red-legged frog (T)
- Critical habitat, California red-legged frog (X)

Reptiles

Masticophis lateralis euryxanthus
- Alameda whipsnake [=striped racer] (T)
- Critical habitat, Alameda whipsnake (X)

Birds

Charadrius alexandrinus nivosus
- western snowy plover (T)

Pelecanus occidentalis californicus

California brown pelican (E)

Rallus longirostris obsoletus

California clapper rail (E)

Sternula antillarum (=Sterna, =albifrons) browni

California least tern (E)

Mammals

Reithrodontomys raviventris

salt marsh harvest mouse (E)

Proposed Species

Amphibians

Rana draytonii

Critical habitat, California red-legged frog (PX)

Quads Containing Listed, Proposed or Candidate Species:

HAYWARD (447A)

NEWARK (447D)

County Lists

No county species lists requested.

Key:

(E) *Endangered* - Listed as being in danger of extinction.

(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.

(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.

(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.

Critical Habitat - Area essential to the conservation of a species.

(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.

(C) *Candidate* - Candidate to become a proposed species.

(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.

(X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the

county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our Protocol and Recovery Permits pages.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

  During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

  Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements;

cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. More info

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be December 06, 2010.

Appendix B

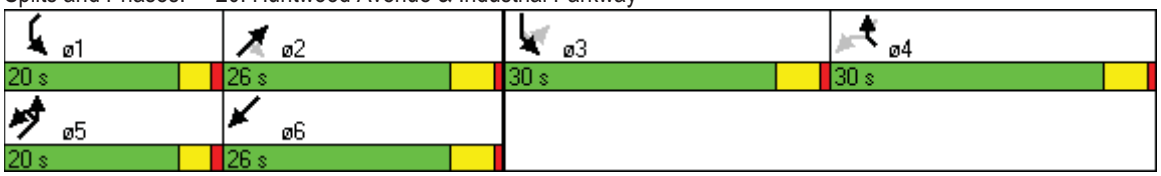
Traffic Data Sheets

Lane Group	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	287	84	119	67	80	72	481	308	164	670	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%		0%				0%			0%	
Storage Length (ft)		0	0	0	0		0		0	0		0
Storage Lanes		1	0	2	1		1		1	1		0
Taper Length (ft)		25	25	25	25		25		25	25		25
Satd. Flow (prot)	1703	3230	0	3298	1386	1524	1703	3406	1524	1703	4835	0
Flt Permitted	0.153	0.961		0.686			0.950			0.950		
Satd. Flow (perm)	274	3230	0	2361	1386	1503	1702	3406	1497	1703	4835	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28				88			428		10	
Link Speed (mph)		30		30				30			30	
Link Distance (ft)		519		676				559			453	
Travel Time (s)		11.8		15.4				12.7			10.3	
Lane Group Flow (vph)	96	478	0	171	76	88	96	534	428	213	784	0
Turn Type	Perm				custom	custom	Prot		Perm	Prot		
Protected Phases		3			4		5	2		1	6	
Permitted Phases	3			4		4			2			
Total Split (s)	30.0	30.0	0.0	30.0	30.0	30.0	20.0	26.0	26.0	20.0	26.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)	26.2	26.2		14.0	14.0	14.0	10.6	20.0	20.0	15.0	27.0	
Actuated g/C Ratio	0.29	0.29		0.15	0.15	0.15	0.12	0.22	0.22	0.16	0.30	
v/c Ratio	1.22	0.51		0.47	0.36	0.29	0.48	0.71	0.65	0.76	0.55	
Control Delay	207.8	28.9		40.3	40.4	10.4	47.4	39.6	8.4	56.4	30.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	207.8	28.9		40.3	40.4	10.4	47.4	39.6	8.4	56.4	30.2	
LOS	F	C		D	D	B	D	D	A	E	C	
Approach Delay		58.8		32.5				27.7			35.8	
Approach LOS		E		C				C			D	

Intersection Summary

Area Type: Other
Cycle Length: 106
Actuated Cycle Length: 91.3
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.22
Intersection Signal Delay: 37.0 — Intersection LOS: D
Intersection Capacity Utilization 54.0% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 20: Huntwood Avenue & Industrial Parkway

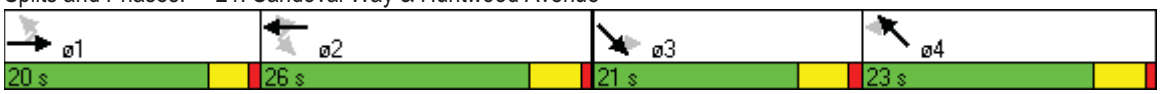


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	3	0	0	12	0	27	85	767	5	1	231	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1626	0	0	1626	1455	0	3232	0	0	4521	0
Flt Permitted					0.752			0.537			0.918	
Satd. Flow (perm)	0	1712	0	0	1282	1455	0	1744	0	0	4154	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						40		1			41	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		197			250			676			632	
Travel Time (s)		4.5			5.7			15.4			14.4	
Lane Group Flow (vph)	0	8	0	0	16	40	0	1139	0	0	342	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		1			2			3			4	
Permitted Phases	1			2		2	3			4		
Total Split (s)	20.0	20.0	0.0	26.0	26.0	26.0	21.0	21.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)		6.9			7.4	7.4		17.4			10.0	
Actuated g/C Ratio		0.14			0.15	0.15		0.35			0.20	
v/c Ratio		0.03			0.08	0.16		1.85			0.39	
Control Delay		21.0			22.2	10.6		405.7			17.1	
Queue Delay		0.0			0.0	0.0		0.0			0.0	
Total Delay		21.0			22.2	10.6		405.7			17.1	
LOS		C			C	B		F			B	
Approach Delay		21.0			13.9			405.7			17.1	
Approach LOS		C			B			F			B	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 49.2
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.85
Intersection Signal Delay: 303.5 — Intersection LOS: F
Intersection Capacity Utilization 44.7% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 21: Sandoval Way & Huntwood Avenue

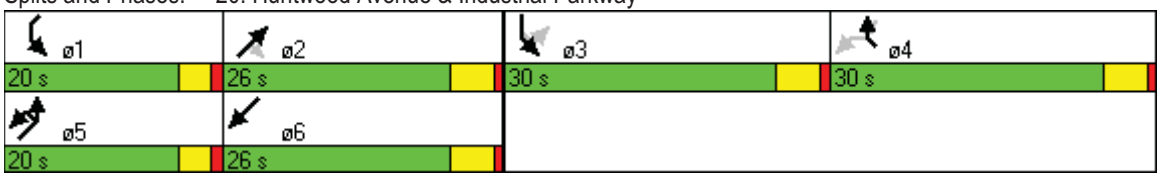


Lane Group	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	287	84	121	67	81	72	481	314	166	670	39
Satd. Flow (prot)	1703	3230	0	3294	1386	1524	1703	3406	1524	1703	4835	0
Flt Permitted	0.153	0.961		0.684			0.950			0.950		
Satd. Flow (perm)	274	3230	0	2354	1386	1503	1702	3406	1497	1703	4835	0
Satd. Flow (RTOR)		28				89			436		10	
Lane Group Flow (vph)	96	478	0	174	76	89	96	534	436	216	784	0
Turn Type	Perm				custom	custom	Prot		Perm	Prot		
Protected Phases		3			4		5	2		1	6	
Permitted Phases	3			4		4			2			
Total Split (s)	30.0	30.0	0.0	30.0	30.0	30.0	20.0	26.0	26.0	20.0	26.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)	26.2	26.2		14.2	14.2	14.2	10.6	20.2	20.2	15.1	27.3	
Actuated g/C Ratio	0.29	0.29		0.15	0.15	0.15	0.12	0.22	0.22	0.16	0.30	
v/c Ratio	1.23	0.51		0.48	0.36	0.29	0.49	0.71	0.65	0.77	0.54	
Control Delay	209.1	29.2		40.5	40.3	10.4	47.6	39.5	8.5	57.3	30.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	209.1	29.2		40.5	40.3	10.4	47.6	39.5	8.5	57.3	30.2	
LOS	F	C		D	D	B	D	D	A	E	C	
Approach Delay		59.3		32.6				27.6			36.0	
Approach LOS		E		C				C			D	

Intersection Summary

Cycle Length: 106
Actuated Cycle Length: 91.8
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.23
Intersection Signal Delay: 37.1 — Intersection LOS: D
Intersection Capacity Utilization 54.1% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 20: Huntwood Avenue & Industrial Parkway

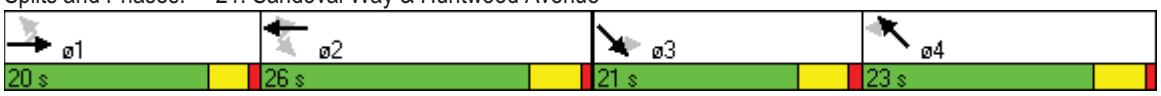


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	3	0	0	12	0	30	93	767	5	1	231	29
Satd. Flow (prot)	0	1626	0	0	1626	1455	0	3232	0	0	4521	0
Flt Permitted					0.752			0.540			0.917	
Satd. Flow (perm)	0	1712	0	0	1282	1455	0	1754	0	0	4150	0
Satd. Flow (RTOR)						44		1			41	
Lane Group Flow (vph)	0	8	0	0	16	44	0	1149	0	0	342	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		1			2			3			4	
Permitted Phases	1			2		2	3			4		
Total Split (s)	20.0	20.0	0.0	26.0	26.0	26.0	21.0	21.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)		6.9			7.4	7.4		17.4			10.0	
Actuated g/C Ratio		0.14			0.15	0.15		0.35			0.20	
v/c Ratio		0.03			0.08	0.17		1.85			0.39	
Control Delay		21.0			22.2	10.4		408.1			17.1	
Queue Delay		0.0			0.0	0.0		0.0			0.0	
Total Delay		21.0			22.2	10.4		408.1			17.1	
LOS		C			C	B		F			B	
Approach Delay		21.0			13.5			408.1			17.1	
Approach LOS		C			B			F			B	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 49.2
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.85
Intersection Signal Delay: 305.1 — Intersection LOS: F
Intersection Capacity Utilization 44.9% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 21: Sandoval Way & Huntwood Avenue

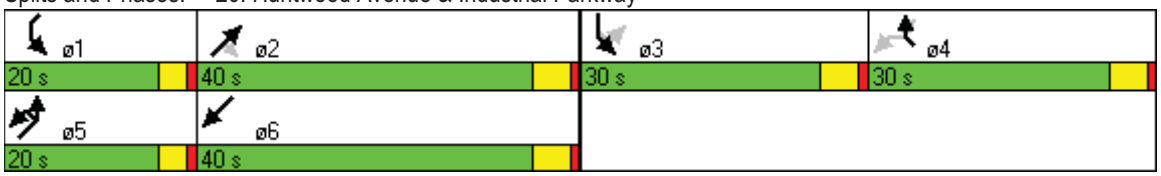


Lane Group	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	69	147	80	345	323	328	251	988	129	108	613	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%		0%				0%			0%	
Storage Length (ft)		0	0	0	0		0		0	0		0
Storage Lanes		1	0	2	1		1		1	1		0
Taper Length (ft)		25	25	25	25		25		25	25		25
Satd. Flow (prot)	1736	3223	0	3321	1413	1553	1736	3471	1553	1736	4824	0
Flt Permitted	0.154	0.967		0.634			0.950			0.950		
Satd. Flow (perm)	281	3223	0	2172	1413	1553	1727	3471	1553	1736	4824	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		61				360			146		43	
Link Speed (mph)		30		30				30			30	
Link Distance (ft)		519		676				559			453	
Travel Time (s)		11.8		15.4				12.7			10.3	
Lane Group Flow (vph)	88	287	0	562	315	360	335	1098	179	140	816	0
Turn Type	Perm				custom	custom	Prot		Perm	Prot		
Protected Phases		3			4		5	2		1	6	
Permitted Phases	3			4		4			2			
Total Split (s)	30.0	30.0	0.0	30.0	30.0	30.0	20.0	40.0	40.0	20.0	40.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)	26.0	26.0		26.0	26.0	26.0	16.0	36.0	36.0	13.6	33.6	
Actuated g/C Ratio	0.22	0.22		0.22	0.22	0.22	0.14	0.31	0.31	0.12	0.29	
v/c Ratio	1.42	0.38		1.17	1.01	0.58	1.42	1.03	0.31	0.70	0.58	
Control Delay	294.3	32.4		138.1	99.5	8.1	249.1	77.0	9.6	68.6	35.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	294.3	32.4		138.1	99.5	8.1	249.1	77.0	9.6	68.6	35.7	
LOS	F	C		F	F	A	F	E	A	E	D	
Approach Delay		93.9		90.4				105.3			40.5	
Approach LOS		F		F				F			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 117.7
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.42
Intersection Signal Delay: 85.1 — Intersection LOS: F
Intersection Capacity Utilization 71.5% — ICU Level of Service C
Analysis Period (min) 15

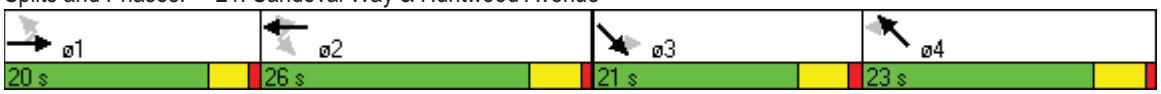
Splits and Phases: 20: Huntwood Avenue & Industrial Parkway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	6	0	4	21	1	82	44	362	4	1	971	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1656	0	0	1694	1509	0	3348	0	0	4825	0
Flt Permitted					0.723			0.537			0.938	
Satd. Flow (perm)	0	1721	0	0	1278	1509	0	1807	0	0	4526	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				121		1			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		197			250			676			632	
Travel Time (s)		4.5			5.7			15.4			14.4	
Lane Group Flow (vph)	0	20	0	0	29	121	0	545	0	0	1223	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		1			2			3			4	
Permitted Phases	1			2		2	3			4		
Total Split (s)	20.0	20.0	0.0	26.0	26.0	26.0	21.0	21.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)		7.5			8.1	8.1		17.2			19.3	
Actuated g/C Ratio		0.13			0.14	0.14		0.29			0.33	
v/c Ratio		0.09			0.17	0.39		1.03			0.83	
Control Delay		22.6			26.7	10.1		74.3			26.6	
Queue Delay		0.0			0.0	0.0		0.0			0.0	
Total Delay		22.6			26.7	10.1		74.3			26.6	
LOS		C			C	B		E			C	
Approach Delay		22.6			13.4			74.3			26.6	
Approach LOS		C			B			E			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 59.2	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 38.9	Intersection LOS: D
Intersection Capacity Utilization 47.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 21: Sandoval Way & Huntwood Avenue

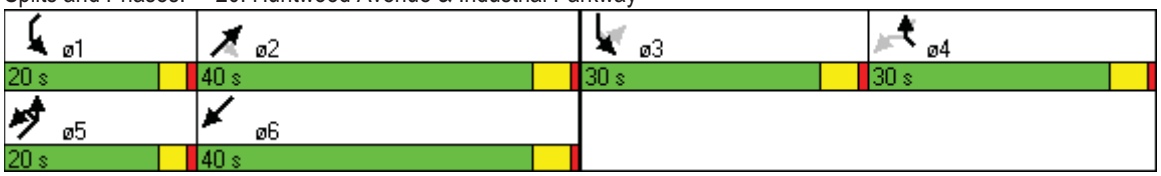


Lane Group	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	69	147	80	325	323	322	251	988	125	107	613	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%		0%				0%			0%	
Storage Length (ft)		0	0	0	0		0		0	0		0
Storage Lanes		1	0	2	1		1		1	1		0
Taper Length (ft)		25	25	25	25		25		25	25		25
Satd. Flow (prot)	1736	3223	0	3311	1413	1553	1736	3471	1553	1736	4824	0
Flt Permitted	0.154	0.967		0.638			0.950			0.950		
Satd. Flow (perm)	281	3223	0	2177	1413	1553	1727	3471	1553	1736	4824	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		61				354			142		43	
Link Speed (mph)		30		30				30			30	
Link Distance (ft)		519		676				559			453	
Travel Time (s)		11.8		15.4				12.7			10.3	
Lane Group Flow (vph)	88	287	0	546	303	354	335	1098	174	139	816	0
Turn Type	Perm				custom	custom	Prot		Perm	Prot		
Protected Phases		3			4		5	2		1	6	
Permitted Phases	3			4		4			2			
Total Split (s)	30.0	30.0	0.0	30.0	30.0	30.0	20.0	40.0	40.0	20.0	40.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)	26.0	26.0		26.0	26.0	26.0	16.0	36.0	36.0	13.5	33.6	
Actuated g/C Ratio	0.22	0.22		0.22	0.22	0.22	0.14	0.31	0.31	0.11	0.29	
v/c Ratio	1.42	0.38		1.13	0.97	0.57	1.42	1.03	0.30	0.69	0.58	
Control Delay	292.4	32.4		125.1	90.2	8.1	249.0	76.9	9.6	68.5	35.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	292.4	32.4		125.1	90.2	8.1	249.0	76.9	9.6	68.5	35.7	
LOS	F	C		F	F	A	F	E	A	E	D	
Approach Delay		93.4		81.9				105.5			40.5	
Approach LOS		F		F				F			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 117.6
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.42
Intersection Signal Delay: 82.5 — Intersection LOS: F
Intersection Capacity Utilization 70.9% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 20: Huntwood Avenue & Industrial Parkway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	6	0	4	21	1	56	39	362	4	1	971	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1656	0	0	1694	1509	0	3348	0	0	4825	0
Flt Permitted					0.719			0.554			0.938	
Satd. Flow (perm)	0	1721	0	0	1271	1509	0	1864	0	0	4526	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				82		1			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		197			250			676			632	
Travel Time (s)		4.5			5.7			15.4			14.4	
Lane Group Flow (vph)	0	20	0	0	29	82	0	538	0	0	1223	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		1			2			3			4	
Permitted Phases	1			2		2	3			4		
Total Split (s)	20.0	20.0	0.0	26.0	26.0	26.0	21.0	21.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)		7.4			7.9	7.9		17.2			19.2	
Actuated g/C Ratio		0.13			0.13	0.13		0.29			0.33	
v/c Ratio		0.09			0.17	0.30		0.99			0.83	
Control Delay		22.4			27.0	10.5		61.5			26.3	
Queue Delay		0.0			0.0	0.0		0.0			0.0	
Total Delay		22.4			27.0	10.5		61.5			26.3	
LOS		C			C	B		E			C	
Approach Delay		22.4			14.8			61.5			26.3	
Approach LOS		C			B			E			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 59	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 35.6	Intersection LOS: D
Intersection Capacity Utilization 47.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 21: Sandoval Way & Huntwood Avenue