Appendix A

AMG Land Development/Mandela Station Affordable LP, Mandela Station Substantial Conformance Set

AO Architects, August 21, 2025

MANDELA STATION
OAKLAND, CA

SUBSTANTIAL CONFORMANCE SET
AUGUST 4, 2025

SHEET INDEX

G1.0	COVER SHEET

ARCHITECTURE

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A2.0	CONCEPTUAL BUILDING PLANS
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A2.2	CONCEPTUAL BUILDING PLANS
A2.3	CONCEPTUAL BUILDING PLANS
A2.4	CONCEPTUAL BUILDING PLANS
A2.5	CONCEPTUAL BUILDING PLANS
A2.6	CONCEPTUAL BUILDING PLANS
A2.7	CONCEPTUAL BUILDING PLANS
A3.0	CONCEPTUAL UNIT PLANS
A4.0	CONCEPTUAL BUILDING ELEVATIONS
A4.1	CONCEPTUAL BUILDING ELEVATIONS
A4.2	CONCEPTUAL BUILDING ELEVATIONS
A4.3	CONCEPTUAL BUILDING ELEVATIONS
A5.0	CONCEPTUAL 3D VIEWS
A6.0	CONCEPTUAL COLOR AND MATERIAL BOARD
A7.0	PTAC DETAILS

LANDSCAPE ARCHITECTURE

L1.0	LANDSCAPE PLAN

PROJECT DATA

	ORIGINAL DESIGN	PROPOSED DESIGN
SETBACKS	FRONT (5TH STREET): 3'-4" SIDE (CHESTER ST): 1'-3" SIDE (EAST): 0" REAR (BART STATION): 1'-1"	FRONT (5TH STREET): 0'-0" * SIDE (CHESTER ST): 0'-0" ** SIDE (EAST): 0-0" *** REAR (BART STATION): 0'-2"
DENSITY	188.98 DU/AC	188.98 DU/AC
F.A.R.	4.49	4.35
RETAIL	13,944 SQ.FT.	12,688 SQ.FT.
NO. OF STORIES	7 STORIES	8 STORIES
BUILDING HEIGHT	80' (TOP OF ROOF)	75'-7" (TOP OF ROOF)
OPEN SPACE	PRIVATE OPEN SPACE: 10,187 SQ.FT. COMMON OPEN SPACE: 14,628 SQ.FT. TOTAL OPEN SPACE: 24,815 SQ.FT.	PRIVATE OPEN SPACE: 2,100 SQ.FT. COMMON OPEN SPACE: 14,698 SQ.FT. TOTAL OPEN SPACE: 16,798 SQ.FT.
UNIT COUNT	240 UNITS	240 UNITS
UNIT MIX	STUDIOS: 42 UNITS (17.5%) 1-BED: 137 UNITS (57%) 2-BED: 47 UNITS (19.5%) 3-BED: 14 UNITS (6%)	STUDIOS: 59 UNITS (24.5%) 1-BED: 136 UNITS (57%) 2-BED: 34 UNITS (14%) 3-BED: 11 UNITS (4.5%)
VEHICULAR PARKING	50 SPACES	50 SPACES ****
BICYCLE PARKING	SHORT TERM: 20 STALLS LONG TERM: 68 STALLS TOTAL: 88 STALLS	SHORT TERM: 2 STALLS LONG TERM: 120 STALLS TOTAL: 122 STALLS

* ± 4'-0" & 6'-0" OVERHANG FROM LEVEL 2-8 OVER FRONT PROPERTY LINE ALONG 5TH STREET

** ± 2'-8" & 3'-0" OVERHANG FROM LEVEL 2 & 3 OVER SIDE PROPERTY LINE ALONG CHESTER STREET

*** ± 5'-0" OVERHANG FROM LEVEL 2-8 OVER EAST SIDE PROPERTY LINE

**** NOT INCLUDING CAR SHARE SPACES

PROJECT TEAM

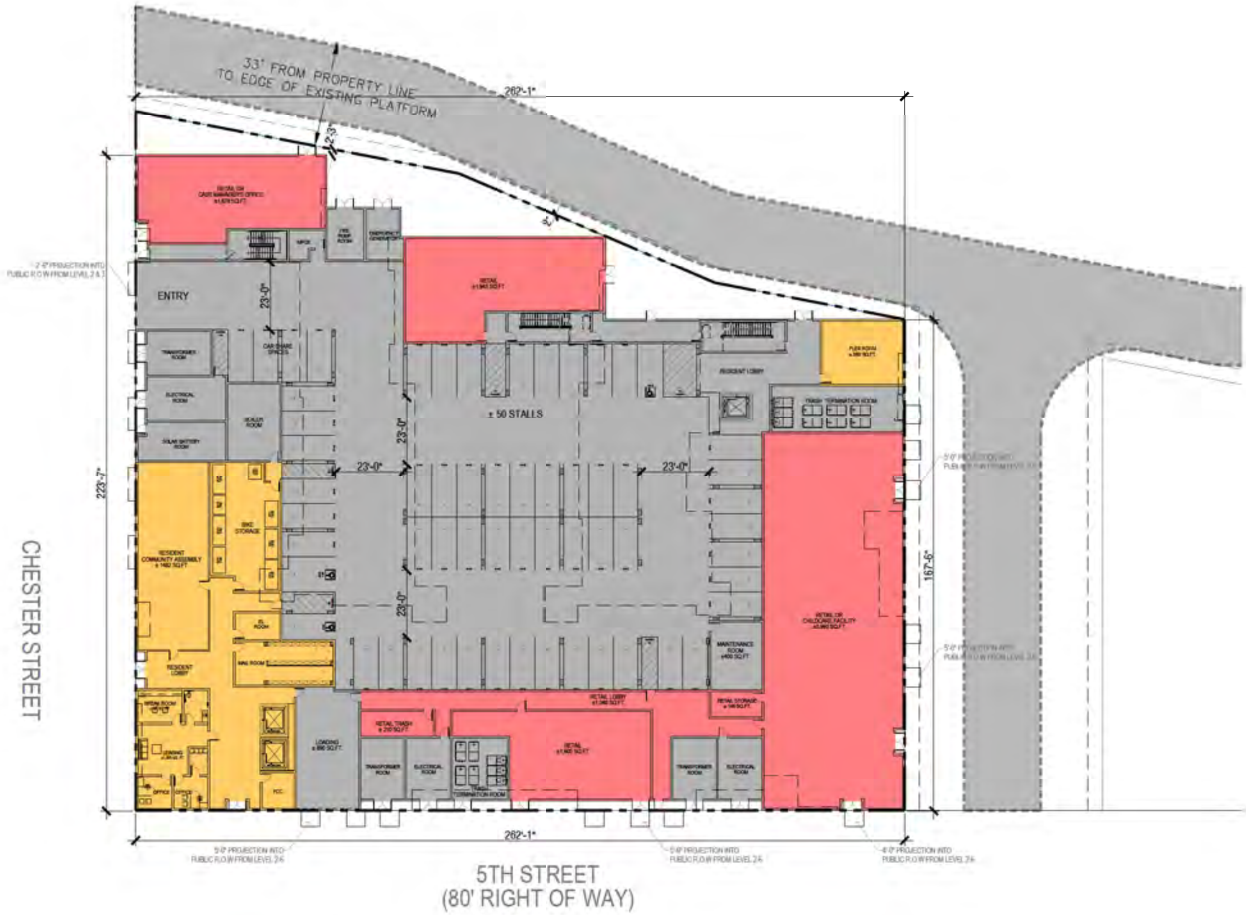
APPLICANT/OWNER:
MANDELA STATION AFFORDABLE LP
430 E. State Street, Ste 100,
Eagle, ID 91426
(818) 380-2600 Ext. 14
Contact: Art May
amay@keystonedg.com

RESIDENTIAL ARCHITECT:
AO
144 North Orange Street
Orange, CA 92866
(714) 639-9860
Contact: Ioanna Magiati
ioannam@aoarchitects.com
Contact: Drishti Shah
drishtis@aoarchitects.com

VICINITY MAP

LEGEND

- RESIDENTIAL
- RETAIL
- RESIDENTIAL AMENITY
- PODIUM
- BUILDING LINE ABOVE



PROJECT DATA		
	ORIGINAL DESIGN	PROPOSED DESIGN
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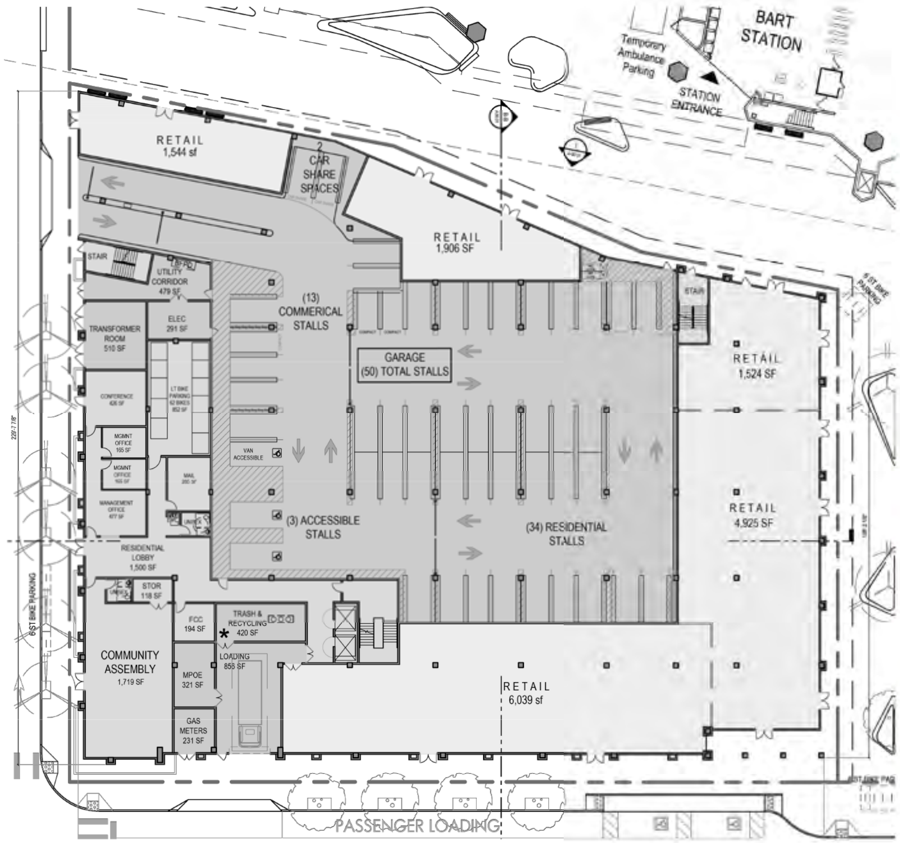
** ± 2'-6" & 3'-0" OVERHANG FROM LEVEL 2 & 3 OVER SIDE PROPERTY LINE ALONG CHESTER STREET

*** ± 5'-0" OVERHANG FROM LEVEL 2-6 OVER EAST SIDE PROPERTY LINE

**** NOT INCLUDING CAR SHARE SPACES

LEGEND

- RESIDENTIAL
- RETAIL
- RESIDENTIAL AMENITY
- PODIUM
- BUILDING LINE ABOVE
- PROPERTY LINE



LEVEL 1
ORIGINAL DESIGN

LEVEL 1
PROPOSED DESIGN

AMG LAND DEVELOPMENT

MANDELA STATION
OAKLAND, CA

CONCEPTUAL BUILDING PLANS

A2.0

JOB NO. 2023-0847
DATE 08-04-2025

LEGEND

- RESIDENTIAL
- RETAIL
- RESIDENTIAL AMENITY
- PODIUM
- BUILDING LINE ABOVE
- PROPERTY LINE

LEVEL 2
ORIGINAL DESIGN

LEVEL 2
PROPOSED DESIGN

AMG LAND DEVELOPMENT

MANDELA STATION

OAKLAND, CA

CONCEPTUAL BUILDING PLANS

0 20 40 60 80

A2.1

JOB NO. 2023-0847
DATE 08-04-2025

LEGEND

- RESIDENTIAL
- RETAIL
- RESIDENTIAL AMENITY
- PODIUM
- BUILDING LINE ABOVE
- PROPERTY LINE

LEVEL 3
ORIGINAL DESIGN

LEVEL 3
PROPOSED DESIGN

AMG LAND DEVELOPMENT

MANDELA STATION

OAKLAND, CA

CONCEPTUAL BUILDING PLANS

A2.2

JOB NO. 2023-0847
DATE 08-04-2025

LEGEND

- RESIDENTIAL
- RETAIL
- RESIDENTIAL AMENITY
- PODIUM
- BUILDING LINE ABOVE
- PROPERTY LINE

LEVEL 4
ORIGINAL DESIGN

LEVEL 4
PROPOSED DESIGN

LEGEND

- RESIDENTIAL
- RETAIL
- RESIDENTIAL AMENITY
- PODIUM
- BUILDING LINE ABOVE
- PROPERTY LINE

LEVEL 5
ORIGINAL DESIGN

LEVEL 5
PROPOSED DESIGN

LEGEND

- RESIDENTIAL
- RETAIL
- RESIDENTIAL AMENITY
- PODIUM
- BUILDING LINE ABOVE
- PROPERTY LINE

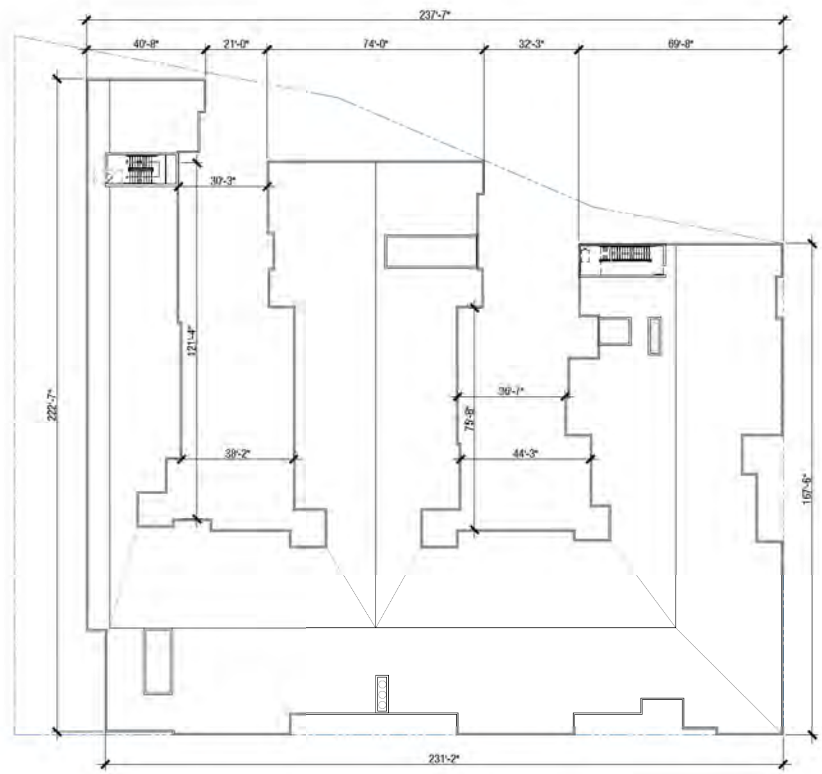
LEVEL 6
ORIGINAL DESIGN

LEVEL 6
PROPOSED DESIGN

LEGEND

- RESIDENTIAL
- RETAIL
- RESIDENTIAL AMENITY
- PODIUM
- BUILDING LINE ABOVE
- PROPERTY LINE

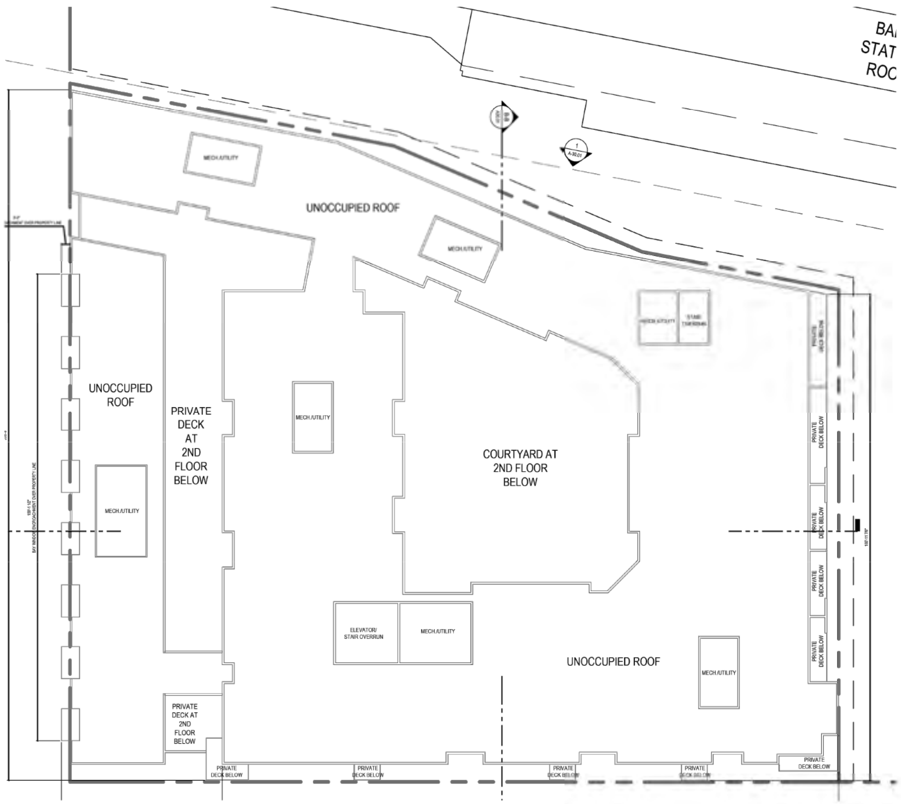
LEVEL 7
ORIGINAL DESIGN



ROOF PLAN - LEVEL 7
PROPOSED DESIGN

LEGEND

- RESIDENTIAL
- RETAIL
- RESIDENTIAL AMENITY
- PODIUM
- BUILDING LINE ABOVE
- PROPERTY LINE



ROOF PLAN - LEVEL 8
ORIGINAL DESIGN

THE PROPOSED BUILDING IS 6 STORIES TALL

AMG LAND DEVELOPMENT

MANDELA STATION

OAKLAND, CA

CONCEPTUAL BUILDING PLANS

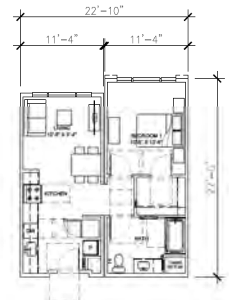
A2.7

JOB NO. 2023-0847
DATE 08-04-2025

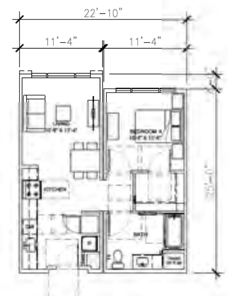
UNIT S1
STUDIO - 1 BATH
UNIT AREA: 411 SQ. FT.

UNIT S1.1
STUDIO - 1 BATH
UNIT AREA: 411 SQ. FT.
PATIO AREA: 35 SQ.FT.

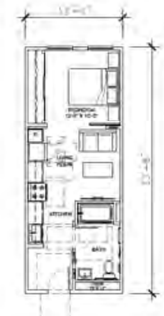
UNIT A1
1 BED - 1 BATH
UNIT AREA: 554 SQ. FT.



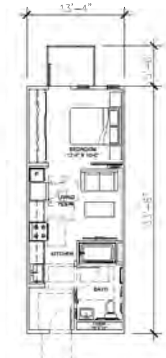
UNIT A1.1
1 BED - 1 BATH
UNIT AREA: 577 SQ. FT.



UNIT A1.2
1 BED - 1 BATH
UNIT AREA: 577 SQ. FT.



UNIT A2
1 BED - 1 BATH
UNIT AREA: 450 SQ. FT.

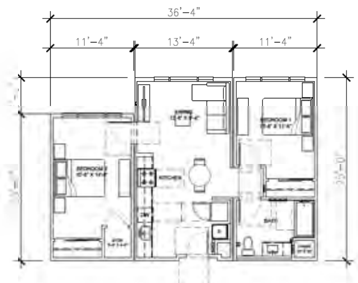


UNIT A2.1
1 BED - 1 BATH
UNIT AREA: 450 SQ. FT.
PATIO AREA: 35 SQ.FT.

UNIT A3
1 BED - 1 BATH
UNIT AREA: 612 SQ. FT.

UNIT B1
2 BED - 1 BATH
UNIT AREA: 791 SQ. FT.

UNIT B2.1
2 BED - 1 BATH
UNIT AREA: [illegible] SQ. FT.



UNIT B2.2
2 BED - 1 BATH
UNIT AREA: 832 SQ. FT.

UNIT C1
3 BED - 2 BATH
UNIT AREA: 1106 SQ. FT.

UNIT C2
3 BED - 2 BATH
UNIT AREA: 1040 SQ. FT.
PATIO AREA: 35 SQ.FT.

AMG LAND DEVELOPMENT

MANDELA STATION

OAKLAND, CA

UNIT PLANS

0 8' 16' 24' 32'
1"=8'

A3.0

JOB NO. 2023-0847
DATE 08-04-2025

LEGEND

PROPERTY LINE (P.L.)

PROJECTION INTO PUBLIC R.O.W

NOTE: THERE IS A 1'-0" PLANE CHANGE BETWEEN THE SW CORNER UNIT AND LAUNDRY ROOM ON THE UPPER FLOORS. AT THE GROUND LEVEL, THIS WILL BE REFLECTED WITH A 6" DEPTH CHANGE BETWEEN THE RED BRICK PILASTERS AT THE RESIDENTIAL LOBBY AND LOADING DOCK AND THE GRAY BRICK VENEER BETWEEN THEM.

1. PROPOSED NORTH ELEVATION

1. EXISTING NORTH ELEVATION

KEY MAP

AMG LAND DEVELOPMENT

MANDELA STATION

OAKLAND, CA

CONCEPTUAL ELEVATIONS

0 16 32 48 64

AO

A4.0

JOB NO. 2023-0847
DATE 08-04-2025

LEGEND

PROPERTY LINE (P.L.)

PROJECTION INTO PUBLIC R.O.W.

2. PROPOSED WEST ELEVATION

2. EXISTING WEST ELEVATION

KEY MAP

AMG LAND DEVELOPMENT

MANDELA STATION

OAKLAND, CA

CONCEPTUAL ELEVATIONS

0 16' 32' 48' 64'

AO

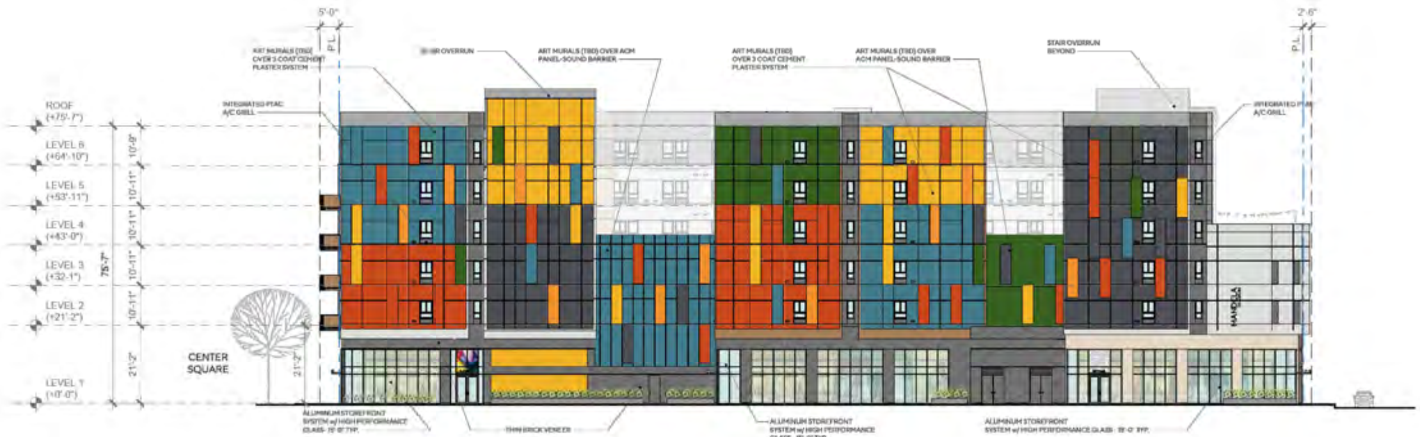
A4.1

JOB NO. 2023-0847
DATE 08-04-2025

LEGEND

PROPERTY LINE (P.L.)

PROJECTION INTO PUBLIC R.O.W.



3. PROPOSED SOUTH ELEVATION

1/" 6"=1'-0" AT 36" X 24"

0 5 10 20 50

3. EXISTING SOUTH ELEVATION

KEY MAP

AMG LAND DEVELOPMENT

MANDELA STATION

OAKLAND, CA

CONCEPTUAL ELEVATIONS

0 16' 32' 48' 64'

A4.2

JOB NO. 2023-0847
DATE 08-04-2025

LEGEND

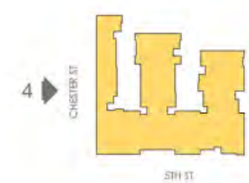
PROPERTY LINE (P.L.)

PROJECTION INTO PUBLIC R.O.W.

4. PROPOSED EAST ELEVATION

4. EXISTING EAST ELEVATION

KEY MAP



AMG LAND DEVELOPMENT

MANDELA STATION

OAKLAND, CA

CONCEPTUAL ELEVATIONS

0 16' 32' 48' 64'

AO

A4.3

JOB NO. 2023-0847
DATE 08-04-2025

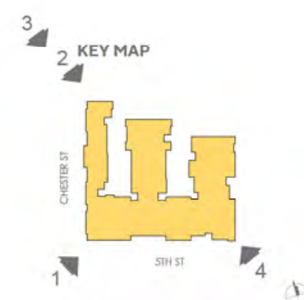
VIEW FROM ACROSS THE BART STATION 3

VIEW FROM CHESTER ST & BART PLATFORM 2

VIEW FROM SOUTHEAST CORNER 4

VIEW FROM CORNER OF 5TH ST & CHESTER ST 1

KEY MAP



AMG LAND DEVELOPMENT

MANDELA STATION

OAKLAND, CA

CONCEPTUAL 3D VIEWS

0 16' 32' 48' 64' 1"=16'

A5.0

JOB NO. 2023-0847
DATE 08-04-2025

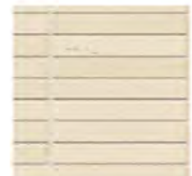
NORTH ELEVATION - 5TH STREET

EAST ELEVATION - CHESTER STREET

MATERIALS

2. BRICK VENEER CLAY COLOR MIX

1. STUCCO 20/30 - LIGHT SAND FINISH



4. BRICK VENEER CREAM COLOR

3. BRICK VENEER GRAY COLOR MIX

6. HARDIE ARTISAN SIDING OR EQUIV. PRIMED FOR PAINT HORIZONTAL OR VERTICAL AS NEEDED

5. ALUMINUM WINDOW SYSTEM COLOR COORDINATED WITH WINDOWS

8. METAL CANOPY COLOR COORDINATED WITH WINDOWS

7. PTAC LOUVER INTEGRATION

COLORS

A. SW 7656 RHINESTONE

B. SW 7659 GRIS

C. SW 7067 CITYSCAPE

D. SW9565 FORGED STEEL

E. SW 6117 SMOKEY TOPAZ

F. SW 7572 LOTUS POD

G. SW 7548 PORTICO

13. ARCHITECTURAL TRANSITION EXTRUSIONS H, J, Z, CORNER AND BASE TRIMS AS NEEDED

12. FIBER CEMENT SMOOTH TRIM BOARDS PAINTED

11. HARDIE ARCHITECTURAL PANEL OR EQUIV PAINTED

10. BOLT-ON BALCONIES PERF-METAL RAILING PAINTED

Endurance Casement

Performance

Water Test Pressure

Acoustical Performance

NFRC

9. VPI VINYL WINDOWS STEELGRAY OR EQUIV

AMG LAND DEVELOPMENT

MANDELA STATION

OAKLAND, CA

CONCEPTUAL COLOR & MATERIAL BOARD

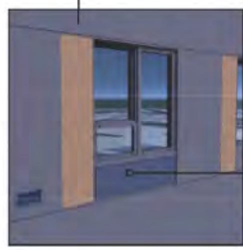
A6.0

JOB NO. 2023-0847
DATE 08-04-2025

5TH ST ELEVATION

The re-designed PTAC grilles now span the full width of the window and are aligned with the mullions, creating a cleaner and more intentional appearance.

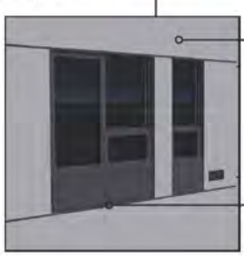
Bolt-On Balcony Perforated Sheet Metal for Privacy Screening



The re-designed PTAC grilles now span the full width of the window and are aligned with the mullions, creating a cleaner and more intentional appearance.

PTAC grilles will be color-matched to adjacent paneling or window frames, depending on placement, to ensure visual continuity across the façade.

CHESTER ST ELEVATION

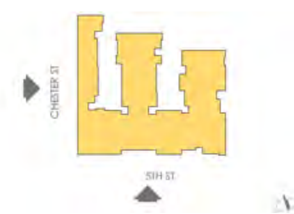


Fiber Cement Board Paneling

The re-designed PTAC grilles now span the full width of the window and are aligned with the mullions, creating a cleaner and more intentional appearance.

PTAC grilles will be color-matched to adjacent paneling or window frames, depending on placement, to ensure visual continuity across the façade.

KEY MAP



AMG LAND DEVELOPMENT

MANDELA STATION

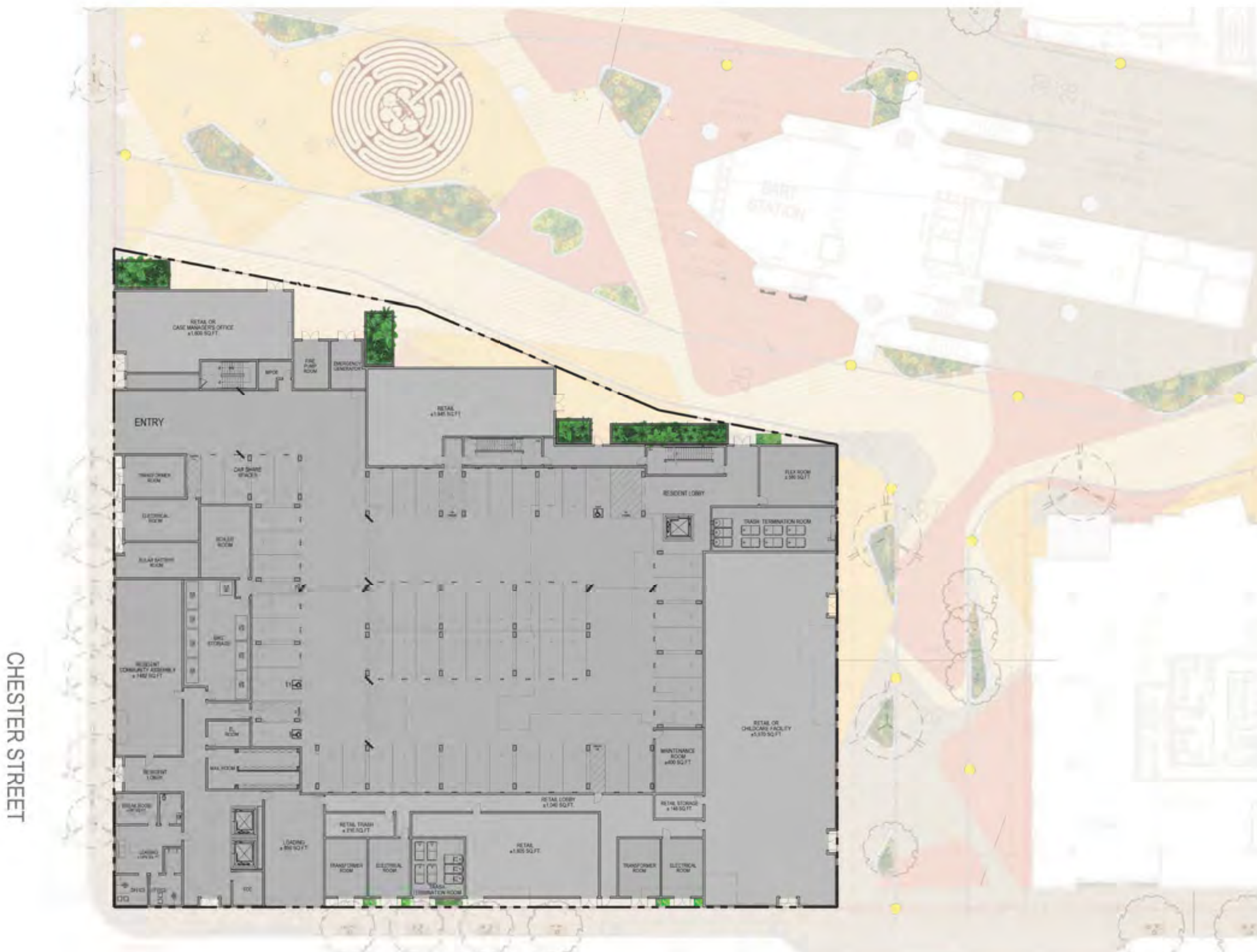
OAKLAND, CA

PTAC DETAILS

0 16' 32' 48' 64'
1"=16'

A7.0

JOB NO. 2023-0847
DATE 08-04-2025



LID STORMWATER PLANTER - PLANTING INTENT

GFRC OR METAL PREFABRICATED PLANTERS

PREFABRICATED PLANTERS PLANTING PALETTE - LOW MAINTENANCE PERENNIALS AND GRASSES

Appendix B

Approval of Revisions to the Preliminary Development Plan for West Oakland BART TOD and Approval of the Final Development Plan for site T-3, with attached Findings

City of Oakland, November 5, 2020

CITY OF OAKLAND

DALZIEL BUILDING • 250 FRANK H. OGAWA PLAZA • SUITE 2114 • OAKLAND, CALIFORNIA 94612

Planning and Building Department (510) 238-3941
Bureau of Planning FAX (510) 238-6538
TDD (510) 238-3254

Sent via Electronic Mail

November 5, 2020

Ronnie Turner,
China Harbour Engineering Company (CHEC)/
Strategic Urban Development Alliance
4000 Executive Parkway, Suite 275
San Ramon, CA 94583

RE: Case File No. PLN18490-REV02, PLN 18521-REV01, PLN18490-PUDF01, PLN18490-PUDF02, PLN18490-PUDF03 West Oakland BART 1451 7th St (APNs 004 007700300, 004 007100300)

Dear Mr. Turner:

The City Planning Commission voted (by a +4, -0 vote) to accept your revisions to the affordable housing condition of approval #78 and your amendments to the affordable housing percentages within the submitted plans. With these amendments, your applications as noted above were APPROVED (by a **+4, -0** vote) at the City Planning Commission meeting on November 4, 2020. The Commission's action is indicated below.

1. Rely on the West Oakland Specific Plan (WOSP) EIR as adequate under CEQA for analysis of the West Oakland BART TOD and adopt CEQA finding that no further environmental review is required pursuant to Public Resources Code Section 21166 and CEQA Guidelines Section 15162;
2. Approval of the revision to the Preliminary Development Plan, subject to the attached findings and revised conditions.
3. Approval of a Minor Variance for reduction of off-street commercial loading, based on the attached findings.
4. Approval of the Final Development Plan for T1, subject to the attached findings.
5. Approval of the Final Development Plan for Horizontal Improvements, subject to the attached findings.
6. Approval of the Final Development Plan for T3, subject to the attached findings.
7. Approval of the revision to the Vesting Tentative Parcel Map 10940.
8. Require the three Final Development Plans to go back to the Design Review Committee for consideration of exterior design treatments.

If you, or any interested party, seeks to challenge this decision before City Council, an appeal must be filed by no later than ten (10) calendar days from the date of this letter, by 4:00 pm on **November 16, 2020**. An appeal shall be on a form provided by the Bureau of Planning of the Planning and Building Department, and submitted via email to: (1) Dara O'Byrne, Planner IV, dobyrne@oaklandca.gov, (2) Robert Merkamp, Zoning Manager, at Rmerkamp@oaklandca.gov, and (3) Catherine Payne, Development Planning Manager, at Cpayne@oaklandca.gov. The appeal form is available online at https://www.oaklandca.gov/documents/appeal-application-form. The appeal shall state specifically wherein it is claimed there was error or abuse of discretion by the Zoning Manager or decision-making body or wherein the decision is not supported by substantial evidence. Applicable appeal fees in the amount of $1,180.00 in accordance with the City of Oakland Master Fee Schedule must be paid within five (5) business days of filing the appeal. Failure to timely appeal (or to timely pay all appeal fees) will preclude you, or any interested party, from challenging the City's decision in court. The appeal itself must raise each and every issue that is contested, along with all the arguments and evidence in the record which supports the basis of the appeal; failure to do so may preclude you, or any interested party, from raising such issues during the appeal and/or in court. However, the appeal will be limited to issues and/or evidence presented to the Zoning Manager prior to the close of the previously noticed public comment period on the matter. For further information, see the attached Interim City Administrator Emergency Order No. 3 and Interim Procedures for Appeals of City Planning Commission Decisions for Development Projects.

If you have any questions, please contact the case planner, **Dara O'Byrne** at **(510) 238-6983** or **dobyrne@oaklandca.gov,** however, this does not substitute for filing of an appeal as described above.

Very Truly Yours,

CATHERINE PAYNE
Acting Development Planning Manager

cc: Brian Mulry, Office of the City Attorney

Attachments:

A. West Oakland Specific Plan EIR Addendum #1, Transportation Analysis (non-CEQA), Transportation and Parking Demand Management Plan, Greenhouse Gas Reduction Plan and CEQA Technical Memo: West Oakland BART TOD Project – Assessment of Project Changes, dated October 22, 2020
B. Findings for Approval
C. Proposed Revision to West Oakland BART TOD Preliminary Development Plan, dated September 16, 2020
D. Proposed Revision to Vesting Tentative Parcel Map, 10940
E. Proposed T1 Final Development Plan, dated September 16, 2020
F. Proposed Horizontal Improvements Final Development Plan, dated September 16, 2020
G. Proposed T3 Final Development Plan, dated September 16, 2020
H. Conditions of Approval:
    1. Standard Conditions of Approval, with proposed revisions and clean copy
    2. Oakland Department of Transportation, Engineering Services Conditions of Approval
    3. Oakland Department of Transportation, City Surveyor Conditions of Approval
    4. Oakland Fire Department Conditions of Approval

ATTACHMENT B

FINDINGS FOR APPROVAL

This proposal meets all the required Design Review Criteria (Section 17.136.050), Minor Variance Criteria, and Planned Unit Development Permit Criteria (Section 17.140.080) as set forth below and which are required to approve your application. This proposal does not contain characteristics that require denial pursuant to the Tentative Map Findings (Section 16.08.030) and is consistent with the Lot Design Standards (Section 16.24.040) of the Oakland Subdivision Regulations. Required findings are shown in regular type; reasons your proposal satisfies them are shown in *italics* type. (Note: the Project's conformance with the following findings is not limited to the discussion below, but is also included in all discussions in this report, at the hearing, and elsewhere in the record).

City of Oakland Design Review Findings

The proposed West Oakland BART TOD Preliminary Development Plan revision design is subject to Planning Code Section 17.136.050 - Regular design review criteria. Accordingly, regular design review approval may be granted only if the proposal conforms to all of the following general design review criteria, as well as to any and all other applicable design review criteria:

17.136.050 Regular design review criteria.

Regular design review approval may be granted only if the proposal conforms to all of the following general design review criteria, as well as to any and all other applicable design review criteria:

For Residential Facilities.

1. That the proposed design will create a building or set of buildings that are well related to the surrounding area in their setting, scale, bulk, height, materials, and textures:

   The proposed West Oakland BART TOD project includes two mixed-use buildings with residential facilities. Both buildings are designed to comply with the applicable design regulations for the site. Each building on the site is designed to complement, but not mimic, the other. The modern style of the project and the highly articulated facades ensure that the neighborhood will be attractive, visually complex and varied. The project fits the vision set forth in the West Oakland Specific Plan (WOSP) Design Guidelines

2. That the proposed design will protect, preserve, or enhance desirable neighborhood characteristics;

   The West Oakland BART TOD project is adjacent to the South Prescott neighborhood, which is part of the broader West Oakland neighborhood. The project complies with the intent of the WOSP design guidelines and provides massing and style that support a unique visual appearance in the neighborhood, while respecting the adjacent residential neighborhood height and character.

3. That the proposed design will be sensitive to the topography and landscape.

   The West Oakland BART TOD site is located in a generally flat area. The project site is bounded by 7th Street to the north, 5th Street to the south, Chester Street to the west, and Mandela Parkway to the east. Existing land uses in the vicinity include multi-story commercial and residential development to the north, parking/fuel station/vacant lot to the east, light industrial and low-rise residential to the south, and low-rise residential to the west.

   The site is currently surface parking with the BART tracks running diagonally through it with the BART station in the center. The project creates a signature tower at the corner of Mandela Pkwy and 7th St, which was envisioned with the WOSP.

4. That, if situated on a hill, the design and massing of the proposed building relates to the grade of the hill;

   NA.

5. That the proposed design conforms in all significant respects with the Oakland General Plan and with any applicable design review guidelines or criteria, district plan, or development control map which have been adopted by the Planning Commission or City Council.

   As noted throughout this staff report, the West Oakland BART TOD Preliminary Development Plan is consistent with the General Plan and West Oakland Specific Plan and complies with the underlying regulations controlling development of the site, when considering the density and height increases and the reduction in parking and open space as a result of the State Affordable Housing Bonus. The project meets the intent of the West Oakland Specific Plan design guidelines.

For Nonresidential Facilities and Signs.

1. That the proposal will help achieve or maintain a group of facilities which are well related to one another and which, when taken together, will result in a well-composed design, with consideration given to site, landscape, bulk, height, arrangement, texture, materials, colors, and appurtenances; the relation of these factors to other facilities in the vicinity; and the relation of the proposal to the total setting as seen from key points in the surrounding area. Only elements of design which have some significant relationship to outside appearance shall be considered, except as otherwise provided in Section 17.136.060;

   The proposed project creates a well-composed design in relationship to the West Oakland BART station and the surrounding neighborhood. The project includes three distinct buildings with retail on the ground floor throughout the site, creating activated public spaces. The project is well positioned to the total setting of the surrounding area, with the high-rise tower creating a signature element in the neighborhood at 7th St and Mandela Pkwy, with mid-rise buildings and three-story residential units facing residential neighborhoods.

2. That the proposed design will be of a quality and character which harmonizes with, and serves to protect the value of, private and public investments in the area;

   The proposed project transforms a surface parking lot into a dynamic transit-oriented development, which is of a quality and character envisioned in the West Oakland Specific Plan. The project will protect the value of the neighborhood by providing affordable housing, office space, and neighborhood serving retail.

2. That the proposed design conforms in all significant respects with the Oakland General Plan and with any applicable design review guidelines or criteria, district plan, or development control map which have been adopted by the Planning Commission or City Council.

   The proposed project complies with the vision of a transit-oriented district in the Oakland General Plan and the West Oakland Specific Plan. The project also complies with the West Oakland Specific Plan Design Guidelines, providing a transit-oriented development with residential, office, and neighborhood-serving retail on the ground floor. The project provides active pedestrian-oriented facades along all street frontages and facing the public spaces around the BART station.

City of Oakland Variance Findings

The proposed West Oakland BART TOD project requires a minor variance for reduced on-street commercial loading. Accordingly, minor variance approval may be granted only if the proposal conforms to all of the following general variance findings, below:

17.148.050 Findings required.

A. With the exception of variances for Adult Entertainment Activities or Sign Facilities, a variance may be granted only upon determination that all of the following conditions are present:

1. That strict compliance with the specified regulation would result in practical difficulty or unnecessary hardship inconsistent with the purposes of the zoning regulations, due to unique physical or topographic circumstances or conditions of design; or, as an alternative in the case of a minor variance, that such strict compliance would preclude an effective design solution improving livability, operational efficiency, or appearance.

   Strict compliance with the off-street loading regulations would preclude an effective design solution. The project is required to have three commercial loading berths, each measuring 12'w x 33'd x 14'h. Loading access is limited to the building frontage along Mandela Parkway because curb cuts or driveways for off-street loading are not feasible on 5th St due to AC Transit bus stop and bus layover areas along 5th St. Three full sized berths would limit the Mandela frontage to only vehicular access/usage and reduce the potential retail area on the ground level. Additional curb cuts would also negatively impact the Class IV Cycletrack along Mandela and the pedestrian environment. In addition, the Planning Code discourages driveways from being located within 20 feet of pedestrian walkways or plazas. Therefore the proposed variance is to provide one full sized berth on the ground level and two smaller 12'w x 25'd x 8'-2"h berths in the uppermost basement parking level.

2. That strict compliance with the regulations would deprive the applicant of privileges enjoyed by owners of similarly zoned property; or, as an alternative in the case of a minor variance, that such strict compliance would preclude an effective design solution fulfilling the basic intent of the applicable regulation.

   Strict compliance with the regulations would lead to the entire length of Mandela being dedicated to loading and parking, with very large curb cuts that would likely not meet City regulations for distance from the intersection and distance from pedestrian walkways. Accommodating three full sized berths would eliminate all retail frontage and pedestrian entries on Mandela Parkway. Maximizing retail uses on Mandela Parkway is desirable to active this corner.

3. That the variance, if granted, will not adversely affect the character, livability, or appropriate development of abutting properties or the surrounding area, and will not be detrimental to the public welfare or contrary to adopted plans or development policy.

The proposed project, specifically T4, provides one loading birth that complies with the Planning Code and two loading births that do not comply with the height requirements, so smaller trucks or vans could use these spaces for loading.

4. That the variance will not constitute a grant of special privilege inconsistent with limitations imposed on similarly zoned properties or inconsistent with the purposes of the zoning regulations.

   Most of the building program is dedicated to office space, which generally requires loading from smaller vans that can be accommodated in the two basement loading berths. The larger ground floor loading berth can accommodate full sized trucks for the offices but will mostly be utilized by the retail tenants.

5. That the elements of the proposal requiring the variance (e.g., elements such as buildings, walls, fences, driveways, garages and carports, etc.) conform with the regular design review criteria set forth in the design review procedure at Section 17.136.050.

   Off-street loading that is located off the street improves the overall site plan and design of the building, which is a well-designed and articulated mixed-use, transit-oriented development.

6. That the proposal conforms in all significant respects with the Oakland General Plan and with any other applicable guidelines or criteria, district plan, or development control map which have been adopted by the Planning Commission or City Council.

   The proposed project complies with the applicable regulatory framework in all ways, with the exception of this minor variance and the waivers and concessions allowed by the State Affordable Housing Bonus program. The proposed project otherwise conforms to the underlying Planned Unit Development regulations, zoning district, WOSP, and General Plan designation.

7. For proposals involving one (1) or two (2) residential dwelling units on a lot: That, if the variance would relax a regulation governing maximum height, minimum yards, maximum lot coverage or maximum floor area ratio, the proposal also conforms with at least one of the following additional criteria:
   1. The proposal when viewed in its entirety will not adversely impact abutting residences to the side, rear, or directly across the street with respect to solar access, view blockage and privacy to a degree greater than that which would be possible if the residence were built according to the applicable regulation and, for height variances, the proposal provides detailing, articulation or other design treatments that mitigate any bulk created by the additional height; or
   2. Over sixty percent (60%) of the lots in the immediate vicinity are already developed and the proposal does not exceed the corresponding as-built condition on these lots and, for height variances, the proposal provides detailing, articulation or other design treatments that mitigate any bulk created by the additional height. The immediate context shall consist of the five (5) closest lots

on each side of the project site plus the ten (10) closest lots on the opposite side of the street (see illustration I-4b); however, the Director of City Planning may make an alternative determination of immediate context based on specific site conditions. Such determination shall be in writing and included as part of any decision on any variance.

NA.

Planned Unit Development Findings

17.140.080 Permit criteria.
A Planned Unit Development permit may be granted only if it is found that the development (including conditions imposed under the authority of Sections 17.142.060 and 17.140.030) conforms to all of the following criteria, as well as to the Planned Unit Development regulations in Chapter 17.142:

A. That the location, design, size, and uses are consistent with the Oakland General Plan and with any other applicable plan, development control map, design guidelines, or ordinance adopted by the City Council or Planning Commission;
The location, design, size, and uses in the proposed project are consistent with the Oakland General Plan, the West Oakland Specific Plan (WOSP), the WOSP Design Guidelines, and the S-15W designation in the Planning Code, as described in the staff report above. The Oakland General Plan and WOSP designate the site Community Commercial and as transit-oriented development. This designation seeks to encourage neighborhood center uses and larger scale retail and commercial uses, which can be complemented by the addition of urban residential development and compatible mixed use development. The project site is zoned as Transit-Oriented Development Commercial Zone (S-15W), which is intended to feature high-density residential, commercial, and mixed-use developments to encourage a balance of pedestrian-oriented activities, transit opportunities, and concentrated development near transit stations. The proposed uses (mixed-use multi-family residential, office, and retail) are allowable under the General Plan designation and zoning.

The project would be substantially consistent with the development density established by existing zoning, community plan, or General Plan policies and the State Affordable Housing Density Bonus Law, which requires that the City grant a density bonus if the project meets affordable housing requirements. Requested variations from base zoning, community plan or General Plan requirements are allowable under the applicable local and State regulations and would therefore not represent conflicts with applicable plans.

B. That the location, design, and size are such that the development can be well integrated with its surroundings, and, in the case of a departure in character from surrounding uses, that the location and design will adequately reduce the impact of the development;
The development adheres to the WOSP Design Guidelines to ensure the location, design, and size are integrated into the surroundings of the neighborhood. The WOSP envisioned a signature tower at the corner of Mandela Pkwy and 7th St, which is included in the proposed development. This tower is a departure from existing community character, but is responding to the community's vision for the future of the neighborhood. The WOSP EIR determined that the increased height and density was appropriate for the transit site and would not result in a substantial conflict with existing uses if building height transitions were considered at boundaries. The project proposes low-rise residential units along the Chester Street boundary with the South Prescott neighborhood low-rise residential units consistent

with this conclusion and would therefore be consistent with the less-than-significant conclusion in the WOSP EIR.

C. That the location, design, size, and uses are such that traffic generated by the development can be accommodated safely and without congestion on major streets and will avoid traversing other local streets;
Consistent with the findings of the WOSP EIR, the WOSP EIR Addendum #1 finds that the project would not result in any significant impacts related to transportation or circulation. Further, based on an examination of the other Program EIRs, implementation of the project would not result in an increase in the severity of any previously identified impacts, nor would it result in new significant impacts related to transportation or circulation that were not previously identified in the WOSP EIR and Program EIRs.

The project is required to prepare and implement a Transportation and Parking Demand Management Plan (TDM Plan) because it would generate more than 50 peak hour trips. The TDM Plan includes on-going operational strategies, as well as infrastructure improvements in the project vicinity, that encourage the use of non-automobile travel modes.

The project aims to improve access to the site by walking, biking, and transit to replace the more auto-oriented existing site. The major infrastructure improvements included in the project consist of:

- *New Class IV bicycle lanes along both directions of 7th Street and Mandela Parkway adjacent to the project.*
- *Improved sidewalks and other pedestrian amenities along the project frontages and pedestrian safety and accessibility improvements along the corridor and at intersections*
- *Enhanced bus facilities along the project frontage.*

D. That the location, design, size, and uses are such that the residents or establishments to be accommodated will be adequately served by existing or proposed facilities and services;
The project can be adequately served by existing and proposed services and facilities. The WOSP EIR concluded that while development of the Plan Area would increase demand for public services and recreation, it also includes improvements and would pay development fees to support services and the impacts in this regard would be less-than-significant or reduced to that level through implementation of applicable SCAs. The project would comply with the following SCAs related to public services, parks, and recreation: SCA-GEN-1: Compliance with Other Requirements (#3), SCA-PUB-1: Capital Improvements Impact Fee (#74), and SCA-HAZ-4: Fire Safety Phasing Plan (#46).

E. That the location, design, size, and uses will result in an attractive, healthful, efficient, and stable environment for living, shopping, or working, the beneficial effects of which environment could not otherwise be achieved under the zoning regulations;
The project's location, design, size and uses will result in an attractive, healthful, efficient

and stable environment for living, shopping and working. As discussed in the General Plan, WOSP, and Zoning analysis, the project brings to fruition the vision of transit-oriented development surrounding the BART station. The project introduces up to 55,000 square feet of neighborhood-serving retail, 300,000 square feet of office, and 762 housing units to the community.

The PUD regulations provide the project with the flexibility to create a cohesive and integrated project with three separate primary buildings, particularly with the constraints of the BART station and BART tracks. The PUD regulations also provide more flexibility for phasing the implementation of the project.

F. That the development will be well integrated into its setting, will not require excessive earth moving or destroy desirable natural features, will not be visually obtrusive and will harmonize with surrounding areas and facilities, will not substantially harm major views for surrounding residents, and will provide sufficient buffering in the form of spatial separation, vegetation, topographic features, or other devices.
The proposed project will be well integrated into its setting. West Oakland is an urban setting with a combination of residential and industrial character. While the proposed project includes a modern, glass tower that will be distinct in the neighborhood, this site is implementing the vision of the WOSP by creating a signature tower at this location. The tower will not substantially harm major views for surrounding residents. The project site does not contain any natural features and earth moving will be limited to what is needed to create the basement, foundations, and a level site for walkways and plazas. The project creates a transition from the high rise tower to mid-rise building, to 38 ft tall residential units across from the South Prescott neighborhood on Chester St.

REQUIRED FINDINGS:
WEST OAKLAND BART TOD PROJECT (MANDELA STATION)
FINAL DEVELOPMENT PLAN T3

Required findings include:

- California Environmental Quality Act (provided throughout this record)
- Regular Design Review: Planning Code Section17.136.050
- Final Development Plan Conformity with PDP

City of Oakland Design Review Findings for FDP T3

The proposed West Oakland BART TOD Final Development Plan for T3 design is subject to Planning Code Section 17.136.050 - Regular design review criteria. Accordingly, regular design review approval may be granted only if the proposal conforms to all of the following general design review criteria, as well as to any and all other applicable design review criteria:

17.136.050 Regular design review criteria.

Regular design review approval may be granted only if the proposal conforms to all of the following general design review criteria, as well as to any and all other applicable design review criteria:

For Residential Facilities.

1. That the proposed design will create a building or set of buildings that are well related to the surrounding area in their setting, scale, bulk, height, materials, and textures:

    The proposed T3 mid-rise residential building is an 80 foot tall mixed-use building (stepping down to 38 ft on Chester St) with 240 affordable residential units. The site was designated in the West Oakland Specific Plan for a 60 foot tall transit-oriented development. The State Affordable Housing Bonus allows the project to exceed the height contemplated in the Planning Code and in the Specific Plan. While the building is taller than initially contemplated, the building steps down along Chester St to reduce the scale of the building adjacent to the residential neighborhood to the west. The building is well articulated along Chester St, providing a residential scale facing the residential neighborhood. The façade facing 5th St provides an appropriate scale with pedestrian-oriented ground floor retail and well-articulated upper stories. The bulk and scale of the non-articulated wall facing 7th St is broken up by art that will be visible from 7th St and from the BART tracks. If art is not provided along this wall, the applicant will revise the wall with additional articulation, depth, or texture to reduce the bulk of the wall and return to DRC for review. The project fits the vision set forth in the West Oakland Specific Plan (WOSP) Design Guidelines and the project specific Design Guidelines.

2. That the proposed design will protect, preserve, or enhance desirable neighborhood characteristics;

    The T3 mid-rise affordable housing building provides a good transition from the residential neighborhood to the west to the T1 high rise residential tower to the east. The project has residential activities along

Chester St with a 38 ft high building facade, stepping up to 80 ft in height along 5th St. The building provides pedestrian-oriented facades along all 4 sides of the building, enhancing 5th St and Chester St while also activating the plaza spaces around the BART station.

3. That the proposed design will be sensitive to the topography and landscape.

    The T3 mid-rise affordable housing building is located in a generally flat area. The building will reestablish street trees and other landscaping along Chester St and 5th St.

    The site is currently surface parking with the BART tracks running diagonally through it with the BART station in the center.

4. That, if situated on a hill, the design and massing of the proposed building relates to the grade of the hill;

    NA.

5. That the proposed design conforms in all significant respects with the Oakland General Plan and with any applicable design review guidelines or criteria, district plan, or development control map which have been adopted by the Planning Commission or City Council.

    As noted throughout this staff report, the mixed-use building T3 Final Development Plan is consistent with the General Plan and West Oakland Specific Plan and complies with the underlying regulations controlling development of the site, when considering the density and height increases and the reduction in parking and open space as a result of the State Affordable Housing Bonus. The project meets the intent of the West Oakland Specific Plan design guidelines as well as the project specific design guidelines.

For Nonresidential Facilities and Signs.

4. That the proposal will help achieve or maintain a group of facilities which are well related to one another and which, when taken together, will result in a well-composed design, with consideration given to site, landscape, bulk, height, arrangement, texture, materials, colors, and appurtenances; the relation of these factors to other facilities in the vicinity; and the relation of the proposal to the total setting as seen from key points in the surrounding area. Only elements of design which have some significant relationship to outside appearance shall be considered, except as otherwise provided in Section 17.136.060;

The proposed project creates a well-composed design in relationship to the West Oakland BART station and the surrounding neighborhood. The project includes an 80-ft tall residential building with a pedestrian-oriented base. The project is well positioned to the total setting of the surrounding area. The non-residential facilities are a minor component of this project, including the ground floor, pedestrian-oriented retail facing 5th St and the plazas on the interior of the site.

5. That the proposed design will be of a quality and character which harmonizes with, and serves to protect the value of, private and public investments in the area;

    The proposed project transforms a surface parking lot into a dynamic transit-oriented development, which is of a quality and character envisioned in the West Oakland Specific Plan. The project will protect the value of the neighborhood by providing affordable housing and neighborhood serving retail.

6. That the proposed design conforms in all significant respects with the Oakland General Plan and with any applicable design review guidelines or criteria, district plan, or development control map which have been adopted by the Planning Commission or City Council.

    The proposed project complies with the vision of a transit-oriented district in the Oakland General Plan and the West Oakland Specific Plan. The project also complies with the West Oakland Specific Plan Design Guidelines, providing a transit-oriented development with residential, office, and neighborhood-serving retail on the ground floor. The project provides active pedestrian-oriented facades along all facades of the building.

Final Development Plan Conformity with
Preliminary Development Plan Findings for T3

1. The final plan shall conform in all major respects with the approved preliminary development plan.
   The FDP for residential building T3 substantially conforms in all major respects with the proposed revision to the Preliminary Development Plan, including number of residential units, height, scale, and proposed land use activities.

2. The final plan shall include all information included in the preliminary development plan plus the following: the location of water, sewerage, and drainage facilities; detailed building and landscaping plans and elevations; the character and location of signs; plans for street improvements; and grading or earth-moving plans.
   The FDP for residential building T3 includes all information in the PDP plus details related to utilities, building design, and grading. The FDP includes details for street improvements, but these are also addressed in detail in the FDP for Horizontal Improvements.

3. The final plan shall be sufficiently detailed to indicate fully the ultimate operation and appearance of the development. Copies of legal documents required for dedication or reservation of group or common spaces, for the creation of nonprofit homes' association, or for performance bonds, shall also be submitted.
   The FDP for residential building T3 is sufficiently detailed to indicate the ultimate operation and appearance of the development.

Appendix C

California Emissions Estimator Model (CalEEMod) Construction-Period Emissions

Lamphier-Gregory, 2025

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	T-3 no Haul
Construction Start Date	1/6/2025
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.90
Precipitation (days)	17.0
Location	37.80469055881507, -122.29619550951847
County	Alameda
City	Oakland
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	1480
EDFZ	1
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.28

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Apartments Mid Rise	240	Dwelling Unit	1.00	230,400	0.00	—	677	—
Strip Mall	12.8	1000sqft	0.00	12,850	0.00	—	—	—

Enclosed Parking with Elevator	50.0	Space	0.00	20,000	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	PM10E	PM2.5E
Daily, Summer (Max)	—	—	—	—
Unmit.	1.18	6.56	0.23	0.21
Daily, Winter (Max)	—	—	—	—
Unmit.	338	62.4	1.37	1.34
Average Daily (Max)	—	—	—	—
Unmit.	9.96	4.85	0.16	0.15
Annual (Max)	—	—	—	—
Unmit.	1.82	0.89	0.03	0.03

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	PM10E	PM2.5E
Daily - Summer (Max)	—	—	—	—
2025	1.18	6.56	0.23	0.21
Daily - Winter (Max)	—	—	—	—
2025	338	62.4	1.37	1.34
Average Daily	—	—	—	—
2025	9.96	4.85	0.16	0.15

Annual	—	—	—	—
2025	1.82	0.89	0.03	0.03

3. Construction Emissions Details

3.1. Demolition (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM2.5E
Onsite	—	—	—	—
Daily, Summer (Max)	—	—	—	—
Daily, Winter (Max)	—	—	—	—
Off-Road Equipment	0.47	4.33	0.16	0.14
Demolition	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—
Off-Road Equipment	0.03	0.24	0.01	0.01
Demolition	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Annual	—	—	—	—
Off-Road Equipment	< 0.005	0.04	< 0.005	< 0.005
Demolition	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Offsite	—	—	—	—
Daily, Summer (Max)	—	—	—	—
Daily, Winter (Max)	—	—	—	—
Worker	0.03	0.03	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	0.03	1.72	0.03	0.03

Average Daily	—	—	—	—
Worker	< 0.005	< 0.005	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.09	< 0.005	< 0.005
Annual	—	—	—	—
Worker	< 0.005	< 0.005	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.02	< 0.005	< 0.005

3.3. Site Preparation (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM2.5E
Onsite	—	—	—	—
Daily, Summer (Max)	—	—	—	—
Daily, Winter (Max)	—	—	—	—
Off-Road Equipment	0.47	4.16	0.21	0.20
Dust From Material Movement	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—
Off-Road Equipment	< 0.005	0.02	< 0.005	< 0.005
Dust From Material Movement	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Annual	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	< 0.005	< 0.005
Dust From Material Movement	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Offsite	—	—	—	—
Daily, Summer (Max)	—	—	—	—

Daily, Winter (Max)	—	—	—	—
Worker	0.02	0.02	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—
Worker	< 0.005	< 0.005	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00
Annual	—	—	—	—
Worker	< 0.005	< 0.005	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00

3.5. Grading (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM2.5E
Onsite	—	—	—	—
Daily, Summer (Max)	—	—	—	—
Daily, Winter (Max)	—	—	—	—
Off-Road Equipment	1.09	10.1	0.46	0.43
Dust From Material Movement	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—
Off-Road Equipment	0.01	0.11	0.01	< 0.005
Dust From Material Movement	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Annual	—	—	—	—
Off-Road Equipment	< 0.005	0.02	< 0.005	< 0.005

Dust From Material Movement	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Offsite	—	—	—	—
Daily, Summer (Max)	—	—	—	—
Daily, Winter (Max)	—	—	—	—
Worker	0.02	0.02	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	0.65	52.3	0.91	0.91
Average Daily	—	—	—	—
Worker	< 0.005	< 0.005	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	0.01	0.56	0.01	0.01
Annual	—	—	—	—
Worker	< 0.005	< 0.005	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.10	< 0.005	< 0.005

3.7. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM2.5E
Onsite	—	—	—	—
Daily, Summer (Max)	—	—	—	—
Off-Road Equipment	0.52	5.14	0.22	0.20
Onsite truck	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—
Off-Road Equipment	0.52	5.14	0.22	0.20
Onsite truck	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—

Off-Road Equipment	0.29	2.82	0.12	0.11
Onsite truck	0.00	0.00	0.00	0.00
Annual	—	—	—	—
Off-Road Equipment	0.05	0.51	0.02	0.02
Onsite truck	0.00	0.00	0.00	0.00
Offsite	—	—	—	—
Daily, Summer (Max)	—	—	—	—
Worker	0.63	0.41	0.00	0.00
Vendor	0.03	1.01	0.01	0.01
Hauling	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—
Worker	0.61	0.58	0.00	0.00
Vendor	0.02	1.07	0.01	0.01
Hauling	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—
Worker	0.33	0.28	0.00	0.00
Vendor	0.01	0.57	0.01	0.01
Hauling	0.00	0.00	0.00	0.00
Annual	—	—	—	—
Worker	0.06	0.05	0.00	0.00
Vendor	< 0.005	0.10	< 0.005	< 0.005
Hauling	0.00	0.00	0.00	0.00

3.9. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM2.5E
Onsite	—	—	—	—
Daily, Summer (Max)	—	—	—	—

Daily, Winter (Max)	—	—	—	—
Off-Road Equipment	0.51	4.37	0.19	0.18
Paving	0.00	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—
Off-Road Equipment	0.01	0.12	0.01	< 0.005
Paving	0.00	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Annual	—	—	—	—
Off-Road Equipment	< 0.005	0.02	< 0.005	< 0.005
Paving	0.00	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Offsite	—	—	—	—
Daily, Summer (Max)	—	—	—	—
Daily, Winter (Max)	—	—	—	—
Worker	0.06	0.05	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—
Worker	< 0.005	< 0.005	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00
Annual	—	—	—	—
Worker	< 0.005	< 0.005	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00

3.11. Architectural Coating (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	PM10E	PM2.5E
Onsite	—	—	—	—
Daily, Summer (Max)	—	—	—	—
Daily, Winter (Max)	—	—	—	—
Off-Road Equipment	0.13	0.88	0.03	0.03
Architectural Coatings	338	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—
Off-Road Equipment	< 0.005	0.02	< 0.005	< 0.005
Architectural Coatings	9.26	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Annual	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	< 0.005	< 0.005
Architectural Coatings	1.69	—	—	—
Onsite truck	0.00	0.00	0.00	0.00
Offsite	—	—	—	—
Daily, Summer (Max)	—	—	—	—
Daily, Winter (Max)	—	—	—	—
Worker	0.12	0.12	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—
Worker	< 0.005	< 0.005	0.00	0.00
Vendor	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00
Annual	—	—	—	—
Worker	< 0.005	< 0.005	0.00	0.00

Vendor	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	PM10E	PM2.5E
Daily, Summer (Max)	—	—	—	—
Total	—	—	—	—
Daily, Winter (Max)	—	—	—	—
Total	—	—	—	—
Annual	—	—	—	—
Total	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	PM10E	PM2.5E
Daily, Summer (Max)	—	—	—	—
Total	—	—	—	—
Daily, Winter (Max)	—	—	—	—
Total	—	—	—	—
Annual	—	—	—	—
Total	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	PM10E	PM2.5E
Daily, Summer (Max)	—	—	—	—
Avoided	—	—	—	—
Subtotal	—	—	—	—
Sequestered	—	—	—	—
Subtotal	—	—	—	—
Removed	—	—	—	—
Subtotal	—	—	—	—
—	—	—	—	—
Daily, Winter (Max)	—	—	—	—
Avoided	—	—	—	—
Subtotal	—	—	—	—
Sequestered	—	—	—	—
Subtotal	—	—	—	—
Removed	—	—	—	—
Subtotal	—	—	—	—
—	—	—	—	—
Annual	—	—	—	—
Avoided	—	—	—	—
Subtotal	—	—	—	—
Sequestered	—	—	—	—
Subtotal	—	—	—	—
Removed	—	—	—	—
Subtotal	—	—	—	—
—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	1/6/2025	2/3/2025	5.00	20.0	—
Site Preparation	Site Preparation	2/4/2025	2/6/2025	5.00	2.00	—
Grading	Grading	2/7/2025	2/12/2025	5.00	4.00	—
Building Construction	Building Construction	2/13/2025	11/20/2025	5.00	200	—
Paving	Paving	11/21/2025	12/5/2025	5.00	10.0	—
Architectural Coating	Architectural Coating	12/6/2025	12/20/2025	5.00	10.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Tractors/Loaders/Backhoes	Diesel	Average	2.00	6.00	84.0	0.37
Demolition	Rubber Tired Dozers	Diesel	Average	1.00	1.00	367	0.40
Demolition	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Site Preparation	Graders	Diesel	Average	1.00	8.00	148	0.41
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	6.00	148	0.41
Grading	Tractors/Loaders/Backhoes	Diesel	Average	1.00	7.00	84.0	0.37
Grading	Rubber Tired Dozers	Diesel	Average	1.00	6.00	367	0.40
Building Construction	Cranes	Diesel	Average	1.00	4.00	367	0.29
Building Construction	Forklifts	Diesel	Average	2.00	6.00	82.0	0.20
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37

Paving	Tractors/Loaders/Back	Diesel	Average	1.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Average	1.00	7.00	81.0	0.42
Paving	Rollers	Diesel	Average	1.00	7.00	36.0	0.38
Paving	Cement and Mortar Mixers	Diesel	Average	4.00	6.00	10.0	0.56
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	10.0	11.7	LDA,LDT1,LDT2
Demolition	Vendor	—	8.40	HHDT,MHDT
Demolition	Hauling	19.3	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	5.00	11.7	LDA,LDT1,LDT2
Site Preparation	Vendor	—	8.40	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	7.50	11.7	LDA,LDT1,LDT2
Grading	Vendor	—	8.40	HHDT,MHDT
Grading	Hauling	68.8	200	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	185	11.7	LDA,LDT1,LDT2
Building Construction	Vendor	31.0	8.40	HHDT,MHDT

Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	17.5	11.7	LDA,LDT1,LDT2
Paving	Vendor	—	8.40	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	37.1	11.7	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	8.40	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	466,560	155,520	19,275	6,425	—

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Ton of Debris)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	1,537	—

Site Preparation	0.00	0.00	1.00	0.00	—
Grading	0.00	2,200	3.00	0.00	—
Paving	0.00	0.00	0.00	0.00	0.15

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Apartments Mid Rise	0.15	0%
Strip Mall	0.00	0%
Enclosed Parking with Elevator	0.00	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2025	0.00	204	0.03	< 0.005

Appendix D

Affordable Housing Project at Mandela Station, NEPA/CEQA Air Quality Assessment

Illingworth & Rodkin, Inc., December 22,2025

AFFORDABLE HOUSING PROJECT AT MANDELA STATION - WEST NEPA/CEQA AIR QUALITY ASSESSMENT

Oakland, California

December 22, 2025

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Introduction

The purpose of this report is to address the air quality and health risk impacts associated with the proposed T-3 affordable housing development portion of the Mandela Station project. The Mandela Station project (formally known as the West Oakland BART Station Transit Oriented Development Planned Unit Development Project) will removal all of the existing 451 parking spaces at the West Oakland BART station's surface parking lot. In its place, three new mid-rise / high-rise buildings would be constructed. The development has been split into four areas labeled T-1 through T-4:

- T-1: a mixed-use building with 522 residential units, approximately 14,350 square feet of retail space, and 125 parking spaces,
- T-2: including the existing transit station, a program of landscape and streetscape improvements and a series of flexible kiosk spaces,
- T-3: a mid-rise mixed-use building with 16,000 square feet of ground-floor retail, 240 affordable residential units, 2,060 square feet of other non-residential space, and 50 parking spaces, and
- T-4: a mid-rise commercial building with 300,000 square feet of office, 23,200 square feet of ground-floor retail, and 210 parking spaces.

The T-3 development is a stand-alone Project, separate from the T-1 and T-4 development sites, and separate from the horizontal improvements associated with the T-2 site.

Air quality impacts from this project would be associated with demolition of existing parking lot and pavement, the construction of the new residential building and infrastructure, and operation of the Project. Air pollutants associated with construction and operation of the T-3 Project were estimated using the California Emissions Estimator Model (CalEEMod). In addition, the potential project health risks and the impacts of existing toxic air contaminant (TAC) sources affecting nearby sensitive receptors were evaluated. This analysis compares emissions to the federal general conformity emissions thresholds applicable to all U.S. Department of Housing and Urban Development (HUD) projects for National Environmental Policy Act (NEPA) compliance and the significance thresholds established by the Bay Area Air District for California Environmental Quality Act (CEQA) compliance.[1]

Project Description

The approximately one-acre T-3 project site is located near the West Oakland BART station and adjacent to the intersection of 5th and Chester Streets in Oakland, California. The T-3 project would remove the existing asphalt/concrete associated with surface parking facility and construct a mid-rise mixed-use building with 16,000 square feet of ground-floor retail, 240 affordable residential units, 2,060 square feet of other non-residential space, and 50 parking spaces. The site is part of the Mandela Station development and falls within the bounds of the West Oakland Specific Plan. A detailed construction schedule is not available. However, it is anticipated that the project would be constructed over a 24-month period with pavement removal, excavation and grading for soil

[1] Bay Area Air District, *2022 CEQA Air Quality Guidelines*, April 2023.

remediation, and building pad and footings and trenching for utility connections taking 4 months to complete, building construction taking 18 months, and two months for landscaping, streetscape improvements, paving, and architectural coatings.[2]

Setting

Air pollutants are governed by multiple federal and State standards to regulate and mitigate health impacts. At the federal level, the Clean Air Act (FCAA) requires the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), respirable particulate matter with a diameter less than 10 micrometers (PM_{10}), fine particulate matter ($PM_{2.5}$), and sulfur dioxide (SO_2). The U.S. EPA has also identified nine priority mobile source air toxics (MSATs): 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (DPM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter.[3] The project is in Santa Clara County, which is in the San Francisco Bay Area Air Basin. The Bay Area meets all NAAQS except for ground-level O_3 and $PM_{2.5}$. The MSAT, or TAC, with the greatest health risks to new residents is DPM.

The California Air Resources Board (CARB) has established more restrictive California Ambient Air Quality Standards (CAAQS) based on the California Clean Air Act (CCAA). Under current CARB designations, the Air Basin meets the CAAQS for all pollutants except for O_3, PM_{10}, and $PM_{2.5}$. CEQA also requires an evaluation of TAC health risks during project construction and operation. The TACs of most concern for construction and operation of projects are DPM and $PM_{2.5}$.

Air Pollutants of Concern

Ground-Level Ozone

High ozone levels are caused by the cumulative emissions of reactive organic gases (ROG) and nitrogen oxides (NO_X). These precursor pollutants react under certain meteorological conditions to form high O_3 levels. Controlling the emissions of these precursor pollutants is the focus of the Bay Area's attempts to reduce O_3 levels. The highest O_3 levels in the Bay Area occur in the eastern and southern inland valleys that are downwind of air pollutant sources. High O_3 levels aggravate respiratory and cardiovascular diseases, reduce lung function, and increase coughing and chest discomfort.

Particulate Matter (PM)

Particulate matter is assessed and measured in terms of respirable particulate matter or particles that have a diameter of 10 micrometers or less (PM_{10}) and fine particulate matter where particles

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[2] The duration for the emissions analysis is based on CalEEMod's default schedule and represents worst case daily/annual emissions.

[3] US Department of Transportation Federal Highway Administration, *Updated Interim Guidance on Mobile Source Air Toxic (MSAT) Analysis in National Environmental Policy Act (NEPA) Documents*, January 2023. Web: https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/.

have a diameter of 2.5 micrometers or less ($PM_{2.5}$). Elevated concentrations of PM_{10} and $PM_{2.5}$ are the result of both region-wide (or cumulative) emissions and localized emissions. High particulate matter levels aggravate respiratory and cardiovascular diseases, reduce lung function, increase mortality (e.g., lung cancer), and result in reduced lung growth in children.

Toxic Air Contaminants (TACs)

TACs are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer). TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter [DPM] near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, State, and federal level.

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about seventy percent of the cancer risk from TACs (based on the Bay Area average).[4] According to the CARB, diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects from diesel exhaust exposure a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the State's Proposition 65 or under the Federal Hazardous Air Pollutants programs. Health risks from TACs are estimated using California's Office of Environmental Health Hazard Assessment (OEHHA) risk assessment guidelines, which were published in February of 2015 and incorporated in Bay Area Air District's current CEQA guidance.[5]

Sensitive Receptors

CARB has identified the following groups of people more affected by air pollution than others: children under 16, people over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, and elementary schools. For cancer risk assessments, infants and small children are the most sensitive receptors, since they are more susceptible to cancer causing TACs. Residential locations are assumed to include infants and small children. The closest sensitive receptors to the project site are the single-family homes to the west across Chester Street and to the south across 5th Street from the project site. This project would also introduce new sensitive receptors (i.e., residents) to the area as buildings are completed and occupied.[6]

[4] CARB, *Summary: Diesel Particulate Matter Health Impacts*, Web: https://ww2.arb.ca.gov/resources/summary-diesel-particulate-matter-health-impacts#footnote1_7yob8j5.
[5] OEHHA, 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. February.
[6] Illingworth & Rodkin, 2021. *Mandela Station Lot 3 Mixed-Use Project Air Quality Community Risk Assessment*.

Authorities and Regulations

Federal

The FCAA, as amended, is the primary federal law that governs air quality while the CCAA is its companion state law. These laws and related regulations established by the EPA and the CARB set standards for the concentration of pollutants in the air. The federal and State standards are set at levels that protect public health with a margin of safety and are subject to periodic review and revision. Both State and federal regulatory schemes also cover TACs.

Areas that have ambient air quality in violation of the NAAQS are referred to as nonattainment areas. Nonattainment areas are required to develop, adopt, and implement a state implementation plan (SIP) to achieve, maintain, and enforce the NAAQS. SIPs are developed on a pollutant-by-pollutant basis for each NAAQS violated. In California, air pollution control agencies have primary responsibility for developing SIPs, generally in coordination with local and regional land use and transportation planning agencies. The San Francisco Bay Area is designated as nonattainment for the federal 8-hour O_3 standard and the 24-hour $PM_{2.5}$ standard. The San Francisco Bay Area is designated as attainment or unclassified for the other national ambient air quality standards.[7]

The EPA also sets nationwide emission and fuel standards for mobile sources, which include on-road (highway) motor vehicles such trucks, buses, and automobiles, and non-road (off-road) vehicles and equipment used in construction, agricultural, industrial, and mining activities (such as bulldozers and loaders). EPA has established a number of emission standards for on- and non-road heavy-duty diesel engines used in trucks and other equipment. Diesel engines are a significant source of nitrogen oxides, or NO_X, and particulate matter (PM_{10} and $PM_{2.5}$). Implementation of the heavy-duty diesel on-road vehicle standards, non-road diesel engine standards, and mobile source emission controls are responsible for greatly reducing mobile source air pollution during the last 30 years. Technological advances in vehicle and engine design, together with cleaner, higher-quality fuels, have reduced emissions so much that EPA expects the progress to continue, even as people drive more miles and use more power equipment every year.[8]

Under the FCAA, CARB may also adopt and enforce its own vehicle emissions and fuel standards. However, regardless of whether a manufacturer receives CARB approval, all new motor vehicles, engines, and fuels must still receive certification from EPA before they can be offered for sale.

The predominant regulation that guides assessment of air quality impacts of federal actions is the General Conformity Rule, established under the FCAA (Section 176(c)(4)). The General Conformity Rule ensures that the actions taken by federal agencies in nonattainment and maintenance areas do not interfere with a State's plans to meet the NAAQS.[9] Federal agencies

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[7] The unclassified designation includes attainment areas that comply with NAAQS, as well as areas for which monitoring data are lacking. Unclassified areas are treated as attainment areas for most regulatory purposes.
[8] US EPA, https://www.epa.gov/emission-standards-reference-guide/basic-information-about-emission-standards-reference-guide-road.
[9] Areas that have been reclassified from nonattainment to attainment of the NAAQS are automatically considered maintenance areas.

must prepare and evaluate the total direct and indirect emissions caused by certain federal activities should their action to implement a federal project be approved. Such conformity evaluations are required for all activities applicable under § 93.153 and are not otherwise presumed to already conform or be exempt. The General Conformity Rule applies pollutant-specific *de minimis* thresholds that are compared to project emissions, which include both construction and operation of the project. Emissions below the thresholds are considered to have little impact on the ambient air quality of an area and, therefore, have no impact on an area's NAAQS compliance. The *de minimis* pollutant thresholds that apply to the San Francisco Bay Area Air Basin are for O_3 precursors (VOC and NO_X) and $PM_{2.5}$.[10] The General Conformity *de minimis* thresholds for these pollutants are 100 tons per year.

In addition to the FCAA, NEPA requires that policies and regulations administered by the federal government are consistent with its environmental protection goals. NEPA also requires that federal agencies use an interdisciplinary approach to planning and decision-making for any actions that could impact the environment. It requires environmental review of federal actions including the creation of Environmental Documents that describe the environmental effects of a proposed project and its alternatives, including a section on air quality.

State

CARB has set statewide CAAQS that establish health-based concentration limits for ambient air quality and developed vehicle emissions and fuel standards for on-road and off-road mobile sources that are more stringent than those adopted by the EPA. Several of CARB's regulatory programs affect medium and heavy-duty diesel trucks that represent the bulk of DPM emissions from California highways. These regulations include the solid waste collection vehicle (SWCV) rule, in-use public and utility fleets, and the heavy-duty diesel truck and bus regulations. In 2008, CARB approved a regulation to reduce emissions of DPM and NO_X from on-road heavy-duty diesel fueled vehicles.[11] The regulation requires affected vehicles to meet specific performance requirements between 2014 and 2023, with all affected diesel vehicles required to have 2010 model-year engines or equivalent by 2023. Advanced Clean Cars and Advanced Clean Cars II (ACC II) that will require all new cars and light trucks sold in California will be zero-emission vehicles by 2035.

CARB has also adopted and implemented regulations to reduce DPM and NO_X emissions from in-use (existing) and new off-road heavy-duty diesel vehicles (e.g., loaders, tractors, bulldozers, backhoes, off-highway trucks, etc.).[12] The regulations apply to diesel-powered off-road vehicles with engines 25 horsepower (hp) or greater. The regulations are intended to reduce particulate matter and NO_X exhaust emissions by imposing limits on idling, requiring vehicles to be report to CARB's online reporting system, restringing the adding of older vehicles into fleets and banning older Tiered engines, and requiring owners to turn over their fleet (replace older equipment with newer equipment) or retrofit existing equipment in order to achieve specified fleet-averaged

[10] VOC = volatile organic compounds. The State of California reports Reactive Organic Compounds (ROG) as an ozone precursor.
[11] Available online: http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm. Accessed: November 21, 2014.
[12] CARB, Web: https://ww2.arb.ca.gov/resources/fact-sheets/overview-amendments-use-road-diesel-fueled-fleets-regulation

emission rates.[13] Implementation of this regulation, in conjunction with stringent federal off-road equipment engine emission limits for new vehicles, significantly reduces emissions of DPM and NO_X in order to help reduce health risks throughout California.

To address the issue of diesel emissions in the state, CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles.*[14] In addition to requiring more stringent emission standards for new on-road and off-road mobile sources and stationary diesel-fueled engines, a significant component of the plan involves application of emission control strategies to existing diesel vehicles and equipment.

CEQA is a State statute similar to NEPA that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. Local air districts get involved with CEQA by establishing thresholds of significance for both project construction and operation.

Local Air District

The Bay Area Air District has jurisdiction over an approximately 5,600-square mile area, commonly referred to as the San Francisco Bay Area (Bay Area). The District's boundary encompasses the nine San Francisco Bay Area counties, including Alameda County, Contra Costa County, Marin County, San Francisco County, San Mateo County, Santa Clara County, Napa County, southwestern Solano County, and southern Sonoma County.

Bay Area Air District is the lead agency in developing plans to address attainment and maintenance of the NAAQS and CAAQS. It also has authority to permit most types of stationary equipment utilized for industrial, commercial, and residential purposes. Bay Area Air District's responsibilities include permitting and inspection of stationary sources; enforcement of FCAA and CCAA regulations, including setting fees, levying fines, and enforcement actions; and ensuring that public nuisances and health risks are minimized.

Bay Area Air District's Community Air Risk Evaluation (CARE) program was initiated in 2004 to evaluate and reduce health risks associated with exposures to outdoor TACs in the Bay Area.[15] The program examines TAC emissions from point sources, area sources, and on-road and off-road mobile sources with an emphasis on diesel exhaust, which is a major contributor to airborne health risk in California. The CARE program is on-going and encourages community input. The technical analysis portion of the CARE program has been implemented in three phases that includes an assessment of the sources of TAC emissions, modeling and measurement programs to estimate concentrations of TAC, and an assessment of exposures and health risks. Throughout the program, information derived from the technical analyses has been used to develop emission reduction activities in areas with high TAC exposures and high density of sensitive populations. Risk reduction activities associated with the CARE program are focused on the most at-risk

[13] CARB, Web: https://ww2.arb.ca.gov/our-work/programs/truckstop-resources/road-zone/road-diesel-regulation
[14] California Air Resources Board, 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. October.
[15] See Bay Area Air District: https://www.baaqmd.gov/community-health/community-health-protection-program/community-air-risk-evaluation-care-program.

communities in the Bay Area. Seven areas have been identified by Bay Area Air District as impacted communities. They include Eastern San Francisco, Richmond/San Pablo, Western Alameda, San José, Vallejo, Concord, and Pittsburgh/Antioch. The project site is within the Western Alameda CARE area.

Overburdened communities are areas located either (i) within a census tract identified by the California Communities Environmental Health Screening Tool (CalEnviroScreen), Version 4.0 implemented by OEHHA, as having an overall score at or above the 70th percentile, or (ii) within 1,000 feet of any such census tract.[16] The Bay Area Air District has identified several overburdened areas within its boundaries. The project site is located in an overburdened census tract as identified by CalEnviroScreen.[17] The census tract in which the project is located ranked within the 93rd percentile.

Bay Area Air District CEQA Air Quality Guidelines

In June 2010, Bay Area Air District adopted thresholds of significance to assist in the review of projects under CEQA. In 2023, Bay Area Air District revised the *CEQA Air Quality Guidelines* that include significance thresholds to assist in the evaluation of air quality impacts of projects and plans proposed within the Bay Area. The current Bay Area Air District guidelines provide recommended procedures for evaluating potential air impacts during the environmental review process consistent with CEQA requirements including thresholds of significance, mitigation measures, and background air quality information. They include assessment methodologies for criteria air pollutants and TAC emissions as shown in Table 1.[18] Air quality impacts and health risks are considered potentially significant if they exceed these thresholds.

The Bay Area Air District recommends all projects include a "basic" set of best management practices (BMPs) to manage fugitive dust. Project impacts from dust (i.e., fugitive PM_{10} and $PM_{2.5}$) are considered to be less than significant for CEQA purposes if BMPs are implemented (listed below). Bay Area Air District strongly encourages enhanced BMPs for construction sites near schools, residential areas, other sensitive land uses, or if air quality impacts were found to be significant.

[16] See Bay Area Air District: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-2-permits/2021-amendments/documents/20210722_01_appendixd_mapsofoverburdenedcommunities-pdf.pdf?la=en.
[17] OEHAA, CalEnviroScreen 4.0 Maps https://experience.arcgis.com/experience/11d2f52282a54ceebcac7428e6184203/page/CalEnviroScreen-4_0/
[18] Bay Area Air District, *2022 CEQA Air Quality Guidelines*. April 2023.

Table 1. Bay Area Air District CEQA Significance Thresholds

<table>
<tr><th rowspan="2">Criteria Air Pollutant</th><th colspan="2">Construction Thresholds</th><th colspan="2">Operational Thresholds</th></tr>
<tr><th colspan="2">Average Daily Emissions (lbs./day)</th><th>Average Daily Emissions (lbs./day)</th><th>Annual Average Emissions (tons/year)</th></tr>
<tr><td>ROG</td><td colspan="2">54</td><td>54</td><td>10</td></tr>
<tr><td>NO_X</td><td colspan="2">54</td><td>54</td><td>10</td></tr>
<tr><td>PM_{10}</td><td colspan="2">82 (Exhaust)</td><td>82</td><td>15</td></tr>
<tr><td>$PM_{2.5}$</td><td colspan="2">54 (Exhaust)</td><td>54</td><td>10</td></tr>
<tr><td>CO</td><td colspan="2">Not Applicable</td><td colspan="2">9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)</td></tr>
<tr><td>Fugitive Dust</td><td colspan="2">Construction Dust Ordinance or other Best Management Practices (BMPs)*</td><td colspan="2">Not Applicable</td></tr>
<tr><th>Health Risks and Hazards</th><th colspan="2">Single Sources/ Individual Project</th><th colspan="2">Combined Sources (Cumulative from all sources within 1000-foot zone of influence)</th></tr>
<tr><td>Excess Cancer Risk</td><td>>10.0 in a million</td><td rowspan="3">OR Compliance with Qualified Community Risk Reduction Plan</td><td>>100 in a million</td><td rowspan="3">OR Compliance with Qualified Community Risk Reduction Plan</td></tr>
<tr><td>Hazard Index</td><td>>1.0</td><td>>10.0</td></tr>
<tr><td>Incremental annual $PM_{2.5}$</td><td>>0.3 $\mu g/m^3$</td><td>>0.8 $\mu g/m^3$</td></tr>
<tr><td colspan="5">Note: ROG = reactive organic gases, NO_X = nitrogen oxides, PM_{10} = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less.
* Bay Area Air District strongly recommends implementing all feasible fugitive dust management practices especially when construction projects are located near sensitive communities, including schools, residential areas, or other sensitive land uses.</td></tr>
</table>

Source: Bay Area Air District, 2022

City of Oakland

Standard Conditions of Approval

The City of Oakland has established Standard Conditions of Approval (SCAs)[19] that are applicable to all projects. SCAs applicable to the project are considered requirements of the project and not mitigation. The applicable air quality SCAs include:

22. Dust Controls – Construction Related

Requirement: The project applicant shall implement all of the following applicable dust control measures during construction of the project:

a) Water all exposed surfaces of active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever feasible.

[19] City of Oakland Department of Planning and Building Bureau of Planning, *Standard Conditions of Approval*, Adopted November 3, 2008, and revised August 1, 2025. Web: https://www.oaklandca.gov/files/assets/city/v/4/planning-amp-building/documents/pc/forms-and-apps/current-standard-conditions-of-approval.pdf

b) Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).
c) 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.
d) Limit vehicle speeds on unpaved roads to 15 miles per hour.
e) All excavation, grading, and/or demolition activities (if any) shall be suspended when average wind speeds exceed 20 mph.
f) All trucks and equipment, including tires, shall be washed off prior to leaving the site.
g) Unpaved roads providing access to sites located 100 feet or further from a paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.
h) All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

23. Criteria Air Pollutant Controls - Construction and Operation Related

Requirement: The project applicant shall implement all of the following applicable basic control measures for criteria air pollutants during construction of the project as applicable:

a) Idling times on all diesel-fueled commercial vehicles over 10,000 lbs. shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to two minutes (as required by the California airborne toxics control measure Title 13, Section 2485, of the California Code of Regulations). Clear signage to this effect shall be provided for construction workers at all access points.
b) Idling times on all diesel-fueled off-road vehicles over 25 horsepower shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to two minutes and fleet operators must develop a written policy as required by Title 23, Section 2449, of the California Code of Regulations ("California Air Resources Board Off-Road Diesel Regulations").
c) All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. Equipment check documentation should be kept at the construction site and be available for review by the City and the Bay Area Air Quality District as needed.
d) Portable equipment shall be powered by grid electricity if available. If electricity is not available, propane or natural gas generators shall be used if feasible. Diesel engines shall only be used if grid electricity is not available and propane or natural gas generators cannot meet the electrical demand.
e) Low VOC (i.e., ROG) coatings shall be used that comply with Air District Regulation 8, Rule 3: Architectural Coatings.
f) All equipment to be used on the construction site shall comply with the requirements of Title 13, Section 2449, of the California Code of Regulations ("California Air Resources Board Off-Road Diesel Regulations") and upon request by the City (and the Air District if specifically requested), the project applicant shall provide written documentation that fleet requirements have been met.

24. Toxic Air Contaminant Controls-Construction Related

a) *Particulate Matter Reduction Measures*

Requirement: The project applicant shall implement appropriate measures during construction to reduce potential health risks to sensitive receptors due to exposure to diesel particulate matter (DPM) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) in exhaust and fugitive emissions from construction activities. The project applicant shall choose to implement I or both ii and iii:

i. The project applicant shall retain a qualified air quality consultant to prepare a Health Risk Assessment (HRA) in accordance with current guidance from the California Air Resources Board (CARB), the Office of Environmental Health and Hazard Assessment (OEHHA), and the Bay Area Air Quality Management District (Air District) to determine the health risk to sensitive receptors exposed to DPM and $PM_{2.5}$ from exhaust and fugitive emissions from project construction. The HRA shall be based on project-specific construction schedule, equipment, and activity data. Estimated project-level health risks shall be compared to the City's health risk significance thresholds for projects. The HRA shall be submitted to the City (and the Air District if specifically requested) for review and approval. If the HRA concludes that the health risk is at or below the City's health risk significance thresholds for projects, then DPM and $PM_{2.5}$ reduction measures are not required. If the HRA concludes that the health risk exceeds the City's health risk significance thresholds for projects, DPM and $PM_{2.5}$ reduction measures shall be identified to reduce the health risk to below the City's health risk significance thresholds as set forth under subsection b below. Identified DPM and $PM_{2.5}$ reduction measures shall be submitted to the City for review and approval prior to the issuance of building permits and the approved DPM and $PM_{2.5}$ reduction measures shall be implemented during construction.

-or-

ii. The project applicant shall incorporate the following health risk reduction measures into the project to reduce TAC emissions from construction equipment. These features shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City:

- All off-road diesel equipment shall be equipped with the most effective Verified Diesel Emission Control Strategies (VDECS) available for the engine type (Tier 4 engines automatically meet this requirement) as certified by CARB. The equipment shall be properly maintained and tuned in accordance with manufacturer specifications. This shall be verified through an equipment inventory submittal and Certification Statement that the Contractor agrees to compliance and acknowledges that a significant violation of this requirement shall constitute a material breach of contract.
- Where access to grid-powered electricity is available, portable diesel engines shall be prohibited and electric engines shall be used for concrete/industrial saws, sweepers/scrubbers, aerial lifts, welders, air compressors, fixed cranes, forklifts, cement and mortar mixers, pressure washers, and pumps.

Any other best available technology that reduces emissions offered at the time that future projects are reviewed may be included in the construction emissions minimization plan (e.g., alternative fuel sources, etc.).

-and-

iii. The project applicant shall implement all enhanced control measures included in Dust Controls – Construction Related.

b) *Construction Emissions Minimization Plan (if required by a above)*

Requirement: The project applicant shall prepare a Construction Emissions Minimization Plan (Emissions Plan) for all identified DPM reduction measures (if any). The Emissions Plan shall be submitted to the City (and the Bay Area Air Quality District if specifically requested) for review and approval prior to the issuance of building permits. The Emissions Plan shall include the following:

i. An equipment inventory summarizing the type of off-road equipment required for each phase of construction, including the equipment manufacturer, equipment identification number, engine model year, engine certification (tier rating), horsepower, and engine serial number. For all VDECS, the equipment inventory shall also include the technology type, serial number, make, model, manufacturer, CARB verification number level, and installation date.

ii. ii. A Certification Statement that the Contractor agrees to comply fully with the Emissions Plan and acknowledges that a significant violation of the Emissions Plan shall constitute a material breach of contract.

25. Reduce Exposure to Air Pollution (Toxic Air Contaminants)

a) *Health Risk Reduction Measures*

Requirement: The project applicant shall incorporate appropriate measures into the project design in order to reduce the potential health risk due to exposure to toxic air contaminants. The project applicant shall choose <u>one</u> of the following methods:

i. The project applicant shall retain a qualified air quality consultant to prepare a Health Risk Assessment (HRA) in accordance with California Air Resources Board (CARB) and Office of Environmental Health and Hazard Assessment requirements and in accordance with Bay Area Air Quality Management District (Air District) CEQA guidance for HRAs to determine the health risk of exposure of project residents/occupants/users to air pollutants and the exposure of existing off-site sensitive receptors to project-generated TAC emissions. The HRA shall be based on project-specific activity data. Estimated project-level health risks shall be compared to the City's health risk significance thresholds for projects. The HRA shall be submitted to the City for review and approval. If the HRA concludes that the health risk is at or below the City's health risk significance thresholds for projects, then health risk reduction measures are not required. If the HRA concludes that the health risk exceeds the City's health risk significance thresholds for projects, health risk reduction measures shall be identified to reduce the health risk below the City's health risk significance thresholds. Identified risk reduction measures shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City. The approved risk reduction measures shall be implemented during construction and/or operations as applicable.

-or-

ii. The project applicant shall incorporate the following health risk reduction measures into the project. These features shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City:

- Installation of mechanical ventilation systems to reduce cancer risks and Particulate Matter (PM) exposure for residents and other sensitive populations in the project that are in close proximity to sources of air pollution. Mechanical ventilation systems shall be capable of achieving the protection from particulate matter (PM2.5) equivalent to that associated with a MERV-16 filtration (as defined by American Society of Heating, Refrigerating, and Air-Conditioning Engineers standard 52.2). As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required.
- Where appropriate, install passive electrostatic filtering systems, especially those with low air velocities (i.e., 1 mph).
- Phasing of residential developments when proposed within 500 feet of freeways such that homes nearest the freeway are built last, if feasible.
- The project shall be designed to locate sensitive receptors as far away as feasible from the source(s) of air pollution. Operable windows, balconies, and building air intakes shall be located as far away from these sources as feasible. If near a distribution center, residents shall be located as far away as feasible from a loading dock or where trucks concentrate to deliver goods.
- Sensitive receptors shall be located on the upper floors of buildings, if feasible.
- Planting trees and/or vegetation between sensitive receptors and pollution source, if feasible. Trees that are best suited to trapping PM shall be planted, including one or more of the following: Pine (Pinus nigra var. maritima), Cypress (X Cupressocyparis leylandii), Hybrid poplar (Populus deltoids X trichocarpa), and Redwood (Sequoia sempervirens).
- Sensitive receptors shall be located as far away from truck activity areas, such as loading docks and delivery areas, as feasible.
- Existing and new diesel generators shall meet CARB's Tier 4 emission standards, if feasible.
- Emissions from diesel trucks shall be reduced through implementing the following measures, if feasible:
    - Installing electrical hook-ups for diesel trucks at loading docks.
    - Requiring trucks to use Transportation Refrigeration Units (TRU) that meet Tier 4 emission standards.
    - Requiring truck-intensive projects to use advanced exhaust technology (e.g., hybrid) or alternative fuels.
    - Prohibiting trucks from idling for more than two minutes.
    - Establishing truck routes to avoid sensitive receptors in the project. A truck route program, along with truck calming, parking, and delivery restrictions, shall be implemented.

b) *Maintenance of Health Risk Reduction Measures*

Requirement: The project applicant shall maintain, repair, and/or replace installed health risk reduction measures, including but not limited to the HVAC system (if applicable), on an ongoing and as-needed basis. Prior to occupancy, the project applicant shall prepare and then distribute to the building manager/operator an operation and maintenance manual for the HVAC system and filter including the maintenance and replacement schedule for the filter.

Oakland Thresholds of Significance

The City of Oakland has established SCAs applicable to all projects. To help clarify and standardize analysis and decision-making in the environmental review process in the City of Oakland, the City has also established CEQA Thresholds of Significance, which are consistent with those established by the Air District. The City's Thresholds are presented in Table 2 and are to be used in conjunction with the City's SCAs, which are incorporated into projects regardless of a project's environmental determination.

Specific to a health risk analysis, projects are considered significant if, during either project construction or project operation, they result in (a) an increase in cancer risk level greater than 10 in one million, (b) a non-cancer risk (chronic or acute) hazard index (HI) greater than 1.0, or (c) an increase of annual average $PM_{2.5}$ of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$). Under cumulative conditions, projects are considered significant if they result in (a) a cancer risk level greater than 100 in a million, (b) an HI greater than 10.0, or (c) annual average $PM_{2.5}$ of greater than 0.8 micrograms per cubic meter. Per the Air District CEQA guidance and the City's Guidelines, health risk impacts are to consider all TAC sources within 1,000 feet of the project.

Table 2. City of Oakland Thresholds of Significance

Health Risks and Hazards	Single Sources	Combined Sources
Excess Cancer Risk	>10 per one million	>100 per one million
Hazard Index	>1.0	>10.0
Incremental annual $PM_{2.5}$	>0.3 $\mu g/m^3$	>0.8 $\mu g/m^3$

Source: City of Oakland CEQA Thresholds of Significance Guidelines, September 26, 2023.

AIR QUALITY IMPACTS

Criteria Pollutant Emissions – Project Construction and Operation

The Bay Area is a nonattainment area for ground-level O_3 and $PM_{2.5}$ under the FCAA NAAQS. Because the Project will be receiving federal funding, the General Conformity Rule applies as do the *de minimis* thresholds for O_3 precursor pollutants (ROG and NO_X) and $PM_{2.5}$. These emissions thresholds apply to emissions from construction of the Project as well as operation. Emissions modeling was conducted by Lamphier Gregory using the CalEEMod model to estimate the air quality impacts associated with the criteria pollutants for which the Bay Area is nonattainment (i.e., ROG, NO_X, and $PM_{2.5}$).

Construction Period Emissions

The CalEEMod analysis provided by Lamphier-Gregory was used to estimated construction emissions for this analysis.[20] CalEEMod Version 2022 (2022.1.1.28) was used to estimate construction emissions from on-site activities, haul trips, vehicle trips, and evaporative emissions. The CalEEMod model output along with inputs are included in *Attachment 1*.

Land Use Inputs

Table 3 describes the CalEEMod land use inputs.

Table 3. Summary of CalEEMod Inputs and Construction Schedule

Project Land Uses	Size[1]	Units	Acreage
Apartments Mid Rise	240	Dwelling Unit	1.0
Enclosed Parking w/ Elevator	50	Spaces	
Strip Mall	12.8	1,000 sf	

[1] Minor deviations in the number of units, spaces, or commercial square footage would not change the emissions analysis enough to warrant re-modeling nor would it result in changes to the results or conclusions of this report.

Construction Inputs

CalEEMod computes annual emissions for construction projects based on the project type, size, and acreage. The model provides emission estimates for both on-site and off-site construction activities. On-site activities are primarily made up of construction equipment emissions, while off-site activity includes worker, hauling, and vendor traffic. The construction build-out scenario, including the equipment quantities, average hours per day, total number of workdays, and schedule, were developed by Lamphier Gregory and include model-provided values (included in *Attachment 1*). Lamphier Gregory used values for the construction year 2025 which are conservative given the earliest possible start date to be January 2027. CalEEMod estimates the project could be built over a period of approximately 12 months, or 264 construction workdays. However, the project would progress at a slower pace, resulting in lower daily emissions and total emissions spread out over a two-year period.[21]

Construction Traffic Emissions

Construction would produce traffic in the form of haul trips, worker trips, and truck traffic. Traffic-related emissions are based on haul, worker, and vendor trip estimates input into CalEEMod by Lamphier Gregory. CalEEMod provides daily estimates of haul, worker, and vendor trips for each construction phase based on material quantities input into the model. Daily haul trips for material export were developed by Lamphier Gregory.

[20] Email correspondence from Scott Gregory to Jay Witt, December 8, 2025.
[21] Based on the construction information in the draft Environmental Assessment for the *Affordable Housing Project at Mandela Station - West Oakland BART Site*, December 2025.

Summary of Computed Construction Period Emissions

Average daily construction emissions were estimated for each year of construction by dividing annual construction emissions by the number of active workdays during that year. Table 4 shows the average daily construction emissions of ozone precursor pollutants (ROG and NO_X), PM_{10} exhaust, $PM_{2.5}$ exhaust, and total $PM_{2.5}$ during construction of the project. Emissions are compared against the general conformity (i.e., *de minimis*) thresholds for NEPA purposes and the Bay Area Air District CEQA significance thresholds. Predicted construction emissions would not exceed the *de minimis* thresholds used for NEPA purposes, nor would emissions exceed Bay Area Air District's CEQA significance thresholds.

Table 4. Construction Period Emissions

	ROG	NOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	Total $PM_{2.5}$
Total Construction Emissions	1.82	0.89	0.03	0.03	0.08
Construction Emissions Per Year (Tons)					
Annual Construction Emissions	0.91	0.45	0.015	0.015	0.04
FCAA De Minimis Thresholds (tons/year)	*100 tons*	*100 tons*	*NA*	*NA*	*100 tons*
Exceed Threshold?	No	No			No
Average Daily Construction Emissions Per Year (pounds/day)					
One Year (264 workdays)	13.79	6.74	0.23	0.23	0.61
Two Years (528 workdays)	6.89	3.37	0.11	0.11	0.30
CEQA Thresholds (pounds per day)	*54* lbs./day	*54* lbs./day	*82* lbs./day	*54* lbs./day	*NA*
Exceed Threshold?	No	No	No	No	

Construction activities, particularly during site preparation and grading, would temporarily generate fugitive dust in the form of PM_{10} and $PM_{2.5}$. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. The Air District recommends all projects include a "basic" set of best management practices (BMPs) to manage fugitive dust and considers impacts from dust (i.e., fugitive PM_{10} and $PM_{2.5}$) to be less-than-significant if BMPs are implemented to reduce these emissions. The project would be required to implement the basic BMPs recommended by the Air District, which are consistent with and have been adopted by the City as SCA #22 (Construction Dust Controls) during all phases of construction to reduce dust and other particulate matter emissions.

SCA #22 – Construction Dust Controls: The project applicant shall implement all of the following applicable dust control measures during construction of the project:

a) Water all exposed surfaces of active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever feasible.
b) Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).
c) 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.
d) Limit vehicle speeds on unpaved roads to 15 miles per hour.
e) All excavation, grading, and/or demolition activities (if any) shall be suspended when average wind speeds exceed 20 mph.
f) All trucks and equipment, including tires, shall be washed off prior to leaving the site.
g) Unpaved roads providing access to sites located 100 feet or further from a paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.
h) All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

The City's required SCA #22 is consistent with Air District-recommended basic BMPs for reducing fugitive dust. For this analysis, only the basic set of SCA #22 is required as the Project PM emissions were below the City's significance thresholds. Enhanced SCAs would be required if air quality impacts were found to be significant.

<u>Operational Period Emissions</u>

Operational air emissions from the project would be generated primarily from autos driven by future residents. Evaporative emissions from architectural coatings and maintenance products (classified as consumer products) are typical emissions from these types of uses. CalEEMod was used to estimate emissions from operation of the proposed project assuming full build-out.

Land Uses

The project land uses were entered into CalEEMod as described in Table 3 for the construction period modeling.

Opening Year

Emissions associated with vehicle travel depend on the year of analysis because emission control technology requirements are phased-in over time. Therefore, the earlier the year analyzed in the model, the higher the emission rates utilized by CalEEMod. For this analysis, an opening year of 2026 was selected to provide the most conservative result.

Trip Generation Rates

The default CalEEMod daily trip generation rates (i.e., Institute of Transportation Engineers rates) was used for the operational emissions analysis as were default trip lengths and trip types.

Other Inputs

Default model assumptions for emissions associated with solid waste generation were applied to the project. Wastewater treatment was changed to 100 percent aerobic conditions to represent the use of city sewer services (i.e., project would not send wastewater to septic tanks or facultative lagoons).

Existing Uses

The project site contains a surface parking lot. The parking lot generates negligible operational and traffic emissions which would not meaningfully offset emissions from the proposed project. Therefore, the emissions from the existing use were not considered, nor used to offset proposed project conditions.

Summary of Operational Emissions

Annual operational emissions were predicted using CalEEMod and Table 5 compares the annual operational emissions estimates to the applicable General Conformity *de minimis* and Bay Area Air District CEQA thresholds. The operational period emissions would not exceed the *de minimis* thresholds or the Bay Area Air District CEQA significance thresholds.

Table 5. Operational Period Emissions

Year	ROG	NOx	Total PM_{10}	Total $PM_{2.5}$
Emissions Per Year (tons)				
2026	2.28	1.10	2.08	0.54
FCAA De Minimis Thresholds (tons/year)	*100 tons/year*	*100 tons/year*	*NA*	*100 tons/year*
Exceed Threshold?	No	No		No
CEQA Thresholds (tons/year)	*10 tons*/year	*10 tons*/year	*15 tons*/year	*10 tons*/year
Exceed Threshold?	No	No	No	No
Average Daily Emissions (pounds/day)				
2026	12.47	6.01	11.40	2.98
CEQA Thresholds (lbs./day)	*54* lbs./day	*54* lbs./day	*82* lbs./day	*82* lbs./day
Exceed Threshold?	No	No	No	No

Project Health Risk Impacts

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust (i.e., DPM), which is a known TAC. [22] These exhaust emissions pose health risks for sensitive receptors such as surrounding residents. The primary health risk impacts associated with construction emissions are cancer risk and exposure to increased $PM_{2.5}$ concentrations. Construction activity is the primary source of TAC emissions from the project as there are no proposed stationary sources

[22] DPM is identified by California as a toxic air contaminant due to the potential to cause cancer.

of TACs and traffic impacts from project operation are negligible when compared to existing roadway volumes. Per the Transportation Impact Study (TIS) prepared for the West Oakland BART TOD by Fehr & Peers (January 18, 2019), the entire TOD development (areas T-1 through T-4) would generate an estimated 1,254 trips per day, accounting for a 47 percent trip reduction based on City of Oakland Transportation Impact Review Guidelines for urban environments less than 0.5 miles from a BART station. Traffic impacts on TAC concentrations, specifically DPM and $PM_{2.5}$, are negligible for daily volumes of 10,000 vehicles or less and do not warrant a quantitative analysis. Traffic impacts from the project's operation will be similar to those described in Illingworth and Rodkin's previous report.[23]

Health risk impacts from construction to nearby sensitive receptors were assessed by predicting increased lifetime cancer risk, the increase in maximum annual $PM_{2.5}$ concentrations, and computing the Hazard Index (HI) for non-cancer health risks. This assessment used dispersion modeling to predict the off-site TAC concentrations resulting from project construction, so that lifetime cancer risks, increased $PM_{2.5}$ concentrations, and HI could be evaluated.

Modeled Sensitive Receptors

Receptors for this assessment included locations where sensitive populations would be present for extended periods of time (i.e., chronic exposures). This includes the nearby existing residences, as shown in Figure 1. Residential receptors (single family and multi-family) are assumed to include all receptor groups (i.e., third trimester, infants, children, and adults) with almost continuous exposure to project emissions. While there are additional sensitive receptors within 1,000 feet of the project site, the receptors chosen for the analysis are adequate to identify maximum impacts from the project.

Construction Emissions

The CalEEMod model provided total annual PM_{10} exhaust emissions (assumed to be DPM) for the off-road construction equipment and for exhaust emissions from on-road vehicles, with total emissions from construction being 0.03 tons (51.3 pounds). The on-road vehicle emissions are a result of haul truck travel on-site during demolition, excavation, grading activities, worker travel on-site, and vendor travel on-site during construction. On-site travel was assumed to be approximately a half mile in distance per vehicle trip. Fugitive $PM_{2.5}$ dust emissions were calculated by CalEEMod as less than 0.01 tons (13.2 pounds) from construction.

Dispersion Modeling

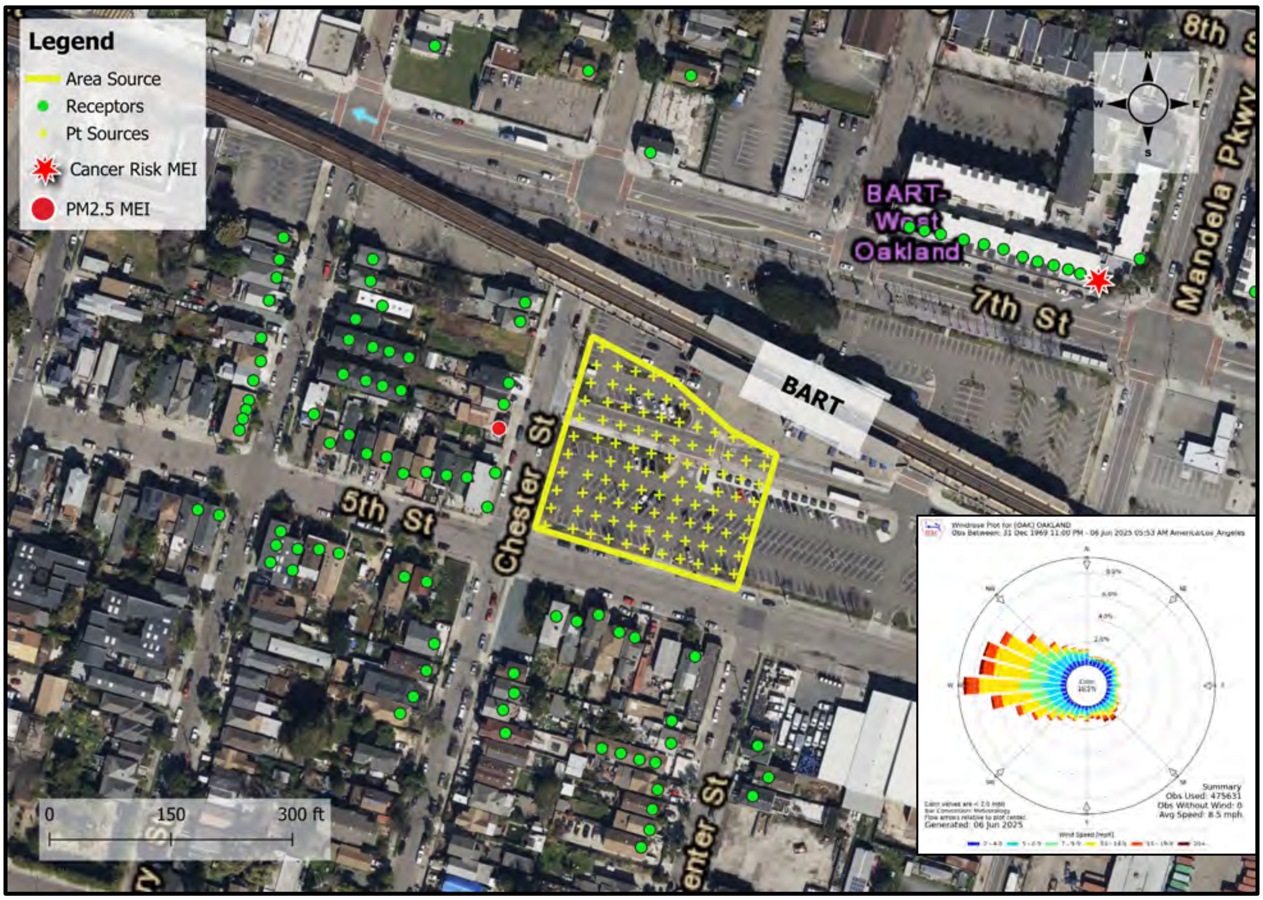
The U.S. EPA AERMOD dispersion model was used to predict DPM and $PM_{2.5}$ concentrations at sensitive receptors (i.e., residences) in the vicinity of the project construction area. The AERMOD dispersion model is a Bay Area Air District-recommended model for use in modeling analysis of these types of emission activities for CEQA projects.[24] Emission sources for each of the construction sites were grouped into two categories: exhaust emissions of DPM and fugitive $PM_{2.5}$ dust emissions.

[23] Illingworth & Rodkin, 2021. *Mandela Station Lot 3 Mixed-Use Project Air Quality Community Risk Assessment*.
[24] Bay Area Air District, 2023, *Appendix E of the 2022 CEQA Guidelines.* April.

Construction Sources

DPM exhaust emissions were modeled as an array of point sources to reflect construction equipment and trucks operating at the site. These sources included nine-foot release heights (construction equipment exhaust stack height) that were placed at 23 feet (7 meter) intervals throughout the construction site. This resulted in 101 individual point sources being used to represent equipment and vehicle DPM exhaust emissions. DPM emissions were divided into each of the point sources that were spread throughout the project construction sites. In addition, the following stack parameters were used: a vertical release, a stack diameter of 2.5 inches, an exhaust temperature of 918˚F, and an exit velocity of 309 feet per second. Point source plume rise is calculated by the AERMOD dispersion model. Emissions from vehicle travel on- and off-site were also distributed among the point sources. The array of point sources used for the modeling of each site are shown in Figure 1.

Figure 1. Locations of Project Construction Site, Point Sources, Off-Site Sensitive Receptors, Maximum TAC Impacts (MEIs), and Oakland Airport Wind Rose



For modeling fugitive $PM_{2.5}$ emissions, a near-ground level release height of 7 feet (2 meters) was used for the area source. Fugitive dust emissions at construction sites come from a variety of sources, including truck and equipment travel, grading activities, truck loading (with loaders) and unloading (rear or bottom dumping), loaders and excavators moving and transferring soil and other materials, etc. All of these activities result in fugitive dust emissions at various heights at the point(s) of generation. Once generated, the dust plume will tend to rise as it moves downwind across the site and exits the site at a higher elevation than when it was generated. For all these reasons, a 7-foot release height was used as the average release height across the construction site. Emissions from the construction equipment and on-road vehicle travel were distributed throughout the modeled area sources.

AERMOD Inputs and Meteorological Data

The modeling used a five-year data set (2013-2017) of hourly meteorological data from the Oakland Airport prepared for use with the AERMOD model by Bay Area Air District. The wind rose, showing the predominate wind directions used by the model, is included in Figure 1. Construction emissions were modeled as occurring Monday through Friday between 7:00 a.m. to 7:00 p.m., when the majority of construction is expected to occur. Annual DPM and $PM_{2.5}$ concentrations from construction activities were calculated at nearby sensitive receptors using the model. Receptor heights of 5 feet (1.5 meters) were used to represent the breathing heights of receptors at nearby single-family residences.[25] Breathing heights of nearby multifamily homes we set at 15 feet (4.6 meters) as the ground floor of those buildings are used for commercial purposes.

Summary of Construction Health Risk Impacts

The maximum increased cancer risks were calculated using the modeled DPM concentrations combined with the Bay Area Air District CEQA guidance for age sensitivity factors and exposure parameters. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing TACs. Third trimester, infant, child, and adult exposures were assumed to occur at all family residences during the entire construction period, while adult exposures were assumed at the senior residences.

Non-cancer health hazards and maximum annual $PM_{2.5}$ concentrations were also calculated. The maximum modeled annual $PM_{2.5}$ concentration was calculated based on combined DPM exhaust and fugitive $PM_{2.5}$ concentrations. The maximum computed HI value was based on the ratio of the maximum estimated DPM concentration and the chronic inhalation refence exposure level of 5 $\mu g/m^3$ for DPM.

The modeled maximum annual DPM and $PM_{2.5}$ concentrations were identified at nearby sensitive receptors (as shown in Figure 1). The maximally exposed individual (MEI) was based on the maximum annual DPM concentration, which typically results in the receptor with the highest cancer risk. Results of this assessment indicated that the construction MEI was located at two different receptors (i.e., one for cancer risk and the other for annual $PM_{2.5}$ concentration). The cancer risk MEI was located at a multi-family home to the northeast across the BART tracks and 7th Street from the project site. The maximum annual $PM_{2.5}$ concentration occurred at a single-family home west of the site across Chester Street from the project site. Table 6 summarizes the maximum cancer risks, annual $PM_{2.5}$ concentrations, and HI for project related construction

[25] Bay Area Air District, 2023, *Appendix E of the 2022 CEQA Guidelines.* April.

activities affecting the MEIs. *Attachment 2* to this report includes the emission calculations used for the construction modeling and the cancer risk calculations.

As shown in Table 6, the unmitigated maximum cancer risk, maximum annual $PM_{2.5}$ concentrations, and HI from construction activities at the MEIs would not exceed the Bay Area Air District's single-source CEQA significance thresholds.

Table 6. Construction Health Risk Impacts on the MEIs

Source		Cancer Risk[1] (per million)	Annual $PM_{2.5}$[1] ($\mu g/m^3$)	Hazard Index
Project Construction	Unmitigated	2.60 (infant)	0.03	<0.01
	Single-Source Threshold	***>10.0***	***>0.3***	***>1.0***
Exceed Threshold?	Unmitigated	*No*	*No*	*No*

Notes: [1] The maximum cancer risk and $PM_{2.5}$ concentration occur at different receptor locations.

Cumulative Health Risks at the MEIs

Cumulative health risk assessments look at all substantial sources of TACs located within 1,000 feet of a project site (i.e., influence area) that can affect sensitive receptors. These sources include rail lines, highways, busy surface streets, and stationary sources identified by Bay Area Air District.

A review of the project area using Bay Area Air District's geographic information systems (GIS) TAC screening maps identified existing health risks from nearby roadways, railways, and stationary sources at the MEIs. However, only the local roadways and two stationary sources are within the 1,000-foot influence area of the project. Figure 2 shows the locations of the TAC sources affecting the MEIs within the influence area. Health risk impacts from these sources upon the MEIs are reported in Table 7. Details of the cumulative screening and health risk calculations are included in *Attachment 3*.

Nearby Local Roadways and Railways

The project site is located in a mixed residential/commercial area near the West Oakland BART station, several local roadways, and Interstate 880 (I-880) (see Figure 2). Cancer risks, annual $PM_{2.5}$ concentrations, and HI associated with traffic on the nearby portions of I-880 and local roadways (i.e., Mandela Parkway, and 7th Street) were modeled as part of the health risk assessment conducted for the new residents.[26] Impacts from rail lines were not included in the analysis conducted in 2021 due to the fact they were outside the 1,000-foot influence area of the project.

Since the on-site assessment was conducted in 2021, the Air District has developed mobile source screening values provided via GIS data files (i.e., raster files).[27] Bay Area Air District raster files provide screening-level cancer risk, $PM_{2.5}$ concentrations, and HI for roadways and railways within the Bay Area and were produced using AERMOD and a 20x20-meter emissions grid. The raster

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[26] Illingworth & Rodkin, 2021. *Mandela Station Lot 3 Mixed-Use Project Air Quality Community Risk Assessment*.
[27] https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools/health-risk-screening-and-modeling

file for the roadways uses EMFAC2021 data for vehicle emissions and fleet mix for roadways, 2021 train schedules and 2020 fuel consumption rates for rail activities and includes Appendix E of the Air District's CEQA Air Quality Guidance for risk assessment assumptions. More information regarding the assumptions used to develop the screening layers can be found in Sections 6 and 7 in Appendix E of Bay Area Air District's 2022 CEQA guidance.[28] These estimates represent conservative risks reflective of 2022 conditions and are meant to provide a conservative estimate of future conditions, which do not reflect the increased proportion of zero emission motor vehicles that will result in lower future emissions.[29]

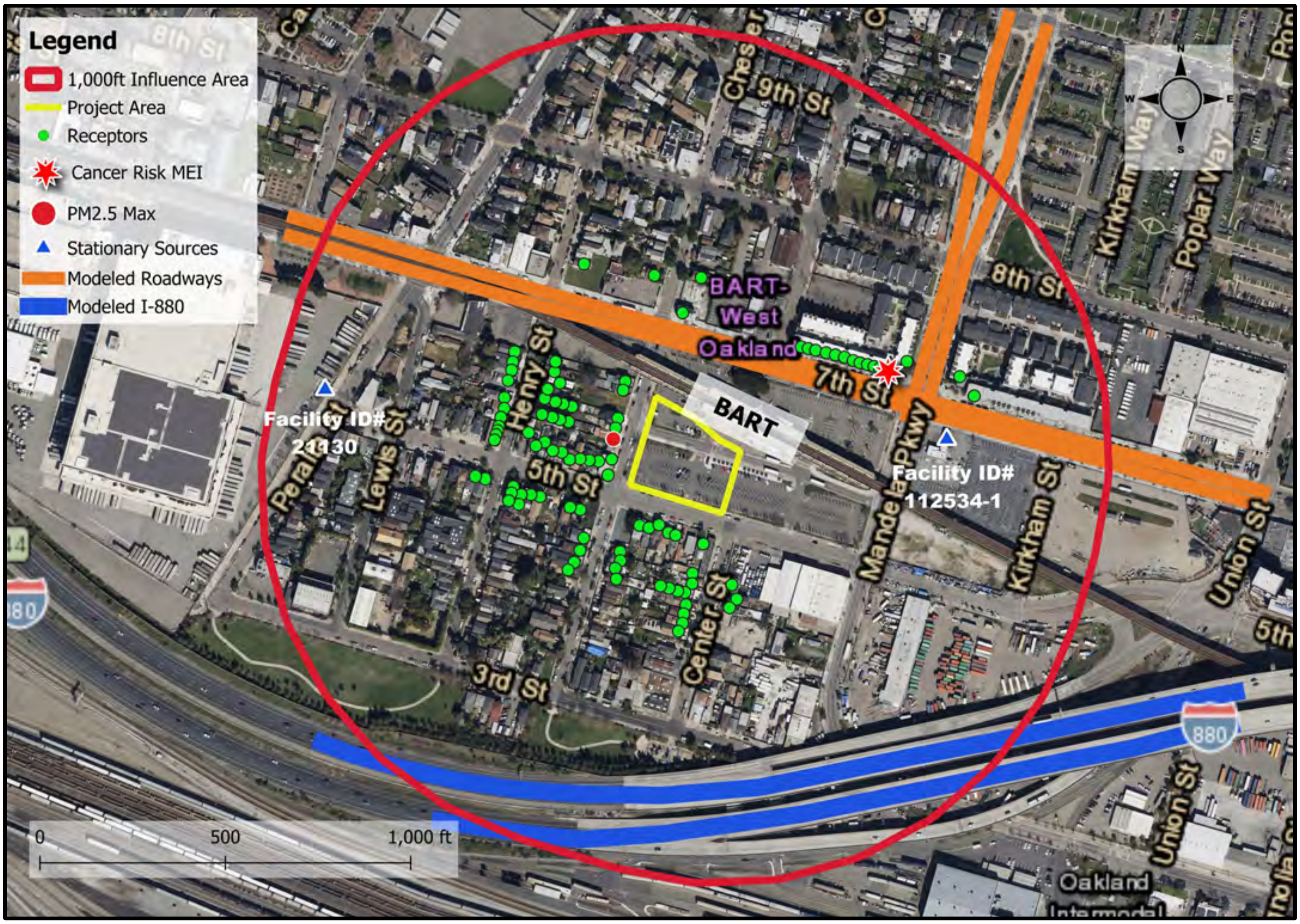
These screening values are considered higher than values that would be obtained with the refined modeling methods that were used to conduct the analysis in 2021. These raster data are based on region-wide emissions rather than just those that occur within 1,000 feet of the project. Both the screening-level and refined cancer risks, $PM_{2.5}$ concentration, and HI for the cumulative roadway and rail impacts at the MEIs are listed in Table 7. Refined risks are based on the methods used in the 2021 analysis previously referenced and do not include rail impacts.

Bay Area Air District Permitted Stationary Sources

Permitted stationary sources of air pollution near the project site were identified using Bay Area Air District's *Permitted Stationary Sources 2025* GIS map website.[30] This mapping tool identifies the location of nearby stationary TAC sources and their estimated risk and hazard impacts, including 2023 emissions data and adjustments to account for OEHHA guidance. Two sources were identified using this tool, one diesel generator and a gasoline distribution facility (i.e., gas station). The screening risk and hazard levels or emissions estimates provided by Bay Area Air District for the stationary sources were adjusted for distance using the *Health Risk Calculator with Distance Multipliers* and the *CARB Gas Station Risk Assessment Screening Tool*, as appropriate. The estimated distances between the MEIs and the sources were input into the Air District's tools and the resulting health risk impacts upon the MEIs are reported in Table 7.

[28] Bay Area Air District, 2022. CEQA Air Quality Guidelines Appendix E. April 2023. https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa-guidelines-2022/appendix-e-recommended-methods-for-screening-and-modeling-local-risks-and-hazards_final-pdf.pdf?la=en
[29] Bay Area Air District, 2022. *CEQA Air Quality Guidelines* Appendix E, Section 9. April 2023
[30] Bay Area Air District, *Stationary Source Screening Tool,* Web: https://experience.arcgis.com/experience/89ba715c4dc7427f85e2d2fc5b8175ff/page/Stationary-Source-Screening-Tool?draft=true

Figure 2. Project Site and Nearby TAC and $PM_{2.5}$ Sources



Summary of Cumulative Health Risk Impacts

Table 7 reports both the project and cumulative health risk impacts at the MEIs and maximum annual $PM_{2.5}$ location. The project would not exceed the Bay Area Air District's single source CEQA significance thresholds, nor would it exceed the Bay Area Air District's cumulative source CEQA thresholds.

Table 7. Impacts from Combined Sources at Off-Site MEIs

Source		Cancer Risk[1] (per million)	Annual $PM_{2.5}$[1] ($\mu g/m^3$)	Hazard Index
Project Impacts				
Project Construction	Unmitigated	2.60 (infant)	0.03	<0.01
	Single-Source Threshold	***>10.0***	***>0.3***	***>1.0***
	Exceed Threshold?	*No*	*No*	*No*
Cumulative Impacts				
Regional Railway Raster Data (Air District Screening)		53.63	0.09	0.01
Regional Roadways Raster Data (Air District Screening)		22.35	0.40	0.06
Modeled Roadways (2021 Analysis)		6.50	0.29	<0.03
I-880		*4.10*	0.08	*<0.01*
Mandela Parkway		*0.60*	*0.02*	*<0.01*
7th Street		*1.80*	*0.19*	*<0.01*
Facility ID # 112531-1 (GDF)		0.52	NA	0.10
Facility ID # 21130 (Generator)		0.40	<0.001	<0.01
Cumulative Total	Unmitigated	63.65 – 79.50	0.41 – 0.52	0.19 – 0.29
	Cumulative Source Threshold	***>100***	***>0.8***	***>10.0***
Exceed Threshold?		*No*	*No*	*No*

Notes: [1] The maximum cancer risk and $PM_{2.5}$ concentration occur at different receptor locations.

Conclusions

An air quality analysis of the T-3 portion of the Mandela Station TOD project was conducted to verify it would not exceed either the federal General Conformity *de minimis* thresholds nor the Bay Area Air District CEQA significance thresholds. An emissions analysis conducted using CalEEMod verified construction of the project would not exceed either the federal General Conformity *de minimis* thresholds nor the Bay Area Air District CEQA significance thresholds for criteria pollutants. Likewise, an estimate of criteria pollutant emissions generated during project operation showed that operation of the project would not exceed either the federal General Conformity *de minimis* thresholds nor the Bay Area Air District CEQA significance thresholds for criteria pollutants.

The analysis of TAC pollutant concentrations (DPM and $PM_{2.5}$) generated from construction of the T-3 project demonstrated the health risks associated with construction would be below the Air District's single-source significance thresholds for cancer risk, maximum annual $PM_{2.5}$ concentration and HI. A cumulative source analysis that included the impacts from existing sources of TACs and construction of the T-3 project at the location of the MEI and maximum annual $PM_{2.5}$ concentration showed the project would not exceed the Air District's cumulative-source significance thresholds for cancer risk, maximum annual $PM_{2.5}$ concentration and HI.

Operation of the T-3 project would not generate TACs in a quantity warranting a quantitative analysis. The project would not generate daily traffic volumes in excess of 10,000 vehicles per day, nor would a significant portion of the trips generated involved diesel-fueled vehicles. Current plans for the project do not show stationary sources of TACs. However, should an emergency generator be added to the project, it will require a permit for the Air District, limiting its hours of operation to below CEQA significance thresholds. Therefore, operation of the project is anticipated to maintain the risk levels to which receptors in the area are currently exposed.

21-018 W. Oakland BART T-3 Residential - Oakland, CA

DPM Emissions and Modeling Emission Rates - No Controls

Construction Year	Activity	DPM (ton/year)	Source Type	No. Sources	DPM Emissions (lb/yr)	(lb/hr)	(g/s)	Emissions per Point Source (g/s)
2025	DPM_CONST	0.0257	Point	101	51.3	0.01619	2.04E-03	2.02E-05
Total		***0.0257***			***51.3***			

hr/day =	12	(7am - 7pm)
days/yr =	264	
hours/year =	3168	

21-018 W. Oakland BART T-3 Residential - Oakland, CA

PM2.5 Fugitive Dust Emissions for Modeling - Basic Dust Controls Half Mile

Construction Year	Activity	Project	Area Source	PM2.5 Emissions (ton/year)	(lb/yr)	(lb/hr)	(g/s)	Modeled Area (m^2)	PM2.5 Emission Rate $g/s/m^2$
2025	Construction		PM25_CONST	0.0066	13.2	0.00417	5.258E-04	5089.2	1.03E-07

Construction Hours

Weekday hr/day =	12	(7am - 7pm)
days/yr =	264	
hours/year =	3168	

21-018 W. Oakland BART T-3 Residential - Oakland, CA
DPM and PM2.5 Concentrations
Maximum Concentration Receptors

Emissions Years	2025
Receptor Information	
Number of Receptors	Varies
Receptor Height (in m) =	1.5m SF/4.6 MF

Meteorological Conditions	
Air District Oakland Airport Met	2013 - 2017
Land Use Classification	urban
Wind Speed =	variable
Wind Direction =	variable

2025 Offsite Maximum Concentrations - Floor 1 (or 2)

Meteorological Data Years	Concentrations ($\mu g/m^3$)		
	DPM	Fug PM2.5	Total PM2.5
2013 - 2017	0.01462	0.0141	0.0287

21-018 W. Oakland BART T-3 Residential - Oakland, CA
DPM Cancer Risk and PM2.5 Calculations
Impacts at Off-Site Residential Receptors - 4.6 meter receptor height

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	Infant/Child			Adult
Age -->	**3rd Trimester**	**0 - 2**	**2 - 16**	**16 - 30**
Parameter				
ASF =	10	10	3	1
CPF =	1.10E+00	1.10E+00	1.10E+00	1.10E+00
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

		Exposure Information				Infant/Child	Adult			Adult			
	Exposure				Age	Cancer	Modeled		Age	Cancer			
Exposure	Duration		DPM Conc (ug/m3)		Sensitivity	Risk	DPM Conc (ug/m3)		Sensitivity	Risk		Maximum	
Year	(years)	Age	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)		Fugitive	Total
0	0.25	-0.25 - 0*	2025	0.0146	10	0.20					HI	PM2.5	PM2.5
1	1	0 - 1	2025	0.0146	10	2.40	2025	0.0146	1	0.042	0.003	0.0141	**0.029**
2	1	1 - 2	2026	0.0000	10	0.00	2026	0.0000	1	0.00	0.000	0.0000	0.000
3	1	2 - 3	2027	0.0000	3	0.00	2027	0.0000	1	0.00	0.000	0.0000	0.000
4	1	3 - 4	2028	0.0000	3	0.00	2028	0.0000	1	0.00	0.0000	0.0000	0.0000
5	1	4 - 5	2029	0.0000	3	0.00	2029	0.0000	1	0.00			
6	1	5 - 6	2030	0.0000	3	0.00	2030	0.0000	1	0.00			
7	1	6 - 7	2031	0.0000	3	0.00	2031	0.0000	1	0.00			
8	1	7 - 8	2032	0.0000	3	0.00	2032	0.0000	1	0.00			
9	1	8 - 9	2033	0.0000	3	0.00	2033	0.0000	1	0.00			
10	1	9 - 10	2034	0.0000	3	0.00	2034	0.0000	1	0.00			
11	1	10 - 11	2035	0.0000	3	0.00	2035	0.0000	1	0.00			
12	1	11 - 12	2036	0.0000	3	0.00	2036	0.0000	1	0.00			
13	1	12 - 13	2037	0.0000	3	0.00	2037	0.0000	1	0.00			
14	1	13 - 14	2038	0.0000	3	0.00	2038	0.0000	1	0.00			
15	1	14 - 15	2039	0.0000	3	0.00	2039	0.0000	1	0.00			
16	1	15 - 16	2040	0.0000	3	0.00	2040	0.0000	1	0.00			
17	1	16-17	2041	0.0000	1	0.00	2041	0.0000	1	0.00			
18	1	17-18	2042	0.0000	1	0.00	2042	0.0000	1	0.00			
19	1	18-19	2043	0.0000	1	0.00	2043	0.0000	1	0.00			
20	1	19-20	2044	0.0000	1	0.00	2044	0.0000	1	0.00			
21	1	20-21	2045	0.0000	1	0.00	2045	0.0000	1	0.00			
22	1	21-22	2046	0.0000	1	0.00	2046	0.0000	1	0.00			
23	1	22-23	2047	0.0000	1	0.00	2047	0.0000	1	0.00			
24	1	23-24	2048	0.0000	1	0.00	2048	0.0000	1	0.00			
25	1	24-25	2049	0.0000	1	0.00	2049	0.0000	1	0.00			
26	1	25-26	2050	0.0000	1	0.00	2050	0.0000	1	0.00			
27	1	26-27	2051	0.0000	1	0.00	2051	0.0000	1	0.00			
28	1	27-28	2052	0.0000	1	0.00	2052	0.0000	1	0.00			
29	1	28-29	2053	0.0000	1	0.00	2053	0.0000	1	0.00			
30	1	29-30	2054	0.0000	1	0.00	2054	0.0000	1	0.00			
Total Increased Cancer Risk						**2.60**				**0.042**			

* Third trimester of pregnancy

Attachment 3: Cumulative Screening Information and Calculations

West Oakland BART Station T-3 Project, Oakland - Roadway Impacts to MEI/Max PM2.5 Location
AERMOD Risk Modeling Parameters and Maximum Concentrations

Emissions Years	2023
Receptor Information	
Number of Receptors	
Receptor Height (in m) =	1.5 (1st Floor)/4.6 (2nd Floor)
Receptor Distances =	Varies
Meteorological Conditions	
BAAQMD Oakland Met Data	2013 - 2017
Land Use Classification	urban
Wind Speed =	variable
Wind Direction =	variable

I-880 - Onsite MEI Maximum Concentrations

Meteorological Data Years	TAC Concentrations (µg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00512	0.05532	0.04867

Meteorological Data Years	PM2.5 Concentrations (µg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.08031	0.07313	0.00718

Mandela Parkway - Onsite MEI Maximum Concentrations

Meteorological Data Years	TAC Concentrations (µg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.0005	0.04907	0.06294

Meteorological Data Years	PM2.5 Concentrations (µg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.02228	0.022	0.00028

7th Street Onsite MEI Maximum Concentrations

Meteorological Data Years	TAC Concentrations (µg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00148	0.16312	0.2087

Meteorological Data Years	PM2.5 Concentrations (µg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.1945	0.19202	0.00248

West Oakland BART Station T-3 Project, Oakland - Roadway Impacts to MEI
Maximum DPM Cancer Risk

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Roadway Cancer Risk by Year - MEI Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			TOTAL	
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG		
0	0.25	-0.25 - 0*	2023	10	0.0015	0.1631	0.2087	0.020	0.013	0.0010	0.03	**Hazard Index**
1	1	0 - 1	2023	10	0.0015	0.1631	0.2087	0.243	0.153	0.0115	0.41	0.0003
2	1	1 - 2	2024	10	0.0015	0.1631	0.2087	0.243	0.153	0.0115	0.41	
3	1	2 - 3	2025	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
4	1	3 - 4	2026	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
5	1	4 - 5	2027	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
6	1	5 - 6	2028	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
7	1	6 - 7	2029	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
8	1	7 - 8	2030	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
9	1	8 - 9	2031	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
10	1	9 - 10	2032	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
11	1	10 - 11	2033	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
12	1	11 - 12	2034	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
13	1	12 - 13	2035	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
14	1	13 - 14	2036	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
15	1	14 - 15	2037	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
16	1	15 - 16	2038	3	0.0015	0.1631	0.2087	0.038	0.024	0.0018	0.06	
17	1	16-17	2039	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
18	1	17-18	2040	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
19	1	18-19	2041	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
20	1	19-20	2042	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
21	1	20-21	2043	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
22	1	21-22	2044	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
23	1	22-23	2045	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
24	1	23-24	2046	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
25	1	24-25	2047	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
26	1	25-26	2048	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
27	1	26-27	2049	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
28	1	27-28	2050	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
29	1	28-29	2051	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
30	1	29-30	2052	1	0.0015	0.1631	0.2087	0.004	0.003	0.0002	0.007	
Total Increased Cancer Risk								1.10	0.693	0.052	**1.8**	

* Third trimester of pregnancy

West Oakland BART Station T-3 Project, Oakland - Roadway Impacts to MEI
Maximum DPM Cancer Risk

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air $(\mu g/m^3)$
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Roadway Cancer Risk by Year - MEI Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)				
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL	
0	0.25	-0.25 - 0*	2025	10	0.0051	0.0553	0.0487	0.070	0.004	0.0002	0.07	**Hazard Index**
1	1	0 - 1	2025	10	0.0051	0.0553	0.0487	0.841	0.052	0.0027	0.90	0.0010
2	1	1 - 2	2026	10	0.0051	0.0553	0.0487	0.841	0.052	0.0027	0.90	
3	1	2 - 3	2027	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
4	1	3 - 4	2028	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
5	1	4 - 5	2029	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
6	1	5 - 6	2030	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
7	1	6 - 7	2031	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
8	1	7 - 8	2032	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
9	1	8 - 9	2033	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
10	1	9 - 10	2034	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
11	1	10 - 11	2035	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
12	1	11 - 12	2036	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
13	1	12 - 13	2037	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
14	1	13 - 14	2038	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
15	1	14 - 15	2039	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
16	1	15 - 16	2040	3	0.0051	0.0553	0.0487	0.132	0.008	0.0004	0.14	
17	1	16-17	2041	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
18	1	17-18	2042	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
19	1	18-19	2043	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
20	1	19-20	2044	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
21	1	20-21	2045	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
22	1	21-22	2046	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
23	1	22-23	2047	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
24	1	23-24	2048	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
25	1	24-25	2049	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
26	1	25-26	2050	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
27	1	26-27	2051	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
28	1	27-28	2052	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
29	1	28-29	2053	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
30	1	29-30	2054	1	0.0051	0.0553	0.0487	0.015	0.001	0.0000	0.016	
Total Increased Cancer Risk								3.81	0.235	0.012	**4.1**	

* Third trimester of pregnancy

West Oakland BART Station T-3 Project, Oakland - Roadway Impacts to MEI
Maximum DPM Cancer Risk

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Roadway Cancer Risk by Year - MEI Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)				
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL	
0	0.25	-0.25 - 0*	2025	10	0.0005	0.0491	0.0629	0.007	0.004	0.0003	0.01	**Hazard Index**
1	1	0 - 1	2025	10	0.0005	0.0491	0.0629	0.082	0.046	0.0035	0.13	0.0001
2	1	1 - 2	2026	10	0.0005	0.0491	0.0629	0.082	0.046	0.0035	0.13	
3	1	2 - 3	2027	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
4	1	3 - 4	2028	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
5	1	4 - 5	2029	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
6	1	5 - 6	2030	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
7	1	6 - 7	2031	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
8	1	7 - 8	2032	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
9	1	8 - 9	2033	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
10	1	9 - 10	2034	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
11	1	10 - 11	2035	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
12	1	11 - 12	2036	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
13	1	12 - 13	2037	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
14	1	13 - 14	2038	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
15	1	14 - 15	2039	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
16	1	15 - 16	2040	3	0.0005	0.0491	0.0629	0.013	0.007	0.0005	0.02	
17	1	16-17	2041	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
18	1	17-18	2042	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
19	1	18-19	2043	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
20	1	19-20	2044	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
21	1	20-21	2045	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
22	1	21-22	2046	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
23	1	22-23	2047	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
24	1	23-24	2048	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
25	1	24-25	2049	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
26	1	25-26	2050	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
27	1	26-27	2051	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
28	1	27-28	2052	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
29	1	28-29	2053	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
30	1	29-30	2054	1	0.0005	0.0491	0.0629	0.001	0.001	0.0001	0.002	
Total Increased Cancer Risk								0.37	0.209	0.016	**0.6**	

* Third trimester of pregnancy

FIGURE A3-1: Roadway Cancer Risk at MEI

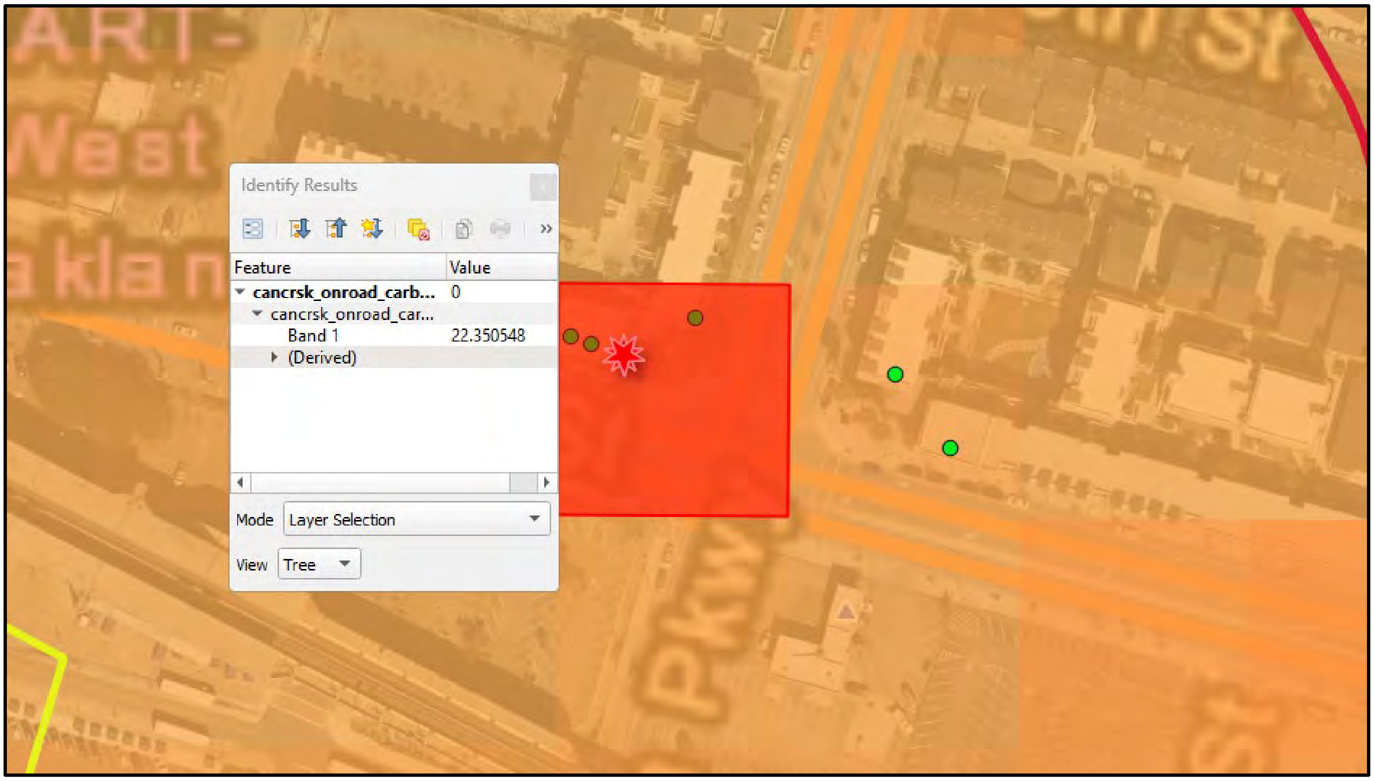


FIGURE A3-2: Roadway PM2.5 Conc. at MEI

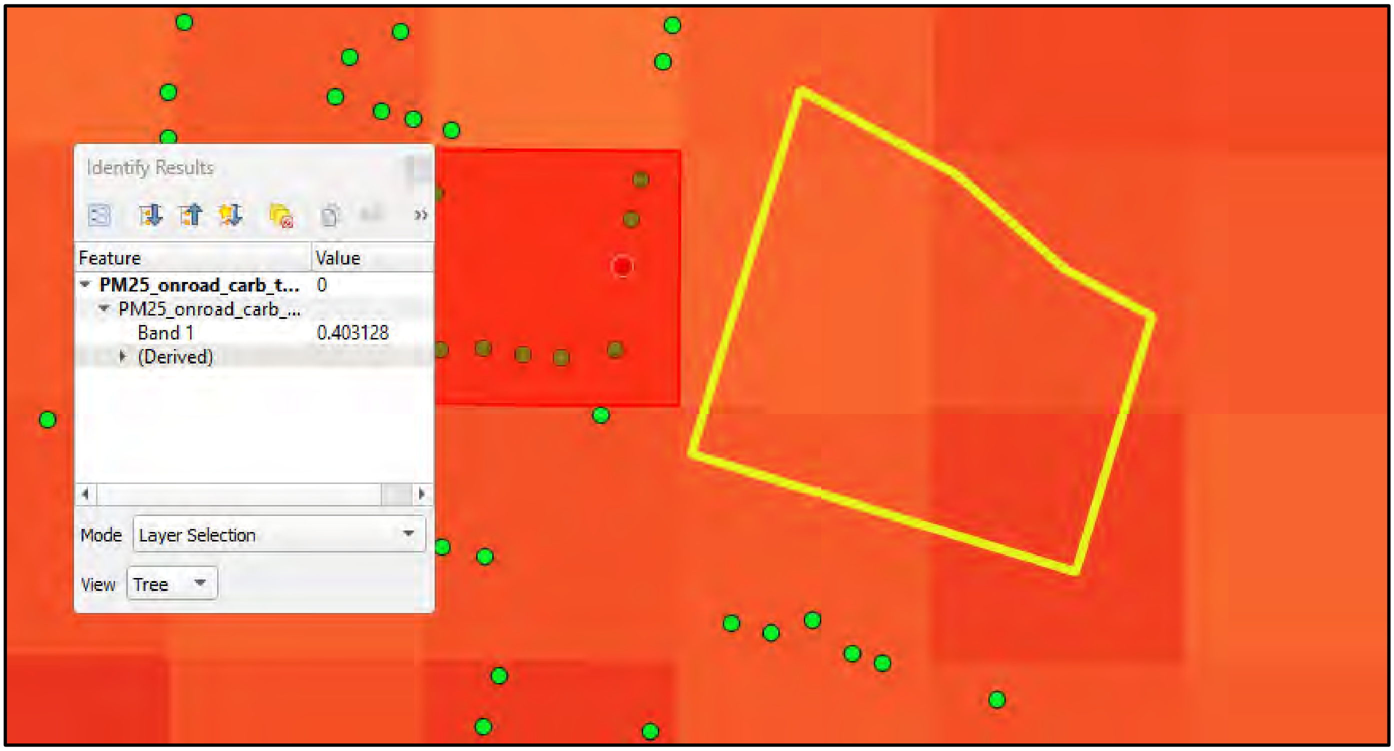


FIGURE A3-3: Roadway HI at MEI

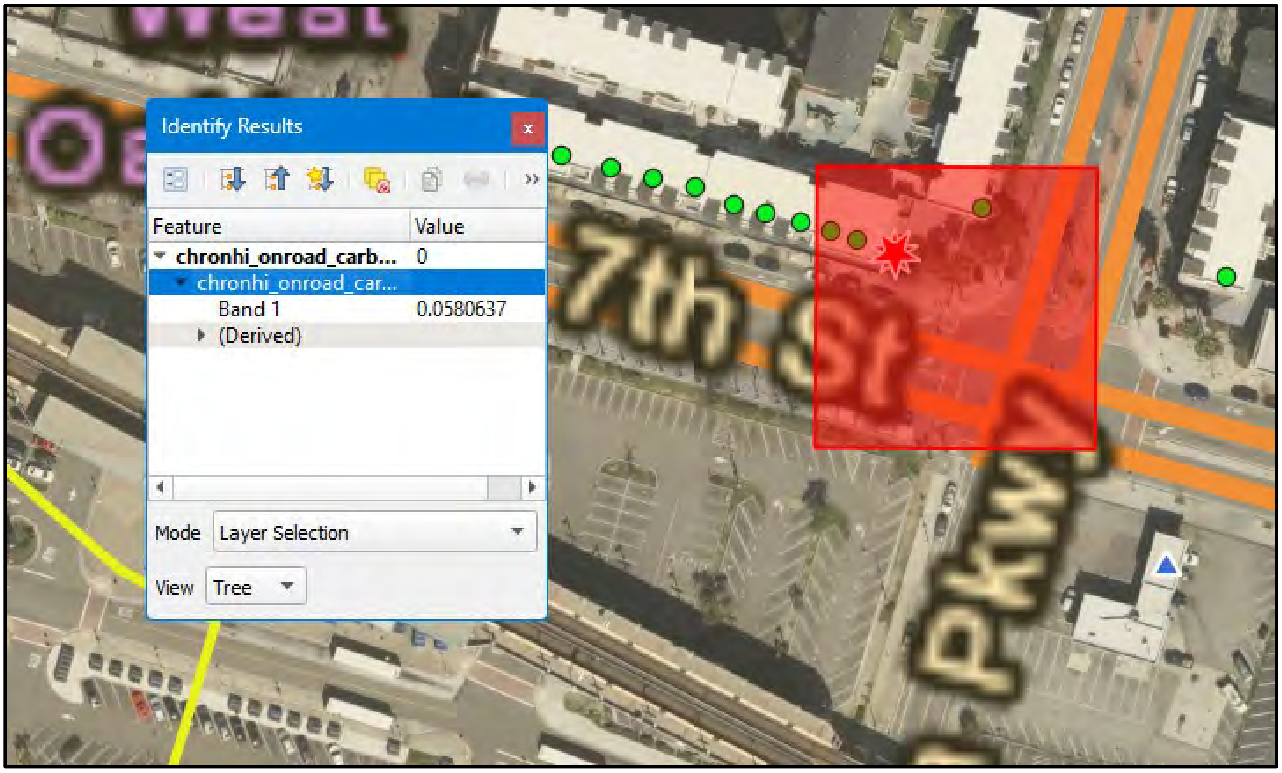


FIGURE A3-4: Railway Cancer Risk at MEI

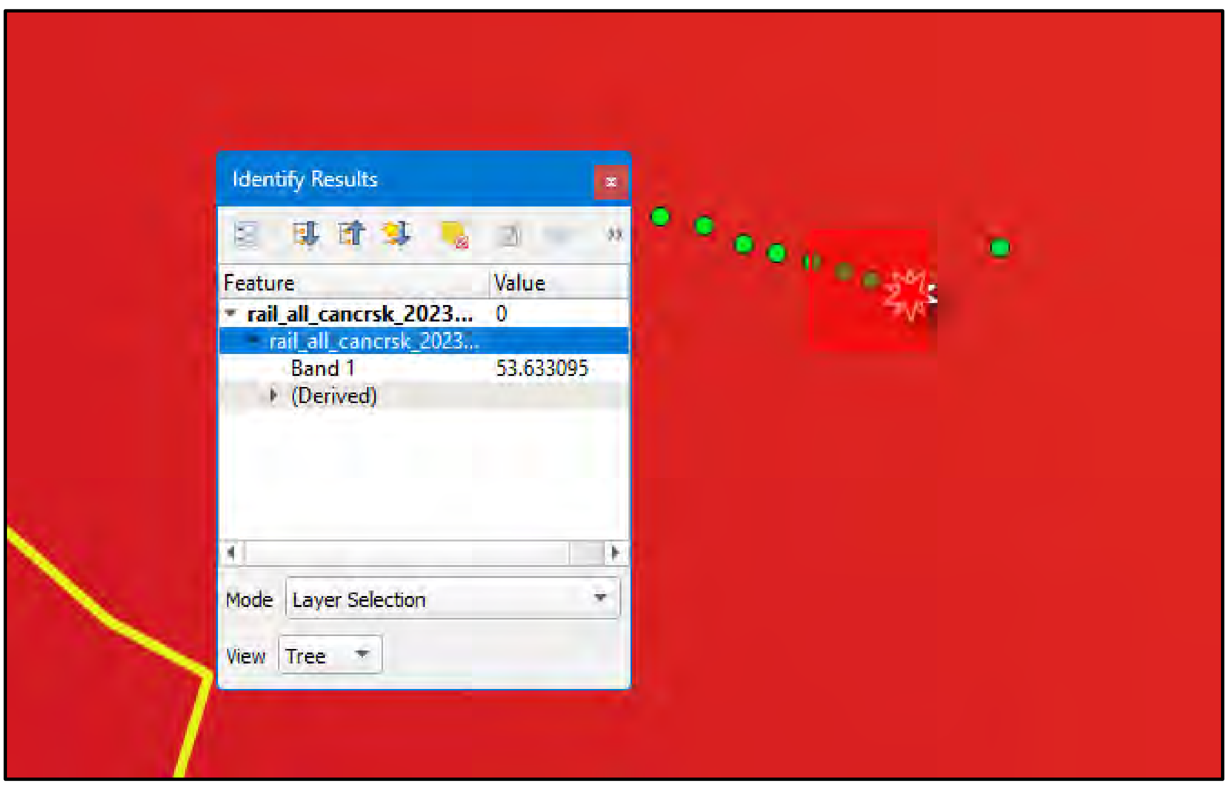


FIGURE A3-5: Railway $PM_{2.5}$ Conc. at Max Location

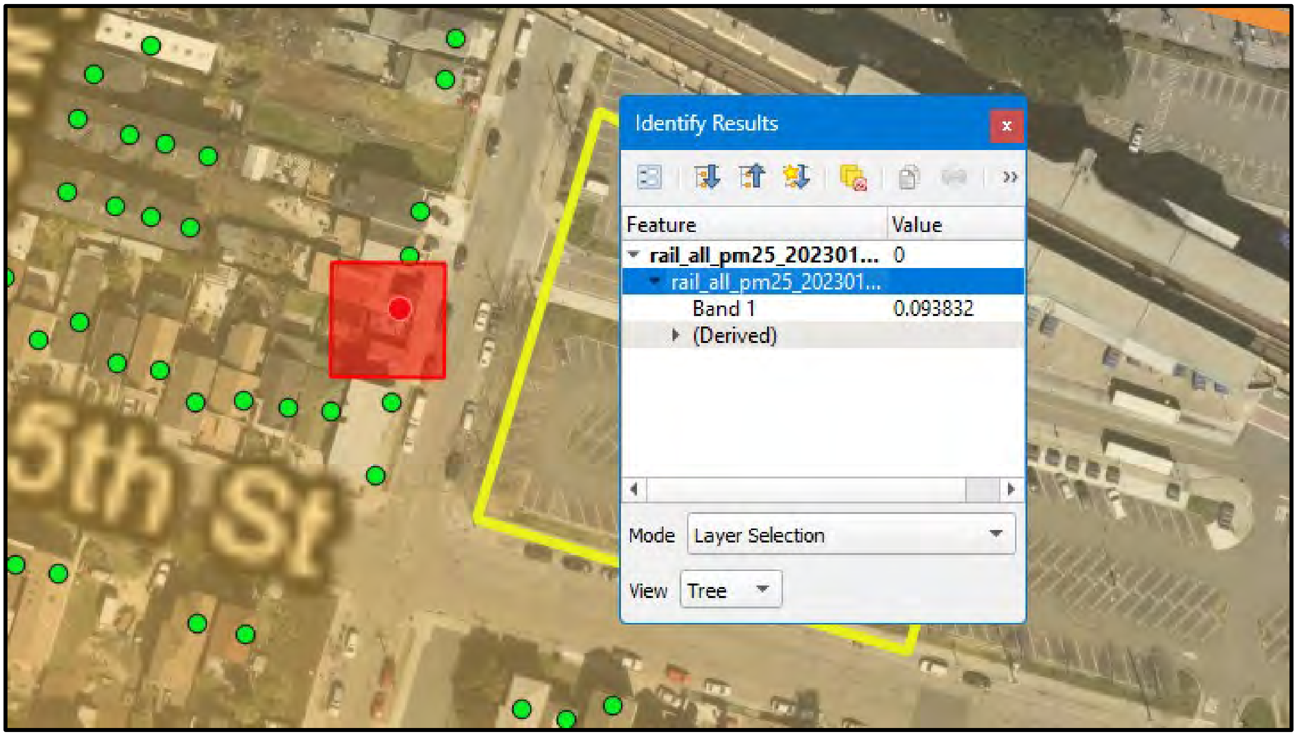
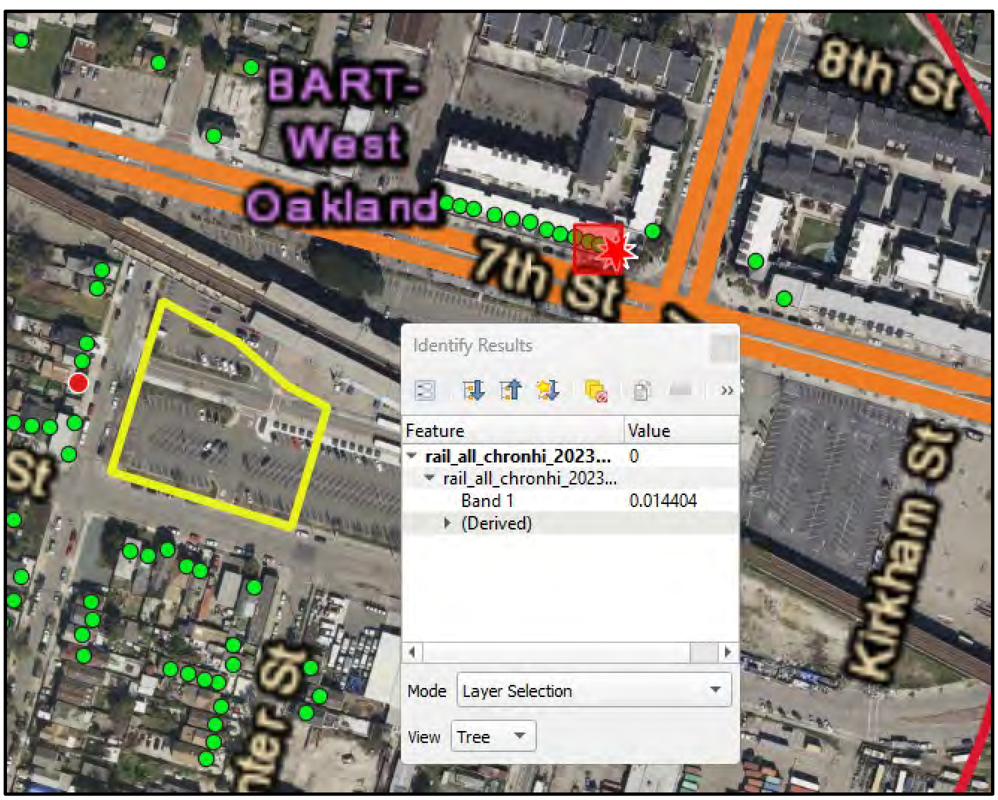


FIGURE A3-6: Railway HI at MEI

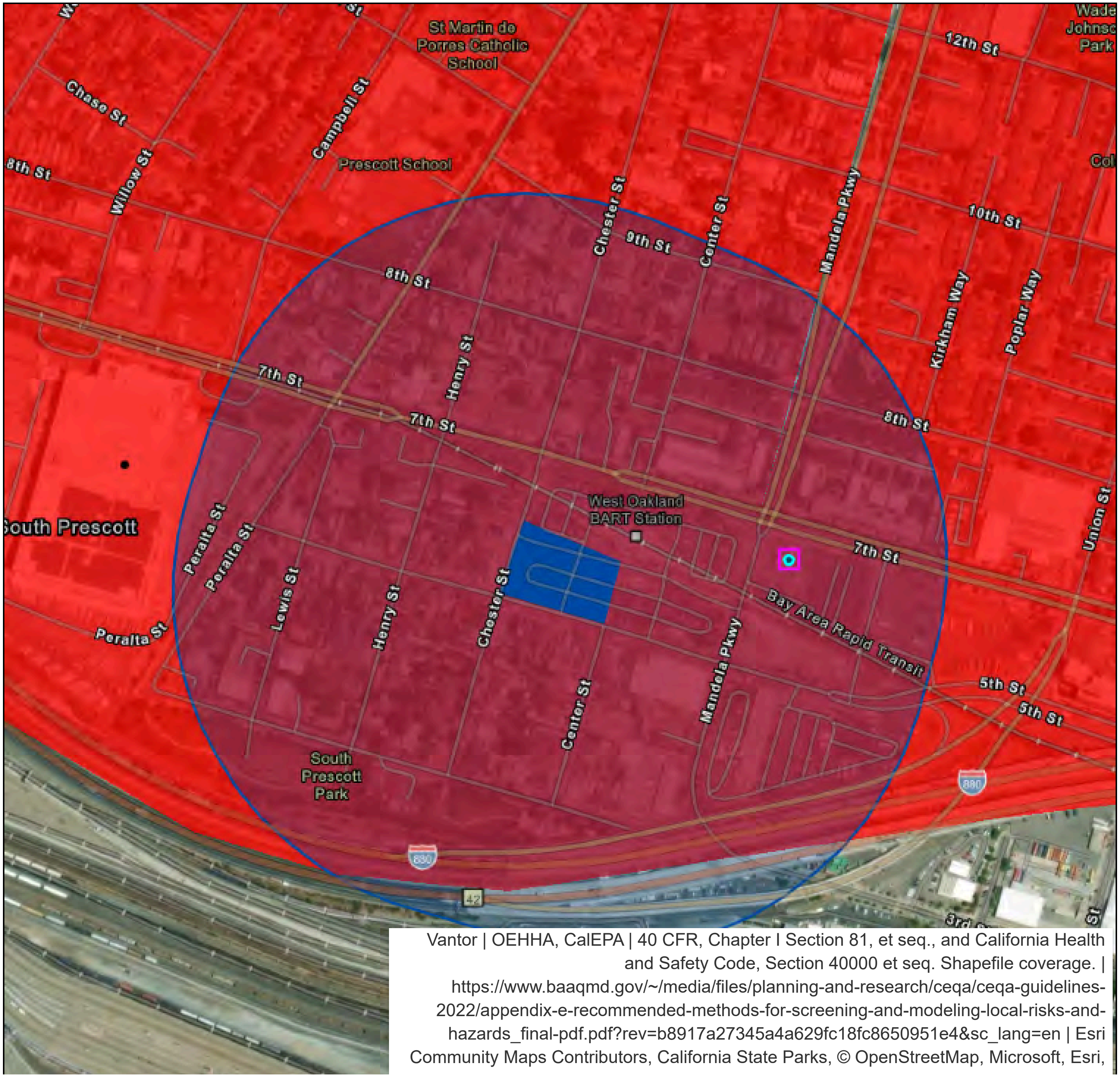


Near Me Report

Area of Interest (AOI) Information

Area: 4,271,970.81 ft²

Date: Fri Dec 12 2025 10:44:22 GMT-0700 (Mountain Standard Time)



Vantor | OEHHA, CalEPA | 40 CFR, Chapter I Section 81, et seq., and California Health and Safety Code, Section 40000 et seq. Shapefile coverage. | https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa-guidelines-2022/appendix-e-recommended-methods-for-screening-and-modeling-local-risks-and-hazards_final-pdf.pdf?rev=b8917a27345a4a629fc18fc8650951e4&sc_lang=en | Esri Community Maps Contributors, California State Parks, © OpenStreetMap, Microsoft, Esri,

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Permitted Stationary Sources ●

Bay Area Air District Boundary

Overburdened Communities

Permitted Stationary Sources | Total count: 1

#	OBJECTID	FacilityID	FacilityName
1	10662	112534-1	Bart Gas & Food

#	Address	City	State
1	1395 7th St	Oakland	CA

#	Zip	County	Latitude
1	94607	Alameda	37.804690

#	Longitude	SourceType	NAICS
1	-122.293403	Retail Gas Station	457110

#	NAICS Sector	NAICS Subsector	NAICS Industry
1	Retail Trade	Gasoline Stations	Gasoline Stations with Convenience Stores

#	CancerRisk	ChronicHI	PM25	Throughput_Gal/yr
1	*No data*	*No data*	0.00	534430.0

2022 CARB & CAPCOA Gasoline Service Station Industrywide Risk Assessment Look-up Tool
Version 1.0 - February 18, 2022

Required Value	User Defined Input	Instructions
Annual Throughput (gallons/year)	**534430**	Enter your gas station's annual throughput in gallons of gasoline dispensed per year.
Hourly Dispensing Throughput (gallons/hour)	**500**	The tool will calculate the maximum hourly vehicle fueling throughput based on annual throughput as defined by Table 10 of the 2020 Gasoline Service Station Industrywide Risk Assessment Technical Guidance Document (Technical Guidance). If a different value is desired please enter it into cell L4.
Hourly Loading Throughput (gallons/hour)	**8800**	The tool will calculate the maximum hourly loading throughput based on annual throughput as defined by Table 10 of the Technical Guidance. If a different value is desired please enter it into cell L5.
Meteorological Data	**San Jose**	Select appropriate meteorological data. Met sets provided include 2 rural (Redding and Lancaster) and 4 urban (Fresno, Ontario, San Diego, and San Jose) locations. Use whichever best correlates to your location. If you would like to use site-specific meteorological data please refer to the Variable Met Tool.
Distance to Nearest Resident (meters)	**73**	Enter the distance to the nearest residential receptor in meters as measured from the edge of the station canopy. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
Distance to Nearest Business (meters)		Enter the distance to the nearest worker receptor in meters as measured from the edge of the station canopy. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
Distance to Acute Receptor (meters)	**73**	Enter the distance where acute impacts are expected in meters as measured from the edge of the station canopy. This can be the distance to the property boundary, nearest resident, nearest worker, or any other user defined location. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
Control Scenario	**EVR Phase I & EVR Phase II**	Select the appropriate control scenario for your gas station. Please refer to technical Guidance for an explanation of the different control scenarios. Almost all gas stations in California are equipped with EVR Phase I and EVR Phase II controls.
Include Building Downwash Adjustments	**no**	Building downwash may over estimate risk results. High results should be investigated further through site-specific health risk assessment.

Risk Value	Results
Max Residential Cancer Risk (chances/million)	**0.52**
Max Worker Cancer Risk (chances/million)	
Chronic HI	**#N/A**
Acute HI	**0.10**

Appendix E

Mandela Station T-3 Mixed-Use Project, Air Quality Community Risk Assessment

Illingworth & Rodkin, Inc., February 16, 2021

MANDELA STATION LOT 3 MIXED-USE PROJECT AIR QUALITY COMMUNITY RISK ASSESSMENT

Oakland, California

February 16, 2021

Prepared for:

Scott Gregory
Lamphier • Gregory
1944 Embarcadero
Oakland, CA 94606

Prepared by:

Jay Witt
James Reyff

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality
429 E. Cotati Avenue
Cotati, CA 94931
(707) 794-0400

I&R Project: 21-018

Introduction

This report provides the results of a toxic air contaminant (TAC) health risk analysis (HRA) for the proposed development of a new mixed-use project located adjacent to the West Oakland BART station, bounded by 7th Street to the north, Mandela Parkway to the east, 5th Street to the south, and Chester Street to the west in Oakland, California. The project site is currently occupied by surface parking lots that provide 413 automobile parking spaces for the West Oakland BART station. The project would replace the surface parking lots with:

- 762 multi-family dwelling units,
- Approximately 382,000 square feet (sf) of office space,
- Approximately 75,000 sf of ground-level commercial space, and
- Approximately 400 parking spaces in a garage accessible via Chester Street.

The Mandela Station project has been divided into three phases. Phase I, also known as the T3 Development, involves "Lot 3," while Phase II will develop Lot 1 (i.e., T1 and T2 Developments). Phase III will develop Lot 2 (i.e., T4 Development). Phase I will construct 15,944 sf of ground-level retail space and 2,057 sf of other non-residential space on floor one and approximately 240 residential units on floors two through seven. Lot 3 is approximately 1.4 acres.

This assessment predicts community risk impacts with respect to the City of Oakland Standard Conditions of Approval (SCA). The project is subject to the City's SCA for air quality, provided as *Attachment 1*. The following condition applies:

SCA #19. Exposure to Air Pollution (Toxic Air Contaminants) - Health Risk Reduction Measures.

This measure requires projects near sources of toxic air contaminants to perform a health risk assessment and, if necessary, incorporate appropriate measures into the project design in order to reduce the potential health risk due to exposure to toxic air contaminants. This analysis addresses only the effects of nearby air pollution and toxic air contaminant sources upon the project.

Setting

The project site is in Alameda County which is a part of San Francisco Bay Area Air Basin. Air quality in the region is affected by natural factors such as proximity to the Bay and ocean, topography, and meteorology, as well as proximity to sources of air pollution. Ambient air quality standards have been established at both the State and federal level. The Bay Area meets all ambient air quality standards with the exception of ground-level ozone, respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$).

Air Pollutants and TACs

Particulate Matter

Particulate matter (PM) is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size, and chemical composition, and can be made up of many different materials such as metals, soot, soil, and dust. Particles 10 microns or less in diameter are defined as "respirable particulate matter" or "PM_{10}." Fine particles are 2.5 microns or less in diameter ($PM_{2.5}$) and, while also respirable, can contribute significantly to regional haze and reduction of visibility. Inhalable particulates come from smoke, dust, aerosols, and metallic oxides. Although particulates are found naturally in the air, most particulate matter found in the vicinity of the project site is emitted either directly or indirectly by motor vehicles, industry, construction, agricultural activities, and wind erosion of disturbed areas. Most $PM_{2.5}$ is comprised of combustion products such as smoke. Extended exposure to PM can increase the risk of chronic respiratory disease (Bay Area Air Quality Management District (BAAQMD) 2011a).[1, 2] PM exposure is also associated with increased risk of premature deaths, especially in the elderly and people with pre-existing cardiopulmonary disease.

Toxic Air Contaminants

Toxic Air Contaminants (TACs) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer or serious illness) and include but are not limited to criteria air pollutants. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and federal level. The identification, regulation, and monitoring of TACs is relatively new compared to that for criteria air pollutants that have established ambient air quality standards. TACs are regulated or evaluated on the basis of risk to human health rather than comparison to an ambient air quality standard or emission-based threshold.

Diesel exhaust is the predominant cancer-causing TAC in California. The California Air Resources Board (CARB) estimates that about 70% of total known cancer risk related to air toxics in California is attributable to diesel particulate matter (DPM).[3] According to CARB, diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the state's Proposition 65 or under the Federal Hazardous Air Pollutants programs.

To address the issue of diesel emissions in the state, CARB developed the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles.[4] In addition to requiring more stringent emission standards for new on-road and off-road mobile sources and stationary diesel-fueled engines to reduce particulate matter emissions by 90 percent, a significant component of the plan involves application of emission control strategies to existing diesel vehicles and equipment. Many of the measures of the Diesel Risk Reduction Plan have been

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[1] BAAQMD 2016. Planning Healthy Places. May. Accessed at http://www.baaqmd.gov/~/media/files/planning-and-research/planning-healthy-places/php_may20_2016-pdf.pdf?la=en on August 24, 2016.
[2] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2017.
[3] CAEB. *Summary: Diesel Particulate Matter Health Impacts*. https://www.arb.ca.gov/research/diesel/diesel-health_summ.htm
[4] California Air Resources Board. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. October 2000.

approved and adopted, including the Federal on-road and non-road diesel engine emission standards for new engines, as well as adoption of regulations for low sulfur fuel in California.

CARB has adopted and implemented several regulations for stationary and mobile sources to reduce emissions of DPM. Several of these regulatory programs affect medium and heavy-duty diesel trucks that represent the bulk of DPM emissions from California highways. CARB regulations require on-road diesel trucks to be retrofitted with particulate matter controls or replaced to meet 2010 or later engine standards that have much lower DPM and $PM_{2.5}$ emissions. This regulation will substantially reduce these emissions between 2013 and 2023. While new trucks and buses will meet strict federal standards, this measure is intended to accelerate the rate at which the fleet either turns over so there are more cleaner vehicles on the road or is retrofitted to meet similar standards. With this regulation, older, more polluting trucks would be removed from the roads sooner.

CARB has also adopted and implemented regulations to reduce DPM and NO_X emissions from in-use (existing) and new off-road heavy-duty diesel vehicles (e.g., loaders, tractors, bulldozers, backhoes, off-highway trucks, etc.). The regulations apply to diesel-powered off-road vehicles with engines 25 horsepower (hp) or greater. The regulations are intended to reduce particulate matter and nitrogen oxides (NO_X) exhaust emissions by requiring owners to turn over their fleet (replace older equipment with newer equipment) or retrofit existing equipment in order to achieve specified fleet-averaged emission rates. Implementation of this regulation, in conjunction with stringent Federal off-road equipment engine emission limits for new vehicles, will significantly reduce emissions of DPM and NO_X.

Sensitive Receptors

"Sensitive receptors" are defined as facilities where sensitive population groups, such as children, the elderly, the acutely ill, and the chronically ill, are likely to be located. These land uses include residences, schools, playgrounds, childcare centers, retirement homes, convalescent homes, hospitals, and medical clinics. The project would include sensitive receptors in the form of new residences. For the purposes of a thorough health risk assessment, the hypothetical resident of the new residential development is assumed to be a 3^{rd}-trimeter fetus, growing to be an infant, child, and adult over a 30-year period.

TAC and $PM_{2.5}$ Impact Analysis

Oakland uses the BAAQMD California Environmental Quality Act (CEQA) Air Quality Guidelines to consider exposure of sensitive receptors to air pollutant levels that result in an unacceptable cancer risk or hazards. For cancer risk, which is a concern for DPM and other mobile-source TACs, the BAAQMD considers an increased risk of contracting cancer that is 10.0 in one million chances or greater, to be a threshold for a single source. The BAAQMD CEQA Guidelines also consider single-source TAC exposure to be excessive if annual fine particulate matter ($PM_{2.5}$) concentrations exceed 0.3 micrograms per cubic meter ($\mu g/m^3$) or if the computed hazard index (HI) is greater than 1.0 for non-cancer risk hazards. Cumulative exposure is assessed by combining the risks and annual $PM_{2.5}$ concentrations for all sources within 1,000 feet of a project. The thresholds for cumulative exposure are an excess cancer risk of 100 in one million, annual $PM_{2.5}$

concentrations of 0.8 µg/m^3, and a hazard index greater than 10.0. These thresholds were used to address impacts from TAC sources that could affect future project residents. The methodology for computing cancer risk, annual $PM_{2.5}$ concentrations, and non-cancer hazards is contained in *Attachment 2*. Note that this methodology describes the current guidance to computed cancer risk finalized by the State Office of Environmental Health Hazards Assessment (OEHHA), which provides greater protections for infants and children.

A review of the project site has identified five TAC sources within 1,000 feet of the site that could adversely affect new residents; Interstate 880 (I-880), Mandela Parkway, 7th Street, a diesel fueled emergency generator located at the United States Postal Service (USPA) distribution facility, and a gasoline dispensing facility (i.e., gas station). The USPS distribution facility and an Amtrak Maintenance Facility are located just outside of the 1,000-foot radius of the site and were not considered in the analysis. Likewise, The Port of Oakland and its associated rail facilities are located well beyond the site's 1,000-foot radius. The BART line that transects the Mandela Station project site is electric powered and assumed to have no TAC emissions.

A summary of the predicted impacts of these sources on the project are shown in Table 1. Locations of these sources and the project are shown in in Figure 1.

Table 1. Summary of TAC Impacts from Sources within 1,000 feet on Project

Source	**Maximum Cancer Risk (per million)***	**Maximum Annual $PM_{2.5}$ (µg/m^3)***	**Maximum Hazard Index***
I-880	5.5	0.07	<0.01
Mandela Parkway	0.1	0.03	<0.01
7th Street	0.4	0.24	<0.01
Plant #21130 (Generator)	0.4	<0.001	<0.01
Plant #112534 (Gas Dispensing Facility)	0.2	---	<0.01
BAAQMD Single-Source Threshold	***>10.0***	***>0.3***	***>1.0***
Exceed Threshold?	*No*	*No*	*No*

*On-site MEI located on 2nd Floor residence. Bold text indicates BAAQMD Threshold(s) and any exceedances.

Freeways – I-880

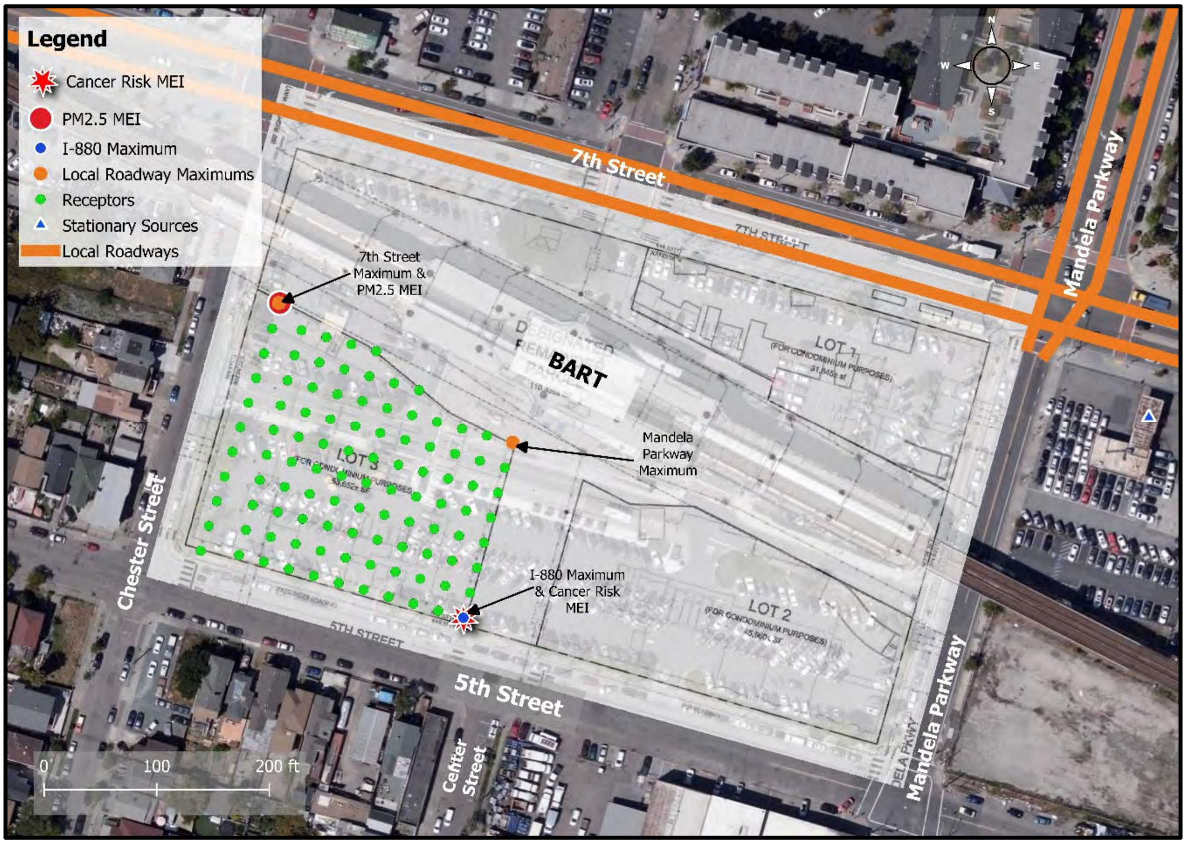
A refined analysis of the impacts of TACs and $PM_{2.5}$ from I-880 on a maximally exposed individual (MEI) living at the new residences provided by the project is necessary to evaluate potential cancer risks and $PM_{2.5}$ concentrations associated with its proximity to the freeway. A review of the 2019 traffic information reported by the California Department of Transportation (Caltrans) through its Traffic Census Program indicates that I-880 nearest the project site had an average annual daily traffic (AADT) volume of 127,700 vehicles per day with about 10.7 percent of the volume being trucks, of which 7.7 percent are considered heavy duty trucks and 3.0 percent are medium duty trucks.[5]

[5] Estimate provided by CT-EMFAC2017 using an overall truck percentage of 10.7. Truck percentage provided by Caltrans Traffic Census Program data.

Figure 1. Project Site and Nearby TAC and $PM_{2.5}$ Sources

TAC and $PM_{2.5}$ concentrations were calculated at receptor locations placed throughout the site using a grid of receptors with 23-foot (7-meter) spacing. Residential units in the project building would be on the second through seventh floors with the first floor containing commercial spaces, parking, and other amenities. Therefore, I-880 impacts were modeled for the second through seventh floors levels, as the first floor will contain no residential areas. Residential receptor heights were established based on the floor heights provided by the applicant and an approximately 4-foot 11-inch (1.5m) person height, which was added to the floor elevation to represent the breathing heights of residents. Therefore, total receptor heights were 7.6 meters (24.9 feet), 10.6 meters (34.9 feet), 13.7 meters (44.9 feet), 16.7 meters (54.9 feet), 19.8 meters (64.9 feet), and 22.8 meters (74.9 feet), for the second through seventh floors, respectively. Figure 2 shows the freeway links used for the modeling and receptor locations at the project site where concentrations were calculated.

Figure 2. On-Site Sensitive Receptors, Sources Modeled, and Receptor with Maximum TAC Impacts



Modeling I-880 Emissions

Analysis of I-880 involved developing emissions estimates of DPM, organic TACs (as TOG), and $PM_{2.5}$ emissions for the first operational year of the project, assumed to be 2023. Emissions associated with vehicle travel depend on the year of analysis because emission control technology requirements are phased-in over time. Overall vehicle emissions, in particular diesel truck emissions, will decrease in the future. Therefore, the earlier the year analyzed, the higher the emission rates produced. Therefore, year 2023 emissions were conservatively assumed as being representative of future conditions over the period that cancer risks are evaluated (30 years).

AADT for 2023 were estimated from 2019 levels assuming an increase of 1 percent per year. Hourly traffic distributions specific to the closest segment of I-880 were obtained from Caltrans Performance Measurement System (PeMS). PeMS data is collected in real-time from nearly 40,000 individual detectors spanning the freeway system across all major metropolitan areas of California[6]. The fraction of traffic volume each hour was calculated using PeMS data and applied to the 2023 AADT to estimate hourly traffic emission rates for I-880.

6 https://dot.ca.gov/programs/traffic-operations/mpr/pems-source

For all hours of the day, other than during peak a.m. and p.m. periods, an average speed of 60 mph was estimated for northbound travel and 65 mph for southbound travel based on weekday 2019 speed data from PeMS. Speeds on northbound and southbound I-880 in the vicinity of the project site during the peak a.m. and p.m. periods were also identified using 2019 PeMS data. The average speed during the 2-hour a.m. peak period was approximately 60 mph for both the northbound and southbound directions. During the 2-hour peak p.m. period, the average travel speed in the northbound direction was approximately 65 mph and 60 mph in the southbound direction.

The Caltrans version of the CARB's EMFAC2017 emissions model, known as CT-EMFAC2017, was used to develop vehicle emission factors for the year 2023 using the mix of vehicles in Alameda County. These emissions factors were then used to estimate TAC and $PM_{2.5}$ emissions over a 30-year exposure period to calculate increased cancer risks to the project's residential MEI from traffic on I-880. EMFAC2017 became available for use in March 2018 and approved by the EPA in August 2019. It includes the latest data on California's car and truck fleets and travel activity. CT-EMFAC2017 provides emission factors for mobile source pollutants and TACs, including DPM. Emission processes modeled include running exhaust for DPM, $PM_{2.5}$ and total organic compounds (e.g., TOG), running evaporative losses for TOG, and fugitive road dust for $PM_{2.5}$ that includes tire and brake wear emissions. Inputs to the emissions model include region (i.e., Alameda County), type of road (i.e., freeway), traffic mix assigned by CT-EMFAC2017 for the county and adjusted for the local truck mix on I-880, year of analysis, and season (i.e., annual).

Hourly emissions rates were developed for DPM, organic TACs, and $PM_{2.5}$ emissions for 2023 traffic along the applicable segment of I-880. TAC and $PM_{2.5}$ concentrations were developed using the hourly emissions rates with an air quality dispersion model (AERMOD). Maximum increased lifetime cancer risks and annual $PM_{2.5}$ concentrations for the receptors were then computed using modeled TAC and $PM_{2.5}$ concentrations and the BAAQMD methods and exposure parameters described in *Attachment 1*.

Dispersion Modeling

Dispersion modeling of TAC and $PM_{2.5}$ emissions was conducted using the U.S. EPA AERMOD dispersion model, which is recommended by the BAAQMD for this type of analysis. Northbound and southbound traffic on I-880 near the project site was evaluated with the model. Emissions from vehicle traffic were modeled in AERMOD using a series of volume sources along a line (line volume sources), with line segments used to represent northbound and southbound travel lanes on I-880. The modeling used a five-year data set (2013-2017) of hourly meteorological data from the Oakland Airport in Oakland, CA prepared by the BAAQMD for use with the AERMOD model. Other inputs to the model included road geometry and elevations, hourly traffic emissions, and receptor locations and heights. Figure 2 shows the roadway links used for the modeling and receptor locations where concentrations were calculated.

Computed Cancer and Non-Cancer Health Impacts

The calculation of risk impacts from I-880 was developed for an individual that resides at the project site starting as a third trimester fetus, growing to be an infant, child, and adult over a 30-year period. Therefore, age-appropriate sensitivity factors were applied. The highest concentrations of TACs from I-880 occurred at the southeast corner of the site on the second floor. The maximum predicted annual DPM concentration from I-880 traffic at the site was 0.007 $\mu g/m^3$. This concentration, along with the concentrations of TOG-related TACs, would result in a cancer risk of 5.5 in one million. This risk would not exceed the single-source threshold of less than 10 per million. The maximum annual $PM_{2.5}$ concentration from I-880 at the site is estimated to be 0.10 $\mu g/m^3$, which is below the single-source threshold of 0.3 $\mu g/m^3$. The HI would be less than 0.01 for DPM, well below the single-source threshold of less than 1.0.

Local Roadways – Mandela Parkway and 7th Street

A refined analysis of the impacts of TACs and $PM_{2.5}$ from adjacent local roadways on those living at the new residences provided by the project is necessary to evaluate potential cancer risks and $PM_{2.5}$ concentrations associated with its proximity to roadways with an average annual daily traffic (AADT) of 10,000 vehicles or more. Local roadway traffic volumes adjacent to the project were estimated using the existing (2018) with project intersection volumes provided in figure 2 of the project's transportation assessment developed by the traffic consultant.[7] AADT for 2023 were estimated from 2018 levels assuming an increase of 1 percent per year.

A review of the traffic data provided identified two adjacent local roadways with the potential for AADTs over 10,000 vehicles per day: 7th Street and Mandela Parkway north of 7th Street. Mandela Parkway's daily traffic volume in the vicinity of the project was estimated to be approximately 6,000, while the daily traffic volume on 7th Street was estimated at approximately 11,300. Therefore, the daily traffic volume on Mandela Parkway was rounded up to 10,000 to produce a conservative emissions estimate.

Truck percentages for both roadways were estimated using BAAQMD's 2009 West Oakland Truck Survey Report.[8] Both Mandela Parkway and 7th Street were estimated to have about 5 percent trucks in the vicinity of the project based on daily truck counts conducted at the intersection of 7th Street and Mandela Parkway in 2008.[9] The truck counts in the 2009 West Oakland Truck Survey Report were assumed to grow 1 percent per year, or 10 percent between 2008 and 2018. The grown daily truck volume was then compared to the 2018 daily intersection volumes prepared for the project by the traffic consultant to obtain the 5 percent estimate.

TAC and $PM_{2.5}$ concentrations were calculated at the same receptor locations as those used to assess impacts from I-880. Figure 2 shows the links used to model Mandela Parkway and 7th Street and shows the receptor locations at the project site where concentrations were calculated.

Modeling Local Roadway Emissions

Analysis of roadway TAC impacts involved developing estimates of DPM, organic TACs (as TOG), and $PM_{2.5}$ emissions for the first operational year of the project. For this analysis, that year

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[7] Fehr & Peers Memorandum, *West Oakland BART TOD – Transportation Assessment*. January 2019.
[8] BAAQMD. 2009. BAAQMD West Oakland Truck Survey Report. Table 7.
https://www.baaqmd.gov/~/media/files/planning-and-research/care-program/final-west-oakland-truck-survey-report-dec-2009.pdf
[9] Table 7. Total Weekday Daily Manual Truck Counts for Surface Streets.

was assumed to be 2023 or later. Emissions associated with vehicle travel depend on the year of analysis because emission control technology requirements are phased-in over time. Overall vehicle emissions, in particular diesel truck emissions, will decrease in the future. Therefore, the earlier the year analyzed, the higher the emission rates produced. Therefore, year 2023 emissions were conservatively assumed as being representative of future conditions over the period that cancer risks are evaluated (30 years).

The fraction of traffic volume each hour on I-880 near the project site was used to estimate hourly traffic volumes and emissions for Mandela Parkway and 7th Street. Hourly I-880 traffic distributions were obtained from Caltrans PeMS. For all hours of the day, other than during peak a.m. and p.m. periods, an average speed of 30 mph was assumed for all vehicles. For the 2-hour a.m. and 2-hour p.m. peak periods, an average travel speed of 20 mph was used to represent congested traffic conditions.

As with the analysis of I-880, CT-EMFAC2017 was used to develop vehicle emission factors for local roadways using the mix of vehicles in Alameda County. Emission processes modeled include running exhaust for DPM, $PM_{2.5}$ and TOG, running evaporative losses for TOG, and fugitive road dust for $PM_{2.5}$ that includes tire and brake wear emissions. Inputs to the emissions model include region (i.e., Alameda County), type of road (i.e., local urban), traffic mix assigned by CT-EMFAC2017 for the county and adjusted for the assumed truck mix (5 percent), year of analysis, and season (i.e., annual).

Hourly emissions rates were developed for DPM, organic TACs, and $PM_{2.5}$ emissions along the applicable segments of Mandela Parkway and 7th Street. TAC and $PM_{2.5}$ concentrations at the project site were developed using the hourly emissions rates and AERMOD. Maximum increased lifetime cancer risks and annual $PM_{2.5}$ concentrations for the maximum concentration receptor were computed using modeled TAC and $PM_{2.5}$ concentrations and the BAAQMD methods and exposure parameters described in *Attachment 1*.

Dispersion Modeling

Dispersion modeling of TAC and $PM_{2.5}$ emissions was conducted using the U.S. EPA AERMOD dispersion model, which is recommended by the BAAQMD for this type of analysis. Northbound and southbound traffic on Mandela Parkway and eastbound and westbound traffic on 7th Street near the project site were evaluated with AERMOD using a series of area sources along a line (line area sources), with line segments used to represent each travel direction. The modeling used a five-year data set (2013-2017) of hourly meteorological data from the Oakland Airport in Oakland, California prepared by the BAAQMD for use with the AERMOD model. Other inputs to the model included road geometry and elevations, hourly traffic emissions, and receptor locations and heights. Figure 2 shows the roadway links used for the modeling and receptor locations where the maximum concentrations from each roadway would occur.

Computed Cancer and Non-Cancer Health Impacts

As with the analysis of I-880, the calculation of risk impacts from local roadways was developed for an individual that resides at the project site starting as a third trimester fetus, growing to become an infant, child, and adult over a 30-year period.

The highest concentrations of TACs and $PM_{2.5}$ from Mandela Parkway occurred at the northeast corner of the site on the second floor. The maximum increased cancer risk at this location was computed as 0.1 in one million, below the BAAQMD single source threshold of below 10.0 in a million. The maximum total $PM_{2.5}$ concentration was 0.04 $\mu g/m^3$, also below the BAAQMD single source threshold of 0.3 $\mu g/m^3$. The maximum predicted annual DPM concentration from Mandela Parkway traffic was less than 0.001 $\mu g/m^3$,which is lower than the REL resulting in an HI much less than 0.01.

The highest concentrations of TACs and $PM_{2.5}$ from 7th Street occurred at the northwest corner of the site on the second floor. The maximum increased cancer risk at this location was computed as 0.8 in one million, below the BAAQMD single source threshold of below 10.0 in a million. The maximum total $PM_{2.5}$ concentration was 0.24 $\mu g/m^3$, also below the BAAQMD single source threshold of 0.3 $\mu g/m^3$. The maximum predicted annual DPM concentration from 7th Street traffic at the second floor MEI was less than 0.001 $\mu g/m^3$,which is lower than the REL resulting in an HI much less than 0.01.

Stationary Sources

Permitted stationary sources of air pollution near the project site were identified using BAAQMD's *Permitted Stationary Sources 2018* GIS website,[10] which identifies the location of nearby stationary sources and their estimated risk and hazard impacts, including emissions and adjustments to account for new OEHHA guidance. The website provided the concentration and risk values needed for the analysis. Two nearby stationary sources were identified:

- Plant #21130 is a diesel-powered emergency generator at the USPS facility.
- Plant #112534 is a gasoline dispensing facility (BART Gas & Food).

Estimated risks and hazard impacts for each of these facilities were adjusted for distance using the appropriate BAAQMD *Distance Multiplier Tool for Diesel Internal Combustion Engines, Gasoline Dispensing Facilities (GDFs), or Generic Sources*. The distance-adjusted risk values for each stationary source at the project site are listed in Table 1. Neither of the existing stationary sources exceed BAAQMD single-source thresholds at the project site.

10 BAAQMD, https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65

Cumulative Cancer Risk, Hazard Index and Annual $PM_{2.5}$ Concentrations

The combination of impacts from all sources at the receptor most affected onsite by TAC sources, or the MEI, is reported in Table 2. The receptor with the highest overall cancer risk occurred at the southeast corner of the site on the second floor (i.e., Cancer Risk MEI). The highest total annual $PM_{2.5}$ concentration onsite occurred at a receptor on the second-floor level at the northern boundary of the site, near 7th Street (i.e., $PM_{2.5}$ Concentration MEI). The impacts from each source were added at these locations to compute the maximum cumulative impacts from all sources.

Combined cancer risk is presented in Table 2 below. Cumulative impacts onsite are below BAAQMD's cumulative sources thresholds of 100 chances of cancer per million, annual $PM_{2.5}$ concentration less than 0.8 µg/m^3, and an HI below 10.0. Concentrations and risks associated with the third through seventh floors were also developed for comparison purposes and provided in Table 2.

Table 2. Maximum Cumulative Impacts by Floor on Project Residents

Source	Cumulative Maximum Cancer Risk (per million)*	Cumulative Maximum Annual $PM_{2.5}$ (µg/m^3)**	Cumulative Maximum Hazard Index
2nd Floor Level	6.6	0.33	<0.01
3rd Floor Level	5.5	0.23	<0.01
4th Floor Level	4.4	0.16	<0.01
5th Floor Level	3.5	0.11	<0.01
6th Floor Level	2.7	0.08	<0.01
7th Floor Level	2.1	0.06	<0.01
BAAQMD Cumulative Source Threshold	***>100***	***>0.80***	***>10.0***
Threshold Exceeded on Any Floor?	*No*	*No*	*No*

Values in Bold exceed Threshold.
* Location of Cancer Risk MEI. ** Location of $PM_{2.5}$ MEI

Conclusions and Recommendations

There are unequal air quality impacts within West Oakland. Some people are closer to sources of air pollution and breathe unhealthier air. Neighborhoods closer to the Port of Oakland, interstates, and busy roadways experience much higher levels of pollution and cancer risk. Therefore, BAAQMD conducted a TAC and $PM_{2.5}$ data analysis that describe exposures in West Oakland. These assessments included development of gridded emissions of DPM and $PM_{2.5}$ across West Oakland and northern Alameda (including the project site) and modeled exposures in terms of increased cancer risk and annual $PM_{2.5}$ concentrations. While the project site is not within 1,000 feet of any large sources of TACs and future residents would not be exposed to TAC sources that would exceed BAAQMD thresholds, some consideration should be given to ambient background TAC concentrations in West Oakland.

Table 1 summarized the maximum increased cancer risks and annual $PM_{2.5}$ concentrations at the project site, resulting from traffic on I-880, Mandela Parkway, and 7th Street, as well as the operation of existing nearby stationary sources. None of the dwelling units at the project site are estimated to have a cancer risk, $PM_{2.5}$ concentration, or HI that would exceed BAAQMD single-source or cumulative health risk thresholds. Therefore, based solely on this risk assessment, control features would not be required. However, due to the project's location and the assessment of West Oakland conducted by BAAQMD, it would be recommended the project utilize MERV 13 air filtration.

The U.S. EPA reports particle size removal efficiency for filters rated MERV 13 of 90 percent for particles in the size range of 1 to 3 µm and less than 75 percent for particles 0.3 to 1 µm.[11,12] The BAAQMD's *Planning Healthy Places* guidance indicates that MERV 13 air filtration devices installed on an HVAC air intake system can remove 80-90 percent of indoor particulate matter (greater than 0.3 microns in diameter).[13] A properly installed and operated ventilation system with MERV 13 air filters would reduce DPM and $PM_{2.5}$ concentrations by 80 percent or greater indoors when compared to outdoors.

West Oakland has significant sources of TACs that result in high background concentrations of many pollutants, including DPM and $PM_{2.5}$. HVAC systems with high efficiency particulate filters, specifically MERV 13 filters, would further reduce indoor concentrations of DPM and $PM_{2.5}$, reducing the health risks associated with these pollutants.

Attachments

The supporting screening calculations and modeling information are provided in attachments to this report:

Attachment 1: Applicable City of Oakland SCAs
Attachment 2: Health Impact Evaluation Methodology
Attachment 3: I-880, Mandela Parkway, and 7th Street Emissions
Attachment 4: I-880, Mandela Parkway, and 7th Street Health Risk Calculations
Attachment 5: Stationary Source Information
Attachment 6: Cumulative Health Risk Calculations

[11] American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., 2007. *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. ANSI/ASHRAE Addendum b to Standard 52.2-2007.
[12] United States Environmental Protection Agency (U.S. EPA), 2009. *Residential Air Cleaners (Second Edition): A Summary of Available Information*. U.S. EPA 402-F-09-002. Revised August 2009.
[13] Bay Area Air Quality Management District (BAAQMD), 2016. *Planning Healthy Places, A Guidebook for addressing local sources of air pollutants in community planning*. May.

Attachment 1: Applicable City of Oakland SCAs

19. Exposure to Air Pollution (Toxic Air Contaminants)

a. ***Health Risk Reduction Measures***

Requirement: The project applicant shall incorporate appropriate measures into the project design in order to reduce the potential health risk due to exposure to toxic air contaminants. The project applicant shall choose one of the following methods:

i. The project applicant shall retain a qualified air quality consultant to prepare a Health Risk Assessment (HRA) in accordance with California Air Resources Board (CARB) and Office of Environmental Health and Hazard Assessment requirements to determine the health risk of exposure of project residents/occupants/users to air pollutants. The HRA shall be submitted to the City for review and approval. If the HRA concludes that the health risk is at or below acceptable levels, then health risk reduction measures are not required. If the HRA concludes that the health risk exceeds acceptable levels, health risk reduction measures shall be identified to reduce the health risk to acceptable levels. Identified risk reduction measures shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City.

- or -

ii. The project applicant shall incorporate the following health risk reduction measures into the project. These features shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City:

- Installation of air filtration to reduce cancer risks and Particulate Matter (PM) exposure for residents and other sensitive populations in the project that are in close proximity to sources of air pollution. Air filter devices shall be rated MERV-13 [insert MERV-16 for projects located in the West Oakland Specific Plan area] or higher. As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required.
- Where appropriate, install passive electrostatic filtering systems, especially those with low air velocities (i.e., 1 mph).
- Phasing of residential developments when proposed within 500 feet of freeways such that homes nearest the freeway are built last, if feasible.
- The project shall be designed to locate sensitive receptors as far away as feasible from the source(s) of air pollution. Operable windows, balconies, and building air intakes shall be located as far away from these sources as feasible. If near a distribution center, residents shall be located as far away as feasible from a loading dock or where trucks concentrate to deliver goods.
- Sensitive receptors shall be located on the upper floors of buildings, if feasible.

- Planting trees and/or vegetation between sensitive receptors and pollution source, if feasible. Trees that are best suited to trapping PM shall be planted, including one or more of the following: Pine (*Pinus nigra* var. *maritima*), Cypress (*X Cupressocyparis leylandii*), Hybrid popular (*Populus deltoids X trichocarpa*), and Redwood *(Sequoia sempervirens*).
- Sensitive receptors shall be located as far away from truck activity areas, such as loading docks and delivery areas, as feasible.
- Existing and new diesel generators shall meet CARB's Tier 4 emission standards, if feasible.
- Emissions from diesel trucks shall be reduced through implementing the following measures, if feasible:
  - Installing electrical hook-ups for diesel trucks at loading docks.
  - Requiring trucks to use Transportation Refrigeration Units (TRU) that meet Tier 4 emission standards.
  - Requiring truck-intensive projects to use advanced exhaust technology (e.g., hybrid) or alternative fuels.
  - Prohibiting trucks from idling for more than two minutes.
  - Establishing truck routes to avoid sensitive receptors in the project. A truck route program, along with truck calming, parking, and delivery restrictions, shall be implemented.

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Building

b. ***Maintenance of Health Risk Reduction Measures***

Requirement: The project applicant shall maintain, repair, and/or replace installed health risk reduction measures, including but not limited to the HVAC system (if applicable), on an ongoing and as-needed basis. Prior to occupancy, the project applicant shall prepare and then distribute to the building manager/operator an operation and maintenance manual for the HVAC system and filter including the maintenance and replacement schedule for the filter.

When Required: Ongoing

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

Attachment 2: Health Impact Evaluation Methodology

A health risk assessment (HRA) for exposure to Toxic Air Contaminates (TACs) requires the application of a risk characterization model to the results from the air dispersion model to estimate potential health risk at each sensitive receptor location. The State of California Office of Environmental Health Hazard Assessment (OEHHA) and California Air Resources Board (CARB) develop recommended methods for conducting health risk assessments. The most recent OEHHA risk assessment guidelines were published in February of 2015.[14] These guidelines incorporate substantial changes designed to provide for enhanced protection of children, as required by State law, compared to previous published risk assessment guidelines. CARB has provided additional guidance on implementing OEHHA's recommended methods.[15] This HRA used the 2015 OEHHA risk assessment guidelines and CARB guidance. The BAAQMD has adopted recommended procedures for applying the newest OEHHA guidelines as part of Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants.[16] Exposure parameters from the OEHHA guidelines and the recent BAAQMD HRA Guidelines were used in this evaluation.

Cancer Risk

Potential increased cancer risk from inhalation of TACs are calculated based on the TAC concentration over the period of exposure, inhalation dose, the TAC cancer potency factor, and an age sensitivity factor to reflect the greater sensitivity of infants and children to cancer causing TACs. The inhalation dose depends on a person's breathing rate, exposure time and frequency and duration of exposure. These parameters vary depending on the age, or age range, of the persons being exposed and whether the exposure is considered to occur at a residential location or other sensitive receptor location.

The current OEHHA guidance recommends that cancer risk be calculated by age groups to account for different breathing rates and sensitivity to TACs. Specifically, they recommend evaluating risks for the third trimester of pregnancy to age zero, ages zero to less than two (infant exposure), ages two to less than 16 (child exposure), and ages 16 to 70 (adult exposure). Age sensitivity factors (ASFs) associated with the different types of exposure are an ASF of 10 for the third trimester and infant exposures, an ASF of 3 for a child exposure, and an ASF of 1 for an adult exposure. Also associated with each exposure type are different breathing rates, expressed as liters per kilogram of body weight per day (L/kg-day). As recommended by the BAAQMD for residential exposures, 95^{th} percentile breathing rates are used for the third trimester and infant exposures, and 80^{th} percentile breathing rates for child and adult exposures. For children at schools and daycare facilities, BAAQMD recommends using the 95^{th} percentile breathing rates. Additionally, CARB and the BAAQMD recommend the use of a residential exposure duration of

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14 OEHHA, 2015*Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. February.
15 CARB, 2015*Risk Management Guidance for Stationary Sources of Air Toxics* July 23.
16 BAAQMD, 2016*BAAQMD Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines* December 2016.

30 years for sources with long-term emissions (e.g., roadways). For workers, assumed to be adults, a 25-year exposure period is recommended by the BAAQMD.

Under previous OEHHA and BAAQMD HRA guidance, residential receptors are assumed to be at their home 24 hours a day, or 100 percent of the time. In the 2015 Risk Assessment Guidance, OEHHA includes adjustments to exposure duration to account for the fraction of time at home (FAH), which can be less than 100 percent of the time, based on updated population and activity statistics. The FAH factors are age-specific and are: 0.85 for third trimester of pregnancy to less than 2 years old, 0.72 for ages 2 to less than 16 years, and 0.73 for ages 16 to 70 years. Use of the FAH factors is allowed by the BAAQMD if there are no schools in the project vicinity that would have a cancer risk of one in a million or greater assuming 100 percent exposure (FAH = 1.0).

Functionally, cancer risk is calculated using the following parameters and formulas:

Cancer Risk (per million) = $CPF \times Inhalation\ Dose \times ASF \times ED/AT \times FAH \times 10^6$

Where:

CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = $C_{air} \times DBR \times A \times (EF/365) \times 10^{-6}$

Where:

C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

The health risk parameters used in this evaluation are summarized as follows:

Parameter	Exposure Type →	Infant		Child		Adult
	Age Range →	3rd Trimester	0<2	2 < 9	2 < 16	16 - 30
DPM Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$		1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
Daily Breathing Rate (L/kg-day) 80th Percentile Rate		273	758	631	572	261
Daily Breathing Rate (L/kg-day) 95th Percentile Rate		361	1,090	861	745	335
Inhalation Absorption Factor		1	1	1	1	1
Averaging Time (years)		70	70	70	70	70
Exposure Duration (years)		0.25	2	14	14	14
Exposure Frequency (days/year)		350	350	350	350	350
Age Sensitivity Factor		10	10	3	3	1
Fraction of Time at Home		0.85-1.0	0.85-1.0	0.72-1.0	0.72-1.0	0.73

Non-Cancer Hazards

Non-cancer health risk is usually determined by comparing the predicted level of exposure to a chemical to the level of exposure that is not expected to cause any adverse effects (reference exposure level), even to the most susceptible people. Potential non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). The HI value represents the maximum concentration at which no adverse health effects to the respiratory system are anticipated to occur. OEHHA has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The total HI is calculated as the sum of the HIs for each TAC evaluated and the total HI is compared to the BAAQMD significance thresholds to determine whether a non-cancer health impact from a project would occur.

Typically, for residential projects located near roadways with substantial TAC emissions, the primary TAC of concern with non-cancer health effects is diesel particulate matter (DPM). For DPM, the chronic inhalation REL is 5 micrograms per cubic meter ($\mu g/m^3$).

Annual $PM_{2.5}$ Concentrations

While not a TAC, fine particulate matter ($PM_{2.5}$) has been identified by the BAAQMD as a pollutant with potential non-cancer health effects that should be included when evaluating potential community health impacts under the California Environmental Quality Act (CEQA). The thresholds of significance for $PM_{2.5}$ (project level and cumulative) are in terms of an increase in the annual average concentration. When considering $PM_{2.5}$ impacts, the contribution from all sources of $PM_{2.5}$ emissions should be included. For projects with potential impacts from nearby local roadways, the $PM_{2.5}$ impacts should include those from vehicle exhaust emissions, $PM_{2.5}$ generated from vehicle tire and brake wear, and fugitive emissions from re-suspended dust on the roads.

Attachment 3: I-880, Mandela Parkway, and 7th Street Emissions

Road Link	Description	Direction	No. Lanes	Link Length (miles)	Link Width (ft)	Link Width (m)	Release Height (ft)	Release Height (m)	Initial Vertical Dimention (m)	Initial Vertical Dispersion (m)	Average Speed (mph)	Average Vehicles per Day
NB_880_DPM	Northbound I-880 DPM	N	4	0.47	48	14.63	11.15	3.4	6.8	3.16	60mph off peak, 60mph AM Peak, 65mph PM peak period	79,685
SB_880_DPM	Southbound I-880 DPM	S	4	0.41	48	14.63	11.15	3.4	6.8	3.16	65mph off peak, 60mph AM Peak, 60mph PM peak period	53,123
NB_880_XXX	Northbound I-880 XXX	N	4	0.47	48	14.63	4.27	1.3	3.05	1.42	60mph off peak, 60mph AM Peak, 65mph PM peak period	79,685
SB_880_XXX	Southbound I-880 XXX	S	4	0.41	48	14.63	4.27	1.3	3.05	1.42	65mph off peak, 60mph AM Peak, 60mph PM peak period	53,123
NB_MAN_DPM	Northbound Mandela DPM	N	2	0.21	24	7.32	11.15	3.4	6.8	3.16	30mph off peak, 20mph AM Peak, 20mph PM peak period	5,000
SB_MAN_DPM	Southbound Mandela DPM	S	2	0.21	24	7.32	11.15	3.4	6.8	3.16	30mph off peak, 20mph AM Peak, 20mph PM peak period	5,000
NB_MAN_XXX	Northbound Mandela XXX	N	2	0.21	24	7.32	4.27	1.3	3.05	1.42	30mph off peak, 20mph AM Peak, 20mph PM peak period	5,000
SB_MAN_XXX	Southbound Mandela XXX	S	2	0.21	24	7.32	4.27	1.3	3.05	1.42	30mph off peak, 20mph AM Peak, 20mph PM peak period	5,000
EB_7th_DPM	Eastbound 7th St. DPM	E	2	0.51	24	7.32	11.15	3.4	6.8	3.16	30mph off peak, 20mph AM Peak, 20mph PM peak period	5,650
WB_7th_DPM	Westbound 7th St. DPM	W	2	0.51	24	7.32	11.15	3.4	6.8	3.16	30mph off peak, 20mph AM Peak, 20mph PM peak period	5,650
EB_7th_XXX	Eastbound 7th St. XXX	E	2	0.51	24	7.32	4.27	1.3	3.05	1.42	30mph off peak, 20mph AM Peak, 20mph PM peak period	5,650
WB_7th_XXX	Westbound 7th St. XXX	W	2	0.51	24	7.32	4.27	1.3	3.05	1.42	30mph off peak, 20mph AM Peak, 20mph PM peak period	5,650

Emission Factors

	Speed Category	1	2	3	4	5	6
	Travel Speed (mph)	20	30	60	65		
Emisions per vehicle (g/VMT)	DPM	0.00052	0.00044	0.002025	0.002433		
	PM2.5	0.00293	0.00182	0.002884	0.003418		
	TOG Exhaust	0.05966	0.03616	0.025022	0.028198		
	TOG Evap	0.07151	0.04768	0.023734	0.021908		

	Freeway	Local Urban
Fugitive PM2.5	0.031358	0.15557

		I-880		Mandela Parkway		7th St.			
Vehicle Type	Truck 1 (MDT)	3,984			140		339	0	
	Truck 2 (HDT)	10,226			360		870	0	
	Non-Truck	118,598			9,500		10,091	0	
Total	2023 ADT		132,808		10,000		11,300		-
	Directional Volume	**53,123**	**79,685**	**5,000**	**5,000**	**5650**	**5650**	**0**	**0**
	Average Veh/Hour/Dir	2,213	3,320	208	208	235	235	0	0

2023 Hourly Traffic Volumes and DPM Emisssions - Northbound I-880 DPM

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.02288693	1,824	0.000487	8	0.0524552	4180	0.001116107	16	0.04956366	3949	0.001267062
1	0.01836006	1463	0.0003907	9	0.0534951	4263	0.001138233	17	0.04933961	3932	0.001261334
2	0.0168171	1340	0.0003578	10	0.0539958	4303	0.001148887	18	0.04745429	3781	0.001009701
3	0.01784477	1422	0.0003797	11	0.0522083	4160	0.001110853	19	0.04663099	3716	0.000992183
4	0.02535209	2020	0.0005394	12	0.0521369	4155	0.001109334	20	0.04425476	3526	0.000941623
5	0.03575705	2849	0.0007608	13	0.0520114	4145	0.001106664	21	0.04121511	3284	0.000876948
6	0.04696275	3742	0.0009992	14	0.0526262	4194	0.001119745	22	0.03681342	2933	0.000783292
7	0.05267052	4197	0.0011207	15	0.049818	3970	0.001059994	23	0.02933002	2337	0.000624065
									TOTAL	79,685	

2023 Hourly Traffic Volumes and DPM Emisssions - Southbound I-880 DPM

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.02074708	1102	0.0003052	8	0.0497993	2646	0.000732671	16	0.05466683	2904	0.00066941
1	0.01278184	679	0.0001881	9	0.0513691	2729	0.000629029	17	0.05460857	2901	0.000668696
2	0.0108542	577	0.0001597	10	0.0525816	2793	0.000643876	18	0.05315691	2824	0.000782069
3	0.01060622	563	0.000156	11	0.0534871	2841	0.000786927	19	0.0498604	2649	0.000733569
4	0.02440226	1296	0.000359	12	0.0530572	2819	0.000780602	20	0.04596718	2442	0.00067629
5	0.03599419	1912	0.0005296	13	0.0534033	2837	0.000785694	21	0.04319769	2295	0.000635544
6	0.04140564	2200	0.0006092	14	0.0542806	2884	0.000798601	22	0.03917622	2081	0.000576378
7	0.047786	2539	0.000703	15	0.0543962	2890	0.000800301	23	0.03241422	1722	0.000476893
									TOTAL	53,123	

2023 Hourly Traffic Volumes and DPM Emisssions - Northbound Mandela DPM

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.021817	109	0.000003	8	0.0511273	256	7.79904E-06	16	0.05211525	261	7.94975E-06
1	0.01557095	78	1.976E-06	9	0.0524321	262	6.65232E-06	17	0.05197409	260	7.92821E-06
2	0.01383565	69	1.755E-06	10	0.0532887	266	6.76101E-06	18	0.0503056	252	6.38252E-06
3	0.0142255	71	1.805E-06	11	0.0528477	264	6.70505E-06	19	0.0482457	241	6.12117E-06
4	0.02487718	124	3.156E-06	12	0.0525971	263	6.67325E-06	20	0.04511097	226	5.72345E-06
5	0.03587562	179	4.552E-06	13	0.0527074	264	6.68725E-06	21	0.0422064	211	5.35494E-06
6	0.0441842	221	5.606E-06	14	0.0534534	267	6.7819E-06	22	0.03799482	190	4.82059E-06
7	0.05022826	251	7.662E-06	15	0.0521071	261	6.61109E-06	23	0.03087212	154	3.9169E-06
									TOTAL	5,000	

2023 Hourly Traffic Volumes and DPM Emisssions - Southbound Mandela DPM

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.021817	109	2.766E-06	8	0.0511273	256	7.7931E-06	16	0.05211525	261	7.94369E-06
1	0.01557095	78	1.974E-06	9	0.0524321	262	6.64726E-06	17	0.05197409	260	7.92217E-06
2	0.01383565	69	1.754E-06	10	0.0532887	266	6.75586E-06	18	0.0503056	252	6.37766E-06
3	0.0142255	71	1.803E-06	11	0.0528477	264	6.69994E-06	19	0.0482457	241	6.11651E-06
4	0.02487718	124	3.154E-06	12	0.0525971	263	6.66817E-06	20	0.04511097	226	5.71909E-06
5	0.03587562	179	4.548E-06	13	0.0527074	264	6.68215E-06	21	0.0422064	211	5.35086E-06
6	0.0441842	221	5.602E-06	14	0.0534534	267	6.77673E-06	22	0.03799482	190	4.81692E-06
7	0.05022826	251	7.656E-06	15	0.0521071	261	6.60605E-06	23	0.03087212	154	3.91392E-06
									TOTAL	5,000	

2023 Hourly Traffic Volumes and DPM Emisssions - Eastbound 7th St. DPM

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.021817	123	0.000008	8	0.0511273	289	2.15523E-05	16	0.05211525	294	2.19688E-05
1	0.01557095	88	5.459E-06	9	0.0524321	296	1.83834E-05	17	0.05197409	294	2.19093E-05
2	0.01383565	78	4.851E-06	10	0.0532887	301	1.86838E-05	18	0.0503056	284	1.76378E-05
3	0.0142255	80	4.988E-06	11	0.0528477	299	1.85291E-05	19	0.0482457	273	1.69156E-05
4	0.02487718	141	8.722E-06	12	0.0525971	297	1.84413E-05	20	0.04511097	255	1.58165E-05
5	0.03587562	203	1.258E-05	13	0.0527074	298	1.84799E-05	21	0.0422064	238	1.47982E-05
6	0.0441842	250	1.549E-05	14	0.0534534	302	1.87415E-05	22	0.03799482	215	1.33215E-05
7	0.05022826	284	2.117E-05	15	0.0521071	294	1.82695E-05	23	0.03087212	174	1.08242E-05
									TOTAL	5,650	

2023 Hourly Traffic Volumes and DPM Emisssions - Westbound 7th St. DPM

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.021817	123	7.668E-06	8	0.0511273	289	2.16045E-05	16	0.05211525	294	2.2022E-05
1	0.01557095	88	5.473E-06	9	0.0524321	296	1.84279E-05	17	0.05197409	294	2.19623E-05
2	0.01383565	78	4.863E-06	10	0.0532887	301	1.8729E-05	18	0.0503056	284	1.76805E-05
3	0.0142255	80	5E-06	11	0.0528477	299	1.8574E-05	19	0.0482457	273	1.69565E-05
4	0.02487718	141	8.743E-06	12	0.0525971	297	1.84859E-05	20	0.04511097	255	1.58548E-05
5	0.03587562	203	1.261E-05	13	0.0527074	298	1.85247E-05	21	0.0422064	238	1.4834E-05
6	0.0441842	250	1.553E-05	14	0.0534534	302	1.87869E-05	22	0.03799482	215	1.33537E-05
7	0.05022826	284	2.122E-05	15	0.0521071	294	1.83137E-05	23	0.03087212	174	1.08504E-05
									TOTAL	5,650	

2023 Hourly Traffic Volumes and PM2.5 Emisssions - Northbound I-880 XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.01683092	1,341	0.000510	8	0.0496547	3957	0.001504694	16	0.06396647	5097	0.002297294
1	0.0103436	824	0.0003134	9	0.0496941	3960	0.001505887	17	0.06161021	4909	0.002212672
2	0.00787276	627	0.0002386	10	0.0524778	4182	0.001590242	18	0.06241599	4974	0.0018914
3	0.00582967	465	0.0001767	11	0.0578364	4609	0.001752623	19	0.0569003	4534	0.001724257
4	0.00668128	532	0.0002025	12	0.0642607	5121	0.001947301	20	0.04795353	3821	0.001453142
5	0.01152229	918	0.0003492	13	0.0681977	5434	0.002066603	21	0.04270681	3403	0.00129415
6	0.0240534	1917	0.0007289	14	0.0689006	5490	0.002087905	22	0.03476998	2771	0.001053639
7	0.0429856	3425	0.0013026	15	0.0661384	5270	0.002004201	23	0.02639671	2103	0.000799903
									TOTAL	79,685	

2023 Hourly Traffic Volumes and PM2.5 Emisssions - Southbound I-880 XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.01481049	787	0.0003061	8	0.0600046	3188	0.001240223	16	0.05509767	2927	0.000960885
1	0.0142615	758	0.0002948	9	0.055076	2926	0.000960508	17	0.05352202	2843	0.000933406
2	0.01479093	786	0.0003057	10	0.0559088	2970	0.000975031	18	0.04561318	2423	0.000942769
3	0.0178104	946	0.0003681	11	0.0566642	3010	0.00117118	19	0.03763954	2000	0.000777964
4	0.02883464	1532	0.000596	12	0.0582255	3093	0.001203452	20	0.03123322	1659	0.000645553
5	0.04555944	2420	0.0009417	13	0.0604508	3211	0.001249446	21	0.02735541	1453	0.000565403
6	0.0522093	2774	0.0010791	14	0.059742	3174	0.001234795	22	0.02360854	1254	0.00048796
7	0.05817081	3090	0.0012023	15	0.055626	2955	0.001149723	23	0.01778489	945	0.000367592
									TOTAL	53,123	

2023 Hourly Traffic Volumes and PM2.5 Emisssions - Northbound Mandela XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	79	0.000008	8	0.0548297	274	4.68885E-05	16	0.05953207	298	5.09098E-05
1	0.01230255	62	6.545E-06	9	0.0523851	262	2.78689E-05	17	0.05756611	288	4.92286E-05
2	0.01133185	57	6.029E-06	10	0.0541933	271	2.88308E-05	18	0.05401459	270	2.87358E-05
3	0.01182004	59	6.288E-06	11	0.0572503	286	3.04571E-05	19	0.04726992	236	2.51476E-05
4	0.01775796	89	9.447E-06	12	0.0612431	306	3.25813E-05	20	0.03959337	198	2.10637E-05
5	0.02854086	143	1.518E-05	13	0.0643243	322	3.42205E-05	21	0.03503111	175	1.86366E-05
6	0.03813135	191	2.029E-05	14	0.0643213	322	3.42189E-05	22	0.02918926	146	1.55287E-05
7	0.0505782	253	4.325E-05	15	0.0608822	304	3.23893E-05	23	0.0220908	110	1.17523E-05
									TOTAL	5,000	

2023 Hourly Traffic Volumes and PM2.5 Emisssions - Southbound Mandela XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	79	8.41E-06	8	0.0548297	274	4.68528E-05	16	0.05953207	298	5.08711E-05
1	0.01230255	62	6.54E-06	9	0.0523851	262	2.78476E-05	17	0.05756611	288	4.91911E-05
2	0.01133185	57	6.024E-06	10	0.0541933	271	2.88089E-05	18	0.05401459	270	2.87139E-05
3	0.01182004	59	6.283E-06	11	0.0572503	286	3.04339E-05	19	0.04726992	236	2.51284E-05
4	0.01775796	89	9.44E-06	12	0.0612431	306	3.25565E-05	20	0.03959337	198	2.10476E-05
5	0.02854086	143	1.517E-05	13	0.0643243	322	3.41944E-05	21	0.03503111	175	1.86224E-05
6	0.03813135	191	2.027E-05	14	0.0643213	322	3.41929E-05	22	0.02918926	146	1.55169E-05
7	0.0505782	253	4.322E-05	15	0.0608822	304	3.23647E-05	23	0.0220908	110	1.17434E-05
									TOTAL	5,000	

2023 Hourly Traffic Volumes and PM2.5 Emisssions - Eastbound 7th St. XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	89	0.000023	8	0.0548297	310	0.000129575	16	0.05953207	336	0.000140687
1	0.01230255	70	1.809E-05	9	0.0523851	296	7.70145E-05	17	0.05756611	325	0.000136041
2	0.01133185	64	1.666E-05	10	0.0541933	306	7.96728E-05	18	0.05401459	305	7.94101E-05
3	0.01182004	67	1.738E-05	11	0.0572503	323	8.41671E-05	19	0.04726992	267	6.94944E-05
4	0.01775796	100	2.611E-05	12	0.0612431	346	9.00372E-05	20	0.03959337	224	5.82086E-05
5	0.02854086	161	4.196E-05	13	0.0643243	363	9.4567E-05	21	0.03503111	198	5.15014E-05
6	0.03813135	215	5.606E-05	14	0.0643213	363	9.45627E-05	22	0.02918926	165	4.29129E-05
7	0.0505782	286	0.0001195	15	0.0608822	344	8.95067E-05	23	0.0220908	125	3.2477E-05
									TOTAL	5,650	

2023 Hourly Traffic Volumes and PM2.5 Emisssions - Westbound 7th St. XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	89	2.332E-05	8	0.0548297	310	0.000129888	16	0.05953207	336	0.000141028
1	0.01230255	70	1.813E-05	9	0.0523851	296	7.72008E-05	17	0.05756611	325	0.00013637
2	0.01133185	64	1.67E-05	10	0.0541933	306	7.98656E-05	18	0.05401459	305	7.96023E-05
3	0.01182004	67	1.742E-05	11	0.0572503	323	8.43707E-05	19	0.04726992	267	6.96625E-05
4	0.01775796	100	2.617E-05	12	0.0612431	346	9.02551E-05	20	0.03959337	224	5.83495E-05
5	0.02854086	161	4.206E-05	13	0.0643243	363	9.47958E-05	21	0.03503111	198	5.1626E-05
6	0.03813135	215	5.619E-05	14	0.0643213	363	9.47915E-05	22	0.02918926	165	4.30167E-05
7	0.0505782	286	0.0001198	15	0.0608822	344	8.97232E-05	23	0.0220908	125	3.25556E-05
									TOTAL	5,650	

2023 Hourly Traffic Volumes and TOG Exhaust Emisssions - Northbound I-880 XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.01683092	1,341	0.004425	8	0.0496547	3957	0.013054945	16	0.06396647	5097	0.018952342
1	0.0103436	824	0.0027195	9	0.0496941	3960	0.013065293	17	0.06161021	4909	0.018254217
2	0.00787276	627	0.0020699	10	0.0524778	4182	0.013797167	18	0.06241599	4974	0.016410057
3	0.00582967	465	0.0015327	11	0.0578364	4609	0.015206007	19	0.0569003	4534	0.014959904
4	0.00668128	532	0.0017566	12	0.0642607	5121	0.016895066	20	0.04795353	3821	0.012607671
5	0.01152229	918	0.0030294	13	0.0681977	5434	0.017930144	21	0.04270681	3403	0.011228232
6	0.0240534	1917	0.006324	14	0.0689006	5490	0.018114961	22	0.03476998	2771	0.009141527
7	0.0429856	3425	0.0113015	15	0.0661384	5270	0.01738874	23	0.02639671	2103	0.006940074
									TOTAL	79,685	

2023 Hourly Traffic Volumes and TOG Exhaust Emisssions - Southbound I-880 XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.01481049	787	0.0025254	8	0.0600046	3188	0.010231659	16	0.05509767	2927	0.008336781
1	0.0142615	758	0.0024318	9	0.055076	2926	0.008333508	17	0.05352202	2843	0.008098369
2	0.01479093	786	0.0025221	10	0.0559088	2970	0.008459509	18	0.04561318	2423	0.00777771
3	0.0178104	946	0.0030369	11	0.0566642	3010	0.009662064	19	0.03763954	2000	0.006418088
4	0.02883464	1532	0.0049167	12	0.0582255	3093	0.009928301	20	0.03123322	1659	0.005325717
5	0.04555944	2420	0.0077685	13	0.0604508	3211	0.010307745	21	0.02735541	1453	0.004664495
6	0.0522093	2774	0.0089024	14	0.059742	3174	0.010186881	22	0.02360854	1254	0.004025598
7	0.05817081	3090	0.009919	15	0.055626	2955	0.009485046	23	0.01778489	945	0.003032582
									TOTAL	53,123	

2023 Hourly Traffic Volumes and TOG Exhaust Emisssions - Northbound Mandela XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	79	0.000167	8	0.0548297	274	0.000954066	16	0.05953207	298	0.00103589
1	0.01230255	62	0.0001297	9	0.0523851	262	0.000552457	17	0.05756611	288	0.001001682
2	0.01133185	57	0.0001195	10	0.0541933	271	0.000571527	18	0.05401459	270	0.000569642
3	0.01182004	59	0.0001247	11	0.0572503	286	0.000603766	19	0.04726992	236	0.000498513
4	0.01775796	89	0.0001873	12	0.0612431	306	0.000645875	20	0.03959337	198	0.000417555
5	0.02854086	143	0.000301	13	0.0643243	322	0.000678369	21	0.03503111	175	0.000369441
6	0.03813135	191	0.0004021	14	0.0643213	322	0.000678338	22	0.02918926	146	0.000307832
7	0.0505782	253	0.0008801	15	0.0608822	304	0.000642069	23	0.0220908	110	0.000232971
									TOTAL	5,000	

2023 Hourly Traffic Volumes and TOG Exhaust Emisssions - Southbound Mandela XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	79	0.0001667	8	0.0548297	274	0.000953339	16	0.05953207	298	0.001035101
1	0.01230255	62	0.0001296	9	0.0523851	262	0.000552036	17	0.05756611	288	0.001000918
2	0.01133185	57	0.0001194	10	0.0541933	271	0.000571092	18	0.05401459	270	0.000569208
3	0.01182004	59	0.0001246	11	0.0572503	286	0.000603306	19	0.04726992	236	0.000498133
4	0.01775796	89	0.0001871	12	0.0612431	306	0.000645383	20	0.03959337	198	0.000417237
5	0.02854086	143	0.0003008	13	0.0643243	322	0.000677852	21	0.03503111	175	0.00036916
6	0.03813135	191	0.0004018	14	0.0643213	322	0.000677821	22	0.02918926	146	0.000307598
7	0.0505782	253	0.0008794	15	0.0608822	304	0.00064158	23	0.0220908	110	0.000232794
									TOTAL	5,000	

2023 Hourly Traffic Volumes and TOG Exhaust Emisssi Eastbound 7th St. XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	89	0.000461	8	0.0548297	310	0.002636523	16	0.05953207	336	0.002862641
1	0.01230255	70	0.0003585	9	0.0523851	296	0.001526694	17	0.05756611	325	0.002768107
2	0.01133185	64	0.0003303	10	0.0541933	306	0.001579392	18	0.05401459	305	0.001574184
3	0.01182004	67	0.0003445	11	0.0572503	323	0.001668483	19	0.04726992	267	0.001377619
4	0.01775796	100	0.0005175	12	0.0612431	346	0.00178485	20	0.03959337	224	0.001153896
5	0.02854086	161	0.0008318	13	0.0643243	363	0.001874645	21	0.03503111	198	0.001020935
6	0.03813135	215	0.0011113	14	0.0643213	363	0.00187456	22	0.02918926	165	0.000850682
7	0.0505782	286	0.0024321	15	0.0608822	344	0.001774332	23	0.0220908	125	0.000643807
									TOTAL	5,650	

2023 Hourly Traffic Volumes and TOG Exhaust Emisssi Westbound 7th St. XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	89	0.0004622	8	0.0548297	310	0.002642903	16	0.05953207	336	0.002869568
1	0.01230255	70	0.0003594	9	0.0523851	296	0.001530388	17	0.05756611	325	0.002774805
2	0.01133185	64	0.0003311	10	0.0541933	306	0.001583214	18	0.05401459	305	0.001577993
3	0.01182004	67	0.0003453	11	0.0572503	323	0.00167252	19	0.04726992	267	0.001380953
4	0.01775796	100	0.0005188	12	0.0612431	346	0.001789169	20	0.03959337	224	0.001156689
5	0.02854086	161	0.0008338	13	0.0643243	363	0.001879181	21	0.03503111	198	0.001023406
6	0.03813135	215	0.001114	14	0.0643213	363	0.001879096	22	0.02918926	165	0.000852741
7	0.0505782	286	0.002438	15	0.0608822	344	0.001778625	23	0.0220908	125	0.000645365
									TOTAL	5,650	

2023 Hourly Traffic Volumes and TOG Evaporative Emisssions - Northbound I-880 XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.01683092	1,341	0.004197	8	0.0496547	3957	0.01238278	16	0.06396647	5097	0.014724739
1	0.0103436	824	0.0025795	9	0.0496941	3960	0.012392595	17	0.06161021	4909	0.014182342
2	0.00787276	627	0.0019633	10	0.0524778	4182	0.013086787	18	0.06241599	4974	0.015565147
3	0.00582967	465	0.0014538	11	0.0578364	4609	0.01442309	19	0.0569003	4534	0.014189658
4	0.00668128	532	0.0016662	12	0.0642607	5121	0.016025183	20	0.04795353	3821	0.011958535
5	0.01152229	918	0.0028734	13	0.0681977	5434	0.017006968	21	0.04270681	3403	0.01065012
6	0.0240534	1917	0.0059984	14	0.0689006	5490	0.017182269	22	0.03476998	2771	0.008670853
7	0.0429856	3425	0.0107196	15	0.0661384	5270	0.016493439	23	0.02639671	2103	0.006582748
									TOTAL	79,685	

2023 Hourly Traffic Volumes and TOG Evaporative Emisssions - Southbound I-880 XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.01481049	787	0.0019621	8	0.0600046	3188	0.007949335	16	0.05509767	2927	0.007907542
1	0.0142615	758	0.0018893	9	0.055076	2926	0.007904437	17	0.05352202	2843	0.007681405
2	0.01479093	786	0.0019595	10	0.0559088	2970	0.008023951	18	0.04561318	2423	0.006042776
3	0.0178104	946	0.0023595	11	0.0566642	3010	0.007506796	19	0.03763954	2000	0.004986438
4	0.02883464	1532	0.00382	12	0.0582255	3093	0.007713646	20	0.03123322	1659	0.004137736
5	0.04555944	2420	0.0060357	13	0.0604508	3211	0.008008449	21	0.02735541	1453	0.00362401
6	0.0522093	2774	0.0069166	14	0.059742	3174	0.007914545	22	0.02360854	1254	0.003127629
7	0.05817081	3090	0.0077064	15	0.055626	2955	0.007369265	23	0.01778489	945	0.00235612
									TOTAL	53,123	

2023 Hourly Traffic Volumes and TOG Evaporative Emisssions - Northbound Mandela XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	79	0.000220	8	0.0548297	274	0.00114363	16	0.05953207	298	0.001241712
1	0.01230255	62	0.0001711	9	0.0523851	262	0.000728427	17	0.05756611	288	0.001200707
2	0.01133185	57	0.0001576	10	0.0541933	271	0.000753571	18	0.05401459	270	0.000751086
3	0.01182004	59	0.0001644	11	0.0572503	286	0.000796079	19	0.04726992	236	0.0006573
4	0.01775796	89	0.0002469	12	0.0612431	306	0.000851601	20	0.03959337	198	0.000550556
5	0.02854086	143	0.0003969	13	0.0643243	322	0.000894445	21	0.03503111	175	0.000487116
6	0.03813135	191	0.0005302	14	0.0643213	322	0.000894404	22	0.02918926	146	0.000405884
7	0.0505782	253	0.001055	15	0.0608822	304	0.000846582	23	0.0220908	110	0.000307178
									TOTAL	5,000	

2023 Hourly Traffic Volumes and TOG Evaporative Emisssions - Southbound Mandela XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	79	0.0002198	8	0.0548297	274	0.001142759	16	0.05953207	298	0.001240766
1	0.01230255	62	0.0001709	9	0.0523851	262	0.000727872	17	0.05756611	288	0.001199792
2	0.01133185	57	0.0001575	10	0.0541933	271	0.000752997	18	0.05401459	270	0.000750514
3	0.01182004	59	0.0001642	11	0.0572503	286	0.000795473	19	0.04726992	236	0.000656799
4	0.01775796	89	0.0002467	12	0.0612431	306	0.000850952	20	0.03959337	198	0.000550136
5	0.02854086	143	0.0003966	13	0.0643243	322	0.000893763	21	0.03503111	175	0.000486745
6	0.03813135	191	0.0005298	14	0.0643213	322	0.000893722	22	0.02918926	146	0.000405575
7	0.0505782	253	0.0010541	15	0.0608822	304	0.000845937	23	0.0220908	110	0.000306944
									TOTAL	5,000	

2023 Hourly Traffic Volumes and TOG Evaporative Emi Eastbound 7th St. XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	89	0.000608	8	0.0548297	310	0.003160377	16	0.05953207	336	0.003431422
1	0.01230255	70	0.0004727	9	0.0523851	296	0.00201298	17	0.05756611	325	0.003318104
2	0.01133185	64	0.0004354	10	0.0541933	306	0.002082464	18	0.05401459	305	0.002075596
3	0.01182004	67	0.0004542	11	0.0572503	323	0.002199932	19	0.04726992	267	0.001816422
4	0.01775796	100	0.0006824	12	0.0612431	346	0.002353365	20	0.03959337	224	0.001521438
5	0.02854086	161	0.0010967	13	0.0643243	363	0.002471762	21	0.03503111	198	0.001346126
6	0.03813135	215	0.0014653	14	0.0643213	363	0.002471649	22	0.02918926	165	0.001121644
7	0.0505782	286	0.0029153	15	0.0608822	344	0.002339496	23	0.0220908	125	0.000848874
									TOTAL	5,650	

2023 Hourly Traffic Volumes and TOG Evaporative Emi Westbound 7th St. XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	89	0.0006094	8	0.0548297	310	0.003168024	16	0.05953207	336	0.003439725
1	0.01230255	70	0.0004739	9	0.0523851	296	0.002017851	17	0.05756611	325	0.003326133
2	0.01133185	64	0.0004365	10	0.0541933	306	0.002087503	18	0.05401459	305	0.002080619
3	0.01182004	67	0.0004553	11	0.0572503	323	0.002205256	19	0.04726992	267	0.001820817
4	0.01775796	100	0.000684	12	0.0612431	346	0.002359059	20	0.03959337	224	0.00152512
5	0.02854086	161	0.0010994	13	0.0643243	363	0.002477743	21	0.03503111	198	0.001349383
6	0.03813135	215	0.0014688	14	0.0643213	363	0.00247763	22	0.02918926	165	0.001124358
7	0.0505782	286	0.0029224	15	0.0608822	344	0.002345157	23	0.0220908	125	0.000850928
									TOTAL	5,650	

2023 Hourly Traffic Volumes and Fugitive PM2.5 Emisssions - Northbound I-880 XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.01683092	1,341	0.005546	8	0.0496547	3957	0.016360681	16	0.06396647	5097	0.02107623
1	0.0103436	824	0.0034081	9	0.0496941	3960	0.016373649	17	0.06161021	4909	0.02029987
2	0.00787276	627	0.002594	10	0.0524778	4182	0.017290847	18	0.06241599	4974	0.020565366
3	0.00582967	465	0.0019208	11	0.0578364	4609	0.019056429	19	0.0569003	4534	0.018748008
4	0.00668128	532	0.0022014	12	0.0642607	5121	0.021173186	20	0.04795353	3821	0.015800149
5	0.01152229	918	0.0037965	13	0.0681977	5434	0.022470364	21	0.04270681	3403	0.014071413
6	0.0240534	1917	0.0079253	14	0.0689006	5490	0.02270198	22	0.03476998	2771	0.011456318
7	0.0429856	3425	0.0141633	15	0.0661384	5270	0.021791867	23	0.02639671	2103	0.008697419
									TOTAL	79,685	

2023 Hourly Traffic Volumes and Fugitive PM2.5 Emisssions - Southbound I-880 XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.01481049	787	0.0028084	8	0.0600046	3188	0.011378267	16	0.05509767	2927	0.010447797
1	0.0142615	758	0.0027043	9	0.055076	2926	0.010443695	17	0.05352202	2843	0.010149015
2	0.01479093	786	0.0028047	10	0.0559088	2970	0.010601602	18	0.04561318	2423	0.008649317
3	0.0178104	946	0.0033773	11	0.0566642	3010	0.01074484	19	0.03763954	2000	0.007137329
4	0.02883464	1532	0.0054677	12	0.0582255	3093	0.011040913	20	0.03123322	1659	0.005922542
5	0.04555944	2420	0.0086391	13	0.0604508	3211	0.01146288	21	0.02735541	1453	0.00518722
6	0.0522093	2774	0.0099001	14	0.059742	3174	0.01132847	22	0.02360854	1254	0.004476726
7	0.05817081	3090	0.0110305	15	0.055626	2955	0.010547985	23	0.01778489	945	0.003372428
									TOTAL	53,123	

2023 Hourly Traffic Volumes and Fugitive PM2.5 Emisssions - Northbound Mandela XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	79	0.000718	8	0.0548297	274	0.00248789	16	0.05953207	298	0.00270126
1	0.01230255	62	0.0005582	9	0.0523851	262	0.002376966	17	0.05756611	288	0.002612055
2	0.01133185	57	0.0005142	10	0.0541933	271	0.002459014	18	0.05401459	270	0.002450905
3	0.01182004	59	0.0005363	11	0.0572503	286	0.002597724	19	0.04726992	236	0.002144867
4	0.01775796	89	0.0008058	12	0.0612431	306	0.0027789	20	0.03959337	198	0.001796544
5	0.02854086	143	0.001295	13	0.0643243	322	0.002918705	21	0.03503111	175	0.001589532
6	0.03813135	191	0.0017302	14	0.0643213	322	0.002918572	22	0.02918926	146	0.001324459
7	0.0505782	253	0.002295	15	0.0608822	304	0.002762524	23	0.0220908	110	0.001002367
									TOTAL	5,000	

2023 Hourly Traffic Volumes and Fugitive PM2.5 Emisssions - Southbound Mandela XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	79	0.0007173	8	0.0548297	274	0.002485995	16	0.05953207	298	0.002699202
1	0.01230255	62	0.0005578	9	0.0523851	262	0.002375155	17	0.05756611	288	0.002610065
2	0.01133185	57	0.0005138	10	0.0541933	271	0.002457141	18	0.05401459	270	0.002449038
3	0.01182004	59	0.0005359	11	0.0572503	286	0.002595744	19	0.04726992	236	0.002143232
4	0.01775796	89	0.0008052	12	0.0612431	306	0.002776782	20	0.03959337	198	0.001795176
5	0.02854086	143	0.0012941	13	0.0643243	322	0.002916481	21	0.03503111	175	0.001588321
6	0.03813135	191	0.0017289	14	0.0643213	322	0.002916348	22	0.02918926	146	0.00132345
7	0.0505782	253	0.0022932	15	0.0608822	304	0.002760419	23	0.0220908	110	0.001001604
									TOTAL	5,000	

2023 Hourly Traffic Volumes and Fugitive PM2.5 Emi: Eastbound 7th St. XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	89	0.001984	8	0.0548297	310	0.006875184	16	0.05953207	336	0.007464824
1	0.01230255	70	0.0015426	9	0.0523851	296	0.00656865	17	0.05756611	325	0.007218309
2	0.01133185	64	0.0014209	10	0.0541933	306	0.006795386	18	0.05401459	305	0.006772977
3	0.01182004	67	0.0014821	11	0.0572503	323	0.007178704	19	0.04726992	267	0.005927253
4	0.01775796	100	0.0022267	12	0.0612431	346	0.007679377	20	0.03959337	224	0.004964678
5	0.02854086	161	0.0035788	13	0.0643243	363	0.008065723	21	0.03503111	198	0.004392608
6	0.03813135	215	0.0047814	14	0.0643213	363	0.008065355	22	0.02918926	165	0.003660089
7	0.0505782	286	0.0063421	15	0.0608822	344	0.007634122	23	0.0220908	125	0.002770002
									TOTAL	5,650	

2023 Hourly Traffic Volumes and Fugitive PM2.5 Emi: Westbound 7th St. XXX

Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s	Hour	Fraction Per Hour	VPH	g/s
0	0.0158207	89	0.0019886	8	0.0548297	310	0.00689182	16	0.05953207	336	0.007482887
1	0.01230255	70	0.0015464	9	0.0523851	296	0.006584545	17	0.05756611	325	0.007235776
2	0.01133185	64	0.0014244	10	0.0541933	306	0.006811829	18	0.05401459	305	0.006789366
3	0.01182004	67	0.0014857	11	0.0572503	323	0.007196075	19	0.04726992	267	0.005941595
4	0.01775796	100	0.0022321	12	0.0612431	346	0.007697959	20	0.03959337	224	0.004976691
5	0.02854086	161	0.0035874	13	0.0643243	363	0.00808524	21	0.03503111	198	0.004403237
6	0.03813135	215	0.0047929	14	0.0643213	363	0.008084872	22	0.02918926	165	0.003668946
7	0.0505782	286	0.0063574	15	0.0608822	344	0.007652595	23	0.0220908	125	0.002776705
									TOTAL	5,650	

Attachment 4: I-880, Mandela Parkway, and 7th Street Health Risk Calculations

West Oakland BART Station Project, Oakland - Max I-880 Impacts Onsite
AERMOD Risk Modeling Parameters and Maximum Concentrations
Lot 3, 2nd Floor Receptors

Emissions Years	2023
Receptor Information	
Number of Receptors	
Receptor Height (in m) =	7.6 (2nd Floor)
Receptor Distances =	7m apart Onsite
Meteorological Conditions	
BAAQMD Oakland Met Data	2013 - 2017
Land Use Classification	urban
Wind Speed =	variable
Wind Direction =	variable

I-880 - Onsite MEI Maximum Concentrations - Floor 2

Meteorological Data Years	TAC Concentrations (μg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.0069	0.07957	0.07012

Meteorological Data Years	PM2.5 Concentrations (μg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.10468	0.09532	0.00936

West Oakland BART Station Project, Oakland - Max I880 Impacts Onsite
Maximum DPM Cancer Risk and PM2.5 Calculations
2nd Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0069	0.0796	0.0701	0.094	0.006	0.0003	0.10
1	1	0 - 1	2023	10	0.0069	0.0796	0.0701	1.133	0.075	0.0039	1.21
2	1	1 - 2	2024	10	0.0069	0.0796	0.0701	1.133	0.075	0.0039	1.21
3	1	2 - 3	2025	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
4	1	3 - 4	2026	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
5	1	4 - 5	2027	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
6	1	5 - 6	2028	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
7	1	6 - 7	2029	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
8	1	7 - 8	2030	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
9	1	8 - 9	2031	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
10	1	9 - 10	2032	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
11	1	10 - 11	2033	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
12	1	11 - 12	2034	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
13	1	12 - 13	2035	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
14	1	13 - 14	2036	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
15	1	14 - 15	2037	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
16	1	15 - 16	2038	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
17	1	16-17	2039	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
18	1	17-18	2040	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
19	1	18-19	2041	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
20	1	19-20	2042	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
21	1	20-21	2043	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
22	1	21-22	2044	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
23	1	22-23	2045	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
24	1	23-24	2046	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
25	1	24-25	2047	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
26	1	25-26	2048	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
27	1	26-27	2049	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
28	1	27-28	2050	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
29	1	28-29	2051	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
30	1	29-30	2052	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
Total Increased Cancer Risk								5.14	0.338	0.018	**5.5**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (µg/m3)**
0.0014	0.105

West Oakland BART Station Project, Oakland - Max Mandela Impacts Onsite
AERMOD Risk Modeling Parameters and Maximum Concentrations
Lot 3, 2nd Floor Receptors

Emissions Years	2023
Receptor Information	
Number of Receptors	
Receptor Height (in m) =	7.6 (2nd Floor)
Receptor Distances =	7m apart Onsite
Meteorological Conditions	
BAAQMD Oakland Met Data	2013 - 2017
Land Use Classification	urban
Wind Speed =	variable
Wind Direction =	variable

Mandela Parkway - Onsite MEI Maximum Concentrations - Floor 2

Meteorological Data Years	TAC Concentrations (μg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00011	0.00902	0.01165

Meteorological Data Years	PM2.5 Concentrations (μg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.03581	0.03536	0.00045

West Oakland BART Station Project, Oakland - Max Mandela Parkway Impacts Onsite
Maximum DPM Cancer Risk and PM2.5 Calculations
2nd Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0001	0.0090	0.0117	0.001	0.001	0.0001	0.00
1	1	0 - 1	2023	10	0.0001	0.0090	0.0117	0.018	0.008	0.0006	0.03
2	1	1 - 2	2024	10	0.0001	0.0090	0.0117	0.018	0.008	0.0006	0.03
3	1	2 - 3	2025	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
4	1	3 - 4	2026	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
5	1	4 - 5	2027	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
6	1	5 - 6	2028	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
7	1	6 - 7	2029	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
8	1	7 - 8	2030	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
9	1	8 - 9	2031	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
10	1	9 - 10	2032	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
11	1	10 - 11	2033	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
12	1	11 - 12	2034	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
13	1	12 - 13	2035	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
14	1	13 - 14	2036	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
15	1	14 - 15	2037	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
16	1	15 - 16	2038	3	0.0001	0.0090	0.0117	0.003	0.001	0.0001	0.00
17	1	16-17	2039	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
18	1	17-18	2040	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
19	1	18-19	2041	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
20	1	19-20	2042	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
21	1	20-21	2043	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
22	1	21-22	2044	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
23	1	22-23	2045	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
24	1	23-24	2046	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
25	1	24-25	2047	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
26	1	25-26	2048	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
27	1	26-27	2049	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
28	1	27-28	2050	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
29	1	28-29	2051	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
30	1	29-30	2052	1	0.0001	0.0090	0.0117	0.000	0.000	0.0000	0.000
Total Increased Cancer Risk								0.08	0.038	0.003	**0.1**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (µg/m3)**
0.0000	0.036

West Oakland BART Station Project, Oakland - Max 7th Street Impacts Onsite
AERMOD Risk Modeling Parameters and Maximum Concentrations
Lot 3, 2nd Floor Receptors

Emissions Years	2023
Receptor Information	
Number of Receptors	
Receptor Height (in m) =	7.6 (2nd Floor)
Receptor Distances =	7m apart Onsite
Meteorological Conditions	
BAAQMD Oakland Met Data	2013 - 2017
Land Use Classification	urban
Wind Speed =	variable
Wind Direction =	variable

7th Street Onsite MEI Maximum Concentrations - Floor 2

Meteorological Data Years	TAC Concentrations (μg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00064	0.06082	0.07813

Meteorological Data Years	PM2.5 Concentrations (μg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.23565	0.2326	0.00305

West Oakland BART Station Project, Oakland - Max 7th St. Impacts Onsite
Maximum DPM Cancer Risk and PM2.5 Calculations
2nd Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age --> Parameter	3rd Trimester	0 - 2	2 - 16	16 - 30
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0006	0.0608	0.0781	0.009	0.005	0.0004	0.01
1	1	0 - 1	2023	10	0.0006	0.0608	0.0781	0.105	0.057	0.0043	0.17
2	1	1 - 2	2024	10	0.0006	0.0608	0.0781	0.105	0.057	0.0043	0.17
3	1	2 - 3	2025	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
4	1	3 - 4	2026	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
5	1	4 - 5	2027	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
6	1	5 - 6	2028	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
7	1	6 - 7	2029	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
8	1	7 - 8	2030	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
9	1	8 - 9	2031	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
10	1	9 - 10	2032	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
11	1	10 - 11	2033	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
12	1	11 - 12	2034	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
13	1	12 - 13	2035	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
14	1	13 - 14	2036	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
15	1	14 - 15	2037	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
16	1	15 - 16	2038	3	0.0006	0.0608	0.0781	0.017	0.009	0.0007	0.03
17	1	16-17	2039	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
18	1	17-18	2040	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
19	1	18-19	2041	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
20	1	19-20	2042	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
21	1	20-21	2043	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
22	1	21-22	2044	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
23	1	22-23	2045	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
24	1	23-24	2046	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
25	1	24-25	2047	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
26	1	25-26	2048	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
27	1	26-27	2049	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
28	1	27-28	2050	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
29	1	28-29	2051	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
30	1	29-30	2052	1	0.0006	0.0608	0.0781	0.002	0.001	0.0001	0.003
Total Increased Cancer Risk								0.48	0.258	0.020	**0.8**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (μg/m3)**
0.0001	0.236

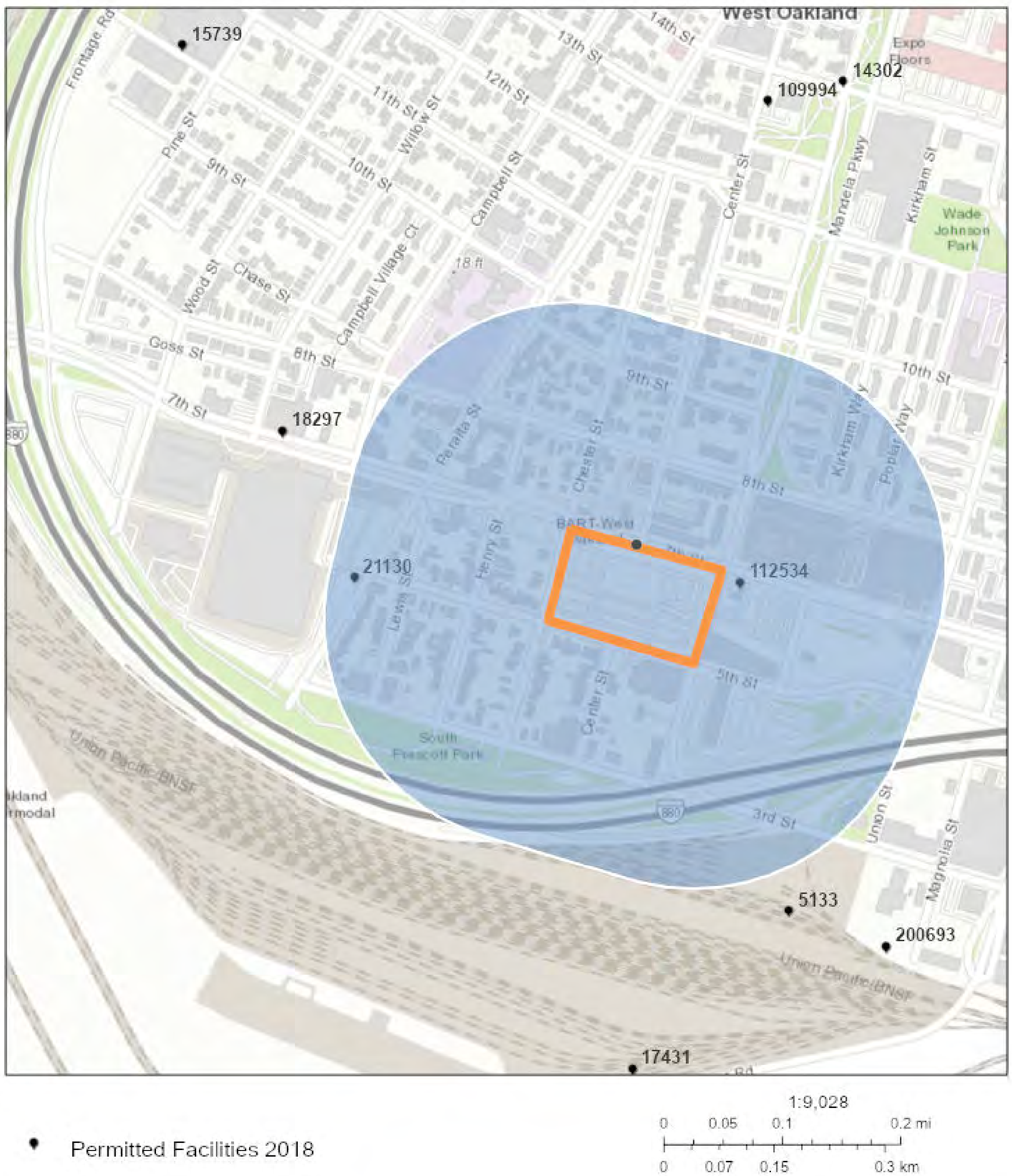
Attachment 5: Stationary Source Information

Stationary Source Risk & Hazards Screening Report

Area of Interest (AOI) Information

Area : 5,661,970.98 ft²

Jan 29 2021 13:40:16 Mountain Standard Time



URS Corporation, Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, Intermap, USGS, METI/NASA, EPA, USDA

Summary

Name	Count	Area(ft²)	Length(ft)
Permitted Facilities 2018	2	N/A	N/A

Permitted Facilities 2018

#	FACID	Name	Address	City	St
1	21130	US Postal Service - Building Maintenance	1675 7th Street	Oakland	CA
2	112534	Bart Gas & Food	1395 7th St	Oakland	CA

#	Zip	County	Cancer	Hazard	PM_25	Type	Count
1	94615	Alameda	10.310	0.010	0.010	Generators	1
2	94607	Alameda	7.050	0.030	0.000	Gas Dispensing Facility	1

Note: The estimated risk and hazard impacts from these sources would be expected to be substantially lower when site specific Health Risk Screening Assessments are conducted.

The screening level map is not recommended for evaluating sensitive land uses such as schools, senior centers, day cares, and health facilities.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Risk & Hazard Stationary Source Inquiry Form

This form is required when users request stationary source data from BAAQMD

This form is to be used with the BAAQMD's Google Earth stationary source screening tables.

Click here for guidance on coducting risk & hazard screening, including roadways & freeways, refer to the District's Risk & Hazard Analysis flow chart.

Click here for District's Recommended Methods for Screening and Modeling Local Risks and Hazards document.

Table A: Requester Contact Information

Date of Request	
Contact Name	
Affiliation	
Phone	
Email	
Project Name	West Oakland BART
Address	
City	Oakland
County	Alameda
Type (residential, commercial, mixed use, industrial, etc.)	Mixed Use
Project Size (# of units or building square feet)	
Comments: Onsite HRA Only	

For Air District assistance, the following steps must be completed:

1. Complete all the contact and project information requested in Table A ncomplete forms will not be processed. Please include a project site map.

2. Download and install the free program Google Earth, **http://www.google.com/earth/download/ge/,** and then download the county specific Google Earth stationary source application files from the District's website, **http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx.** The small points on the map represent stationary sources permitted by the District (Map A on right). These permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc. Click on a point to view the source's Information Table, including the name, location, and preliminary estimated cancer risk, hazard index, and PM2.5 concentration.

3. Find the project site in Google Earth by inputting the site's address in the Google Earth search box.

4. Identify stationary sources within at least a 1 Table B of project site. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google E search box to confirm the source's address location. Please report any mapping errors to the District.

5. List the stationary source information in blue section only.

6. Note that a small percentage of the stationary sources have Health Risk Screening Assessment (HRSA) data INSTEAD of screening level data. These sources will be noted by an asterisk next to the Plant Name (Map B on right). If HRSA values are presented, these values have already been modeled and cannot be adjusted further.

7. Email this completed form to District staff. District staff will provide the most recent risk, hazard, and PM2.5 data that are available for the source(s). If this information or data are not available, source emissions data will be provided. Staff will respond to inquiries within three weeks.

Note that a public records request received for the same stationary source information will cancel the processing of your SSIF request.

Table B: Google Earth data / **MEI**

Distance from Receptor (feet) or MEI[1]	Plant No.	Facility Name	Address	Cancer Risk[2]	Hazard Risk[2]	$PM_{2.5}$[2]	Source No.[3]	Type of Source[4]	Fuel Code[5]	Status/Comments	Distance Adjustment Multiplier	Adjusted Cancer Risk Estimate	Adjusted Hazard Risk	Adjusted PM2.5
	21130	US Postal Service - Building Maintenance	1675 7th Street, Oakland CA	10.31	0.01	0.01		Generators		2018 Dataset	0.04	0.4	0.000	0.0004
	112534	Bart Gas & Food	1395 7th St, Oakland CA	7.05	0.03	0		Gas Dispensing Facility		2018 Dataset	0.03	0.2	0.001	0.000

Project Site

Distance from Receptor (feet) or MEI[1]	FACID (Plant No.)	Distance Adjustment Multiplier	Adjusted Cancer Risk Estimate	Adjusted Hazard Risk	Adjusted PM2.5
920+	21130	0.04	0.41	0.00	0.000
635	112534	0.03	0.22	0.001	0.000
			0.00		
			0.00		
			0.00	0.000	0.000
			0.00		

Footnotes:

1. Maximally exposed individual
2. These Cancer Risk, Hazard Index, and PM2.5 columns represent the values in the Google Earth Plant Information Table.
3. Each plant may have multiple permits and sources.
4. Permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc.
5. Fuel codes: 98 = diesel, 189 = Natural Gas.
6. If a Health Risk Screening Assessment (HRSA) was completed for the source, the application number will be listed here.
7. The date that the HRSA was completed.
8. Engineer who completed the HRSA. For District purposes only.
9. All HRSA completed before 1/5/2010 need to be multiplied by an age sensitivity factor of 1.7.
10. The HRSA "Chronic Health" number represents the Hazard Index.
11. Further information about common sources:
    a. Sources that only include diesel internal combustion engines can be adjusted using the BAAQMD's Diesel Multiplier worksheet.
    b. The risk from natural gas boilers used for space heating when <25 MM BTU/hr would have an estimated cancer risk of one in a million or less, and a chronic hazard index of
    c. BAAQMD Reg 11 Rule 16 required that all co-residential (sharing a wall, floor, ceiling or is in the same building as a residential unit) dry cleaners cease use of perc on July 1, 2010. Therefore, there is no cancer risk, hazard or PM2.5 concentrations from co-residential dry cleaning businesses in the BAAQMD.
    d. Non co-residential dry cleaners must phase out use of perc by Jan. 1, 2023. Therefore, the risk from these dry cleaners does not need to be factored in over a 70-year period, but instead
    e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Mulitplier worksheet.
    f. Unless otherwise noted, exempt sources are considered insignificant. See BAAQMD Reg 2 Rule 1 for a list of exempt sources.
    g. This spray booth is considered to be insignificant.

Attachment 6: Cumulative Health Risk Calculations

West Oakland BART Station Project, Oakland - Cumulative Roadway Impacts Onsite
AERMOD Risk Modeling Parameters and Max Cumulative Concentrations
Lot 3, 2nd Floor Receptors

Emissions Years	2023
Receptor Information	
Number of Receptors	
Receptor Height (in m) =	7.6 (2nd Floor)
Receptor Distances =	7m apart Onsite
Meteorological Conditions	
BAAQMD Oakland Met Data	2013 - 2017
Land Use Classification	urban
Wind Speed =	variable
Wind Direction =	variable

I-880 - Onsite MEI Maximum Concentrations - Floor 2

Meteorological	TAC Concentrations (µg/m^3)		
Data Years	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.0069	0.07957	0.07012

Meteorological	PM2.5 Concentrations (µg/m^3)		
Data Years	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.06734	0.06131	0.00603

Mandela Parkway - Onsite MEI Maximum Concentrations - Floor 2

Meteorological	TAC Concentrations (µg/m^3)		
Data Years	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00009	0.00713	0.00922

Meteorological	PM2.5 Concentrations (µg/m^3)		
Data Years	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.0271	0.02676	0.00034

7th Street Onsite MEI Maximum Concentrations - Floor 2

Meteorological	TAC Concentrations (µg/m^3)		
Data Years	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00039	0.0346	0.04459

Meteorological	PM2.5 Concentrations (µg/m^3)		
Data Years	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.23565	0.2326	0.00305

West Oakland BART Station Project, Oakland - I880 Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
2nd Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0069	0.0796	0.0701	0.094	0.006	0.0003	0.10
1	1	0 - 1	2023	10	0.0069	0.0796	0.0701	1.133	0.075	0.0039	1.21
2	1	1 - 2	2024	10	0.0069	0.0796	0.0701	1.133	0.075	0.0039	1.21
3	1	2 - 3	2025	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
4	1	3 - 4	2026	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
5	1	4 - 5	2027	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
6	1	5 - 6	2028	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
7	1	6 - 7	2029	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
8	1	7 - 8	2030	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
9	1	8 - 9	2031	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
10	1	9 - 10	2032	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
11	1	10 - 11	2033	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
12	1	11 - 12	2034	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
13	1	12 - 13	2035	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
14	1	13 - 14	2036	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
15	1	14 - 15	2037	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
16	1	15 - 16	2038	3	0.0069	0.0796	0.0701	0.178	0.012	0.0006	0.19
17	1	16-17	2039	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
18	1	17-18	2040	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
19	1	18-19	2041	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
20	1	19-20	2042	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
21	1	20-21	2043	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
22	1	21-22	2044	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
23	1	22-23	2045	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
24	1	23-24	2046	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
25	1	24-25	2047	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
26	1	25-26	2048	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
27	1	26-27	2049	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
28	1	27-28	2050	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
29	1	28-29	2051	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
30	1	29-30	2052	1	0.0069	0.0796	0.0701	0.020	0.001	0.0001	0.021
Total Increased Cancer Risk								5.14	0.338	0.018	**5.5**

* Third trimester of pregnancy

Maximum Hazard Index	Maximum Total PM2.5 (µg/m3)
0.0014	0.067

West Oakland BART Station Project, Oakland - Mandela Parkway Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
2nd Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air $(\mu g/m^3)$
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0001	0.0071	0.0092	0.001	0.001	0.0000	0.00
1	1	0 - 1	2023	10	0.0001	0.0071	0.0092	0.015	0.007	0.0005	0.02
2	1	1 - 2	2024	10	0.0001	0.0071	0.0092	0.015	0.007	0.0005	0.02
3	1	2 - 3	2025	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
4	1	3 - 4	2026	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
5	1	4 - 5	2027	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
6	1	5 - 6	2028	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
7	1	6 - 7	2029	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
8	1	7 - 8	2030	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
9	1	8 - 9	2031	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
10	1	9 - 10	2032	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
11	1	10 - 11	2033	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
12	1	11 - 12	2034	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
13	1	12 - 13	2035	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
14	1	13 - 14	2036	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
15	1	14 - 15	2037	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
16	1	15 - 16	2038	3	0.0001	0.0071	0.0092	0.002	0.001	0.0001	0.00
17	1	16-17	2039	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
18	1	17-18	2040	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
19	1	18-19	2041	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
20	1	19-20	2042	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
21	1	20-21	2043	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
22	1	21-22	2044	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
23	1	22-23	2045	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
24	1	23-24	2046	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
25	1	24-25	2047	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
26	1	25-26	2048	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
27	1	26-27	2049	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
28	1	27-28	2050	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
29	1	28-29	2051	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
30	1	29-30	2052	1	0.0001	0.0071	0.0092	0.000	0.000	0.0000	0.000
Total Increased Cancer Risk								0.07	0.030	0.002	**0.1**

* Third trimester of pregnancy

Maximum	
Hazard Index	Total PM2.5 (µg/m3)
0.0000	0.027

West Oakland BART Station Project, Oakland - 7th St. Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
2nd Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			TOTAL
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	
0	0.25	-0.25 - 0*	2023	10	0.0004	0.0346	0.0446	0.005	0.003	0.0002	0.01
1	1	0 - 1	2023	10	0.0004	0.0346	0.0446	0.064	0.032	0.0025	0.10
2	1	1 - 2	2024	10	0.0004	0.0346	0.0446	0.064	0.032	0.0025	0.10
3	1	2 - 3	2025	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
4	1	3 - 4	2026	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
5	1	4 - 5	2027	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
6	1	5 - 6	2028	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
7	1	6 - 7	2029	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
8	1	7 - 8	2030	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
9	1	8 - 9	2031	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
10	1	9 - 10	2032	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
11	1	10 - 11	2033	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
12	1	11 - 12	2034	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
13	1	12 - 13	2035	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
14	1	13 - 14	2036	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
15	1	14 - 15	2037	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
16	1	15 - 16	2038	3	0.0004	0.0346	0.0446	0.010	0.005	0.0004	0.02
17	1	16-17	2039	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
18	1	17-18	2040	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
19	1	18-19	2041	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
20	1	19-20	2042	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
21	1	20-21	2043	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
22	1	21-22	2044	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
23	1	22-23	2045	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
24	1	23-24	2046	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
25	1	24-25	2047	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
26	1	25-26	2048	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
27	1	26-27	2049	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
28	1	27-28	2050	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
29	1	28-29	2051	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
30	1	29-30	2052	1	0.0004	0.0346	0.0446	0.001	0.001	0.0000	0.002
Total Increased Cancer Risk								0.29	0.147	0.011	**0.4**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (µg/m3)**
0.0001	0.236

West Oakland BART Station Project, Oakland - Cumulative Roadway Impacts Onsite
AERMOD Risk Modeling Parameters and Maximum Concentrations
3rd Floor Receptors

Emissions Years	2023
Receptor Information	
Number of Receptors	
Receptor Height (in m) =	10.6 (3rd Floor)
Receptor Distances =	7m apart Onsite
Meteorological Conditions	
BAAQMD Oakland Met Data	2013 - 2017
Land Use Classification	urban
Wind Speed =	variable
Wind Direction =	variable

I-880 - Onsite MEI Maximum Concentrations - Floor 3

Meteorological Data Years	TAC Concentrations (μg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00561	0.0645	0.05688

Meteorological Data Years	PM2.5 Concentrations (μg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.05671	0.05164	0.00507

Mandela Parkway - Onsite MEI Maximum Concentrations - Floor 3

Meteorological Data Years	TAC Concentrations (μg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00007	0.00603	0.0078

Meteorological Data Years	PM2.5 Concentrations (μg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.0235	0.0232	0.0003

7th Street Onsite MEI Maximum Concentrations - Floor 3

Meteorological Data Years	TAC Concentrations (μg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00032	0.02683	0.03455

Meteorological Data Years	PM2.5 Concentrations (μg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.1529	0.15091	0.00199

West Oakland BART Station Project, Oakland - I880 Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
3rd Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor (mg/kg-day)$^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air (μg/m^3)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors (mg/kg-day)$^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0056	0.0645	0.0569	0.076	0.005	0.0003	0.08
1	1	0 - 1	2023	10	0.0056	0.0645	0.0569	0.921	0.060	0.0031	0.99
2	1	1 - 2	2024	10	0.0056	0.0645	0.0569	0.921	0.060	0.0031	0.99
3	1	2 - 3	2025	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
4	1	3 - 4	2026	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
5	1	4 - 5	2027	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
6	1	5 - 6	2028	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
7	1	6 - 7	2029	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
8	1	7 - 8	2030	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
9	1	8 - 9	2031	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
10	1	9 - 10	2032	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
11	1	10 - 11	2033	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
12	1	11 - 12	2034	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
13	1	12 - 13	2035	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
14	1	13 - 14	2036	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
15	1	14 - 15	2037	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
16	1	15 - 16	2038	3	0.0056	0.0645	0.0569	0.145	0.010	0.0005	0.16
17	1	16-17	2039	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
18	1	17-18	2040	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
19	1	18-19	2041	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
20	1	19-20	2042	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
21	1	20-21	2043	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
22	1	21-22	2044	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
23	1	22-23	2045	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
24	1	23-24	2046	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
25	1	24-25	2047	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
26	1	25-26	2048	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
27	1	26-27	2049	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
28	1	27-28	2050	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
29	1	28-29	2051	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
30	1	29-30	2052	1	0.0056	0.0645	0.0569	0.016	0.001	0.0001	0.017
Total Increased Cancer Risk								4.18	0.274	0.014	**4.5**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (μg/m3)**
0.0011	0.057

West Oakland BART Station Project, Oakland - Mandela Parkway Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
3rd Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0001	0.0060	0.0078	0.001	0.000	0.0000	0.00
1	1	0 - 1	2023	10	0.0001	0.0060	0.0078	0.011	0.006	0.0004	0.02
2	1	1 - 2	2024	10	0.0001	0.0060	0.0078	0.011	0.006	0.0004	0.02
3	1	2 - 3	2025	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
4	1	3 - 4	2026	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
5	1	4 - 5	2027	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
6	1	5 - 6	2028	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
7	1	6 - 7	2029	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
8	1	7 - 8	2030	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
9	1	8 - 9	2031	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
10	1	9 - 10	2032	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
11	1	10 - 11	2033	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
12	1	11 - 12	2034	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
13	1	12 - 13	2035	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
14	1	13 - 14	2036	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
15	1	14 - 15	2037	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
16	1	15 - 16	2038	3	0.0001	0.0060	0.0078	0.002	0.001	0.0001	0.00
17	1	16-17	2039	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
18	1	17-18	2040	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
19	1	18-19	2041	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
20	1	19-20	2042	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
21	1	20-21	2043	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
22	1	21-22	2044	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
23	1	22-23	2045	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
24	1	23-24	2046	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
25	1	24-25	2047	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
26	1	25-26	2048	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
27	1	26-27	2049	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
28	1	27-28	2050	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
29	1	28-29	2051	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
30	1	29-30	2052	1	0.0001	0.0060	0.0078	0.000	0.000	0.0000	0.000
Total Increased Cancer Risk								0.05	0.026	0.002	**0.1**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (µg/m3)**
0.0000	0.024

West Oakland BART Station Project, Oakland - 7th St. Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
3rd Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0003	0.0268	0.0346	0.004	0.002	0.0002	0.01
1	1	0 - 1	2023	10	0.0003	0.0268	0.0346	0.053	0.025	0.0019	0.08
2	1	1 - 2	2024	10	0.0003	0.0268	0.0346	0.053	0.025	0.0019	0.08
3	1	2 - 3	2025	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
4	1	3 - 4	2026	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
5	1	4 - 5	2027	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
6	1	5 - 6	2028	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
7	1	6 - 7	2029	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
8	1	7 - 8	2030	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
9	1	8 - 9	2031	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
10	1	9 - 10	2032	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
11	1	10 - 11	2033	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
12	1	11 - 12	2034	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
13	1	12 - 13	2035	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
14	1	13 - 14	2036	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
15	1	14 - 15	2037	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
16	1	15 - 16	2038	3	0.0003	0.0268	0.0346	0.008	0.004	0.0003	0.01
17	1	16-17	2039	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
18	1	17-18	2040	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
19	1	18-19	2041	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
20	1	19-20	2042	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
21	1	20-21	2043	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
22	1	21-22	2044	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
23	1	22-23	2045	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
24	1	23-24	2046	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
25	1	24-25	2047	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
26	1	25-26	2048	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
27	1	26-27	2049	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
28	1	27-28	2050	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
29	1	28-29	2051	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
30	1	29-30	2052	1	0.0003	0.0268	0.0346	0.001	0.000	0.0000	0.001
Total Increased Cancer Risk								0.24	0.114	0.009	**0.4**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (µg/m3)**
0.0001	0.153

West Oakland BART Station Project, Oakland - Cumulative Roadway Impacts Onsite
AERMOD Risk Modeling Parameters and Maximum Concentrations
4th Floor Receptors

Emissions Years	2023
Receptor Information	
Number of Receptors	
Receptor Height (in m) =	13.7 (3rd Floor)
Receptor Distances =	7m apart Onsite
Meteorological Conditions	
BAAQMD Oakland Met Data	2013 - 2017
Land Use Classification	urban
Wind Speed =	variable
Wind Direction =	variable

I-880 - Onsite MEI Maximum Concentrations - Floor 3

Meteorological	TAC Concentrations (µg/m^3)		
Data Years	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00433	0.04997	0.04414

Meteorological	PM2.5 Concentrations (µg/m^3)		
Data Years	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.04891	0.04454	0.00437

Mandela Parkway - Onsite MEI Maximum Concentrations - Floor 3

Meteorological	TAC Concentrations (µg/m^3)		
Data Years	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00006	0.00469	0.00606

Meteorological	PM2.5 Concentrations (µg/m^3)		
Data Years	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.02049	0.02023	0.00026

7th Street Onsite MEI Maximum Concentrations - Floor 3

Meteorological	TAC Concentrations (µg/m^3)		
Data Years	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00024	0.01891	0.02432

Meteorological	PM2.5 Concentrations (µg/m^3)		
Data Years	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.09404	0.0928	0.00124

West Oakland BART Station Project, Oakland - I880 Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
4th Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age --> Parameter	**3rd Trimester**	**0 - 2**	**2 - 16**	**16 - 30**
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	**Exposure Duration (years)**	**Age**	**Year**	**Age Sensitivity Factor**	**DPM**	**Exhaust TOG**	**Evaporative TOG**	**DPM**	**Exhaust TOG**	**Evaporative TOG**	**TOTAL**
0	0.25	-0.25 - 0*	2023	10	0.0043	0.0500	0.0441	0.059	0.004	0.0002	0.06
1	1	0 - 1	2023	10	0.0043	0.0500	0.0441	0.711	0.047	0.0024	0.76
2	1	1 - 2	2024	10	0.0043	0.0500	0.0441	0.711	0.047	0.0024	0.76
3	1	2 - 3	2025	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
4	1	3 - 4	2026	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
5	1	4 - 5	2027	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
6	1	5 - 6	2028	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
7	1	6 - 7	2029	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
8	1	7 - 8	2030	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
9	1	8 - 9	2031	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
10	1	9 - 10	2032	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
11	1	10 - 11	2033	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
12	1	11 - 12	2034	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
13	1	12 - 13	2035	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
14	1	13 - 14	2036	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
15	1	14 - 15	2037	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
16	1	15 - 16	2038	3	0.0043	0.0500	0.0441	0.112	0.007	0.0004	0.12
17	1	16-17	2039	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
18	1	17-18	2040	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
19	1	18-19	2041	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
20	1	19-20	2042	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
21	1	20-21	2043	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
22	1	21-22	2044	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
23	1	22-23	2045	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
24	1	23-24	2046	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
25	1	24-25	2047	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
26	1	25-26	2048	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
27	1	26-27	2049	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
28	1	27-28	2050	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
29	1	28-29	2051	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
30	1	29-30	2052	1	0.0043	0.0500	0.0441	0.012	0.001	0.0000	0.013
Total Increased Cancer Risk								3.22	0.212	0.011	**3.4**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (µg/m3)**
0.0009	0.049

West Oakland BART Station Project, Oakland - Mandela Parkway Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
4th Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air $(\mu g/m^3)$
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0001	0.0047	0.0061	0.001	0.000	0.0000	0.00
1	1	0 - 1	2023	10	0.0001	0.0047	0.0061	0.010	0.004	0.0003	0.01
2	1	1 - 2	2024	10	0.0001	0.0047	0.0061	0.010	0.004	0.0003	0.01
3	1	2 - 3	2025	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
4	1	3 - 4	2026	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
5	1	4 - 5	2027	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
6	1	5 - 6	2028	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
7	1	6 - 7	2029	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
8	1	7 - 8	2030	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
9	1	8 - 9	2031	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
10	1	9 - 10	2032	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
11	1	10 - 11	2033	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
12	1	11 - 12	2034	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
13	1	12 - 13	2035	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
14	1	13 - 14	2036	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
15	1	14 - 15	2037	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
16	1	15 - 16	2038	3	0.0001	0.0047	0.0061	0.002	0.001	0.0001	0.00
17	1	16-17	2039	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
18	1	17-18	2040	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
19	1	18-19	2041	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
20	1	19-20	2042	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
21	1	20-21	2043	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
22	1	21-22	2044	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
23	1	22-23	2045	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
24	1	23-24	2046	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
25	1	24-25	2047	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
26	1	25-26	2048	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
27	1	26-27	2049	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
28	1	27-28	2050	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
29	1	28-29	2051	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
30	1	29-30	2052	1	0.0001	0.0047	0.0061	0.000	0.000	0.0000	0.000
Total Increased Cancer Risk								0.04	0.020	0.002	**0.1**

* Third trimester of pregnancy

Maximum	
Hazard Index	Total PM2.5 (µg/m3)
0.0000	0.020

West Oakland BART Station Project, Oakland - 7th St. Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
4th Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0002	0.0189	0.0243	0.003	0.001	0.0001	0.00
1	1	0 - 1	2023	10	0.0002	0.0189	0.0243	0.039	0.018	0.0013	0.06
2	1	1 - 2	2024	10	0.0002	0.0189	0.0243	0.039	0.018	0.0013	0.06
3	1	2 - 3	2025	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
4	1	3 - 4	2026	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
5	1	4 - 5	2027	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
6	1	5 - 6	2028	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
7	1	6 - 7	2029	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
8	1	7 - 8	2030	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
9	1	8 - 9	2031	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
10	1	9 - 10	2032	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
11	1	10 - 11	2033	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
12	1	11 - 12	2034	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
13	1	12 - 13	2035	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
14	1	13 - 14	2036	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
15	1	14 - 15	2037	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
16	1	15 - 16	2038	3	0.0002	0.0189	0.0243	0.006	0.003	0.0002	0.01
17	1	16-17	2039	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
18	1	17-18	2040	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
19	1	18-19	2041	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
20	1	19-20	2042	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
21	1	20-21	2043	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
22	1	21-22	2044	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
23	1	22-23	2045	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
24	1	23-24	2046	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
25	1	24-25	2047	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
26	1	25-26	2048	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
27	1	26-27	2049	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
28	1	27-28	2050	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
29	1	28-29	2051	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
30	1	29-30	2052	1	0.0002	0.0189	0.0243	0.001	0.000	0.0000	0.001
Total Increased Cancer Risk								0.18	0.080	0.006	**0.3**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (µg/m3)**
0.0000	0.094

West Oakland BART Station Project, Oakland - Cumulative Roadway Impacts Onsite
AERMOD Risk Modeling Parameters and Maximum Concentrations
5th Floor Receptors

Emissions Years	2023
Receptor Information	
Number of Receptors	
Receptor Height (in m) =	16.7 (5th Floor)
Receptor Distances =	7m apart Onsite
Meteorological Conditions	
BAAQMD Oakland Met Data	2013 - 2017
Land Use Classification	urban
Wind Speed =	variable
Wind Direction =	variable

I-880 - Onsite MEI Maximum Concentrations - Floor 5

Meteorological Data Years	TAC Concentrations (µg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00327	0.03827	0.03389

Meteorological Data Years	PM2.5 Concentrations (µg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.03857	0.03513	0.00344

Mandela Parkway - Onsite MEI Maximum Concentrations - Floor 5

Meteorological Data Years	TAC Concentrations (µg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00005	0.00341	0.00441

Meteorological Data Years	PM2.5 Concentrations (µg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.01492	0.01473	0.00019

7th Street Onsite MEI Maximum Concentrations - Floor 5

Meteorological Data Years	TAC Concentrations (µg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00018	0.01276	0.01637

Meteorological Data Years	PM2.5 Concentrations (µg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.06006	0.05926	0.0008

West Oakland BART Station Project, Oakland - I880 Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
5th Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age --> **Parameter**	**3rd Trimester**	**0 - 2**	**2 - 16**	**16 - 30**
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	**Exposure Duration (years)**	**Age**	**Year**	**Age Sensitivity Factor**	**DPM**	**Exhaust TOG**	**Evaporative TOG**	**DPM**	**Exhaust TOG**	**Evaporative TOG**	**TOTAL**
0	0.25	-0.25 - 0*	2023	10	0.0033	0.0383	0.0339	0.044	0.003	0.0002	0.05
1	1	0 - 1	2023	10	0.0033	0.0383	0.0339	0.537	0.036	0.0019	0.57
2	1	1 - 2	2024	10	0.0033	0.0383	0.0339	0.537	0.036	0.0019	0.57
3	1	2 - 3	2025	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
4	1	3 - 4	2026	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
5	1	4 - 5	2027	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
6	1	5 - 6	2028	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
7	1	6 - 7	2029	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
8	1	7 - 8	2030	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
9	1	8 - 9	2031	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
10	1	9 - 10	2032	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
11	1	10 - 11	2033	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
12	1	11 - 12	2034	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
13	1	12 - 13	2035	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
14	1	13 - 14	2036	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
15	1	14 - 15	2037	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
16	1	15 - 16	2038	3	0.0033	0.0383	0.0339	0.085	0.006	0.0003	0.09
17	1	16-17	2039	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
18	1	17-18	2040	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
19	1	18-19	2041	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
20	1	19-20	2042	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
21	1	20-21	2043	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
22	1	21-22	2044	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
23	1	22-23	2045	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
24	1	23-24	2046	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
25	1	24-25	2047	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
26	1	25-26	2048	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
27	1	26-27	2049	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
28	1	27-28	2050	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
29	1	28-29	2051	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
30	1	29-30	2052	1	0.0033	0.0383	0.0339	0.009	0.001	0.0000	0.010
Total Increased Cancer Risk								2.43	0.163	0.008	**2.6**

* Third trimester of pregnancy

	Maximum
Hazard Index	**Total PM2.5 (μg/m3)**
0.0007	0.039

West Oakland BART Station Project, Oakland - Mandela Parkway Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
5th Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0001	0.0034	0.0044	0.001	0.000	0.0000	0.00
1	1	0 - 1	2023	10	0.0001	0.0034	0.0044	0.008	0.003	0.0002	0.01
2	1	1 - 2	2024	10	0.0001	0.0034	0.0044	0.008	0.003	0.0002	0.01
3	1	2 - 3	2025	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
4	1	3 - 4	2026	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
5	1	4 - 5	2027	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
6	1	5 - 6	2028	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
7	1	6 - 7	2029	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
8	1	7 - 8	2030	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
9	1	8 - 9	2031	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
10	1	9 - 10	2032	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
11	1	10 - 11	2033	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
12	1	11 - 12	2034	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
13	1	12 - 13	2035	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
14	1	13 - 14	2036	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
15	1	14 - 15	2037	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
16	1	15 - 16	2038	3	0.0001	0.0034	0.0044	0.001	0.001	0.0000	0.00
17	1	16-17	2039	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
18	1	17-18	2040	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
19	1	18-19	2041	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
20	1	19-20	2042	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
21	1	20-21	2043	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
22	1	21-22	2044	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
23	1	22-23	2045	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
24	1	23-24	2046	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
25	1	24-25	2047	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
26	1	25-26	2048	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
27	1	26-27	2049	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
28	1	27-28	2050	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
29	1	28-29	2051	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
30	1	29-30	2052	1	0.0001	0.0034	0.0044	0.000	0.000	0.0000	0.000
Total Increased Cancer Risk								0.04	0.014	0.001	**0.1**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (µg/m3)**
0.0000	0.015

West Oakland BART Station Project, Oakland - 7th St. Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
5th Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			TOTAL
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	
0	0.25	-0.25 - 0*	2023	10	0.0002	0.0128	0.0164	0.002	0.001	0.0001	0.00
1	1	0 - 1	2023	10	0.0002	0.0128	0.0164	0.030	0.012	0.0009	0.04
2	1	1 - 2	2024	10	0.0002	0.0128	0.0164	0.030	0.012	0.0009	0.04
3	1	2 - 3	2025	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
4	1	3 - 4	2026	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
5	1	4 - 5	2027	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
6	1	5 - 6	2028	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
7	1	6 - 7	2029	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
8	1	7 - 8	2030	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
9	1	8 - 9	2031	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
10	1	9 - 10	2032	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
11	1	10 - 11	2033	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
12	1	11 - 12	2034	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
13	1	12 - 13	2035	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
14	1	13 - 14	2036	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
15	1	14 - 15	2037	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
16	1	15 - 16	2038	3	0.0002	0.0128	0.0164	0.005	0.002	0.0001	0.01
17	1	16-17	2039	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
18	1	17-18	2040	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
19	1	18-19	2041	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
20	1	19-20	2042	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
21	1	20-21	2043	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
22	1	21-22	2044	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
23	1	22-23	2045	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
24	1	23-24	2046	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
25	1	24-25	2047	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
26	1	25-26	2048	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
27	1	26-27	2049	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
28	1	27-28	2050	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
29	1	28-29	2051	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
30	1	29-30	2052	1	0.0002	0.0128	0.0164	0.001	0.000	0.0000	0.001
Total Increased Cancer Risk								0.13	0.054	0.004	**0.2**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (µg/m3)**
0.0000	0.060

West Oakland BART Station Project, Oakland - Cumulative Roadway Impacts Onsite
AERMOD Risk Modeling Parameters and Maximum Concentrations
6th Floor Receptors

Emissions Years	2023
Receptor Information	
Number of Receptors	
Receptor Height (in m) =	19.8 (6th Floor)
Receptor Distances =	7m apart Onsite

Meteorological Conditions

BAAQMD Oakland Met Data	2013 - 2017
Land Use Classification	urban
Wind Speed =	variable
Wind Direction =	variable

I-880 - Onsite MEI Maximum Concentrations - Floor 6

Meteorological	TAC Concentrations (μg/m^3)		
Data Years	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00245	0.02911	0.02587

Meteorological	PM2.5 Concentrations (μg/m^3)		
Data Years	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.0299	0.02724	0.00266

Mandela Parkway - Onsite MEI Maximum Concentrations - Floor 6

Meteorological	TAC Concentrations (μg/m^3)		
Data Years	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00003	0.00231	0.00298

Meteorological	PM2.5 Concentrations (μg/m^3)		
Data Years	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.01003	0.0099	0.00013

7th Street Onsite MEI Maximum Concentrations - Floor 6

Meteorological	TAC Concentrations (μg/m^3)		
Data Years	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00012	0.00841	0.01074

Meteorological	PM2.5 Concentrations (μg/m^3)		
Data Years	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.03997	0.03943	0.00054

West Oakland BART Station Project, Oakland - I880 Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
6th Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	**3rd Trimester**	**0 - 2**	**2 - 16**	**16 - 30**
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0025	0.0291	0.0259	0.033	0.002	0.0001	0.04
1	1	0 - 1	2023	10	0.0025	0.0291	0.0259	0.402	0.027	0.0014	0.43
2	1	1 - 2	2024	10	0.0025	0.0291	0.0259	0.402	0.027	0.0014	0.43
3	1	2 - 3	2025	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
4	1	3 - 4	2026	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
5	1	4 - 5	2027	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
6	1	5 - 6	2028	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
7	1	6 - 7	2029	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
8	1	7 - 8	2030	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
9	1	8 - 9	2031	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
10	1	9 - 10	2032	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
11	1	10 - 11	2033	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
12	1	11 - 12	2034	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
13	1	12 - 13	2035	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
14	1	13 - 14	2036	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
15	1	14 - 15	2037	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
16	1	15 - 16	2038	3	0.0025	0.0291	0.0259	0.063	0.004	0.0002	0.07
17	1	16-17	2039	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
18	1	17-18	2040	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
19	1	18-19	2041	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
20	1	19-20	2042	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
21	1	20-21	2043	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
22	1	21-22	2044	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
23	1	22-23	2045	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
24	1	23-24	2046	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
25	1	24-25	2047	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
26	1	25-26	2048	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
27	1	26-27	2049	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
28	1	27-28	2050	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
29	1	28-29	2051	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
30	1	29-30	2052	1	0.0025	0.0291	0.0259	0.007	0.000	0.0000	0.008
Total Increased Cancer Risk								1.82	0.124	0.006	**2.0**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (µg/m3)**
0.0005	0.030

West Oakland BART Station Project, Oakland - Mandela Parkway Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
6th Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			TOTAL
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	
0	0.25	-0.25 - 0*	2023	10	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.00
1	1	0 - 1	2023	10	0.0000	0.0023	0.0030	0.005	0.002	0.0002	0.01
2	1	1 - 2	2024	10	0.0000	0.0023	0.0030	0.005	0.002	0.0002	0.01
3	1	2 - 3	2025	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
4	1	3 - 4	2026	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
5	1	4 - 5	2027	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
6	1	5 - 6	2028	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
7	1	6 - 7	2029	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
8	1	7 - 8	2030	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
9	1	8 - 9	2031	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
10	1	9 - 10	2032	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
11	1	10 - 11	2033	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
12	1	11 - 12	2034	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
13	1	12 - 13	2035	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
14	1	13 - 14	2036	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
15	1	14 - 15	2037	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
16	1	15 - 16	2038	3	0.0000	0.0023	0.0030	0.001	0.000	0.0000	0.00
17	1	16-17	2039	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
18	1	17-18	2040	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
19	1	18-19	2041	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
20	1	19-20	2042	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
21	1	20-21	2043	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
22	1	21-22	2044	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
23	1	22-23	2045	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
24	1	23-24	2046	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
25	1	24-25	2047	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
26	1	25-26	2048	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
27	1	26-27	2049	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
28	1	27-28	2050	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
29	1	28-29	2051	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
30	1	29-30	2052	1	0.0000	0.0023	0.0030	0.000	0.000	0.0000	0.000
Total Increased Cancer Risk								0.02	0.010	0.001	**0.0**

* Third trimester of pregnancy

Maximum	
Hazard Index	**Total PM2.5 (µg/m3)**
0.0000	0.010

West Oakland BART Station Project, Oakland - 7th St. Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
6th Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0001	0.0084	0.0107	0.002	0.001	0.0000	0.00
1	1	0 - 1	2023	10	0.0001	0.0084	0.0107	0.020	0.008	0.0006	0.03
2	1	1 - 2	2024	10	0.0001	0.0084	0.0107	0.020	0.008	0.0006	0.03
3	1	2 - 3	2025	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
4	1	3 - 4	2026	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
5	1	4 - 5	2027	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
6	1	5 - 6	2028	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
7	1	6 - 7	2029	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
8	1	7 - 8	2030	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
9	1	8 - 9	2031	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
10	1	9 - 10	2032	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
11	1	10 - 11	2033	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
12	1	11 - 12	2034	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
13	1	12 - 13	2035	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
14	1	13 - 14	2036	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
15	1	14 - 15	2037	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
16	1	15 - 16	2038	3	0.0001	0.0084	0.0107	0.003	0.001	0.0001	0.00
17	1	16-17	2039	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
18	1	17-18	2040	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
19	1	18-19	2041	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
20	1	19-20	2042	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
21	1	20-21	2043	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
22	1	21-22	2044	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
23	1	22-23	2045	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
24	1	23-24	2046	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
25	1	24-25	2047	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
26	1	25-26	2048	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
27	1	26-27	2049	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
28	1	27-28	2050	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
29	1	28-29	2051	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
30	1	29-30	2052	1	0.0001	0.0084	0.0107	0.000	0.000	0.0000	0.000
Total Increased Cancer Risk								0.09	0.036	0.003	**0.1**

* Third trimester of pregnancy

Maximum	
Hazard Index	Total PM2.5 (µg/m3)
0.0000	0.040

West Oakland BART Station Project, Oakland - Roadway Impacts Onsite
AERMOD Risk Modeling Parameters and Maximum Concentrations
7th Floor Receptors

Emissions Years	2023
Receptor Information	
Number of Receptors	
Receptor Height (in m) =	22.8 (7th Floor)
Receptor Distances =	7m apart Onsite
Meteorological Conditions	
BAAQMD Oakland Met Data	2013 - 2017
Land Use Classification	urban
Wind Speed =	variable
Wind Direction =	variable

I-880 - Onsite MEI Maximum Concentrations - Floor 7

Meteorological Data Years	TAC Concentrations (µg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00188	0.0228	0.02035

Meteorological Data Years	PM2.5 Concentrations (µg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.02357	0.02148	0.00209

Mandela Parkway - Onsite MEI Maximum Concentrations - Floor 7

Meteorological Data Years	TAC Concentrations (µg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00002	0.00153	0.00197

Meteorological Data Years	PM2.5 Concentrations (µg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.00651	0.00643	0.00008

7th Street Onsite MEI Maximum Concentrations - Floor 7

Meteorological Data Years	TAC Concentrations (µg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2013 - 2017	0.00008	0.0058	0.00738

Meteorological Data Years	PM2.5 Concentrations (µg/m^3)		
	Total PM2.5	Fugitive PM2.5	Vehicle PM2.5
2013 - 2017	0.02859	0.0282	0.00039

West Oakland BART Station Project, Oakland - I880 Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
7th Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0019	0.0228	0.0204	0.026	0.002	0.0001	0.03
1	1	0 - 1	2023	10	0.0019	0.0228	0.0204	0.309	0.021	0.0011	0.33
2	1	1 - 2	2024	10	0.0019	0.0228	0.0204	0.309	0.021	0.0011	0.33
3	1	2 - 3	2025	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
4	1	3 - 4	2026	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
5	1	4 - 5	2027	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
6	1	5 - 6	2028	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
7	1	6 - 7	2029	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
8	1	7 - 8	2030	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
9	1	8 - 9	2031	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
10	1	9 - 10	2032	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
11	1	10 - 11	2033	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
12	1	11 - 12	2034	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
13	1	12 - 13	2035	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
14	1	13 - 14	2036	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
15	1	14 - 15	2037	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
16	1	15 - 16	2038	3	0.0019	0.0228	0.0204	0.049	0.003	0.0002	0.05
17	1	16-17	2039	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
18	1	17-18	2040	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
19	1	18-19	2041	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
20	1	19-20	2042	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
21	1	20-21	2043	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
22	1	21-22	2044	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
23	1	22-23	2045	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
24	1	23-24	2046	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
25	1	24-25	2047	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
26	1	25-26	2048	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
27	1	26-27	2049	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
28	1	27-28	2050	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
29	1	28-29	2051	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
30	1	29-30	2052	1	0.0019	0.0228	0.0204	0.005	0.000	0.0000	0.006
Total Increased Cancer Risk								1.40	0.097	0.005	**1.5**

* Third trimester of pregnancy

Maximum	
Hazard Index	Total PM2.5 (µg/m3)
0.0004	0.024

West Oakland BART Station Project, Oakland - Mandela Parkway Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
7th Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air $(\mu g/m^3)$
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2023	10	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.00
1	1	0 - 1	2023	10	0.0000	0.0015	0.0020	0.003	0.001	0.0001	0.00
2	1	1 - 2	2024	10	0.0000	0.0015	0.0020	0.003	0.001	0.0001	0.00
3	1	2 - 3	2025	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
4	1	3 - 4	2026	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
5	1	4 - 5	2027	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
6	1	5 - 6	2028	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
7	1	6 - 7	2029	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
8	1	7 - 8	2030	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
9	1	8 - 9	2031	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
10	1	9 - 10	2032	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
11	1	10 - 11	2033	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
12	1	11 - 12	2034	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
13	1	12 - 13	2035	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
14	1	13 - 14	2036	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
15	1	14 - 15	2037	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
16	1	15 - 16	2038	3	0.0000	0.0015	0.0020	0.001	0.000	0.0000	0.00
17	1	16-17	2039	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
18	1	17-18	2040	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
19	1	18-19	2041	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
20	1	19-20	2042	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
21	1	20-21	2043	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
22	1	21-22	2044	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
23	1	22-23	2045	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
24	1	23-24	2046	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
25	1	24-25	2047	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
26	1	25-26	2048	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
27	1	26-27	2049	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
28	1	27-28	2050	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
29	1	28-29	2051	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
30	1	29-30	2052	1	0.0000	0.0015	0.0020	0.000	0.000	0.0000	0.000
Total Increased Cancer Risk								0.01	0.007	0.000	**0.0**

* Third trimester of pregnancy

Maximum	
Hazard Index	Total PM2.5 (µg/m3)
0.0000	0.007

West Oakland BART Station Project, Oakland - 7th St. Impacts Onsite
Cumulative Cancer Risk and PM2.5 Calculations
7th Floor Receptors

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			TOTAL
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	
0	0.25	-0.25 - 0*	2023	10	0.0001	0.0058	0.0074	0.001	0.000	0.0000	0.00
1	1	0 - 1	2023	10	0.0001	0.0058	0.0074	0.013	0.005	0.0004	0.02
2	1	1 - 2	2024	10	0.0001	0.0058	0.0074	0.013	0.005	0.0004	0.02
3	1	2 - 3	2025	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
4	1	3 - 4	2026	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
5	1	4 - 5	2027	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
6	1	5 - 6	2028	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
7	1	6 - 7	2029	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
8	1	7 - 8	2030	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
9	1	8 - 9	2031	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
10	1	9 - 10	2032	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
11	1	10 - 11	2033	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
12	1	11 - 12	2034	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
13	1	12 - 13	2035	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
14	1	13 - 14	2036	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
15	1	14 - 15	2037	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
16	1	15 - 16	2038	3	0.0001	0.0058	0.0074	0.002	0.001	0.0001	0.00
17	1	16-17	2039	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
18	1	17-18	2040	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
19	1	18-19	2041	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
20	1	19-20	2042	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
21	1	20-21	2043	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
22	1	21-22	2044	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
23	1	22-23	2045	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
24	1	23-24	2046	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
25	1	24-25	2047	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
26	1	25-26	2048	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
27	1	26-27	2049	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
28	1	27-28	2050	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
29	1	28-29	2051	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
30	1	29-30	2052	1	0.0001	0.0058	0.0074	0.000	0.000	0.0000	0.000
Total Increased Cancer Risk								0.06	0.025	0.002	**0.1**

* Third trimester of pregnancy

Maximum	
Hazard Index	Total PM2.5 (µg/m3)
0.0000	0.029

Appendix F

Greenhouse Gas Reduction Program for the West Oakland BART TOD Project

Lamphier-Gregory, January 2019

GREENHOUSE GAS REDUCTION PLAN

FOR THE

WEST OAKLAND BART TOD PROJECT

Prepared For:
Project Applicant

Reviewed and Accepted by:
City of Oakland

JANUARY 2019

Prepared By:
Lamphier–Gregory
1944 Embarcadero
Oakland, CA 94606

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INTRODUCTION

This Greenhouse Gas (GHG) Reduction Plan has been prepared to comply with the City of Oakland Standard Condition of Approval (City SCA #42) "Greenhouse Gas Reduction Plan", herein referred to as SCA-GHG-1, as identified in the *WOB TOD Project Addendum*. The information and technical analysis presented herein has been prepared by Rebecca Auld, Senior Planner and Air/GHG Specialist at Lamphier-Gregory, Inc.

SUMMARY OF THE PROJECT

The project represents establishment of the transit-oriented development (TOD) as contemplated in the West Oakland Specific Plan (WOSP) on the site surrounding the West Oakland BART station. The project would demolish the existing 451-space West Oakland BART station surface parking lot and associated circulation and construct three new mid-rise and high-rise buildings, retail under the BART tracks, and a row of townhomes housing a total of 762 residential units, 382,460 square feet of office space, and up to 75,000 square feet of ground-floor retail uses. The project also includes a 400-space underground parking lot and a BART surface plaza and circulation elements.

TRANSIT PRIORITY PROJECT

The project site is located within a "Regional Center" Priority Development Area pursuant to the Plan Bay Area which represents the Sustainable Communities Strategy (SCS) for the greater San Francisco Bay Area (MTC, 2013). Per CEQA Guidelines Section 15183.5 (c), environmental documents for certain residential and mixed-use projects and transit priority projects, as defined in Section 21155 of the Public Resources Code, that are consistent with the general use designation, density, building intensity and applicable policies specified for the project area in an applicable SCS or alternative planning strategy, need not analyze global warming impacts resulting from cars and light duty trucks. A lead agency should consider whether such projects may result in GHGs from other sources, however, consistent with the CEQA Guidelines. Consequently, if a project meets the requirements of a transit priority project, its mobile sources need not be included in the assessment of GHG impacts.

INTRODUCTION TO GHG CONCEPTS AND TERMS

GHGs are heat-trapping gasses in the Earth's atmosphere. Without GHGs, Earth's temperature would be too cold for life to exist. There is indisputable evidence that human activities such as electricity production and transportation are adding to the concentrations of greenhouse gases that are already naturally present in the atmosphere. The buildup of greenhouse gases in the atmosphere is very likely the cause of most of the recent observed increase in average temperatures, and contributes to other climate changes.

The Global Warming Potential (GWP) concept is used to compare the ability of each GHG to trap heat in the atmosphere relative to carbon dioxide (CO_2), which is the most abundant GHG. CO_2 has a GWP of 1, expressed as CO_2 equivalent (CO_2e). Other GHGs, such as CH_4 and N_2O are commonly found in the atmosphere at much lower concentrations, but with higher warming potentials, having CO_2e ratings of 21 and 310, respectively. Trace gases such as chlorofluorocarbons and hydrochlorofluorocarbons have much greater warming potential. GHG emissions estimates incorporate various heat-trapping gasses and are presented for consistency as CO_2e. CO_2e is used as the standard for measurement of GHG emissions throughout this document.

CITY OF OAKLAND GHG REDUCTION PLAN STANDARD CONDITION

SCA-GHG-1 applies to any project that meets one or more of the following three scenarios and has a net increase in GHG emissions:

Scenario A: Projects which:

(a) involve a land use development (i.e., a project that does not require a permit from the Bay Area Air Quality Management District [BAAQMD] to operate),

(b) exceed the GHG emissions screening criteria contained in the BAAQMD CEQA Guidelines, AND

(c) after a GHG analysis is prepared, would exceed both of the City's applicable thresholds of significance (1,100 metric tons of carbon dioxide equivalents [CO_2e] annually and 4.6 metric tons of CO_2e per service population annually).

Scenario B: Projects which:

(a) involve a land use development,

(b) Exceed the GHG emissions screening criteria contained in the BAAQMD CEQA Guidelines,

(c) after a GHG analysis is prepared, would exceed at least one of the City's applicable thresholds of significance (1,100 metric tons of CO_2e annually or 4.6 metric tons of CO_2e per service population annually), AND

(d) are considered to be "Very Large Projects."

A "Very Large Project" is defined as any of the following:

A. Residential development of more than 500 dwelling units;

B. Shopping center or business establishment employing more than 1,000 persons or encompassing more than 500,000 square feet of floor space;

C. Commercial office building employing more than 1,000 persons or encompassing more than 250,000 square feet of floor space;

D. Hotel/motel development of more than 500 rooms;

E. Industrial, manufacturing, processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or encompassing more than 650,000 square feet of floor area; or

F. Any combination of smaller versions of the above that when combined result in equivalent annual GHG emissions as the above.

Scenario C: Projects which:

(a) involve a stationary source of GHG (i.e., a project that requires a permit from BAAQMD to operate) AND

(b) after a GHG analysis is prepared, would exceed the City's applicable threshold of significance (10,000 metric tons of CO_2e annually).

The WOB TOD Project is required to prepare a GHG Reduction Plan as it satisfies all the criteria under Scenario B. The project includes a mix of land uses that exceed the GHG screening criteria in Table 3-1 of the BAAQMD's 2017 CEQA Air Quality Guidelines. Project GHG emissions also exceed the 1,100 metric tons of CO_2e per year threshold AND meet the City's definition of a "Very Large Project."

The full text of SCA-GHG-1 is as follows:

SCA-GHG-1: Greenhouse Gas (GHG) Reduction Plan (#42)

a. Greenhouse Gas (GHG) Reduction Plan Required

The project applicant shall retain a qualified air quality consultant to develop a Greenhouse Gas (GHG) Reduction Plan for City review and approval and shall implement the approved GHG Reduction Plan.

The goal of the GHG Reduction Plan shall be to increase energy efficiency and reduce GHG emissions to below at least one of the Bay Area Quality Management District's (BAAQMD's) CEQA Thresholds of Significance (1,100 metric tons of CO_2e per year or 4.6 metric tons of CO_2e per year per service population) AND to reduce GHG emissions by 36 percent below the project's 2005 "business-as-usual" baseline GHG emissions(as explained below) to help implement the City's Energy and Climate Action Plan (adopted in 2012) which calls for reducing GHG emissions by 36 percent below 2005 levels. The GHG Reduction Plan shall include, at a minimum, (a) a detailed GHG emissions inventory for the project under a "business-as-usual" scenario with no consideration of project design features, or other energy efficiencies, (b) an "adjusted" baseline GHG emissions inventory for the project, taking into consideration energy efficiencies included as part of the project (including the City's Standard Conditions of Approval, proposed mitigation measures, project design features, and other City requirements), and additional GHG reduction measures available to further reduce GHG emissions, and (c) requirements for ongoing monitoring and reporting to demonstrate that the additional GHG reduction measures are being implemented. If the project is to be constructed in phases, the GHG Reduction Plan shall provide GHG emission scenarios by phase.

Potential GHG reduction measures to be considered include, but are not be limited to, measures recommended in BAAQMD's latest CEQA Air Quality Guidelines, the California Air Resources Board Scoping Plan (December 2008, as may be revised), the California Air Pollution Control Officers Association (CAPCOA) Quantifying Greenhouse Gas Mitigation Measures (August 2010, as may be revised), the California Attorney General's website, and Reference Guides on Leadership in Energy and Environmental Design (LEED) published by the U.S. Green Building Council.

The types of allowable GHG reduction measures include the following (listed in order of City preference): (1) physical design features; (2) operational features; and (3) the payment of fees to fund GHG-reducing programs (i.e., the purchase of "carbon credits") as explained below.

The allowable locations of the GHG reduction measures include the following (listed in order of City preference): (1) the project site; (2) off-site within the City of Oakland; (3) off-site within the San Francisco Bay Area Air Basin; (4) off-site within the State of California; then (5) elsewhere in the United States.

As with preferred locations for the implementation of all GHG reductions measures, the preference for carbon credit purchases include those that can be achieved as follows (listed in order of City preference): (1) within the City of Oakland; (2) within the San Francisco Bay Area Air Basin; (3) within the State of California; then (4) elsewhere in the United States. The cost of carbon credit purchases shall be based on current market value at the time purchased and shall be based on the project's operational emissions estimated in the GHG Reduction Plan or subsequent approved emissions inventory, which may result in emissions that are higher or lower than those estimated in the GHG Reduction Plan.

For physical GHG reduction measures to be incorporated into the design of the project, the measures shall be included on the drawings submitted for construction-related permits.

b. GHG Reduction Plan Implementation During Construction

The project applicant shall implement the GHG Reduction Plan during construction of the project. For physical GHG reduction measures to be incorporated into the design of the project, the measures shall be implemented during construction. For physical GHG reduction measures to be incorporated into off-site projects, the project applicant shall obtain all necessary permits/approvals and the measures shall be included on drawings and submitted to the City Planning Director or his/her designee for review and approval. These off-site improvements shall be installed prior to completion of the subject project (or prior to completion of the project phase for phased projects). For GHG reduction measures involving the purchase of carbon credits, evidence of the payment/purchase shall be submitted to the City for review and approval prior to completion of the project (or prior to completion of the project phase, for phased projects).

c. GHG Reduction Plan Implementation After Construction

The project applicant shall implement the GHG Reduction Plan after construction of the project (or at the completion of the project phase for phased projects). For operational GHG reduction measures to be incorporated into the project or off-site projects, the measures shall be implemented on an indefinite and ongoing basis.

The project applicant shall satisfy the following requirements for ongoing monitoring and reporting to demonstrate that the additional GHG reduction measures are being implemented. The GHG Reduction Plan requires regular periodic evaluation over the life of the project (generally estimated to be at least 40 years) to determine how the Plan is achieving required GHG emissions reductions over time, as well as the efficacy of the specific additional GHG reduction measures identified in the Plan.

Annual Report. Implementation of the GHG reduction measures and related requirements shall be ensured through compliance with Conditions of Approval adopted for the project. Generally, starting two years after the City issues the first Certificate of Occupancy for the project, the project applicant shall prepare each year of the useful life of the project an Annual GHG Emissions Reduction Report ("Annual Report"), for review and approval by the City Planning Director or his/her designee. The Annual Report shall be submitted to an independent reviewer of the City's choosing, to be paid for by the project applicant.

The Annual Report shall summarize the project's implementation of GHG reduction measures over the preceding year, intended upcoming changes, compliance with the conditions of the Plan, and include a brief summary of the previous year's Annual Report results (starting the second year). The Annual Report shall include a comparison of annual project emissions to the baseline emissions reported in the GHG Reduction Plan.

The GHG Reduction Plan shall be considered fully attained when project emissions are less than either applicable numeric BAAQMD CEQA Thresholds AND GHG emissions are 36 percent below the project's 2005 "business-as-usual" baseline GHG emissions, as confirmed by the City through an established monitoring program. Monitoring and reporting activities will continue at the City's discretion, as discussed below.

Corrective Procedure. If the third Annual Report, or any report thereafter, indicates that, in spite of the implementation of the GHG Reduction Plan, the project is not achieving the GHG reduction goal, the project applicant shall prepare a report for City review and approval, which proposes additional or revised GHG measures to better achieve the GHG emissions reduction goals, including without limitation, a discussion on the feasibility and effectiveness of the menu of other additional measures ("Corrective GHG Action Plan"). The project applicant shall then implement the approved Corrective GHG Action Plan.

If, one year after the Corrective GHG Action Plan is implemented, the required GHG emissions reduction target is still not being achieved, or if the project applicant fails to submit a report at the times described above, or if the reports do not meet City requirements outlined above, the City may, in addition to its other remedies, (a) assess the project applicant a financial penalty based upon actual percentage reduction in GHG emissions as compared to the percent reduction in GHG emissions established in the GHG Reduction Plan; or (b) refer the matter to the City Planning Commission for scheduling of a compliance hearing to determine whether the project's approvals should be revoked, altered or additional conditions of approval imposed.

The penalty as described in (a) above shall be determined by the City Planning Director or his/her designee and be commensurate with the percentage GHG emissions reduction not achieved (compared to the applicable numeric significance thresholds) or required percentage reduction from the "adjusted" baseline.

In determining whether a financial penalty or other remedy is appropriate, the City shall not impose a penalty if the project applicant has made a good faith effort to comply with the GHG Reduction Plan.

The City would only have the ability to impose a monetary penalty after a reasonable cure period and in accordance with the enforcement process outlined in Planning Code Chapter 17.152. If a financial penalty is imposed, such penalty sums shall be used by the City solely toward the implementation of the GHG Reduction Plan.

Timeline Discretion and Summary. The City shall have the discretion to reasonably modify the timing of reporting, with reasonable notice and opportunity to comment by the applicant, to coincide with other related monitoring and reporting required for the project.

GHG EMISSIONS INVENTORIES AND REDUCTION MEASURES

METHODOLOGY AND ASSUMPTIONS

As part of this GHG Reduction Plan, Lamphier-Gregory prepared a detailed GHG emissions inventory for the project under a 2005 "business-as-usual" (BAU) scenario (hereafter called the "2005 BAU Project") without considering any of the regulatory standards adopted thereafter designed to reduce GHG emissions or other energy efficiencies. The 2005 BAU Project inventory is compared to a Project Buildout (2020) scenario (hereafter called the "2020 Project Buildout"), taking into consideration energy efficiencies included as part of the project (including the City's SCAs, project design features, other City requirements, and federal, state and other local regulatory standards enacted since 2005). Year 2005 is the baseline year because the City's GHG emissions reduction goal specified in its ECAP is based on what GHG emissions were in 2005. Year 2020 is the buildout year as it is the earliest possible project completion year. (Later completion years would generally have lower emissions rates, so the earliest date is used for a conservative analysis.) Consistent with the methodology used in the Oakland ECAP, Lamphier-Gregory analyzed the 2005 BAU Project as if it was operating in 2005 and consistent with the California Emissions Estimator Model (CalEEMod), version 2016.3.2.2. As discussed under the project summary above, the project qualifies as a Transit Priority Project (TPP); therefore, emissions for mobile sources are not considered in the inventories for both scenarios.

GHG emissions for both scenarios were estimated using CalEEMod version 2016.3.2. Assumptions for the emissions inventories were based on a combination of project-specific information and default assumptions of the model, such as emission factors. CalEEMod results are included in full in Appendix A.

GHG EMISSION SOURCES

GHG EMISSION SOURCES INCLUDED IN THE INVENTORY

Emissions included in the updated BAAQMD Guidelines and therefore included in the baseline GHG emissions inventory for the project, as applicable, are:

- Construction Emissions. These are direct stationary and mobile source emissions resulting from construction activities at the site. To convert to a "per-year" emissions number that can be combined with operational emissions, the City's methodology adds the 40-year (assumed building lifetime) amortized construction-related GHG emissions to the project's total operational- related emissions. The same activity level and emission factors were used to estimate emissions in both the 2005 BAU Project and 2020 Project Buildout scenarios. This is a conservative approach as emission factors in 2005 would have been higher as they do not include characteristics that contribute to it being consistent with AB 32 GHG reduction goals during construction.

- Operational Area Sources. Area sources include architectural coatings, consumer products use, hearths, and landscaping equipment. Architectural coatings and consumer products are not substantial sources of GHG. Hearth emissions for the 2020 Project Buildout scenario were calculated using CalEEMod. BAAQMD Rule 6-3-306 does not allow wood stoves or wood-burning fireplaces in new building construction after November 1, 2016, so the percentage of dwelling units with wood stoves was assumed to be zero. The CalEEMod default number of dwelling units with fireplaces was maintained but all units were assumed to have natural gas fireplaces. Hearth emissions for the 2005 BAU Project were calculated with CalEEMod, assuming the default mix of wood and natural gas hearths as the BAAQMD Rule 6-3-306 was still not in effect in 2005.

- Operational Energy Use. These are direct emissions from natural gas and furnaces used on site, and indirect emissions emitted off-site for energy generation and distribution. For estimating GHG emissions from electricity use for the 2020 Project Buildout scenario, the Pacific Gas and Electric Company (PG&E) CO_2 intensity factor for 2020 was used in place of the default carbon intensity in CalEEMod.[1] This intensity factor takes into account the State's Renewable Portfolio Standard (RPS) that requires 33 percent of electricity to be from renewable sources in 2020. The 2005 BAU Project uses the default CalEEMod CO_2 intensity factor. The default carbon intensity is from PG&E's 2008 carbon intensity for electricity. This intensity takes into consideration some benefit of the 2010 RPS goals due to the ramp up of renewables, so is a conservative assumption for year 2005.

- Operational Water and Wastewater Emissions. These indirect emissions are associated with the electricity used to convey water and convey and treat wastewater, due to increased water demand from the project. The water use estimate for the 2020 Project Buildout scenario is the CalEEMod default for the project land uses for Alameda County, minus a 20 percent reduction in indoor water consumption to comply with mandatory CalGreen requirements. Therefore, the indoor water demand is 20 percent higher for 2005 BAU Project than the 2020 Project Buildout scenario, while the outdoor water demand is the same for 2005 as for the 2020 Project Buildout scenario. Based on the design of the East Bay Municipal Utility District's wastewater treatment plant, emissions estimated from wastewater treatment assumed a process with 100 percent aerobic biodegradation and 100 percent anaerobic digestion.

- Operational Solid Waste Disposal Emissions. These are indirect emissions associated with waste transport and disposal. Landfills emit anthropogenic methane from the anaerobic breakdown of material. The Oakland ECAP accounts for the City of Oakland Zero Waste goal, which reduces GHG emissions from waste by 89 percent between 2005 and 2020. This reduction has been incorporated into the 2020 Project Buildout scenario as a calculation outside CalEEMod. Therefore, GHG emissions associated with waste disposal for the 2020 Project Buildout scenario are 11 percent of those estimated for the 2005 BAU Project using CalEEMod.

As discussed earlier, GHG emissions from mobile sources are not included in the comparison of the emission inventories for the two scenarios. However, mobile emissions are presented under both scenarios for informational purposes.

[1] Pacific Gas and Electric Company (PG&E). Greenhouse Gas Emission Factors: Guidance for PG&E Customers. November 2015. Available online at: http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

CURRENT STATE AND LOCAL REQUIREMENTS THAT REDUCE GHG EMISSIONS

The following state programs and existing City requirements will reduce GHG emissions from the 2005 BAU Project and are incorporated in the GHG inventory for the 2020 Project Buildout scenario:

- The City of Oakland's Zero Waste goal will reduce GHG emissions from waste by 89 percent
- The State of California Renewable Portfolio Standard will reduce GHG from PG&E electricity generation
- BAAQMD Rule 6-3 prohibits wood-fired hearths in new homes, thereby reducing GHG emissions per hearth
- Increased residential and nonresidential building energy efficiency due to 2016 Title 24 standards

As discussed earlier, mobile source emissions are not included in either the 2005 BAU Project or the 2020 Project Buildout scenario as the 2020 Project qualifies as a TPP. Nevertheless, the following requirements reduce emissions from mobile sources from the 2005 BAU Project:

- The project Transportation Demand Management (TDM) program will reduce trips by 20 percent, which reduces on-road mobile source emissions (see SCA-TRANS-4 below)
- The Pavley Act and Advanced Clean Cars (ACC) programs reduce on-road vehicle fleet emissions
- Increased penetration of electric vehicles will reduce GHG emissions from on-road mobile sources, even without assuming mandated changes to charging infrastructure

City of Oakland SCAs are incorporated and required as part of a proposed project and are adopted as conditions of approval. In addition to SCA-GHG-1, which is the subject of this GHG Reduction Plan, the following SCAs (which are also identified in Attachment A, SCAMMRP of the CEQA Analysis) are required as part of the project resulting in a further reduction in project GHG emissions from the 2005 BAU Project:

- SCA-AES-3: Landscape Plan (#18). Addresses landscape requirements including tree plantings. This SCA reduces water use by requiring drought-tolerance and required landscaping/trees effect cooler climate, reduce excessive solar gain, and absorb CO_2e emissions.
- SCA-AIR-2: Criteria Air Pollutant Controls – Construction Related (#22). Includes many measures that will reduce or limit the amount of GHG emissions during construction, including limitations on vehicle idling, preference over electricity over petroleum-based combustion equipment, and accelerated use of off-road equipment with emissions control.
- SCA-BIO-2: Tree Planting (#31). Requires tree protection or tree replacement. Trees effect cooler climate, reduce excessive solar gain, and absorb CO_2e emissions.
- SCA-TRANS-2: Bicycle Parking (#78). Requires provision of bicycle parking, which encourage mode shift from vehicles and their emissions to bicycles.

- SCA-TRANS-4: Transportation and Parking Demand Management (#80). Requires the project-specific TDM Plan containing strategies to reduce on-site parking demand and single occupancy vehicle (SOV) travel. GHG emissions reductions attributable to a TDM Plan assume 20 percent reduction in vehicle trip generation.

- SCA-TRANS-5: Plug-In Electric Vehicle (PEV) Charging Infrastructure (#84). Requires inclusion of PEV charging stations in parking areas. Electric vehicles result in fewer GHG emissions.

- SCA-UTIL-1: Construction and Demolition Waste Reduction and Recycling (#85). Requires a project-level Construction & Demolition Waste Reduction and Recycling Plan (WRRP) to reduce construction–related emissions from haul trips by reducing off-site disposal truck trips and/or trip lengths.

- SCA-UTIL-4: Green Building Requirements. Requires compliance with the California Green Building Standards (CALGreen) mandatory measures and the applicable requirements of the City of Oakland Green Building Ordinance, which would reduce energy and water use and related emissions.

- SCA-UTIL-7: Water Efficient Landscape Ordinance (WELO) (#93). Requires water-efficient landscaping, which reducing the emissions related to water use.

Implementation of City of Oakland Plans and Policies also reduce GHG emissions, and they are implemented through many of the mandated measures and SCAs listed above:

- 2012 Oakland ECAP. Oakland developed its ECAP using a GHG reduction target equivalent to 36 percent below 2005 BAU GHG emissions by 2020 (City of Oakland, Resolution No. 82129 C.M.S., 2009). Certain development projects must meet this target (see SCA-GHG-1, above).

- City of Oakland Sustainability Programs. The City has proactively adopted a number of sustainability programs in an effort to reduce the City's impact on climate change. Two main categories that address reducing GHG emissions from a development projects are renewable energy (for City facilities) and green building (see CalGreen/Green Building Requirements, above).

COMPARISON OF 2005 BAU PROJECT AND 2020 PROJECT BUILDOUT SCENARIO EMISSIONS

Table 1 shows the 2005 BAU Project and 2020 Project Buildout scenario GHG inventories, as well as the percent reduction in emissions from the 2005 BAU Project inventory by source category.

Emissions from area sources (hearths and landscaping) under the 2020 Project Buildout scenario decrease by 34 percent from the 2005 BAU Project scenario due to the replacement of wood-fired hearths with natural gas fireplaces, as required by BAAQMD Rule 6-3.

Emissions related to energy use (both electricity and natural gas) decrease by 43 percent, due to the combined impacts of increased building energy efficiency and reductions in the carbon intensity of electricity provided by PG&E. These reductions are from the Title 24 building energy efficiency standards and the state Renewables Portfolio Standard.

Table 1: Comparison of Annual GHG Emissions

Emission Source Category	Total Annual CO_2e Emissions (Metric Tons Per Year)[a] 2005 BAU Project	2020 Project Buildout[b]	Reductions from 2005 BAU Scenario
Construction[c]	21	21	0%
Operational Area	61	40	34%
Operational Energy	3,623	2,075	43%
Operational Mobile	6,339	5,670	11%
Operational Waste	394	43	89%
Operational Water	440	240	45%
Total Emissions	**4,539**	**2,419**	**47%**
Total Emissions Threshold	1,100	1,100	--
Threshold Exceeded?	Yes	Yes	--
Emissions Efficiency (per SP)[d]	**1.1**	**0.6**	**--**
Emissions Efficiency Threshold (per SP)	4.6	4.6	--
Threshold Exceeded?	No	No	--
Reduction Requirement	--	--	36%
Reduction Achieved?	**--**	**--**	**Yes**

[a] Emissions estimates were made using CalEEMod, version 2016.3.2.
[b] Assumes 2021 energy and utility assumptions factoring in 2016 Title 24 standards and CalGreen compliance, actual PG&E emission factors, and compliance with City's waste reduction goals.
[c] In accordance with CEQA guidance from the City of Oakland, GHG emissions during construction are amortized over 40 years.
[d] The service population of 4,261 residents and employees was used, see subsection K, Population and Housing of the project's Addendum document for details.
Source: Lamphier-Gregory, 2019

Compared to the 2005 BAU Project, the 2020 Project Buildout scenario emissions from solid waste are reduce by 89 percent taking into account implementation of Oakland's Zero Waste goal by 2020.

Emissions related to water use, which are from wastewater treatment and the purchased electricity used to supply, distribute, and treat the water, are reduced by 45 percent, due to the state Renewables Portfolio Standard lowering the carbon intensity of purchased electricity between the 2005 BAU Project and 2020 Project Buildout scenarios.

Though not included in the comparison, mobile source emissions (from project-related vehicle trips) decrease by 11 percent between the 2005 BAU Project scenario and the 2020 Project Buildout scenario. This is primarily due to the reduction in fleet average emission factors in CalEEMod as the vehicle fleet gets more efficient by 2020 with the adoption of Pavley and ACC standards as well as an increased penetration of electric vehicles into the fleet.

Overall, at 2020 Project Buildout, the total annual GHG emissions generated by the project (2,419 metric tons CO_2e per year) is approximately 2,120 metric tons CO_2e per year less than the project's estimated 2005 BAU scenario emissions (4,539 metric tons CO_2e per year). This is a reduction of approximately 47 percent – greater than the 36 percent reduction from 2005 BAU required pursuant to the ECAP and SCA-GHG-1.

CONCLUSION

As presented in this GHG Reduction Plan and analyzed in the Addendum document for the project, GHG emissions from the proposed project result in a less than significant CEQA impact. Pursuant to SCA-GHG-1, Lamphier-Gregory prepared this GHG Reduction Plan to demonstrate achievement of a minimum 36 percent reduction of GHG emissions compared to the 2005 BAU scenario, and compliance with the City ECAP.

Table 1 of this GHG Reduction Plan shows that emissions estimated under the 2020 Project Buildout scenario are reduced 47 percent from those estimated for the 2005 BAU Project scenario. Therefore, the project would not conflict with an applicable plan, policy, or regulation adopted for the purposes of reducing greenhouse gas emissions, in particular the City's ECAP (per SCA-GHG-1). Pursuant to SCA-GHG-1, the project is not required to identify and quantify additional specific GHG reduction measures to reduce project emissions for CEQA purposes; the project's emissions are already below one of the CEQA thresholds and exceed the 36 percent reduction from the project's 2005 BAU scenario. The project has fully implemented SCA-GHG-1, the GHG Reduction Plan, for CEQA purposes, as specified in SCA-GHG-1.

ATTACHMENT 1: CALEEMOD RESULTS

WOB TOD 2005

Alameda County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	382.46	1000sqft	1.27	382,460.00	0
Enclosed Parking with Elevator	400.00	Space	1.00	160,000.00	0
Apartments High Rise	500.00	Dwelling Unit	1.26	500,000.00	1430
Apartments Low Rise	22.00	Dwelling Unit	0.28	22,000.00	63
Apartments Mid Rise	240.00	Dwelling Unit	1.27	240,000.00	686
Strip Mall	75.00	1000sqft	1.72	75,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2005
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Lot acreage totals site acreage.

Vehicle Trips - Trip rate per Ferh & Peers non-CEQA analysis including 47% trip reduction for projects near a BART station.

Water And Wastewater - 100% aerobic treatment of wastewater assumed.

Table Name	Column Name	Default Value	New Value
tblLandUse	LotAcreage	8.78	1.27
tblLandUse	LotAcreage	3.60	1.00
tblLandUse	LotAcreage	8.06	1.26
tblLandUse	LotAcreage	1.38	0.28
tblLandUse	LotAcreage	6.32	1.27
tblVehicleTrips	ST_TR	4.98	2.80
tblVehicleTrips	ST_TR	7.16	3.07
tblVehicleTrips	ST_TR	6.39	3.15
tblVehicleTrips	ST_TR	2.46	1.21
tblVehicleTrips	ST_TR	42.04	33.19
tblVehicleTrips	SU_TR	3.65	2.05
tblVehicleTrips	SU_TR	6.07	2.82
tblVehicleTrips	SU_TR	5.86	2.67
tblVehicleTrips	SU_TR	1.05	0.51
tblVehicleTrips	SU_TR	20.43	16.13
tblVehicleTrips	WD_TR	4.20	2.36
tblVehicleTrips	WD_TR	6.59	3.20
tblVehicleTrips	WD_TR	6.65	2.90
tblVehicleTrips	WD_TR	11.03	5.40
tblVehicleTrips	WD_TR	44.32	34.99

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	MT/yr					
Area	34.7394	23.5266	58.2660	0.0707	2.2800e-[illegible]	60.7124
Energy	0.0000	3,607.4101	3,607.4101	0.1428	0.0408	3,623.1270
Mobile	0.0000	6,315.7011	6,315.7011	0.9340	0.0000	6,339.0505
Waste	159.3398	0.0000	159.3398	9.4167	0.0000	394.7576
Water	39.0790	271.6548	310.7338	4.0261	0.0973	440.3855
Total	**233.1581**	**10,218.2925**	**10,451.4507**	**14.5902**	**0.1404**	**10,858.0330**

Mitigated Operational

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Area	34.7394	23.5266	58.2660	0.0707	2.2800e-[illegible]	60.7124
Energy	0.0000	3,607.4101	3,607.4101	0.1428	0.0408	3,623.1270
Mobile	0.0000	6,315.7011	6,315.7011	0.9340	0.0000	6,339.0505
Waste	159.3398	0.0000	159.3398	9.4167	0.0000	394.7576
Water	39.0790	271.6548	310.7338	4.0261	0.0973	440.3855
Total	**233.1581**	**10,218.2925**	**10,451.4507**	**14.5902**	**0.1404**	**10,858.0330**

	Bio- CO2	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	MT/yr					
Mitigated	0.0000	6,315.7011	6,315.70	0.9340	0.0000	6,339.0505
Unmitigated	0.0000	6,315.7011	6,315.70	0.9340	0.0000	6,339.0505

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	1,180.00	1,400.00	1025.00	2,746,783	2,746,783
Apartments Low Rise	70.40	67.54	62.04	158,894	158,894
Apartments Mid Rise	696.00	756.00	640.80	1,609,070	1,609,070
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	2,065.28	462.78	195.05	3,749,949	3,749,949
Strip Mall	2,624.25	2,489.25	1209.75	3,700,534	3,700,534
Total	6,635.93	5,175.57	3,132.64	11,965,231	11,965,231

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Apartments Low Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Apartments Mid Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.540639	0.064683	0.171972	0.117999	0.030504	0.004760	0.020161	0.036194	0.001764	0.004728	0.005037	0.000261	0.001298
Apartments Low Rise	0.540639	0.064683	0.171972	0.117999	0.030504	0.004760	0.020161	0.036194	0.001764	0.004728	0.005037	0.000261	0.001298

Apartments Mid Rise	0.540639	0.064683	0.171972	0.117999	0.030504	0.004760	0.020161	0.036194	0.001764	0.004728	0.005037	0.000261	0.001298
Enclosed Parking with Elevator	0.540639	0.064683	0.171972	0.117999	0.030504	0.004760	0.020161	0.036194	0.001764	0.004728	0.005037	0.000261	0.001298
General Office Building	0.540639	0.064683	0.171972	0.117999	0.030504	0.004760	0.020161	0.036194	0.001764	0.004728	0.005037	0.000261	0.001298
Strip Mall	0.540639	0.064683	0.171972	0.117999	0.030504	0.004760	0.020161	0.036194	0.001764	0.004728	0.005037	0.000261	0.001298

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Electricity Mitigated	0.0000	2,825.8353	2,825.8353	0.1278	0.0264	2,836.9077
Electricity Unmitigated	0.0000	2,825.8353	2,825.8353	0.1278	0.0264	2,836.9077
NaturalGas Mitigated	0.0000	781.5748	781.5748	0.0150	0.0143	786.2193
NaturalGas Unmitigated	0.0000	781.5748	781.5748	0.0150	0.0143	786.2193

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	MT/yr					
Apartments High Rise	4.36522e+006	0.0000	232.9445	232.9445	4.4600e-003	4.2700e-003	234.3288
Apartments Low Rise	447689	0.0000	23.8904	23.8904	4.6000e-004	4.4000e-004	24.0324
Apartments Mid Rise	2.0953e+006	0.0000	111.8134	111.8134	2.1400e-003	2.0500e-003	112.4778
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

General Office Building	7.39295e+006	0.0000	394.5161	394.5161	7.5600e-003	7.2300e-003	396.8605
Strip Mall	345000	0.0000	18.4105	18.4105	3.5000e-004	3.4000e-004	18.5199
Total		**0.0000**	**781.5748**	**781.5748**	**0.0150**	**0.0143**	**786.2193**

Mitigated

	NaturalGas Use	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	MT/yr					
Apartments High Rise	4.36522e+006	0.0000	232.9445	232.9445	4.4600e-003	4.2700e-003	234.3288
Apartments Low Rise	447689	0.0000	23.8904	23.8904	4.6000e-004	4.4000e-004	24.0324
Apartments Mid Rise	2.0953e+006	0.0000	111.8134	111.8134	2.1400e-003	2.0500e-003	112.4778
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	7.39295e+006	0.0000	394.5161	394.5161	7.5600e-003	7.2300e-003	396.8605
Strip Mall	345000	0.0000	18.4105	18.4105	3.5000e-004	3.4000e-004	18.5199
Total		**0.0000**	**781.5748**	**781.5748**	**0.0150**	**0.0143**	**786.2193**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	2.111e+006	614.1127	0.0278	5.7500e-003	616.5189
Apartments Low Rise	92756	26.9838	1.2200e-003	2.5000e-004	27.0895
Apartments Mid Rise	1.01328e+006	294.7741	0.0133	2.7600e-003	295.9291

Enclosed Parking with Elevator	937600	272.7586	0.0123	2.5500e-003	273.8273
General Office Building	4.7731e+006	1,388.5498	0.0628	0.0130	1,393.9905
Strip Mall	786000	228.6564	0.0103	2.1400e-003	229.5524
Total		**2,825.8352**	**0.1278**	**0.0264**	**2,836.9077**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	2.111e+006	614.1127	0.0278	5.7500e-003	616.5189
Apartments Low Rise	92756	26.9838	1.2200e-003	2.5000e-004	27.0895
Apartments Mid Rise	1.01328e+006	294.7741	0.0133	2.7600e-003	295.9291
Enclosed Parking with Elevator	937600	272.7586	0.0123	2.5500e-003	273.8273
General Office Building	4.7731e+006	1,388.5498	0.0628	0.0130	1,393.9905
Strip Mall	786000	228.6564	0.0103	2.1400e-003	229.5524
Total		**2,825.8352**	**0.1278**	**0.0264**	**2,836.9077**

6.0 Area Detail

6.1 Mitigation Measures Area

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Mitigated	34.7394	23.5266	58.2660	0.0707	2.2800e-003	60.7124

Unmitigated	34.7394	23.5266	58.2660	0.0707	2.2800e-003	60.7124

6.2 Area by SubCategory

Unmitigated

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	MT/yr					
Architectural Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	34.7394	14.2691	49.0085	0.0558	2.2800e-003	51.0832
Landscaping	0.0000	9.2575	9.2575	0.0149	0.0000	9.6293
Total	**34.7394**	**23.5266**	**58.2660**	**0.0707**	**2.2800e-003**	**60.7124**

Mitigated

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	MT/yr					
Architectural Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	34.7394	14.2691	49.0085	0.0558	2.2800e-003	51.0832
Landscaping	0.0000	9.2575	9.2575	0.0149	0.0000	9.6293
Total	**34.7394**	**23.5266**	**58.2660**	**0.0707**	**2.2800e-003**	**60.7124**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	310.7338	4.0261	0.0973	440.3855
Unmitigated	310.7338	4.0261	0.0973	440.3855

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	32.577 / 20.5377	82.5266	1.0648	0.0257	116.8169
Apartments Low Rise	1.43339 / 0.903658	3.6312	0.0469	1.1300e-003	5.1399
Apartments Mid Rise	15.637 / 9.85809	39.6128	0.5111	0.0124	56.0721
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	67.976 / 41.6627	170.9889	2.2218	0.0537	242.5350
Strip Mall	5.55544 / 3.40495	13.9743	0.1816	4.3900e-003	19.8215
Total		**310.7338**	**4.0261**	**0.0973**	**440.3855**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			

Apartments High Rise	32.577 / 20.5377	82.5266	1.0648	0.0257	116.8169
Apartments Low Rise	1.43339 / 0.903658	3.6312	0.0469	1.1300e-003	5.1399
Apartments Mid Rise	15.637 / 9.85809	39.6128	0.5111	0.0124	56.0721
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	67.976 / 41.6627	170.9889	2.2218	0.0537	242.5350
Strip Mall	5.55544 / 3.40495	13.9743	0.1816	4.3900e-003	19.8215
Total		**310.7338**	**4.0261**	**0.0973**	**440.3855**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	159.3398	9.4167	0.0000	394.7576
Unmitigated	159.3398	9.4167	0.0000	394.7576

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	230	46.6879	2.7592	0.0000	115.6674

Apartments Low Rise	10.12	2.0543	0.1214	0.0000	5.0894
Apartments Mid Rise	110.4	22.4102	1.3244	0.0000	55.5203
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	355.69	72.2019	4.2670	0.0000	178.8770
Strip Mall	78.75	15.9855	0.9447	0.0000	39.6035
Total		**159.3398**	**9.4167**	**0.0000**	**394.7576**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	230	46.6879	2.7592	0.0000	115.6674
Apartments Low Rise	10.12	2.0543	0.1214	0.0000	5.0894
Apartments Mid Rise	110.4	22.4102	1.3244	0.0000	55.5203
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	355.69	72.2019	4.2670	0.0000	178.8770
Strip Mall	78.75	15.9855	0.9447	0.0000	39.6035
Total		**159.3398**	**9.4167**	**0.0000**	**394.7576**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

WOB TOD 2020

Alameda County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	P
General Office Building	382.46	1000sqft	1.27	382,460.00	
Enclosed Parking with Elevator	400.00	Space	1.00	160,000.00	
Apartments High Rise	500.00	Dwelling Unit	1.26	500,000.00	
Apartments Low Rise	22.00	Dwelling Unit	0.28	22,000.00	
Apartments Mid Rise	240.00	Dwelling Unit	1.27	240,000.00	
Strip Mall	75.00	1000sqft	0.05	75,000.00	

1.2 Other Project Characteristics

Urbanization Urban

Wind Speed (m/s) 2.2

Precipitation Freq (Days) 63

Climate Zone 5

Operational Year 2020

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 290

CH4 Intensity (lb/MWhr) 0.029

N2O Intensity (lb/MWhr) 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - PG&E Emissions Factor for 2020.

Land Use - Lot acreage totals site acreage.

Vehicle Trips - Trips per Fehr & Peers non-CEQA analysis including 47% reduction in trips near BART stations.

Woodstoves -

Water And Wastewater - 100% aerobic treatment of wastewater assumed.

Area Mitigation - Only natural gas fireplaces as required by BAAQMD Rule 6-3.

Water Mitigation - 20% Water reduction in indoor water use in compliance with CalGreen code.

Waste Mitigation - Waste Reduction per Oakland's Zero Waste 2020 goal.

Table Name	Column Name	Default Value	New Value
tblLandUse	LotAcreage	8.78	1.27
tblLandUse	LotAcreage	3.60	1.00
tblLandUse	LotAcreage	8.06	1.26
tblLandUse	LotAcreage	1.38	0.28
tblLandUse	LotAcreage	6.32	1.27
tblLandUse	LotAcreage	1.72	0.05
tblProjectCharacteristics	CO2IntensityFactor	641.35	290
tblVehicleTrips	ST_TR	4.98	2.80
tblVehicleTrips	ST_TR	7.16	3.07
tblVehicleTrips	ST_TR	6.39	3.15
tblVehicleTrips	ST_TR	2.46	1.21
tblVehicleTrips	ST_TR	42.04	33.19
tblVehicleTrips	SU_TR	3.65	2.05
tblVehicleTrips	SU_TR	6.07	2.82
tblVehicleTrips	SU_TR	5.86	2.67
tblVehicleTrips	SU_TR	1.05	0.51
tblVehicleTrips	SU_TR	20.43	16.13
tblVehicleTrips	WD_TR	4.20	2.36
tblVehicleTrips	WD_TR	6.59	3.20
tblVehicleTrips	WD_TR	6.65	2.90
tblVehicleTrips	WD_TR	11.03	5.40
tblVehicleTrips	WD_TR	44.32	34.99

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	MT/yr					
2019	0.0000	827.1986	827.1986	0.0838	0.0000	829.2947
2020	0.0000	741.2696	741.2696	0.0624	0.0000	742.8307
Maximum	**0.0000**	**827.1986**	**827.1986**	**0.0838**	**0.0000**	**829.2947**

Mitigated Construction

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	MT/yr					
2019	0.0000	827.1983	827.1983	0.0838	0.0000	829.2945
2020	0.0000	741.2694	741.2694	0.0624	0.0000	742.8305
Maximum	**0.0000**	**827.1983**	**827.1983**	**0.0838**	**0.0000**	**829.2945**

	Bio- CO2	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**5-13-2019**	**8-12-2019**	1.3749	1.3749
2	**8-13-2019**	**11-12-2019**	1.7341	1.7341
3	**11-13-2019**	**2-12-2020**	1.6775	1.6775

4	**2-13-2020**	**5-12-2020**	1.5482	1.5482
5	**5-13-2020**	**8-12-2020**	8.3754	8.3754
		Highest	8.3754	8.3754

2.2 Overall Operational

Unmitigated Operational

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Area	34.7394	23.5266	58.2660	0.0649	2.2800e-003	60.5670
Energy	0.0000	2,059.3361	2,059.3361	0.1428	0.0408	2,075.0531
Mobile	0.0000	5,662.8728	5,662.8728	0.2720	0.0000	5,669.6717
Waste	159.3398	0.0000	159.3398	9.4167	0.0000	394.7576
Water	39.0790	122.8345	161.9134	4.0261	0.0973	291.5652
Total	**233.1581**	**7,868.5700**	**8,101.7282**	**13.9224**	**0.1404**	**8,491.6145**

Mitigated Operational

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Area	0.0000	39.6983	39.6983	9.6400e-003	5.6000e-004	40.1055
Energy	0.0000	2,059.3361	2,059.3361	0.1428	0.0408	2,075.0531
Mobile	0.0000	5,662.8728	5,662.8728	0.2720	0.0000	5,669.6717
Waste	17.5274	0.0000	17.5274	1.0358	0.0000	43.4233
Water	31.2632	105.2994	136.5626	3.2216	0.0780	240.3449

Total	48.7906	7,867.2067	7,915.9972	4.6818	0.1193	8,068.5985

	Bio- CO_2	NBio-CO_2	Total CO_2	CH_4	N20	CO_2e
Percent Reduction	79.07	0.02	2.29	66.37	14.99	4.98

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	5/13/2019	6/7/2019	5	20	
2	Site Preparation	Site Preparation	6/8/2019	6/21/2019	5	10	
3	Grading	Grading	6/22/2019	7/19/2019	5	20	
4	Building Construction	Building Construction	7/20/2019	6/5/2020	5	230	
5	Paving	Paving	6/6/2020	7/3/2020	5	20	
6	Architectural Coating	Architectural Coating	7/4/2020	7/31/2020	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 1

Residential Indoor: 1,543,050; Residential Outdoor: 514,350; Non-Residential Indoor: 686,190; Non-Residential Outdoor: 228,730; Striped Parking Area

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37

Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	762.00	183.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	152.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2019

Unmitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Off-Road	0.0000	34.6263	34.6263	9.6300e-003	0.0000	34.8672
Total	**0.0000**	**34.6263**	**34.6263**	**9.6300e-003**	**0.0000**	**34.8672**

Unmitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	1.0879	1.0879	3.0000e-005	0.0000	1.0887
Total	**0.0000**	**1.0879**	**1.0879**	**3.0000e-005**	**0.0000**	**1.0887**

Mitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Off-Road	0.0000	34.6263	34.6263	9.6300e-003	0.0000	34.8671
Total	**0.0000**	**34.6263**	**34.6263**	**9.6300e-003**	**0.0000**	**34.8671**

Mitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	1.0879	1.0879	3.0000e-005	0.0000	1.0887
Total	**0.0000**	**1.0879**	**1.0879**	**3.0000e-005**	**0.0000**	**1.0887**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	17.0843	17.0843	5.4100e-003	0.0000	17.2195
Total	**0.0000**	**17.0843**	**17.0843**	**5.4100e-003**	**0.0000**	**17.2195**

Unmitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.6528	0.6528	2.0000e-005	0.0000	0.6532

Total	0.0000	0.6528	0.6528	2.0000e-005	0.0000	0.6532

Mitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	17.0843	17.0843	5.4100e-003	0.0000	17.2195
Total	**0.0000**	**17.0843**	**17.0843**	**5.4100e-003**	**0.0000**	**17.2195**

Mitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.6528	0.6528	2.0000e-005	0.0000	0.6532
Total	**0.0000**	**0.6528**	**0.6528**	**2.0000e-005**	**0.0000**	**0.6532**

3.4 Grading - 2019

Unmitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					

Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	26.6423	26.6423	8.4300e-003	0.0000	26.8530
Total	**0.0000**	**26.6423**	**26.6423**	**8.4300e-003**	**0.0000**	**26.8530**

Unmitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	1.0879	1.0879	3.0000e-005	0.0000	1.0887
Total	**0.0000**	**1.0879**	**1.0879**	**3.0000e-005**	**0.0000**	**1.0887**

Mitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	26.6422	26.6422	8.4300e-003	0.0000	26.8530
Total	**0.0000**	**26.6422**	**26.6422**	**8.4300e-003**	**0.0000**	**26.8530**

Mitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	1.0879	1.0879	3.0000e-005	0.0000	1.0887
Total	**0.0000**	**1.0879**	**1.0879**	**3.0000e-005**	**0.0000**	**1.0887**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Off-Road	0.0000	137.5360	137.5360	0.0335	0.0000	138.3736
Total	**0.0000**	**137.5360**	**137.5360**	**0.0335**	**0.0000**	**138.3736**

Unmitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	285.1677	285.1677	0.0176	0.0000	285.6070
Worker	0.0000	323.3134	323.3134	9.2200e-003	0.0000	323.5439
Total	**0.0000**	**608.4811**	**608.4811**	**0.0268**	**0.0000**	**609.1509**

Mitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Off-Road	0.0000	137.5358	137.5358	0.0335	0.0000	138.3734
Total	**0.0000**	**137.5358**	**137.5358**	**0.0335**	**0.0000**	**138.3734**

Mitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	285.1677	285.1677	0.0176	0.0000	285.6070
Worker	0.0000	323.3134	323.3134	9.2200e-003	0.0000	323.5439
Total	**0.0000**	**608.4811**	**608.4811**	**0.0268**	**0.0000**	**609.1509**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Off-Road	0.0000	130.8596	130.8596	0.0319	0.0000	131.6578
Total	**0.0000**	**130.8596**	**130.8596**	**0.0319**	**0.0000**	**131.6578**

Unmitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	273.4905	273.4905	0.0157	0.0000	273.8837
Worker	0.0000	302.6003	302.6003	7.8100e-003	0.0000	302.7956
Total	**0.0000**	**576.0908**	**576.0908**	**0.0235**	**0.0000**	**576.6793**

Mitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Off-Road	0.0000	130.8595	130.8595	0.0319	0.0000	131.6576
Total	**0.0000**	**130.8595**	**130.8595**	**0.0319**	**0.0000**	**131.6576**

Mitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	273.4905	273.4905	0.0157	0.0000	273.8837

Worker	0.0000	302.6003	302.6003	7.8100e-003	0.0000	302.7956
Total	**0.0000**	**576.0908**	**576.0908**	**0.0235**	**0.0000**	**576.6793**

3.6 Paving - 2020

Unmitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Off-Road	0.0000	20.0282	20.0282	6.4800e-003	0.0000	20.1902
Paving	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**20.0282**	**20.0282**	**6.4800e-003**	**0.0000**	**20.1902**

Unmitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	1.0543	1.0543	3.0000e-005	0.0000	1.0550
Total	**0.0000**	**1.0543**	**1.0543**	**3.0000e-005**	**0.0000**	**1.0550**

Mitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	MT/yr					
Off-Road	0.0000	20.0282	20.0282	6.4800e-003	0.0000	20.1901
Paving	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**20.0282**	**20.0282**	**6.4800e-003**	**0.0000**	**20.1901**

Mitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	1.0543	1.0543	3.0000e-005	0.0000	1.0550
Total	**0.0000**	**1.0543**	**1.0543**	**3.0000e-005**	**0.0000**	**1.0550**

3.7 Architectural Coating - 2020

Unmitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	2.5533	2.5533	2.0000e-004	0.0000	2.5582
Total	**0.0000**	**2.5533**	**2.5533**	**2.0000e-004**	**0.0000**	**2.5582**

Unmitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	10.6834	10.6834	2.8000e-004	0.0000	10.6903
Total	**0.0000**	**10.6834**	**10.6834**	**2.8000e-004**	**0.0000**	**10.6903**

Mitigated Construction On-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	2.5533	2.5533	2.0000e-004	0.0000	2.5582
Total	**0.0000**	**2.5533**	**2.5533**	**2.0000e-004**	**0.0000**	**2.5582**

Mitigated Construction Off-Site

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	10.6834	10.6834	2.8000e-004	0.0000	10.6903

Total	0.0000	10.6834	10.6834	2.8000e-004	0.0000	10.6903

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Mitigated	0.0000	5,662.8728	5,662.8728	0.2720	0.0000	5,669.6717
Unmitigated	0.0000	5,662.8728	5,662.8728	0.2720	0.0000	5,669.6717

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	1,180.00	1,400.00	1025.00	2,746,783	2,746,783
Apartments Low Rise	70.40	67.54	62.04	158,894	158,894
Apartments Mid Rise	696.00	756.00	640.80	1,609,070	1,609,070
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	2,065.28	462.78	195.05	3,749,949	3,749,949
Strip Mall	2,624.25	2,489.25	1209.75	3,700,534	3,700,534
Total	6,635.93	5,175.57	3,132.64	11,965,231	11,965,231

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Apartments Low Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Apartments Mid Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000
Apartments Low Rise	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000
Apartments Mid Rise	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000
Enclosed Parking with Elevator	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000
General Office Building	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000
Strip Mall	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Electricity Mitigated	0.0000	1,277.7613	1,277.7613	0.1278	0.0264	1,288.8338
Electricity Unmitigated	0.0000	1,277.7613	1,277.7613	0.1278	0.0264	1,288.8338
NaturalGas Mitigated	0.0000	781.5748	781.5748	0.0150	0.0143	786.2193
NaturalGas Unmitigated	0.0000	781.5748	781.5748	0.0150	0.0143	786.2193

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Land Use	kBTU/yr	MT/yr					
Apartments High Rise	4.36522e+006	0.0000	232.9445	232.9445	4.4600e-003	4.2700e-003	234.3288
Apartments Low Rise	447689	0.0000	23.8904	23.8904	4.6000e-004	4.4000e-004	24.0324
Apartments Mid Rise	2.0953e+006	0.0000	111.8134	111.8134	2.1400e-003	2.0500e-003	112.4778
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	7.39295e+006	0.0000	394.5161	394.5161	7.5600e-003	7.2300e-003	396.8605
Strip Mall	345000	0.0000	18.4105	18.4105	3.5000e-004	3.4000e-004	18.5199
Total		**0.0000**	**781.5748**	**781.5748**	**0.0150**	**0.0143**	**786.2193**

Mitigated

	NaturalGas Use	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	MT/yr					
Apartments High Rise	4.36522e+006	0.0000	232.9445	232.9445	4.4600e-003	4.2700e-003	234.3288
Apartments Low Rise	447689	0.0000	23.8904	23.8904	4.6000e-004	4.4000e-004	24.0324
Apartments Mid Rise	2.0953e+006	0.0000	111.8134	111.8134	2.1400e-003	2.0500e-003	112.4778
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	7.39295e+006	0.0000	394.5161	394.5161	7.5600e-003	7.2300e-003	396.8605
Strip Mall	345000	0.0000	18.4105	18.4105	3.5000e-004	3.4000e-004	18.5199
Total		**0.0000**	**781.5748**	**781.5748**	**0.0150**	**0.0143**	**786.2193**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	2.111e+006	277.6841	0.0278	5.7500e-003	280.0903
Apartments Low Rise	92756	12.2013	1.2200e-003	2.5000e-004	12.3070
Apartments Mid Rise	1.01328e+006	133.2884	0.0133	2.7600e-003	134.4434
Enclosed Parking with Elevator	937600	123.3336	0.0123	2.5500e-003	124.4023
General Office Building	4.7731e+006	627.8622	0.0628	0.0130	633.3030
Strip Mall	786000	103.3918	0.0103	2.1400e-003	104.2878
Total		**1,277.7613**	**0.1278**	**0.0264**	**1,288.8338**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	2.111e+006	277.6841	0.0278	5.7500e-003	280.0903
Apartments Low Rise	92756	12.2013	1.2200e-003	2.5000e-004	12.3070
Apartments Mid Rise	1.01328e+006	133.2884	0.0133	2.7600e-003	134.4434
Enclosed Parking with Elevator	937600	123.3336	0.0123	2.5500e-003	124.4023
General Office Building	4.7731e+006	627.8622	0.0628	0.0130	633.3030
Strip Mall	786000	103.3918	0.0103	2.1400e-003	104.2878
Total		**1,277.7613**	**0.1278**	**0.0264**	**1,288.8338**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	MT/yr					
Mitigated	0.0000	39.6983	39.6983	9.6400e-003	5.6000e-004	40.1055
Unmitigated	34.7394	23.5266	58.2660	0.0649	2.2800e-003	60.5670

6.2 Area by SubCategory

Unmitigated

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	MT/yr					
Architectural Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	34.7394	14.2691	49.0085	0.0558	2.2800e-003	51.0832
Landscaping	0.0000	9.2575	9.2575	9.0500e-003	0.0000	9.4838
Total	**34.7394**	**23.5266**	**58.2660**	**0.0649**	**2.2800e-003**	**60.5670**

Mitigated

	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	MT/yr					

Architectural Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	30.4408	30.4408	5.8000e-004	5.6000e-004	30.6217
Landscaping	0.0000	9.2575	9.2575	9.0500e-003	0.0000	9.4838
Total	**0.0000**	**39.6983**	**39.6983**	**9.6300e-003**	**5.6000e-004**	**40.1055**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	136.5626	3.2216	0.0780	240.3449
Unmitigated	161.9134	4.0261	0.0973	291.5652

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	32.577 / 20.5377	42.9781	1.0648	0.0257	77.2683
Apartments Low Rise	1.43339 / 0.903658	1.8910	0.0469	1.1300e-003	3.3998
Apartments Mid Rise	15.637 / 9.85809	20.6295	0.5111	0.0124	37.0888
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000

General Office Building	67.976 / 41.6627	89.1305	2.2218	0.0537	160.6767
Strip Mall	5.55544 / 3.40495	7.2843	0.1816	4.3900e-003	13.1315
Total		**161.9134**	**4.0261**	**0.0973**	**291.5652**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	26.0616 / 20.5377	36.2736	0.8520	0.0206	63.7222
Apartments Low Rise	1.14671 / 0.903658	1.5960	0.0375	9.1000e-004	2.8038
Apartments Mid Rise	12.5096 / 9.85809	17.4113	0.4090	9.9000e-003	30.5866
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	54.3808 / 41.6627	75.1407	1.7778	0.0430	132.4109
Strip Mall	4.44435 / 3.40495	6.1410	0.1453	3.5200e-003	10.8215
Total		**136.5626**	**3.2216**	**0.0780**	**240.3449**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			

Mitigated	17.5274	1.0358	0.0000	43.4233
Unmitigated	159.3398	9.4167	0.0000	394.7576

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	230	46.6879	2.7592	0.0000	115.6674
Apartments Low Rise	10.12	2.0543	0.1214	0.0000	5.0894
Apartments Mid Rise	110.4	22.4102	1.3244	0.0000	55.5203
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	355.69	72.2019	4.2670	0.0000	178.8770
Strip Mall	78.75	15.9855	0.9447	0.0000	39.6035
Total		**159.3398**	**9.4167**	**0.0000**	**394.7576**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	25.3	5.1357	0.3035	0.0000	12.7234
Apartments Low Rise	1.1132	0.2260	0.0134	0.0000	0.5598
Apartments Mid Rise	12.144	2.4651	0.1457	0.0000	6.1072

Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	39.1259	7.9422	0.4694	0.0000	19.6765
Strip Mall	8.6625	1.7584	0.1039	0.0000	4.3564
Total		**17.5274**	**1.0358**	**0.0000**	**43.4233**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix G

Remedial Action Plan (RAP), Mandela Station Mixed-Use Development at BART West Oakland Station

Cornerstone Earth Group, revised as of January 6, 2025

CORNERSTONE
EARTH GROUP

TYPE OF SERVICES	Remedial Action Plan
LOCATION	Proposed Mandela Station Mixed-Use Development at Bay Area Transit District West Oakland Station 1451 7th Street Oakland, California
CLIENT	Mandela Station Partners, LLC
PROJECT NUMBER	1261-1-1
DATE	September 5, 2024
	Revised January 6, 2025

CORNERSTONE EARTH GROUP

Type of Services	**Remedial Action Plan**
Location	**Proposed Mandela Station Mixed-Use Development** **at Bay Area Rapid Transit District** **West Oakland Station** **1451 7th Street** **Oakland, California**
Client	**MANDELA STATION PARTNERS, LLC**
Client Address	**201 Spear Street, Suite 1000** **San Francisco, California**
Project Number	**1261-1-4**
Date	**September 5, 2024** **Revised January 6, 2025**

DRAFT

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LIST OF ACRONYMS

AF	Attenuation Factor
ARAR	Applicable or Relevant and Appropriate Requirement
BAAQMD	Bay Area Air Quality Management District
BTEX	Benzene, toluene, ethylbenzene and xylenes
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
COC	Chemicals of Concern
COPC	Chemicals of Potential Concern
CPS	Cleanup Program Site
CSM	Conceptual Site Model
DEH	Alameda County Department of Environmental Health
DTSC	Department of Toxic Substances Control
DTSC-SL	DTSC-modified Screening Level (June, 2020)
EPA	United States Environmental Protection Agency
ESA	Environmental Site Assessment
ESL	Environmental Screening Level (Water Board, 2019)
HSP	Health and Safety Plan
LUC	Land Use Covenant
mg/kg	milligram per kilogram or part per million (ppm)
MSP	Mandela Station Partners, LLC
NEPA	National Environmental Policy Act
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
OVM	Organic Vapor Meter
PAHs	Poly Aromatic Hydrocarbons
PCB	polychlorinated biphenyls (PCBs)
PCE	Tetrachloroethene
ppb	parts per billion
ppm	parts per million
RAO	Removal Action Objective
RAP	Remedial Action Plan
RDIP	Removal Design and Implementation Plan
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level (US EPA, November 2020)
SMP	Site Management Plan
STLC	Soluble Threshold Limit Concentration
TBC	To Be Considered
TCE	Trichloroethene
tDCE	trans-1,2-dichloroethene
TPH	Total Petroleum Hydrocarbons
TPHd	Total Petroleum Hydrocarbons as diesel
TPHo	Total Petroleum Hydrocarbons as oil
TTLC	Total Threshold Limit Concentration
µg/L	microgram per liter or part per billion (ppb)
VCA	Voluntary Cleanup Agreement
VI	Vapor Intrusion
VOC	Volatile Organic Compound

Type of Services	**Draft Remedial Action Plan**
Location	**1451 7th Street Oakland, California**

SECTION 1: INTRODUCTION

On behalf of Mandela Station Partners, LLC (MSP), Cornerstone Earth Group, Inc. (Cornerstone) submits this Draft Remedial Action Plan (RAP) for the planned mixed-use development (T1, T2, T3, and T4 development areas), located on a portion of the West Oakland Bay Area Rapid Transit (BART) station at 1451 7th Street in Oakland, California (Site) as shown on Figures 1 and 2.

MSP entered into a Standard Voluntary Agreement (SVA) with the Department of Toxic Substances Control (DTSC) on February 22, 2021 (Docket No. HSA-FY19/20-082) to provide oversight of MSP's environmental investigation and response measures at the Site considering the anticipated land uses.

This RAP is based on the discussions between the MSP development team and the staff at the DTSC, including a review of prior investigations at the Site as well as Cornerstone's October 2019 and February 2021 supplemental Site investigation. This RAP is a remedy selection document and addresses residual contaminants identified in soil and soil vapor.

1.1 OBJECTIVES OF THE RAP

The objectives of this RAP are to:

- Present and evaluate existing Site conditions;
- Establish appropriate remedial action objectives (RAOs) in soil for protection of human health and the environment that will minimize the potential for impacted soil to be encountered during Site redevelopment activities; and
- Evaluate alternatives and identify a final recommendation for a soil remedial action at the Site that is protective of human health and the environment.

1.2 ELEMENTS OF THE RAP

To accomplish the objectives stated in the preceding section and satisfy regulatory requirements, this RAP includes the following elements:

- A description of the nature and extent of the constituents of potential concern (COPC) at the Site;
- The goals to be achieved by the remedial action;

- An analysis of the alternatives considered and rejected, and the basis for the rejection, including a discussion of effectiveness, implementability, and cost of each alternative; and
- A description of the recommended alternative.

1.3 COMMUNITY CONSIDERATIONS IN CLEANUP

This RAP has been developed to clean up identified soil contamination located at the 5.5-acre Site in Oakland, California. As further discussed in Section 2.2, the Site is planned for mixed commercial and residential development along with associated hardscape, landscape, and open plaza features. The Site is currently occupied by a BART station/platform, elevated rail lines, and parking and drive aisles.

The purpose of this section of the RAP is to discuss aspects of the RAP and RAP implementation that the surrounding community may be most concerned with. The questions identified in this section were provided by the DTSC in their letter dated November 20, 2024.

a. Why is the cleanup needed?

Based on the analytical results of samples collected to date (discussed in Sections 3 and 4) the RAP identified several metals and chemicals in shallow soil across the Site. Concentrations of these metals and chemicals in soil were generally limited in vertical extent but spread throughout the Site. The metals and chemicals identified in soil are not mobile in soil, which is likely why they are limited in shallow soils.

To protect future occupants and users of the Site, the soil where these metals and chemicals are identified within the development areas will be excavated and removed for construction of the building footprints. Remaining soils will be capped by future structures and hardscape features following redevelopment. The future structures and hardscapes are what is referred to as an “engineered cap”. If the remaining soil within the development areas contain metals or chemicals above cleanup goals, the engineered cap will be monitored and maintained to protect the integrity of the recommended remedial approach.

b. How will the cleanup make my community safer?

There is currently no risk to the community from the metals and chemicals detected at the site with the current use as a BART station.

c. How will I be kept safe during the cleanup?

During Site development activities, the following approaches will be followed to protect the surrounding community:

- Dust control measures, including perimeter dust monitoring, perimeter wind screens, and for moisture control, as typically required by the Bay Area Air Quality Management District (BAAQMD).
- When not actively in use, soil stockpiles will be covered with plastic liners.
- Vehicle speeds will be controlled while on-Site. Vehicles and equipment will be cleaned and track-out will be monitored to prevent contaminated soil from leaving the controlled property boundaries.

- Streets surrounding the Site will be swept and cleaned to reduce off-Site dust and dirt generation.

d. Is the water and air in my house safe to drink?

Drinking water for the surrounding community is provided by East Bay Municipal Utility District (EBMUD). Information on drinking water provided by EBMUD can be found at https://www.ebmud.com/water/about-your-water/water-quality.

No volatile chemicals have been detected at the project site that present a risk to indoor air quality at residents in the surrounding neighborhood.

e. What will happen after the cleanup?

The first phase of the mixed commercial and residential development is expected to be built by 2028. The development will be constructed in four phases, as discussed Section 2.2. Additional information on construction can be obtained at https://mandelastation.com.

If soil with metals or chemicals exceeding cleanup goals is left in-place, the engineered cap will be monitored regularly and will be maintained following the protocols established in a future operation, maintenance, and monitoring plan. The results of the monitoring will be submitted to DTSC for review and approval. Annual inspections will additionally be required based on the Land Use Covenant to determine if all Site restrictions are being followed.

f. How will it benefit me?

Construction of the project will result in the removal of the contaminated soil being removed for off-site disposal, with capping of remaining contaminated soil (if any) beneath the building foundations and hardscapes. The community will benefit from a cleaner environment and increased housing and amenities.

g. Do I have a say in what happens?

Further discussed in Section 14, the RAP process includes public participation including:

- Conducting a baseline community survey.
- Development of a community profile.
- Public notice of the public comment period.
- Preparation and distribution of an informational sheet describing the proposed remedy selection and the availability of the draft RAP for public comment.

The draft RAP public comment period will last for at least 30 days. After the comment period, the RAP will be revised as necessary to address the comments before further submission to the DTSC for review and approval.

h. Who can I contact for more information?

Key project team members along with their roles and responsibilities are summarized below. Contact information for the key project team members is presented in Table A.

Table A. Contact Information – Key Project Team Members

Organization	Personnel	Responsibility	Email	Phone
DTSC	Sarah Larese	Regulatory Agency Case Manager	Sarah.larese@dtsc.ca.gov	714-484-5321
Mandela Station Partners, LLC	Art May	Project Development Manager	amay@keystonedg.com	510-2-6-9130
Cornerstone Earth Group	Peter M. Langtry, P.G., C.E.G.	Environmental Professional	plangtry@cornerstoneearth.com	925-817-8814

SECTION 2: SITE DESCRIPTION

2.1 CURRENT USE OF THE PROPERTY

The approximately 5.5-acre Site is currently occupied by the BART station/platform, elevated rails, parking and drive areas. The Site is bounded by Mandela Parkway to the east, 5th Street to the south, Chester Street to the west, and 7th Street to the north. The Site's elevation is approximately 15 feet above mean sea level (msl); topography in the vicinity of the Site slopes gradually downward to the southwest, toward the Oakland Inner Harbor and San Francisco Bay.

2.2 PLANNED DEVELOPMENT

Current development plans consist of the construction of buildings on three areas (T1, T3 and T4 areas) and construction of an open plaza (T2 area). MSP anticipates that the construction of the different areas will be performed in phases, with construction of the T3 area occurring first.

- The area northeast of the BART tracks (T1 Development Area; see Figure 3) will be developed with an approximately 30-story residential tower with ground floor retail and building service functions. The T1 building will have an at-grade foundation.
- The T2 area, located directly northwest of the tracks, will consist of an open space plaza and will include landscape and hardscape features.
- The T3 area, located southwest of the BART tracks, will also have an at-grade foundation with retail, parking and building services on the ground level. The upper levels of the seven-story structure will contain residential units. Improvements that will be made concurrently with the T3 development include construction of a bicycle station beneath the BART tracks. Other improvements made concurrently with the T3 development include bike/pedestrian paseos and temporary repaving (see Figure 3)
- The T4 area, located southeast of the BART tracks, will similarly be developed on the ground floor with retail and building services. The upper levels will include roughly 300,000 to 500,000 square feet of commercial office space. Appurtenant parking, utilities, landscaping and other improvements necessary for site development are also planned.

A brief summary of the planned development on each Site area is presented in Table B below.

Table B. Planned Uses of on-Site Development Areas

Planned Development Area	Planned Use	Notes
T1	Mixed Use	Residential will be above 1 or 2 levels of parking which will be above an on-grade commercial and service level.
T2	Landscape/Hardscape	Open plaza. No on-grade structures.
T3	Mixed Use	Residential over 1 level at grade commercial, parking and service area.
T4	Mixed Use	Commercial office over 1 or 2 levels of parking above an on-grade commercial and service level.

2.3 GEOLOGIC SETTING

The Site vicinity is located on the eastern edge of the San Francisco Bay, which exists within a series of northwesterly-aligned mountains forming the Coast Ranges geomorphic province of California. The Coast Ranges stretch from the Oregon Border nearly to Point Conception. In the San Francisco Bay Area, most of the Coast Ranges have developed on a basement of tectonically mixed Cretaceous- and Jurassic-age (70- to 200-million years old) rocks of the Franciscan Complex. Younger sedimentary and volcanic units locally cap these basement rocks. Still younger surficial deposits that reflect geologic conditions of the last million years or so cover most of the Coast Ranges.

Based on recent Quaternary geologic maps of the area (Graymer 2000), the Site is generally underlain by alluvial fan and fluvial deposits of Holocene age. These alluvial soils generally consist of interbedded clays and sands.

2.4 SUBSURFACE MATERIALS

During subsurface investigations performed by Cornerstone, approximately 8- to 9-inches of aggregate base were observed beneath surface pavements. Beneath the aggregate base, fill was observed in most exploratory borings, extending to depths approximately 2-feet below the ground surface (bgs) to greater than 5-feet bgs (the maximum depth of some of the borings). The fill generally consisted of sand and clayey sand. Beneath the fill, native soil consisting of clayey sand was observed to the maximum depth explored of 15 feet. Based on the preliminary geotechnical investigation performed in 2019 (Parikh Consultants, Inc.), the native soils consist of the Merrit Sand to a depth of approximately 55 feet bgs.

2.5 HYDROGEOLOGY

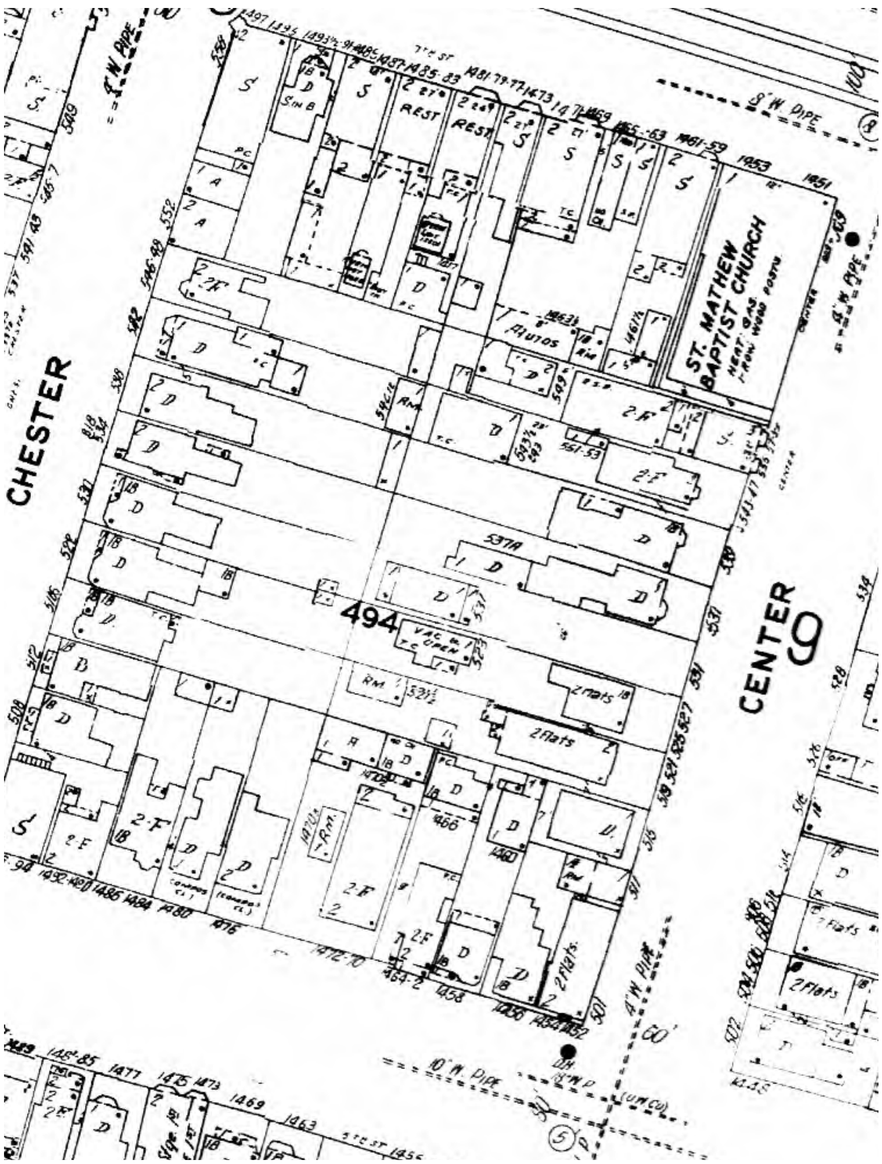
During Cornerstone's investigation performed in October 2019, groundwater was observed in the exploratory borings at approximate depths ranging between 5- to 12 feet.

Based on information obtained from the state Geotracker database for a nearby open Leaking Underground Storage Tank (LUST) case, Chevron Station #20-6145 at 800 Center Street (approximately 500 feet northeast of the Site), the shallow groundwater flow direction was measured toward the southwest (Arcadis, 2021).

SECTION 3: BACKGROUND

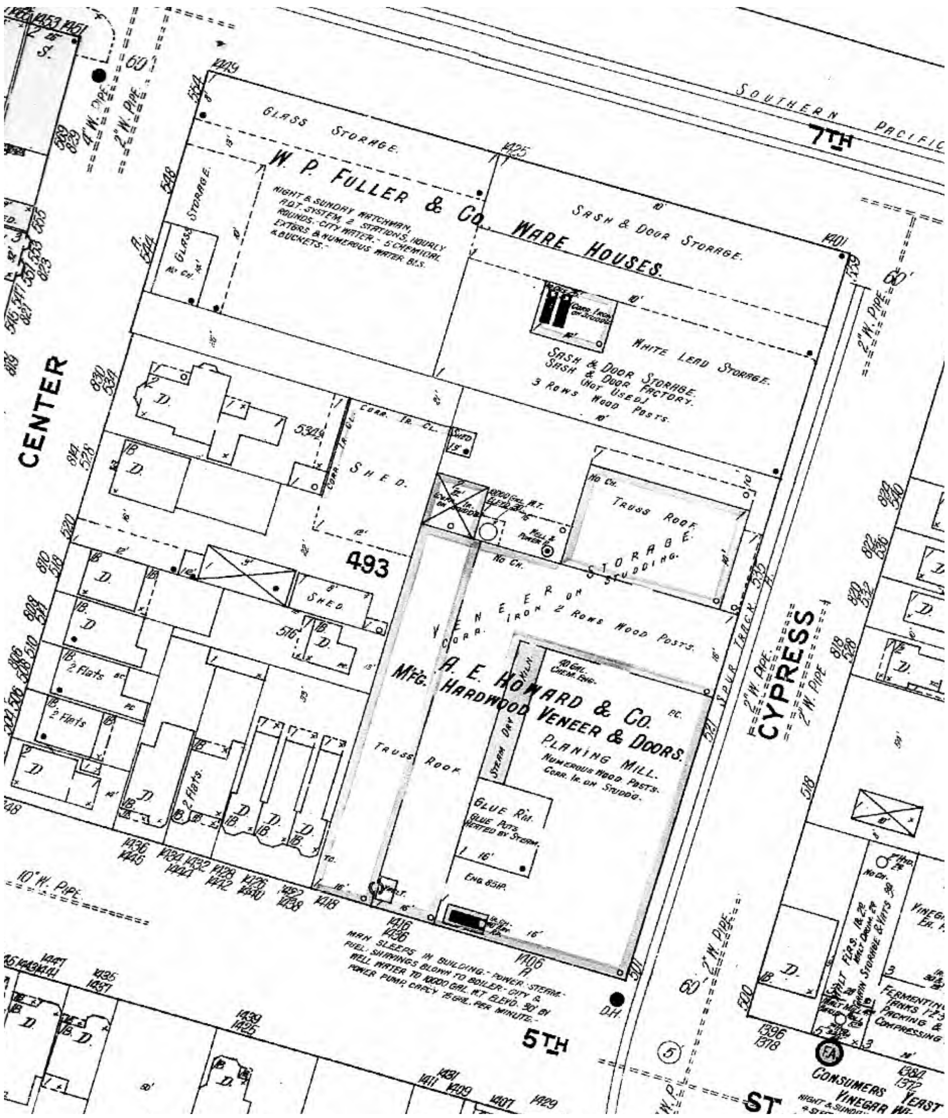
3.1 SITE HISTORY

Based on Phase I Environmental Site Assessments (ESAs) prepared in 2006 (LFR, Inc.) and 2019 (Cornerstone), the Site appears to have been developed with single family residential and commercial businesses since at least 1889. Center Street formerly bisected the Site. The area of the Site west of Center Street historically was generally occupied by single family residences, with restaurants, stores and a church on 7th Street. An excerpt from the 1957 Sanborn map that shows the western half of the Site (T2 and T3 development areas) between Center Street and Chester Street is presented below.



Sanborn map from 1957 showing west half of the Site

Historic Sanborn maps reviewed showed a hardwood veneer and door manufacturing company and associated storage area on the southeast corner of the Site (T4 development area) by 1912. In addition, a sash and door factory and warehouse were located in the northeast portion of the Site, in the general area of the current T1 development area in 1912. A “white lead storage” area was shown associated with this facility. The approximate location of the “white lead storage” area is shown on Figure 2A, and an excerpt from the Sanborn map is presented below.



Sanborn map from 1912 showing east half of the Site

The storage area in the northeast corner of the Site (T1 development area) became a junk yard and auto dismantling yard by 1951. Locations of former commercial/industrial businesses depicted on the 1957 Sanborn map are shown on Figure 2B. All structures on-Site were demolished in the late 1960’s in preparation for construction of the BART elevated tracks and station. By 1968, construction had begun on the trackway supports, and the station and asphalt parking lots were completed by 1972.

3.2 2007 TARGETED SITE INVESTIGATION AND ANALYSIS REPORT BY WEISS ASSOCIATES

In June 2007, Weiss Associates (Weiss) performed soil, groundwater, and soil gas sampling at the Site. The work was contracted by the DTSC using a grant received to investigate the property in support of a previous prospective residential developer. Weiss collected soil samples from 30 locations, groundwater grab samples from seven locations, and soil gas samples from nine locations. The results from the 2007 investigation are summarized below and the associated data tables from the 2007 report are attached in Appendix A. Exploratory boring locations are shown on Figure 2.

3.2.1 Soil Sample Analytical Results

Shallow soil samples (collected at approximate depths of 0.5- and 2.0-feet) were analyzed for total petroleum hydrocarbons (TPH) as gasoline, diesel, and motor oil; volatile organic compounds (VOCs), semi-volatile organic compounds (semi-VOCs); Title 22 metals; pH; polychlorinated biphenyls (PCBs), pesticides, and asbestos.

The soil analytical results were compared by Cornerstone to the DTSC-recommended Residential and Commercial Screening Levels (DTSC-SLs) presented in the DTSC Office of Human and Ecological Risk (HERO) guidance document *Human Health Risk Assessment (HHRA) Note 3* dated May 2022 (DTSC, 2022). If a DTSC-SL had not been established, the soil results were compared to Residential and Commercial Regional Screening Levels (RSLs) established by the USEPA Region 9 (USEPA, May 2024). For detected chemicals for which neither DTSC-SLs nor RSLs have not been established, Tier 1 Environmental Screening Levels (ESLs) established by the San Francisco Bay Regional Water Quality Control Board (January 2019) were used for comparison[1]. In addition, the detected arsenic concentrations were compared to the generally accepted regional background concentration of 11 milligrams per kilogram (mg/kg) (Duverge, 2011).

Laboratory analyses of the soil samples did not detect VOCs above residential DTSC-SLs or above laboratory reporting limits, except for acetone that was reported below the residential RSL of 70,000 mg/kg (no DTSC-SL is available for acetone). Acetone is a common laboratory contaminant.

No DTSC-SL or RSL is available for TPH diesel. TPH diesel oil concentrations detected exceeded the current residential ESL of 260 mg/kg in one location in the Site's northeast corner and three locations in the central area of the Site.

The semi-VOCs bis(2-ethylhexyl)phthalate, benzo(a)pyrene, and benzo(b)fluoranthene exceeded their respective residential DTSC-SLs in three samples collected from the northeastern corner and south-central portions of the Site. PCBs Aroclor-1254 and Aroclor-1260 were also reported above their respective residential DTSC-SLs in three borings advanced in the southwest portion of the Site. Weiss reported that other PCBs, pesticides, and herbicides

[1] DTSC-SLs, RSLs and ESLs are used to screen properties for potential human health concerns where releases of chemicals to soil have occurred. Under most circumstances, the presence of a chemical in soil below the corresponding DTSC-SL, RSL or ESL can be assumed not to pose a significant risk to human health. A chemical exceeding its screening level does not indicate that adverse impacts to human health are occurring or will occur but suggests that further evaluation of potential health concerns is warranted.

were reported above laboratory detection limits, but below screening levels. Weiss also reported that asbestos was not detected above laboratory reporting limits.

Lead was detected at concentrations up to 6,300 mg/kg and exceeded the residential DTSC-SL of 80 mg/kg in 19 of 66 samples analyzed. Laboratory analytical results for lead are shown on Figures 4A and 4B and are discussed further in Section 3.3.

3.2.2 Groundwater Sample Analytical Results

Weiss analyzed seven grab groundwater samples for TPHg, VOCs, TPHd/o, SVOCs, OCPs, PCBs, and lead. Naphthalene, xylenes, and TPHg were reported at concentrations above their respective California Maximum Contaminant Levels (MCLs) and ESL (for TPHg) in one sample. No other analytes were reported above laboratory reporting limits in the other samples analyzed.

3.2.3 Soil Vapor Sample Results

Weiss collected nine soil vapor samples at a depth of approximately 5.5-feet and analyzed the samples for VOCs. Benzene (9 of 9 samples) and tetrachloroethene (PCE) (2 of 9 samples) were detected exceeding the current DTSC screening levels using an attenuation factor (AF) of 0.03; soil vapor screening levels and AFs are discussed further in Section 6.

3.3 2019 PHASE I ENVIRONMENTAL SITE ASSESSMENT BY CORNERSTONE EARTH GROUP

Based on the August 6, 2019, Phase I ESA prepared by Cornerstone, the Site appears to have been developed with single family residential and commercial businesses since at least 1889. Former on-Site structures were demolished in the late 1960's in preparation for construction of the BART elevated tracks and station. By 1968, construction had begun on the trackway supports, and the station and asphalt parking lots were completed by 1972.

The Phase I ESA identified the following Recognized Environmental Conditions[2]:

- As noted above, laboratory analyses of soil samples from the upper 2-feet detected concentrations of arsenic, petroleum hydrocarbons (diesel and motor oil), and semi-VOCs above residential screening criteria (defined in Section 3.2.1) in the northwest corner, northeast corner south-central margin, and near the center of the Site. In addition, PCBs were reported above residential screening criteria in the southwest portion of the Site. On-Site soil quality had not been assessed at depths below 2-feet.

- Lead was reported at concentrations exceeding the current residential DTSC-SL of 80 mg/kg in samples collected from the upper 2-feet. Lead was not assessed within soil at depths below 2-feet. The most elevated concentrations (1,200 mg/kg, 1,300 mg/kg, and 6,300 mg/kg) were reported within the southwestern, south-central, and northeastern portions of the Site, respectively. The approximate location of the sample reported to contain 6,300 mg/kg of lead at 2-feet was in the area identified on the 1912 Sanborn

[2] The presence or likely presence of hazardous substances or petroleum products on the Site: 1) due to significant release to the environment; 2) under conditions indicative of a significant release to the environment; or 3) under conditions that pose a material threat of a future significant release to the environment.

map as "white lead storage" (see Figure 2). Some of the concentrations of total lead detected exceed the threshold for California Hazardous Waste, if soil were to be disposed off-Site.

- Gasoline, naphthalene, and xylenes were reported within groundwater (reportedly encountered at approximately 9½- to 10 feet) along the northern boundary of the Site.

- Benzene and PCE were reported within soil vapor (sampled at an approximate depth of 5½-feet) in the western and northern portions of the Site.

The assessment identified no Controlled Recognized Environmental Conditions[3] or Historical Recognized Environmental Conditions[4]:

3.4 2019 WORKPLAN IMPLEMENTATION

On May 9, 2019, DTSC staff, Cornerstone, and representatives of the MSP development team met to discuss the planned development, results of the 2007 investigation, and additional data needed for the preparation of a RAP. They identified additional soil quality data as needed to evaluate appropriate handling and disposal of soil excavated during construction. In addition, they identified additional groundwater and soil vapor data needed to further evaluate whether vapor intrusion mitigation measures will be required.

Cornerstone submitted the July 22, 2019, workplan for soil, soil vapor and groundwater quality evaluation to the DTSC. DTSC approved the workplan on August 2, 2019.

In accordance with the DTSC-approved Workplan, in October 2019, Cornerstone directed a subsurface investigation and sampled 20 exploratory borings to depths ranging from approximately 5-feet to 15 feet for the collection of soil, soil vapor and groundwater samples. The results from the 2019 investigation are summarized below and in Tables 1 through 4 in the Summary Tables section of the RAP. Exploratory boring locations are shown on Figure 2. Additional details of the investigation are presented in the November 13, 2019, Soil, Groundwater and Soil Vapor Quality Evaluation report (Cornerstone, 2019).

3.4.1 Soil Quality

Laboratory analyses detected lead at concentrations above the residential DTSC-SL of 80 mg/kg in several samples collected from the northeast area of the Site in the vicinity of the former "white lead" storage area. In addition, several samples exceeded certain hazardous waste characterization criteria (applicable when this soil is disposed) under state and federal regulations. Several exceeded California's limit for soluble lead, and one exceeded the federal limit for soluble lead.

No VOCs were detected exceeding their residential DTSC-SLs. The semi-VOC benzo[a]pyrene was detected exceeding the residential DTSC-SL in 12 of 39 soil samples analyzed, generally in

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[3] A Recognized Environmental Condition that has been addressed to the satisfaction of the applicable regulatory agency with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls or restrictions.

[4] A past Recognized Environmental Condition has been addressed to the satisfaction of the applicable regulatory agency or meeting of unrestricted use criteria established by the applicable regulatory agency without subjecting the Site to required controls or restrictions.

samples collected from the upper ½- to 3-feet. Polychlorinated biphenyls (PCBs) were detected above their respective residential screening level in 4 of 39 soil samples, with a maximum of 1.3 mg/kg detected.

3.4.2 Groundwater Quality

Laboratory analyses did not detect VOCs, TPH in the diesel, oil or gasoline range above their respective screening levels. Based on the lack of VOCs and TPHg detected in the groundwater, constituents in groundwater did not appear to present a significant vapor intrusion risk. Groundwater depths were observed to be highly variable, ranging from approximately 5½- to 12 feet. Based on this data, additional evaluation of groundwater quality was not recommended.

3.4.3 Soil Vapor Quality

Laboratory analyses of the soil vapor samples detected benzene (at a maximum of 18 $\mu g/m^3$ detected) in 4 of 6 samples exceeding the residential screening level and 2 of 6 samples exceeding the commercial screening level. The residential and commercial screening levels are 2.91 ug/m^3 and 12.6 $\mu g/m^3$, respectively, based on the DTSC's HERO Note 3 and an attenuation factor of 0.03. The attenuation factor of 0.03 is considered highly conservative for new construction. Based on the discussion presented in Section 6.2, an AF of 0.001 was used to evaluate concentrations of petroleum VOCs (benzene, toluene, ethylbenzene and xylene [BTEX] and 1,3-butadiene) in soil vapor to take into consideration bioattenuation under aerobic conditions. In addition, because the ground floor of the planned buildings primarily will consist of garage space and retail/commercial uses, the commercial screening levels appear appropriate for evaluating the analytical data. None of the BTEX compounds exceeded the commercial screening level using an AF of 0.001.

1,3-butadiene exceeded the residential and commercial screening levels in 1 of 6 samples, and 1,4-Dioxane, detected in only one sample, exceeded the residential screening level but was detected below the commercial screening level.

Methane was detected at an elevated concentration of 20 percent in sample SV-20. There is no health-based screening level for methane. The lower explosive limit (LEL) for methane is 5 percent. Methane can be generated as a result of anaerobic degradation of organic compounds. However, the elevated concentration of methane detected may be indicative of a leaking natural gas line on or near the site. The report recommended additional soil vapor sampling to evaluate the extent of methane and the need for vapor intrusion mitigation measures.

SECTION 4: 2021 SOIL AND SOIL VAPOR QUALTY EVALUATION

4.1 2021 WORK PLAN FOR ADDITIONAL SOIL AND SOIL VAPOR QUALITY EVALUATION

Cornerstone prepared and submitted to DTSC the January 12, 2021, Work Plan for Additional Soil and Soil Vapor Quality Evaluation to evaluate the lateral and vertical extent of lead detected in soil and the elevated concentrations of methane detected during the October 2019 investigation. The additional purpose was to evaluate soil vapor quality beneath the T3 and T4 building pad areas. The Work Plan was approved by the DTSC in a letter dated February 4, 2021, and results were presented to DTSC in 2021 but were not published in a final document.

For completeness, details of the implementation of the Work Plan are presented below in this section.

4.2 PRE-FIELD ACTIVITIES

Cornerstone notified the regional utility notification center (Underground Service Alert [USA]) more than 48 hours before beginning drilling activities so that public and private utilities could be identified and marked at the ground surface. Where practical, Cornerstone marked borings in white paint to designate exploration locations, as requested by USA. Additionally, to reduce the risk of damaging unidentified underground utilities during drilling, Cornerstone also contracted with a private utility locator. A boring permit was obtained from the Alameda County Public Works Agency (ACPWA). A copy of the boring permit is included in Appendix B. Additionally, Cornerstone coordinated with PeneCore Drilling, of Woodland, California, a licensed drilling contractor possessing a C-57 water well contractor's license issued by the State of California, to schedule the sampling activities.

4.3 EXPLORATORY BORINGS

On February 16 and 17, 2021, Cornerstone's field geologist under oversight of a California Certified Engineering Geologist, directed a subsurface investigation, continuously logged in general accordance with the Unified Soil Classification System (ASTM D-2487) and sampled 17 exploratory borings (EB-21 through EB-37) to depths ranging from approximately 5 feet to 10 feet. The borings were advanced using direct push technology. The locations of the exploratory borings advanced are provided in Figure 2.

All borings were advanced using a track-mounted drill rig equipped with Geoprobe® Direct Push Technology and a Dual Wall Sampling System. The Dual Wall Sampling System helps prevent cross contamination between sampling intervals. The Dual Wall Sampler is comprised of two main components: an exterior steel casing and an inner sample barrel. The outer casing has a 3.25-inch outer diameter (OD) and a 2.5-inch inner diameter (ID). The sample barrel is 5 feet in length with a 2.375-inch outside diameter (OD) and a 2-inch inner diameter (ID). The Dual Wall sample barrel is loaded with a 5-foot acetate liner and installed inside the outer casing. The outer drive casing and inner sample barrel are then hydraulically pushed to a depth of approximately 5 feet. As these tools are advanced, the inner sampling barrel collects the soil core sample. This sampler is then retrieved while the outer casing remains in place, protecting the integrity of the hole. A new sampler is lowered into place and advanced another 5 feet to collect the next soil sample. This process continues until a desired depth has been reached.

Upon the same day completion, the borings were tremie grouted from the base of the boring through the casing as it is raised to the surface; no boring was left open overnight.

4.3.1 Subsurface Conditions

This section presents a summary of subsurface conditions encountered in soil borings advanced at the Site. For further detail, soil boring logs are attached in Appendix B.

Based on the exploratory borings advanced at the Site, poorly graded sand fill was observed up to depths extending to approximately 5 feet; the maximum depth explored was approximately 5 feet except for boring EB-35, advanced to an approximate depth of 10 feet. As such, the fill is likely greater than 5 feet beneath portions of the Site. Native soils consisting of poorly graded sand were encountered beneath the fill in borings EB-33, EB-34, EB-35, EB-36 and EB-37. No apparent chemical odors or staining were readily observed in the other exploratory borings.

4.4 SOIL SAMPLE COLLECTION AND LABORATORY ANALYSES

Soil samples for laboratory analyses were collected in new (unused) acetate liners. Ends of the liners were covered in a Teflon film, fitted with plastic end caps, and labeled with a unique sample identification number. Soil samples were placed in an ice-chilled cooler and transported to a state-certified laboratory with chain of custody documentation.

To help determine the vertical and lateral extent of the lead impacted soil, soil samples were collected from ten exploratory borings (EB-28 through EB-37) advanced within the northeast portion of the Site and from seven exploratory borings (EB-21 through EB-27) advanced within the proposed T3 and T4 building pad areas. Soil samples were collected from the upper approximately one foot of soil, and from approximate depth intervals of 2 to 3 feet and 4 to 5 feet. One boring (EB-35) was drilled to a depth of approximately 10 feet, with additional samples collected at approximately 7 to 8 feet and 9 to 10 feet to help evaluate the vertical extent of lead previously detected in soil at this location (EB-19; 2019). Sixty soil samples were collected and analyzed at a state-certified laboratory for total lead (EPA Test Method 6010B). Eighteen samples were additionally analyzed for soluble lead using Soluble Threshold Limit Concentrations (STLC) and/or Toxicity Characteristic Leaching Procedure (TCLP) extractions.

To help evaluate whether lead in soil could present a risk to groundwater quality if it were to be consolidated on-Site, three selected samples were additionally analyzed using deionized water as the extractant for the waste extraction test (WET).

4.4.1 Summary of Soil Analytical Data

The ground floors of the planned structures will consist of parking garage and commercial spaces; no ground floor residential occupancy is planned. Therefore, the detected lead concentrations were compared to both residential and commercial DTSC-SLs.

For cost remediation estimates entailing soil excavation and off-Site disposal, the lead analytical results in soil also were compared to the federal and state regulatory levels determining when “waste” is characterized as a hazardous waste. For total lead, the results were compared to California’s Total Threshold Limit Concentration (TTLC) values, and soluble lead was compared to California’s Soluble Threshold Limit Concentration (STLC); and the federal Toxic Characteristic Leaching Procedure (TCLP).

The sample locations from this event are presented in Figure 2, and the results are presented in Table 5. The analytical results for lead from this investigation and the 2007 and 2019 investigations are presented in Figures 4A and 4B. Chain of custody documentation and laboratory analytical reports are presented in Appendix C. A summary of selected analytical results is provided below:

- Lead was detected exceeding the residential DTSC-SL of 80 mg/kg in 10 of 15 samples collected from the upper foot of soil, in 5 of 15 samples collected from an approximate depth of 2 to 3 feet, and in 1 of 15 samples collected from an approximate depth of 4 to 5 feet. Lead was not detected exceeding 80 mg/kg in soil samples collected deeper than approximately 5 feet.

- Soil samples that had total lead detected between 50 mg/kg and 1,000 mg/kg were tested for California's soluble lead limit (STLC). Soluble lead was detected in 15 of 15 samples at concentrations ranging from 0.504 to 172 milligrams per liter (mg/L). Thirteen of these samples exceeded the California's STLC hazardous waste limit of 5 mg/L.

- Samples with total lead exceeding 1,000 mg/kg for soluble lead were tested using the federal TCLP method. Of the 15 samples analyzed using TCLP extraction, two had lead detected exceeding EPA's TCLP hazardous waste limit of 5 mg/L (18.3 mg/L was detected in EB-28 [0-1] and 59.8 mg/L detected in EB-34 [2-3]).

- To help evaluate whether the capping of lead-contaminated soil could present a risk to groundwater quality if in contact with or in close proximity to shallow groundwater, three selected samples (EB-30 [2-3], EB-34 [0-1], and EB-36 [0-1]) were additionally analyzed using deionized water as the extractant for the WET method. Lead was detected at 2.24 to 10.2 mg/L in the extracts, which exceeded the drinking water standard (Maximum Contaminant Level [MCL]) of 0.015 mg/L.

4.5 SOIL TREATABILITY STUDY

To evaluate whether soil stabilization would be a potential cost-effective alternative to reduce soil disposal costs, selected soil samples collected during Cornerstone's soil quality investigation were used by an environmental remediation contractor (Entact) for a laboratory-scale treatability study to develop stabilization recommendations. The goal of the stabilization is to lower the solubility of the lead present in the soil to levels where the soluble lead does not exceed the federal (RCRA) hazardous waste limit, or for soil with total lead less than 1,000 mg/kg, to lower the solubility of lead below the California hazardous waste limit. Results of the study are presented in Appendix D.

Based on laboratory analyses of soil samples blended with various additives ranging from 2 to 16 percent, Entact concluded that the treatment of soil with lead exceeding federal lead RCRA hazardous waste levels to reduce concentrations to California-only hazardous waste levels was achievable using 2 percent of Enviroblend® CS. However, treatment of soil to reduce the concentrations to non-hazardous waste levels such that the soil is not federal or state hazardous waste required much more additive, specifically 14 percent Enviroblend®. The results of the treatability study were taken into consideration for the development of the removal cost estimates presented in Section 11.3.7. The cost estimates assume that soil in the T1 area where the highest concentrations of lead were detected will be treated to allow disposal as a non-RCRA, California hazardous waste. It is noted that the treated soil would be removed for off-Site disposal, with none of the treated soil remaining on-Site. The treatment of the soil has the potential to create fugitive dust emissions. As noted in Section 12, a Community Air Monitoring Plan (CAMP) would be required by the DTSC; the CAMP presents protocols for mitigating fugitive dust and for air/dust monitoring during the soil treatment.

4.6 SOIL VAPOR COLLECTION AND LABORATORY ANALYSES

On February 16 and 17, 2021, six temporary soil vapor probes (SV-30, SV-31, SV-32, SV-33, SV-34, SV-36) were installed to a depth of approximately 5 feet within the T1 building pad area and seven temporary soil vapor probes (SV-21 through SV-27) were installed to a depth of approximately 5 feet within the T3 and T4 building pad areas. The protocols presented follow the general requirements of the July 2015 document entitled, “Advisory – Active Soil Gas Investigations”, prepared by the Department of Toxic Substances and Control (DTSC), Los Angeles Regional Water Quality Control Board, and San Francisco Regional Water Quality Control Board.

4.6.1 Soil Vapor Probe Installation

The 13 temporary soil vapor probes consisted of a stainless-steel expendable vapor tip and screen affixed to stainless steel tubing. The vapor sampling locations were constructed by first placing approximately 2 inches of coarse aquarium-type sand into the bottom of the borehole using a tremie pipe. The stainless-steel tip and tubing were then lowered into the borehole via a tremie pipe. Additional sand was then placed in the borehole via tremie to create an approximately 1 foot sand pack interval around the vapor tip. Approximately 1 foot of granular bentonite (Benseal™) was placed on top of the sand pack via the tremie pipe. Bentonite “gel” was then mixed utilizing a power drill and paddle (creating the consistency of porridge, but to the viscosity that would allow for flow in a ¾ inch diameter PVC tremie pipe through a funnel). The bentonite gel was then placed via tremie pipe on top of the dry granular bentonite to the approximate ground surface.

4.6.2 Soil Vapor Sampling

Vapor sampling was performed at least 2 hours after completing well construction activities. Thirteen soil vapor samples were collected using the methods described below. Soil vapor sampling field notes are included in Appendix B.

Soil vapor sampling was performed following the protocols presented in the July 2015 document entitled, “Advisory – Active Soil Gas Investigations”, prepared by the Department of Toxic Substances Control and the California Regional Water Quality Control Board, Los Angeles Region. The tubing emanating from the vapor points was affixed to a sample shut off valve in the “off” position. A 167 milliliters-per-minute flow regulator with attached particulate filter was fitted to the shut off valve and the other end to a “T” fitting. One end of the “T” was connected to the sampling summa canister. The other end of the “T” was affixed to a digital vacuum gauge and a GilAir pump utilized for purging.

A minimum 10-minute vacuum tightness test was performed on the manifold and connections by opening and closing the valve and applying and monitoring a vacuum on the vacuum gauge. The sample shut-off valve on the downhole side of the sampling manifold remained in the “off” position. When gauge vacuum was maintained for at least 10 minutes without any noticeable decrease (less than approximately 0.1 inches of mercury [Hg] for properly connected fittings), purging began. The downhole shut off valve was opened and at least three pore volumes were removed utilizing the GilAir pump.

Following purging, sampling began by opening the 1-liter Summa canister valve allowing the soil gas sample to be collected. Sampling continued until the vacuum gauge indicated approximately 5 inches of Hg remaining. Isopropyl alcohol was utilized as a leak detection compound during sampling by placing a moistened cotton gauze near the borehole. To confirm the isopropyl atmosphere, one confirmation sample was collected within the shroud atmosphere. Upon completion of soil gas collection, the Summa canister was labeled with a sample ID, project number, and date and time of collection. The samples were then transported to a state-certified laboratory with chain-of-custody documentation.

The 13 subsurface soil vapor samples were analyzed for VOCs by EPA Test Method TO-15 and the fixed gases carbon dioxide, methane, and oxygen by ASTM Method D-1946. The air sample collected from the shroud atmosphere was analyzed for isopropyl alcohol.

4.6.3 Summary of Soil Vapor Analytical Data

The detected soil vapor concentrations were compared to calculated residential and commercial soil vapor screening levels based on applying an attenuation factor (AF) of 0.03 to the Department of Toxic Substances Control-modified indoor air screening levels (DTSC-SLs; DTSC, May 2022). As noted in Section 3.2.1, where DTSC-SLs are not established for a particular chemical, the calculated residential and commercial soil vapor screening levels for that chemical are based on the RSLs (US EPA, May 2024). The AF is an estimate of how much a contaminant in soil vapor attenuates or decreases when moving from the soil beneath a structure, through the foundation, and into the structure (i.e., vapor intrusion). The AF is applied to the indoor air screening concentration level to determine the estimated concentration in soil vapor in the subsurface that would or could lead to an indoor air concentration equal to the screening level.

The soil vapor analytical results are summarized in Table 6 in the Summary Tables section of this RAP. The analytical results for benzene, ethylbenzene, PCE and methane from this investigation and the 2019 investigation are presented in Figure 5. Chain of custody documentation and laboratory analytical reports are presented in Appendix C. A summary of the results is presented below:

- Benzene was detected in 7 of 11 soil vapor samples at concentrations ranging from 1.8 to 59 micrograms per cubic meter (µg/m^3). Four of these samples (SV-23, SV-25, SV-33, SV-34 and SV-36) exceeded the residential DTSC-SL of 3.23 µg/m^3 and commercial DTSC-SL of 14.0 µg/m^3 using the AF of 0.03, but none exceeded the screening level using an AF 0.001 that takes bioattenuation[5] into consideration (see Section 6).

- Ethylbenzene was detected in two soil vapor samples (SV-25 and SV-26) at concentrations of 46 and 51 µg/m^3, respectively. Both samples exceeded the residential RSL of 36.7 µg/m^3 using the AF of 0.03, but neither exceeded the residential screening level of 1,100 µg/m^3 using an AF 0.001 that takes bioattenuation into consideration. In addition, the ethylbenzene concentrations detected were below the commercial RSL of 163 µg/m^3 using the AF of 0.03.

- PCE exceeded the residential DTSC-SL of 15.3 µg/m^3 in one sample (29 µg/m^3 in SV-25) but was below the commercial DTSC-SL of 66.7 µg/m^3. All other samples were below the residential screening level. Notwithstanding the single residential screening level exceedance, based on the discussion presented in Section 6, which takes into consideration multiple lines of evidence regarding potential for vapor intrusion and cumulative risk at each soil vapor sampling point, the concentrations of PCE detected in soil vapor do not appear to pose a health risk of concern.

Methane was detected in 6 of 11 vapor samples. Three of the samples (SV-33, SV-34 and SV-36) were above the LEL of 5%.

[5] The process of microbial metabolization of organic compounds in the presence of oxygen.

SECTION 5: INITIAL SEA LEVEL RISE VULNERABILITY ASSESSMENT

DTSC requires a sea level rise vulnerability assessment (SVRA) to evaluate the resilience of wastes and remedies at sites to future sea level rise (SLR) impacts. SLR has the potential to significantly impact wastes at sites by causing groundwater levels to rise, by inundation, and by the subsequent deterioration of a remedy and mobilization of contaminants.

To evaluate potential for SLR to affect COPC that may be left in-place after implementation of the RAP, and to assist with the screening of the remedies, an initial SVRA has been prepared based on the California Work Plan recommendations to assess resiliency at 3.5 feet of SLR by 2050 and 6.0 feet SLR by 2100.

Potential impacts to existing buildings and planned developments from SLR can occur as a result of inundation/flooding and rising shallow groundwater levels. Projected inundation/flooding along the San Francisco Bay shoreline as a result of various SLR scenarios can be evaluated using the Adapting to Rising Tides (ART) map (https://explorer.adaptingtorisingtides.org/home) published by the Bay Conservation and Development Commission (BCDC). The ART map allows selection of flooding at various total SLR scenarios, including 36 inches and 77 inches (the closest scenarios available on the map to the 3.5 feet and 6.0 feet SLR scenarios). At a SLR of 36 inches, no flooding or inundation is depicted on-Site on the ART map. The southeast and southwest areas of the Site, south of the BART tracks and in the general areas of the T3 and T4 development areas, are depicted to be inundated/flooded under the 77-inch SLR scenario. The inundation area under the 77-inch SLR scenario is similar to the inundation area shown on the 200-centimeter (cm) SLR scenario discussed below.

Rising groundwater levels have the potential to impact low-lying communities inland from the shoreline. The potential for SLR to cause higher groundwater elevations can be visualized using the United States Geological Survey's CoSMos numerical model, version 2.1 (San Francisco Bay Estuary), available to the public at https://ourcoastourfuture.org/hazard-map/. Under current conditions (no SLR), the southern portion of the Site is depicted to have very shallow groundwater (depth of 0 to 1 meters), with the remainder of the Site depicted as having shallow groundwater (depth of 1 to 2 meters) and moderate groundwater (depth of 2 to 5 meters). Under the 100 cm (approximately 3.5 feet) SLR scenario, the map predicts shallow groundwater to be very shallow beneath most of the Site, and under the 200 cm (approximately 6.5 feet) SLR scenario the southern portion of the Site is depicted with marine inundation, with the remainder of the Site with very shallow groundwater. The map outputs for the 100 cm and 200 cm SLR scenarios are presented in Figures 7A and 7B respectively.

COPC-contaminated soil that may be left in-place beneath building foundations has the potential to become saturated because of rising groundwater associated with SLR, with increased risk by 2100.

SECTION 6: HUMAN HEALTH RISK ASSESSMENT

Cornerstone retained Integral Consulting Inc. to prepare a Human Health Risk Assessment (HHRA). The purpose of the assessment was to evaluate potential risks and hazards to current and hypothetical future receptors that are, or will be, potentially exposed to chemicals detected in environmental media at the Site. The results of the assessment are intended to inform risk managers of the current and long-term risks posed by conditions at the Site and aid planning for Site redevelopment.

The screening level risk assessment was completed in accordance with DTSC guidance (2020 a,b). Included in the assessment are summaries of the Site description, background, and previous investigations. Available data from the Site investigations used in the evaluation are also summarized and discussed. Details of Site characterization activities are available in prior reports (CEG 2019; Weiss 2007) and results of the investigation summarized in Section 4 of this RAP. The screening level risk assessment was focused to assess potential risks and hazards based on the complete and potentially complete exposure pathways identified in the Site-specific conceptual Site model (CSM).

Specifically, analytical results for environmental media were compared to appropriate risk-based screening levels to identify constituents of potential concern (COPC). Baseline and residual soil risks and hazards were determined for each receptor scenario (i.e., residential, commercial, and construction). The baseline scenario evaluated the maximum detected concentration for each analyte from all available soil samples collected at the Site. The residual scenario evaluated the exposure point concentrations (EPCs) for COPC based on the soil samples that are expected to remain in place after Site redevelopment. For soil vapor, hazards and risks were calculated at each soil vapor sample location. Although there are no current or future risks associated with direct contact with groundwater at the Site, available groundwater data were screened to assist with risk management. The evaluation of potential risks and hazards was based on current and hypothetical future receptors under current and reasonably anticipated future land uses.

Conclusions from the HHRA are summarized below; additional details are presented in Integral's August 30, 2021 HHRA report, attached as Appendix E.

6.1 SOIL RISKS

The Site is occupied by the BART station and a paved parking lot. To assist with risk management decisions, a baseline soil risk evaluation was completed for all analytes using the maximum detected concentration from all available soil samples collected at the Site. However, the baseline soil risk evaluation does not reflect current or future land use scenarios. There are no current complete exposure pathways and thus no current risks to Site visitors using BART because the Site is currently paved, there are no inhabited structures, and there is no access to groundwater.

In the future, the HHRA assumed the Site will be redeveloped into areas containing residential and commercial uses including a residential tower with ground floor retail. Additionally, an open space plaza with landscaped areas will be located at the Site. All soils remaining on-Site at concentrations greater than screening levels after remediation is complete will be under hardscape (i.e. paved over with concrete or asphalt, or under future buildings), with the exception of small areas (totaling approximately 3,000 square feet), which will be landscaped and remain unpaved.

Therefore, the exposure pathways to future receptors will be incomplete, except for landscaped areas (which is addressed below). The residual soil risk evaluation presented cumulative hazard and risk estimates for COPC using the EPCs from soils expected to remain in place after Site redevelopment. Hazard and risks were estimated for residential, commercial, and construction worker scenarios. When evaluating the residential results without the inclusion of arsenic (assumed to be ambient/background), cumulative hazards are at or below the endpoint-specific hazard index of 1 and cumulative risk results are greater than DTSC's target of 1×10^{-6} but within the EPA risk range of 1×10^{-6} to 1×10^{-4}.

The predicted blood lead levels for all receptors in the baseline and residual soil scenarios exceeded the DTSC blood lead threshold of 1 µg/dL except for the residual soil commercial worker scenario. However, after the completion of the development, future Site users would not be exposed to impacted soil, and thus, would not be exposed to a significant (above de minimis) lead risk.

The current T2 plaza plan includes landscape areas that will range in size from approximately 100 square feet to 1,200 square feet, although artificial turf will be used instead of natural lawn/grass. Some individual soil samples collected from the T2 area contained metals (i.e., arsenic, lead, mercury) concentrations exceeding residential and commercial risk-based screening levels or published background levels. Therefore, when reviewing data for the residual soil that will remain in landscaped/unpaved areas in context to the risk assessment results, it is important to consider the following:

- For arsenic, concentrations are low (less than background) for the majority of the samples; only 1 of 17 samples exceeds background (i.e., 6 percent of samples analyzed).

- Similarly, for mercury, the concentrations in this area are similar to background levels (Diamond et al. 2009; Scott, 1991; LBNL, 2009).

- Lead concentrations are greater than the residential screening level in 8 of 17 samples, but only five of those samples exceed the commercial/industrial screening level of 320 mg/kg.

- Although it is likely that the exposure to soils in the unpaved areas will be more typical of a commercial scenario than a residential (e.g., backyard) scenario, the RDIP for the T2 plaza will include removal of soil with COC exceeding Site cleanup goals from landscape areas (described in Section 10).

6.2 SOIL VAPOR RISKS

Several soil vapor sample locations located underneath future buildings contain VOC concentrations greater than screening levels. The indoor air AF used by DTSC for screening vapor intrusion risk is 0.03, which is calculated as an upper-bound estimate across all structures based on the EPA vapor intrusion database. This AF was used to screen VOCs to identify COPCs in the first instance.

However, there are certain Site-specific conditions affecting the potential attenuation and soil vapor risks. Oxygen was detected in soil vapor at concentrations greater than 4 percent within the vadose zone across much of the Site, indicating an aerobic environment that is supportive of bioattenuation. As discussed with and agreed to by DTSC during a May 7, 2021 meeting, an AF of 0.001 is acceptable to use for petroleum-related VOCs at this Site to take into consideration bioattenuation in aerobic conditions. For that reason, an AF of 0.001 was used to evaluate risk associated with petroleum VOCs detected (BTEX and 1,3-Butadiene) in the HHRA. These screening levels are presented in Tables 4 and 6.

Currently, there are no inhabited buildings at the Site. Therefore, there are no current risks associated with potential vapor intrusion concerns because the pathway is incomplete. To prepare a baseline risk assessment and then estimate potential future vapor intrusion risk, it was conservatively assumed that future single-family homes could be built upon existing soil vapor sample locations. Therefore, hazards and risks were calculated for each detected analyte at each soil vapor sample location. As noted in Section 2.2, the development plans do not include construction of any single-family residences on the Site.

Residential cumulative hazard estimates were at or below 1 and cumulative risk results were greater than DTSC's target of 1×10^{-6} at soil vapor sample locations SV-18, SV-25, and SV-31 but within the EPA risk range of 1×10^{-6} to 1×10^{-4}. No COPC were identified for the commercial worker scenario.

Based on the following multiple lines of evidence, the HHRA concluded that the vapor intrusion risk into future buildings is expected to be insignificant (*de minimis* risk):

- Chlorinated VOCs were detected in soil vapor at relatively low concentrations, with no concentrations exceeding commercial screening levels within the planned building footprints.
- There will not be any single-family residences at the Site, and there will be no ground-floor residential occupancy.
- Soil beneath the building pads will be excavated to depths of approximately 3 to 6 feet, removing potential unidentified near-surface source areas (if any) and aerating underlying soil.
- The new structure foundations will consist of spread footings or structural mat foundations designed to have a sufficient thickness to minimize cracking or other structural distress.
- Petroleum-related VOCs generally biodegrade rapidly in the vadose zone (DTSC 2011a).
- Chlorinated VOCs were not detected in groundwater grab samples collected from the Site.
- No chlorinated VOC release incidents have been reported up-gradient of the Site that appear likely to significantly impact groundwater quality beneath the Site in the future.

SECTION 7: NATURE AND EXTENT OF CONTAMINATION

7.1 SELECTION OF CHEMICALS OF CONCERN

Data summary tables presenting the analytical results of the soil and soil vapor samples collected at the Site in 2019 and 2021 are included in Tables 1 through 6 in the Summary Tables section of this RAP; results from the 2007 investigation are presented in Appendix A. Based on a comparison of contaminant concentrations detected in Site soil, soil vapor and groundwater to residential screening criteria, and locations of samples with respect to the future development, the following chemicals of concern (COC[6]) were identified:

- Soil: Lead, arsenic, mercury, PAHs (benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene), and PCBs (Aroclor 1254, Aroclor 1260). Baseline risk associated with soil COC are summarized in Table 7.

- Soil Vapor: PCE, benzene, ethylbenzene, 1,3-butadiene, and 1,3-dichlorobenzene.

Methane is acutely hazardous due to its explosive potential in the presence of oxygen. Because there are no associated chronic health hazards, neither US EPA or OEHHA have established toxicity criteria for methane to consider in human health risk assessments. Based on discussion in Section 6, the development is anticipated to achieve RAOs (defined in Section 8) for vapor intrusion associated with VOCs without additional vapor intrusion mitigation measures. The need for mitigation measures to address methane will be evaluated in the RDIP for the T1 building area, including identification of requirements of the City of Oakland Building Department or Fire Department regarding methane mitigation.

None of the COC in on-Site groundwater samples collected by Cornerstone in 2019 exceeded their respective screening levels for vapor intrusion health risks. Thus, no specific removal measures for groundwater are proposed or evaluated in this RAP. Total petroleum hydrocarbons in the diesel range (TPHd) were detected in one groundwater grab sample exceeding the direct exposure ESL. Although groundwater is not expected to be encountered during construction, TPHd was evaluated as a COPC in the human health risk assessment (HHRA) (Section 6).

7.2 SOURCES OF COC IN SOIL

Laboratory analyses detected COC in soil samples that were generally sporadically distributed across the Site. As noted in Section 3.1, much of the Site was historically developed by residences, with commercial activities on the eastern half of the Site prior to the construction of the existing BART station. The source(s) for the COC detected may be associated with the demolition of the former structures and commercial activities, including a junkyard and door manufacturing operations on the east portion of the Site. The COC detected may be associated with undocumented fill; the source of fill is not clear, but some of the fill could be on-Site soil that was re-worked during the construction of the BART station. Additionally, lead detected in shallow soil is commonly associated with atmospheric deposition of lead derived from the combustion of leaded gas from automobile engines. Since the Site is located in a high traffic area of Oakland, this may be another potential source of COC detected in shallow soil. The greatest concentrations of lead detected appear to be associated with the “white lead storage” area depicted on the 1912 Sanborn maps (see Section 3.1 and Figure 2).

[6] COC are COPC that have been identified as exceeding applicable risk levels and have associated removal goals.

7.3 EXTENT OF COC IN SOIL

7.3.1 Arsenic

During the 2019 investigation, arsenic was detected in 5 of 84 samples at or exceeding the generally accepted background level of 11 mg/kg, with a maximum of 110 mg/kg detected (EB-2 at depth of 2 ½ to 3 feet) (Figure 2). Arsenic exceeding 11 mg/kg appears co-located with elevated concentrations of lead.

7.3.2 Lead

During the 2019 and recent 2021 investigation, lead was detected at concentrations exceeding the residential screening level in the upper one-foot samples collected from 19 sample locations, in the 2-to-3-foot samples collected from 12 sample locations, and in the 4-to-5-foot sample collected from three sample locations. The greatest concentration of lead was detected in sample EB-19 collected from a depth of 2½ to 3 feet (23,000 mg/kg) and located on the T1 development area. Lead was not detected exceeding the residential SL in samples collected deeper than 5 feet. The lead impacted soil appears to be limited in vertical extent to the upper 3 feet of soil but is extensive throughout the Site. Lead concentrations detected in soil samples collected in 2007, 2019 and 2021 are shown on Figures 4A and 4B.

7.3.3 Mercury

Mercury was detected in 7 of 84 soil samples exceeding the residential screening level, with a maximum of 140 mg/kg detected (EB-2 at a depth of 2 ½ to 3 feet) (Figure 2). Similar to arsenic, the mercury exceeding the residential screening level appears limited in extent and co-located with the elevated concentrations of lead.

7.3.4 PAHs

PAHs (benz(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene) were detected at concentrations exceeding their respective residential screening levels in eight samples collected from the upper 1 foot of soil and in three samples collected from a depth of 2½ to 3 feet. The extent of PAH contamination appears to be sporadically present across the Site and limited to the upper 1 to 3 feet of soil.

7.3.5 PCBs

PCBs (Aroclor 1254 and Aroclor 1260) were detected at concentrations exceeding their respective residential screening levels in six samples collected from the upper foot of soil (sample IDs) and in one sample collected from a depth of 2½ to 3 feet (EB-2).

7.4 COC IN SOIL VAPOR

Based on the results of Cornerstone’s soil vapor sampling investigations performed in 2019 and 2021, concentrations of benzene, ethylbenzene and PCE appear to be the primary COC based on the frequency and magnitude of detections. These results are presented in Table 4 (2019) and Table 6 (2021) in the Data Summary Tables section of this RAW. Selected COC detected in soil vapor are also shown on Figure 5. The greatest concentrations of these COC in soil vapor generally correspond to the northeast and southeast area of the Site and generally decrease on the western portions of the Site. Although identified as COC in Section 7.1, 1,3-butadiene and 1,3-dichlorobenzene were detected at low frequencies and, as such, are not shown on Figure 5.

The 2019 Phase I ESA (Cornerstone Earth Group) did not identify any adjoining or nearby release incidents that appeared to be a likely source for the PCE detected in soil vapor, based on the types of incidents, regulatory status, the locations of the reported incidents in relation to the Site, and groundwater flow direction. However, based on the historical industrial uses in the northeast and southeast areas of the Site, there is a potential for these operations to have used halogenated VOCs as part of their operations. The historical uses of this area of the Site have the potential to be the source of PCE detected in soil vapor samples collected in these areas.

A service station at 1395 7th Street (directly east of the Site) has reported petroleum hydrocarbon releases due to a leak from an underground storage tank (UST). The detections in soil vapor on-Site and lack of detections in groundwater appear to indicate that the off-Site service station may be the source of benzene detected in the T1 area near Mandela Parkway. Other sporadic detections of benzene may be associated with fuel vapors from vehicle parking in the parking lot.

7.5 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) was developed to assist in understanding Site conditions and potential pathways by which humans may be exposed to COPC at the Site. The CSM is based on the known Site history and results of the data collected at the Site to date. An exposure pathway is considered complete if it presents a means of exposure to a receptor. A complete exposure pathway includes all of the following: a source of contamination, release mechanism, transport mechanism, exposure point, and a receptor. Figure 8 presents the CSM for the Site.

SECTION 8: REMOVAL ACTION OBJECTIVES AND GOALS

Site characterization and risk evaluation have revealed the presence of chemicals of concern at the Site. Removal Action Objectives (RAOs) are goals developed for the protection of human health and the environment and are based on chemical concentrations and potential exposure routes. Protection of human health can be achieved by reducing chemical concentrations and/or by eliminating exposure pathways. RAOs have been developed based upon the current environmental conditions and the anticipated redevelopment plans. The RAOs are the foundation for developing suitable remediation action alternatives.

Based on the RAOs, removal goals (RGs) were then developed that establish specific concentrations of chemicals in soil that are protective of future occupants of the planned mixed-use development. A review of pertinent laws, regulations, and other criteria also was performed to identify applicable or relevant and appropriate requirements (ARARs), plus other pertinent regulatory guidelines, for remediating the Site.

8.1 REMOVAL ACTION OBJECTIVES (RAOS)

RAOs have been established that are protective of human health and the environment and reduce the potential for exposure to the contaminants of concern (COC) in media that may be encountered at the Site. These media-specific RAOs are presented below.

- Minimize or eliminate potential exposure of humans (receptors) to COC-impacted soil through direct contact, ingestion and inhalation during planned construction activities;
- Minimize or eliminate the potential for uncontrolled migration of COC-impacted soil during construction activities;
- Mitigate the potential health risks to future Site occupants associated with COC detected in soil at the Site.
- Establish appropriate management practices for handling impacted soil that may be encountered during planned construction activities.
- Achieve compliance with local, State and Federal regulations.

These RAOs are the foundation for developing suitable remediation action alternatives to remove, to the extent practical, the soils impacted with COC prior to Site development. The selected alternative for remediating the Site must be shown to satisfy each RAO.

8.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Under California law [HSC, 25356.1(d)], remedial action plans must be developed based on the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and State requirements. A key component of the NCP is the requirement that final remedial actions achieve a level of cleanup that protects human health and the environment and also complies with applicable or relevant and appropriate requirements (ARARs). The purpose of this section is to identify potential ARARs for remediation of soil at the Site.

ARARs are federal and state environmental statutes, regulations and standards that specifically address a hazardous substance, pollutant, contaminant, removal action or location. Relevant and appropriate requirements that, while not “applicable,” address problems or situations sufficiently similar to those encountered that their use is well suited to the particular site. State requirements are ARARs only if they are more stringent than federal requirements [40 CFR 300.400 (g)]. ARARs fall into one of three categories: 1) chemical-specific; 2) location-specific; and 3) action-specific. In addition to chemical-, location-, and action-specific ARARs, advisories, criteria, and guidance developed by US EPA or other federal or state agencies may, as appropriate, be considered in developing remediation alternatives. These criteria are referred to as “to-be-considered” (TBC) criteria.

A review of pertinent laws, regulations, and other criteria was performed to identify ARARs and TBC criteria for remediating the Site; a summary is provided in Appendix F.

8.3 REMEDIAL ACTION CLEANUP LEVELS

Risk-based remedial goals (*i.e.*, cleanup levels) are proposed for the Site that consist of the published residential soil screening levels. The proposed remedial goals are presented in Table B below for COC identified in soil. As described in Section 6.2, the HHRA concluded that the vapor intrusion risk into future buildings is expected to be insignificant (*de minimis* risk), and therefore, no COC in soil vapor have been identified. In addition, as described in Sections 3.4.2 and 5.1, no COC were detected in groundwater that present a significant risk for future occupants. As such, no cleanup levels for soil vapor or groundwater are presented in Table C.

Table C. Remedial Goals/Cleanup Levels

COC	Media	Removal Goal	Basis
Arsenic	Soil	11 mg/kg	Duverge (background level)
Lead	Soil	80 mg/kg	Residential DTSC-SL
Mercury	Soil	1 mg/kg	Residential DTSC-SL
Benz(a)anthracene	Soil	1.1 mg/kg	Residential DTSC-SL
Benzo[a]pyrene	Soil	0.11 mg/kg	Residential DTSC-SL
Benzo[b]fluoranthene	Soil	1.1 mg/kg	Residential DTSC-SL
Dibenz(a,h)anthracene	Soil	0.028 mg/kg	Residential DTSC-SL
Indeno(1,2,3-cd)pyrene	Soil	1.1 mg/kg	Residential DTSC-SL
Aroclor 1254	Soil	0.24 mg/kg	Residential DTSC-SL
Aroclor 1260	Soil	0.24 mg/kg	Residential DTSC-SL

SECTION 9: DEVELOPMENT OF GENERAL RESPONSE ACTIONS AND SCREENING OF REMEDIAL TECHOLOGIES

The purpose of this screening step is to minimize the number of general response actions that must be considered in the development of soil remedial alternatives without limiting the flexibility of the remedial design. The remaining general response actions were retained and were used in the development of potentially applicable remedial alternatives (Section 10).

9.1 GENERAL RESPONSE ACTIONS

The following general response actions (GRAs), developed to address soil with COC exceeding Site cleanup levels within the four development areas covered by this RAP, are summarized below.

- **No Further Action**. Evaluation of a "no action" alternative is required under the NCP (40 CFR 300.430). For this GRA, it is assumed that no remedial actions would be initiated.

- **Institutional Controls**. Institutional controls are legal or physical means to help prevent potential exposures for COC by limiting the use of the remedial areas and/or providing for long term operation, maintenance and monitoring requirements.

- **Soil Removal/Treatment/Disposal Actions**. These response actions are intended to reduce the concentrations of COC in soil, thereby reducing the toxicity, mobility, or volume of contamination.

SECTION 10: IDENTIFICATION OF SOIL REMEDIAL ALTERNATIVES

The purpose of this Section of the RAP is to identify and screen possible remedial alternatives (RAs) that may best achieve the RAOs discussed in Section 8.1. The remedial action alternatives were screened and evaluated on the basis of the evaluation criteria described in Section 11.1.

10.1 SOIL REMEDIAL ALTERNATIVES

- **RA-1** – No Action
- **RA-2** – Soil Removal for Construction and On-Site Capping of Remaining Soil Exceeding Cleanup Levels Beneath Site Improvements (building floors/foundations, pavements, landscaping and hardscapes).
- **RA-3** – Removal and Off-Site Disposal of Soil Exceeding Cleanup Levels from T1, T3 and T4 Development Areas and T2 Plaza Landscape Areas, and On-Site Capping of Remaining Soil Exceeding Cleanup Levels Beneath Site Improvements.

10.1.1 Alternative RA-1 – No Action

Applicable DTSC guidance requires the consideration of no action as a baseline alternative during the feasibility screening process. This removal action alternative would not involve the removal or capping of the impacted soil at the Site, but this hypothetical scenario would include a change in land-use to include sensitive uses (residential development).

10.1.2 Alternative RA-2 – Soil Removal for Construction and On-Site Capping of Remaining Soil Exceeding Cleanup Levels Beneath Site Improvements

Under Alternative RA-2, soil would be excavated for construction of the development, but additional excavation beyond the construction envelope would not be performed. Based on the project geotechnical engineer recommendations and preliminary grading approach provided by MSP, the upper approximately 4 feet of soil will be excavated from the T1, T3 and T4 areas. Assumptions regarding the volume of soil to be excavated are presented in Table G2 in Appendix G. The exposed sub-grade soil at a depth of 4 feet will then be compacted, and excavated soil that meets Site cleanup goals will be used to backfill the excavations to the foundation design finished subgrade elevation. Excavated soil that exceeds Site cleanup goals will be removed for off-Site disposal. Soil within the T1 area where elevated concentrations of lead were detected may be treated on-Site to reduce solubility of lead such that the soil can be disposed as a non-RCRA California hazardous waste. The preliminary construction excavation depths are depicted on Figure 9. Limited excavation is expected for construction of the T2 plaza area. In addition, limited excavation of soil is expected for the construction of the bike station that will be built during the T1 development phase (Figure 3).

Based on the analytical results of soil samples collected to date, excavation planned for the construction of the T1, T3 and T4 areas is expected to remove the majority of soil with COC exceeding Site cleanup goals, with a limited amount of COC-contaminated soil possibly remaining in-place below a depth of 4 feet. The Remedial Design and Implementation Plan (RDIP) prepared for each construction area, described in Section 12, will present a soil sampling/analytical plan for the following: 1) evaluating the quality of excavated soil for off-Site disposal profiling or on-Site re-use as geotechnical fill within the construction excavation; 2) the quality of soil remaining in-place, and; 3) extent of COC exceeding cleanup levels (if any) at the base of the construction excavation. The sampling may be performed prior to or during construction. If COC exceeding cleanup levels is left in-place, the lateral extent will be surveyed to assist with future long-term management of the soil. Soil with COC exceeding cleanup levels

that remains beneath buildings will be capped by the concrete foundations/floor systems; details of the foundations/floor systems will be presented in the RDIP for each phase.
In addition, soil exceeding Site cleanup goals may remain in-place beneath other hardscape-covered areas located outside the building footprints, such as the T2 plaza area, driveway areas and the bike station. Hardscapes are anticipated to consist of asphalt and concrete and be approximately 4 to 6 inches thick; details will be presented in the RDIPs for each phase. As noted above, the quality of soil remaining in-place, and extent of soil exceeding cleanup levels, will be confirmed through verification soil sampling during construction. Where COC exceeding cleanup levels is left in-place, the lateral extent will be surveyed to assist with future long-term management of the soil.

Where COC remain in soil at concentrations that exceed cleanup levels in the T1, T2, T3 and/or T4 development areas, an operation and maintenance plan (OMP) and soil management plan (SMP) will be prepared that describes the quality of soil remaining in-place and requires measures intended to manage the soil in-place to prevent unacceptable risk to future occupants, contractors and/or maintenance workers.

Soil excavated during future construction/maintenance activities will require special handling, evaluation and disposal considerations. Regular observation and maintenance will be necessary for the long-term integrity of the hardscape "cap". A DTSC-approved LUC will be recorded against the property that requires compliance with the SMP and prohibits activities that may encounter impacted soil without prior approval of the DTSC, among other things. If necessary, an Operation and Maintenance Agreement (OMA) with DTSC will be required to ensure the implementation of the OMP. The OMP will include criteria for when periodic maintenance will be performed, plus requirements to maintain Financial Assurance and perform annual inspections and Five-Year Reviews.

Upon completion of the soil excavations and capping activities for the T1-T4 areas, remedial goals would be accomplished. The timeline for completion of remedial goals would be dependent on the project development schedule.

10.1.3 Alternative RA-3 – Removal and off-Site Disposal of Soil Exceeding Soil Cleanup Levels from T1, T3 and T4 Development Areas and Landscape Areas in T2 Plaza

Under Alternative RA-3, all soil exceeding the Cleanup Levels within the T1, T2, T3 and T4 development areas will be excavated and disposed at an appropriately licensed off-Site landfill. Assumptions regarding the volume of soil to be excavated are presented in Table G3 in Appendix G. Most of the soil would be excavated as part of the building construction; additional deeper excavation beyond the depth required for construction will be conducted, as needed to remove soil that exceeds cleanup levels. Where soil removal deeper than the construction excavation is required, the removed soil would be replaced with "clean", imported soil approved by DTSC for use as engineered fill. As with RA-2, soil within the T1 area where elevated concentrations of lead were detected may be treated on-Site to reduce solubility of lead such that the soil can be disposed as a non-RCRA California hazardous waste.

Upon completion of soil excavations and loading for off-Site disposal for the T1-T4 areas, remedial goals would be accomplished. The timeline for completion of remedial goals would be dependent on the project development schedule.

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SECTION 11: COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

11.1 EVALUATION CRITERIA

Nine evaluation criteria are set forth in the NCP and accompanying US EPA guidance (NCP, 1990 and US EPA, 1988) for evaluation. Each remedial action alternative was independently analyzed without consideration to the other alternatives. The nine criteria are divided into three categories: 1) Threshold Criteria; 2) Primary Balancing Criteria; and 3) Modifying Criteria as presented below.

- Threshold Criteria
  - Overall Protection of Human Health and the Environment
  - Compliance with ARARs
- Primary Balancing Criteria
  - Long-Term Effectiveness and Permanence
  - Short-Term Effectiveness
  - Reduction of Mobility, Toxicity, of Volume
  - Implementability
  - Cost
- Modifying Criteria
  - Federal and State Acceptance
  - Community Acceptance

The candidate alternative must meet the two Threshold Criteria of protection of human health and the environment and attainment of ARARs, unless an ARAR waiver is granted, to be selected as the final remedy. The next five Primary Balancing criteria are designed to determine how the performances of each alternative compare with one another and identify tradeoffs between them. The final two Modifying Criteria incorporate acceptance by Federal, State and other responsible regulatory entities and by the local community.

11.1.1 Overall Protection of Human Health and the Environment (Threshold Criterion)

This threshold criterion addresses whether a remedial alternative is protective of human health and the environment considering long-term and short-term site-specific characteristics. Typically, assessment of overall protectiveness from COC is based largely on the degree of certainty that an alternative can meet the established RAOs that are intended to prevent exposure to Site-related chemicals at concentrations of potential health or environmental concern. Each remedial alternative's ability to provide overall protection of human health and the environment is therefore evaluated based on the ability of the proposed remedial alternative to meet the relevant RAOs for the Site.

11.1.2 Compliance with ARARs (Threshold Criterion)

The selected remedy must also comply with designated ARARs unless an ARAR waiver is granted. A description and list of potential ARARs and TBCs are presented in Section 8.2 and Appendix F of this report. The ability to meet ARARs/TBCs will be based on each RA's ability to reduce or contain the concentration of COC to the extent feasible, such that COC concentrations are below the concentrations presented in Table B.

11.1.3 Long-Term Effectiveness and Permanence (Balancing Criterion)

This criterion addresses how well a remedy maintains protection of human health and the environment after RAOs have been met to the extent feasible. Components to be addressed include the magnitude of residual risk, and the adequacy and long-term reliability of institutional controls and containment systems.

11.1.4 Reduction of Mobility, Toxicity, or Volume (Balancing Criterion)

Under this criterion, the anticipated amount of target chemical removed or treated and the amount remaining are analyzed and assessed with respect to the degree of expected reduction in chemical mobility, toxicity, or volume for each of the RAs.

11.1.5 Short-Term Effectiveness (Balancing Criterion)

This criterion concerns protection of human health and the environment during construction and implementation of the RA, and the near-term immediately following implementation. Issues to be considered are the time required to achieve protection, the short-term reliability of remedial technologies, protection of workers and the community during construction, and potential disruptions to neighborhoods.

11.1.6 Implementability (Balancing Criterion)

Implementability is assessed by considering the technical and administrative feasibility of each alternative as well as the availability of needed goods and services. Other considerations include the ability to construct and operate remedial facilities, ease of undertaking additional remedial actions, ability to monitor remedial effectiveness, and ability to obtain needed regulatory approvals and permits.

11.1.7 Cost (Balancing Criterion)

The costs to be assessed include capital costs and annual operation and maintenance costs (if applicable). These costs include design and construction costs, other capital and short-term costs, outlays for long-term system operation and maintenance, and costs of performance evaluations and ongoing monitoring, and contingency. Informative sources for estimating costs can include results from treatability studies, quotations from vendors, discussions with construction contractors, standard engineering indices, and experience with similar projects. The cost estimates developed herein are for the comparison of remedial alternatives during the remedy selection process, not for establishing project budgets.

11.1.8 Regulatory Agency Acceptance (Modifying Criterion)

Regulatory agency acceptance criterion incorporates input from DTSC to modify the alternative selection process. Comments received are then incorporated into the report and evaluated prior to issuance of a final report.

11.1.9 Community Acceptance (Modifying Criterion)

The Community Acceptance criterion incorporates input from public comments after a RA is presented to the public to modify the alternative selection process.

11.1.10 Resilience to SLR

In addition to the nine evaluation criteria listed above, the remedial alternatives are additionally evaluated for resiliency to potential impacts associated with SLR, as discussed in Section 5.

11.2 ANALYSIS OF REMEDIAL ALTERNATIVES

Sections 11.2 and 1.3 present an evaluation of each of the individual remedial alternatives (RA-1, RA-2 and RA-3) relative to the evaluation criteria defined in Section 11.1. The remedial alternatives were identified in Section 10. The selected remedial alternative is presented in Section 11.4.

11.2.1 RA-1 – No Action

As described in Section 10.1.1, RA-1 is provided as a baseline remedial alternative.

11.2.1.1 RA-1: Overall Protection of Human Health and the Environment (Threshold Criterion)

The ability to provide overall protection of human health and the environment is evaluated based on the certainty that the proposed remedial alternative will meet the relevant RAO for the Site. RA-1 will not meet the relevant RAOs for the planned change in land use and associated construction activities and, therefore, is not effective.

11.2.1.2 RA-1: Compliance with ARARs (Threshold Criterion)

This alternative will not remediate the COC-impacted soil within the T1, T2, T3 and T4 development areas to minimize or eliminate the potential for COC-impacted soil to be encountered during planned construction activities. As such, RA-1 does not meet the relevant ARARs/TBCs for the planned change in land use and associated construction activities.

11.2.1.3 RA-1: Long-Term Effectiveness and Permanence (Balancing Criterion)

The magnitude of residual risk associated with COC-impacted soil would remain approximately at its current level for the long-term under current Site conditions. Potentially, risk may increase if the COC-impacted soil is encountered during Site construction activities. RA-1 is considered not effective in the long-term considering the planned change in land use and associated construction activities.

11.2.1.4 RA-1: Short-Term Effectiveness (Balancing Criterion)

This criterion concerns protection of human health and the environment during construction and implementation of RA-1 and the near-term immediately following implementation. Since RA-1 does not remediate, to the extent practical, the COC-impacted soil within the four development areas nor minimize or eliminate the potential for COC-impacted soil to be encountered during construction activities, RA-1 is not effective in the short-term (during and immediately following the planned construction).

11.2.1.5 RA-1: Reduction of Mobility, Toxicity, or Volume (Balancing Criterion)

RA-1 does not actively reduce the mass of COC nor does it result in a significant reduction of chemical mobility, toxicity, or volume. A small amount mass of organic compound may be reduced through natural attenuation processes, but these processes are expected to be slow.

11.2.1.6 RA-1: Implementability (Balancing Criterion)

RA-1 is technically implementable.

11.2.1.7 RA-1: Cost (Balancing Criterion)

There are no costs associated with the implementation of RA-1.

11.2.1.8 RA-1: Resilience to SLR

As noted in Section 5, the southern portion of the Site has the potential for inundation/flooding by 2100 due to SLR. In addition, increasing groundwater levels due to SLR have the potential to result in the saturation of deeper COC-contaminated soil by 2100. The potential for COC to affect groundwater quality due to leaching from soil is increased as a result of SLR. As such, RA-1 appears to be the least resilient remedial alternative of the three evaluated.

11.2.2 RA-2 – Excavation and On-Site Consolidation and Capping of Impacted Soil

As described in Section 10.1.1, RA-2 involves the physical removal of the COC-impacted soil by mechanical means only to the extent required for construction of the improvements on T1, T2, T3 and T4. A Land Use Covenant for the long-term management of soil exceeding Site cleanup goals would be required.

11.2.2.1 RA-2: Overall Protection of Human Health and the Environment (Threshold Criterion)

As described in Section 11.1, the ability to provide overall protection of human health and the environment is evaluated based on the certainty that the proposed remedial alternative will meet the relevant RAOs for the Site. Since RA-2 involves physical removal of COC-impacted soil needed for construction of building foundations and capping remaining COC-impacted soil beneath buildings/improvements, it is protective of human health and the environment in both the long- and short-terms.

11.2.2.2 RA-2: Compliance with ARARs (Threshold Criterion)

The ability to meet ARARs/TBCs is based on the ability to reduce or contain COC-impacted soil, to the extent practical. RA-2 involves removal of soil necessary for construction and capping of remaining COC-impacted soil (above the levels presented in Table B) beneath building foundations/improvements. Soil with COC exceeding Site cleanup levels would be managed by a LUC. As such, RA-2 is compliant with ARARs.

11.2.2.3 RA-2: Long-Term Effectiveness and Permanence (Balancing Criterion)

The long-term effectiveness and permanence of RA-2 will maintain protection of human health and the environment by removal of COC-contaminated soil necessary for construction and capping remaining soil exceeding Site cleanup levels beneath building foundations/improvements. Because RA-2 is a physical removal plus on-Site capping of remaining COC-impacted soil, the residual risks following implementation are expected to remain low. However, this alternative will require long-term monitoring to document its effectiveness.

11.2.2.4 RA-2: Short-Term Effectiveness (Balancing Criterion)

This criterion concerns protection of human health and the environment during construction and implementation of the RA and the near-term immediately following implementation. Since RA-2 is a reliable technology involving physical removal, it meets the criterion for short-term effectiveness. Because RA-2 involves heavy equipment, earth movement, and transport of COC-impacted soils for off-Site disposal, protection of workers and the community during implementation must be mitigated by appropriate engineering controls.

11.2.2.5 RA-2: Reduction of Mobility, Toxicity, or Volume (Balancing Criterion)

RA-2 involves physical removal and off-Site disposal of COC-impacted soil excavated for construction of the buildings/improvements and capping remaining COC-impacted soil beneath buildings/improvements; therefore, it is expected to result in a significant reduction of chemical mobility and eliminate potential exposure to future Site users. As a result of physical removal, the volume of COC-impacted soil remaining on-Site will be significantly reduced.

11.2.2.6 RA-2: Implementability (Balancing Criterion)

RA-2 is considered implementable due to the following: 1) needed equipment and services are readily available; 2) the necessary engineering design is minimal; 3) regulatory approvals and permits are expected to be obtainable; and 4) the technology (excavation) is reliable and is commonly used for remediation of contaminated soils.

11.2.2.7 RA-2: Cost (Balancing Criterion)

Estimated costs for RA-2 are discussed in Section 11.3.7

11.2.2.8 RA-2: Resilience to SLR

Under RA-2, COC-contaminated soil would be excavated and removed only to the extent needed for construction of the planned buildings/improvements. COC-contaminated soil that is deeper than the construction excavations would remain in-place and be capped by the buildings/foundations. Because RA-2 involves the removal of a significant amount of the COC-contaminated soil, this remedial alternative is more resilient to inundation/flooding SLR than RA-1, but the potential for groundwater to saturate deeper COC-contaminated soil is similar to RA-1. However, because the mass of COC remaining in soil after construction will be significantly reduced, and to a large extent removed, the corresponding risk of leaching to groundwater as a result of SLR is also significantly reduced.

11.2.3 RA-3 – Excavation and Off-Site Disposal of COC-Impacted Soil

As described in Section 10.1.3, RA-3 involves the removal of soil exceeding the Cleanup Levels within the T1, T2, T3 and T4 development areas and disposed of the soil at an appropriately licensed off-Site landfill. Most of the soil would be excavated as part of the building construction; additional deeper excavation beyond the depth required for construction will be conducted, as needed to remove soil that exceeds cleanup levels.

11.2.3.1 RA-3: Overall Protection of Human Health and the Environment (Threshold Criterion)

Because RA-3 involves physical removal and off-Site disposal of the COC-impacted soil within the four development areas, it will meet the established RAOs that are intended to be protective of human health and the environment in both the long- and short-terms.

11.2.3.2 RA-3: Compliance with ARARs (Threshold Criterion)

As noted above, the ability to meet ARARs/TBCs is based on the ability to reduce or contain COC-impacted soil, to the extent practical. Since RA-3 involves physical removal and off-Site disposal of COC-impacted soil from the four development areas, RA-3 is compliant with ARARs.

11.2.3.3 RA-3: Long-Term Effectiveness and Permanence (Balancing Criterion)

The long-term effectiveness and permanence of RA-3 will maintain protection of human health and the environment by removal of COC-contaminated from four development areas. Because RA-3 is a physical removal, the residual risks following implementation are expected to remain low.

11.2.3.4 RA-3: Short-Term Effectiveness (Balancing Criterion)

This criterion concerns protection of human health and the environment during construction and implementation of the RA and the near-term immediately following implementation. Since RA-3 is a reliable technology involving physical removal and off-Site disposal of COC-impacted soils, it meets the criterion for short-term effectiveness. As with RA-2, because RA-3 involves heavy equipment, earth movement, and transport of COC-impacted soils for off-Site disposal, protection of workers and the community during implementation and potential disruptions to neighborhoods must be mitigated by appropriate engineering controls.

11.2.3.5 RA-3: Reduction of Mobility, Toxicity, or Volume (Balancing Criterion)

RA-3 involves physical removal and off-Site disposal of COC-impacted soils; therefore, it is expected to result in a significant reduction of chemical mobility and volume in soil. The nature of the COC, and thereby its toxicity, is not expected to be effected in a significant manner.

11.2.3.6 RA-3: Implementability (Balancing Criterion)

RA-3 is considered implementable due to the following: 1) needed equipment and services are readily available; 2) the necessary engineering design is minimal; 3) regulatory approvals and permits are expected to be obtainable; and 4) the technology (excavation) is reliable and is commonly used for remediation of contaminated soils.

11.2.3.7 RA-3: Cost (Balancing Criterion)

Estimated costs for RA-3 are discussed in Section 11.3.7

11.2.3.8 RA-3: Resilience to SLR

Under RA-3, COC-contaminated soil would be excavated and removed from the T1, T2, T3 and T4 development areas. As such, the potential for groundwater to saturate deeper COC-contaminated soil is less than RA-2 and, therefore, is more resilient to SLR.

11.3 COMPARATIVE ANALYSIS OF ALTERNATIVES

This Section compares and summarizes the performance of each alternative with respect to the evaluation criteria set forth in NCP (40 CFR 300) and US EPA guidance (US EPA 1988).

11.3.1 Overall Protection of Human Health and the Environment

Except for RA-1, each of the RAs considered includes active remediation that is expected to achieve the RAOs. RA-1 does not employ any active soil remediation; therefore, RA-1 does not achieve the RAOs.

11.3.2 Compliance with ARARs

Except for RA-1, each of the RAs considered is expected to achieve the RAOs and, thereby, be compliant with ARARs. Although compliant with ARARs under the existing Site conditions and current Site use, RA-1 does not remove or cap COC-contaminated soil; therefore, RA-1 does not achieve the RAOs and is not compliant with ARARs for the planned change in land-use of the T1, T3 and T4 development areas.

11.3.3 Long-Term Effectiveness and Permanence

Since RA-1 will not meet RAOs in the context of the change in land use of the T1, T3 and T4 areas, the magnitude of residual risk associated with COC-impacted soil would remain approximately at its current level for the long-term under current Site conditions.

Risk will increase when the COC-impacted soil is encountered during Site construction activities. Both RA-2 and RA-3 will have long-term effectiveness and permanence because they both involve physical removal and off-Site disposal of COC-impacted soil that exceeds cleanup goals, with RA-2 capping a limited amount COC-contaminated soil beneath buildings and hardscapes.

11.3.4 Short-Term Effectiveness

Similar to long-term effectiveness, since RA-1 will not meet RAOs in the context of the change in land use of the T1, T3 and T4 areas, the magnitude of residual risk associated with COC-impacted soil would remain approximately at its current level for the short-term under current Site conditions.

Since RA-2 and RA-3 involve removal of COC-impacted soil and (for RA-2) capping remaining COC-impacted soil beneath improvements, they are considered to be effective in the short-term. Because RA-2 and RA-3 involve heavy equipment, subsurface drilling, earth movement, and other potentially hazardous activities, protection of workers and the community during implementation and potential disruptions to neighborhoods must be mitigated by appropriate engineering controls. RA-2 and RA-3 are similar with respect to short-term effectiveness, whereas RA-1 provides the lowest level of effectiveness.

11.3.5 Reduction of Mobility, Toxicity, or Volume

Except for RA-1, the RAs are expected to provide effective reduction of COC mobility as a result removal and capping beneath building foundations and hardscapes (RA-2). RA-3 will have a greater reduction in the volume of COC remaining within the four development areas compared to RA-2, but both RA-2 and RA-3 eliminate exposure routs to future Site occupants.

11.3.6 Implementability

Except for RA-1, the alternatives involve removal of COC-contaminated soil from the T1, T2, T3 and T4 development areas. Both RA-2 and RA-3 will require mobilization of heavy equipment and materials and additional planning and design to implement. Therefore, RA-1 is the easiest to implement. Implementability of RA-2 and RA-3 should not be prohibitively difficult as the required equipment and services are generally readily available; however, RA-2 and RA-3 are anticipated to be similar in complexity.

11.3.7 Cost

The cost of implementing an alternative includes capital and continuing costs. Continuing costs are defined as on-going costs (e.g., excavation of COC-impacted soil), engineering costs (e.g., preparing plans and specifications, and performing construction oversight), reporting costs, and regulatory agency oversight costs. No capital or continuing costs are associated with RA-1. As noted previously, the cost estimates developed herein are for the comparison of remedial alternatives during the remedy selection process, not for establishing project budgets.

11.3.7.1 Capital Costs

Capital costs associated with implementing RA-2 and RA-3 include construction costs (e.g., excavation of impacted material), engineering costs (e.g., preparing plans and specifications, and performing construction oversight), reporting costs, and regulatory agency oversight costs.

This criterion assesses the relative cost of each technology based on estimated fixed capital for construction or initial implementation and ongoing operational and maintenance costs. The actual costs will depend on true labor and material cost, competitive market conditions, final project scope, and the implementation schedule. Note that the costs estimated for this criterion are the incremental costs to implement the alternative above the normal construction costs incurred as part of development of the Site. For example, demolition of the existing pavements or excavation of soil for foundation construction are normal construction costs and are excluded from the cost estimate. Incremental cost for management/disposal of contaminated soil, beyond the normal construction soil disposal cost, are evaluated.

11.3.7.2 Continuing Costs

Since the DTSC will require a Land Use Covenant for RA-2, continuing costs will be incurred as a result of these institutional constraints. Such events will include annual inspections and five-year reviews. Because soil will be capped beneath building foundations and hardscapes in the T2 Plaza (RA-2), it is assumed that no additional maintenance costs will be required for the cap beyond costs that would be normally incurred for routine maintenance in the absence of capped soil.

11.3.7.3 Estimated Costs for Removal Actions

Estimated remediation costs for implementing each alternative, presented below, are calculated based on the sum of capital costs and continuing costs, including a 20 percent contingency for soil removal/disposal. Tables G1 and G2 in Appendix G present the cost estimates for implementing the removal alternatives.

Alternative 1: $0

Alternative 2: Estimated cost is approximately $3,318,000

Alternative 3: Estimated cost is approximately $4,433,000

11.4 RECOMMENDED REMOVAL ALTERNATIVE

RA-1 is the least effective of the proposed alternatives in mitigating the threat to human health and the environment and is not considered effective or implementable in the context of a change in land use of the T1, T3 and T4 development areas.

RA-2 and RA-3 are considered effective and implementable. These alternatives would require long-term operation and maintenance and regulatory involvement. By removing and/or capping COC-impacted soil, RA-2 and RA-3 significantly reduce risk to groundwater quality beneath the Site compared to RA-1.

Based on consideration of the above factors, RA-2 is recommended as the removal action alternative for the Site.

SECTION 12: REMEDIAL ACTION IMPLEMENTATION

12.1 REMEDIAL DESIGN AND IMPLEMENTATION PLAN

Implementation of the removal actions will consist of a series of separate tasks. Prior to implementing the approved removal action alternatives, a Remedial Design and Implementation Plan (RDIP) for each development phase will be prepared for DTSC review and approval. An RDIP may include two of the development phases, depending on the project schedule. The RDIPs will contain technical/operational plans and engineering designs for implementation of the approved removal alternatives, and a schedule for implementing the construction phase. A Sampling and Analysis Plan will be incorporated into the RDIP that describes confirmation sampling and quality assurance tasks necessary to confirm the effectiveness of the removal actions. In addition, because of concentrations of lead in soil that will be excavated, a Community Air Monitoring Plan (CAMP) also will be prepared and incorporated into the RDIPs. A separate SMP and HSP also will be provided for DTSC review and approval.

12.2 UNEXPECTED DISCOVERY DURING IMPLEMENTATION

The RDIP will include the following DTSC-provided language in the event unexpected conditions are discovered during RAP implementation.

Since this project involves ground disturbing activities, the following information is provided as a precaution in the event of any accidental discoveries of cultural resources or human remains:

i. All personnel performing the remedial activities must be observant and aware that they may potentially encounter Native American Tribal cultural or archaeological resources.

ii. Pursuant to existing government regulations, in the event of accidental discovery of human remains during ground disturbing activities, suspend the ground disturbing activities in the immediate area and surrounding 150 feet, and contact the County Coroner. Failure to notify can result in the issuance of a misdemeanor. The County Coroner will determine the origin of the remains. If the remains are Native American, the County Coroner will be responsible for contacting the Native American Heritage Council (NAHC). The NAHC will identify and notify the person(s) who might be the most likely descendent (MLD) who will make recommendations for the appropriate and dignified treatment of the remains (Public Resources Code, section 5097.98). The MLD shall complete their inspection and make recommendations or preferences for treatment within 48 hours of being granted access to the Site (CEQA Guidelines, CCR section 15064.5(e); HSC section 7050.5).

iii. In the event of accidental discovery of potential Tribal cultural or archaeological resources, immediately suspend ground disturbing activities in the immediate area and surrounding 100 feet and contact the local Native American contact. DTSC staff and property owner should also be immediately notified. After discussion with their Tribal Chairperson or respective Cultural Resources Managers or Tribal Historic Preservation

Officers and in collaboration with DTSC and the property owner, implement measures deemed necessary to record and/or protect the cultural or archaeological resource(s).

iv. Additionally, DTSC Tribal Coordinator and Project Manager shall be notified immediately in the event of any accidental discoveries of either potential cultural or archaeological resources or human remains.

SECTION 13: ADMINISTRATIVE CONTROLS

If soil exceeding unrestricted screening levels remains in-place beneath building foundations and/or hardscapes, a Land Use Covenant (LUC) will be prepared by DTSC for the Site so that the capped soil will not be disturbed without DTSC written approval. The fully executed LUC will be recorded with the Alameda County Recorder's Office before DTSC can issue a certification of Site cleanup completion. The LUC will include the following:

- Restrictions on any future intrusive activities that may potentially disturb or expose the COC-impacted materials without a Soil Management Plan (SMP) approved by DTSC;
- Activities that may disturb the capped areas (e.g. excavation, grading, removal, trenching, filling, earth movement, or mining) shall not be permitted without prior written approval by the DTSC;
- All uses and development of the capped areas shall preserve the integrity and effectiveness of the cap;
- Prohibition of sensitive land uses in areas where concentrations of COC in soil exceed residential/unrestricted screening criteria, such as ground level residences.
- Any contaminated soils brought to the surface by grading, excavation, trenching or backfilling shall be managed in accordance with all applicable provisions of state and federal law; and;
- Annual inspections and five-year reviews will be requirements included in the Land Use Covenant.

In addition to a LUC, if necessary and as applicable for each phase, an Operation and Maintenance Agreement with DTSC will be required for the implementation of an Operation and Maintenance Plan (OMP). The OMP will detail requirements for the long-term management of the soil impacted with COC exceeding unrestricted screening levels left in-place at the Site, as well as the maintenance requirements for the overlying cap. The OMP will include criteria for when periodic maintenance will be performed, plus requirements to maintain Financial Assurance and perform annual inspections and Five-Year Reviews.

SECTION 14: PUBLIC PARTICIPATION

DTSC has developed a public participation strategy to determine the level of public interest in the proposed removal actions at the Site and to inform the local community. Generally, the RAP process includes: 1) conducting a baseline community survey, 2) development of a community profile, 3) public notice of the public comment period, and 4) preparation and distribution of a fact sheet describing the proposed remedy selection and the availability of the draft RAP for public comment. The draft RAP public comment period will be at least 30 days. Site documents will be available in electronic format on DTSC's publicly accessible EnviroStor database (https://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=70000133). The project team may make the decision to hold a public meeting during the public comment period if there is sufficient community interest.

Once the public comment period is completed, DTSC will review and respond to the comments received. The RAP will be revised, as necessary, to address the comments received. If significant changes to the RAP are required, the RAP will be revised and be resubmitted for public review and comment. If significant changes are not required to the RAP, the RAP will be modified and DTSC will approve the finalized RAP for implementation.

SECTION 15: CEQA DOCUMENTATION

The California Environmental Quality Act (CEQA), modeled after the National Environmental Policy Act (NEPA) of 1969, was enacted in 1970 as a system of checks and balances for land-use development and management decisions in California. It is an administrative procedure to ensure comprehensive environmental review of cumulative impacts prior to project approval. It has no agency enforcement tool but allows challenge in courts.

A CEQA project is a project that has a potential for resulting in a direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment. CEQA applies to all discretionary projects proposed to be carried out or approved by California public agencies, unless an exemption applies. The City of Oakland prepared an Environmental Impact Report (EIR) for the West Oakland Specific Plan (https://www.oaklandca.gov/resources/current-environmental-review-ceqa-eir-documents-2011-2020) The DTSC anticipates preparing an Addendum to the EIR and a Notice of Determination.

SECTION 16: ADMINISTRATIVE RECORD AND LIST OF REFERENCES

This Administrative Record list is provided in general accordance with the DTSC RAP Memorandum dated September 28, 1998 and the 1994 DTSC Management Memo #EO-94-004-MM. The purpose of this list is to identify all documents that were relied on or considered in selecting the removal action and in preparing this RAP. An information repository was established to contain selected documents from the Administrative Record including technical reports and project correspondence prepared by Cornerstone and/or DTSC.

Administrative Record List

Arcadis. August 31, 2021. Corrective Action Implementation Plan (Revision 1), Former Signal Oil Station No., 206145 and Adjacent Parcels, 800 Center Street, Oakland, CA

Bradford, et.al. March 1996. *Background Concentrations of Trace and Major Elements in California Soils*. Kearney Foundation Special Report.

Cornerstone Earth Group. July 22, 2019. Work Plan for Soil, Soil Vapor and Groundwater Quality Evaluation, West Oakland Bay Area Rapid Transit Station, 1451 7th Street, Oakland, California

Cornerstone Earth Group. August 6, 2019. Phase I Environmental Site Assessment, West Oakland BART Station, 1451 7th Street, Oakland, California

Cornerstone Earth Group. November 13, 2019. Soil, Groundwater and Soil Vapor Quality Evaluation, West Oakland BART Station, 1451 7th Street, Oakland, California

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Cornerstone Earth Group. September 5, 2024. Draft Remedial Action Plan for Proposed Mandela Station Mixed-Use Development at West Oakland Bay Area Rapid Transit Station, 1451 7th Street, Oakland, California

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DTSC. 2020b. Supplemental guidance: Screening and evaluating vapor intrusion. Draft for Public Comments. California Department of Toxic Substances Control, California Water Resources Control Boards. February.

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Parikh Consultants, Inc. Preliminary Geotechnical Report, West Oakland BART Station Transit-Oriented Design Project, 1451 7th Street, Oakland, California

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USEPA, 2020. Regional Screening Levels for Chemical Contaminants at Superfund Sites, USEPA Region 9, updated November 2020.

Weiss Associates. June 29, 2007. Targeted Site Investigation and Analysis Report for West Oakland Bay Area Rapid Transit Station, Oakland, California

SECTION 17: LIMITATIONS

This report was prepared for the use of Mandela Station Partners LLC and the DTSC in evaluating removal action alternatives. In providing opinions of estimated remediation cost, Mandela Station Partners LLC understands that Cornerstone Earth Group has no control over the cost or availability of labor, equipment or materials; market conditions; or the Contractor's method of pricing, and that Cornerstone Earth Group's opinions of estimated remediation cost are made on the basis of our professional judgment and experience. We recommend obtaining bids from qualified contractors who are experienced in performing this type of work.

Cornerstone Earth Group makes no warranty, expressed, or implied, that the bids, the negotiated cost of work, or the actual cost of work will not vary from Cornerstone Earth Group's opinion of estimated remediation cost.

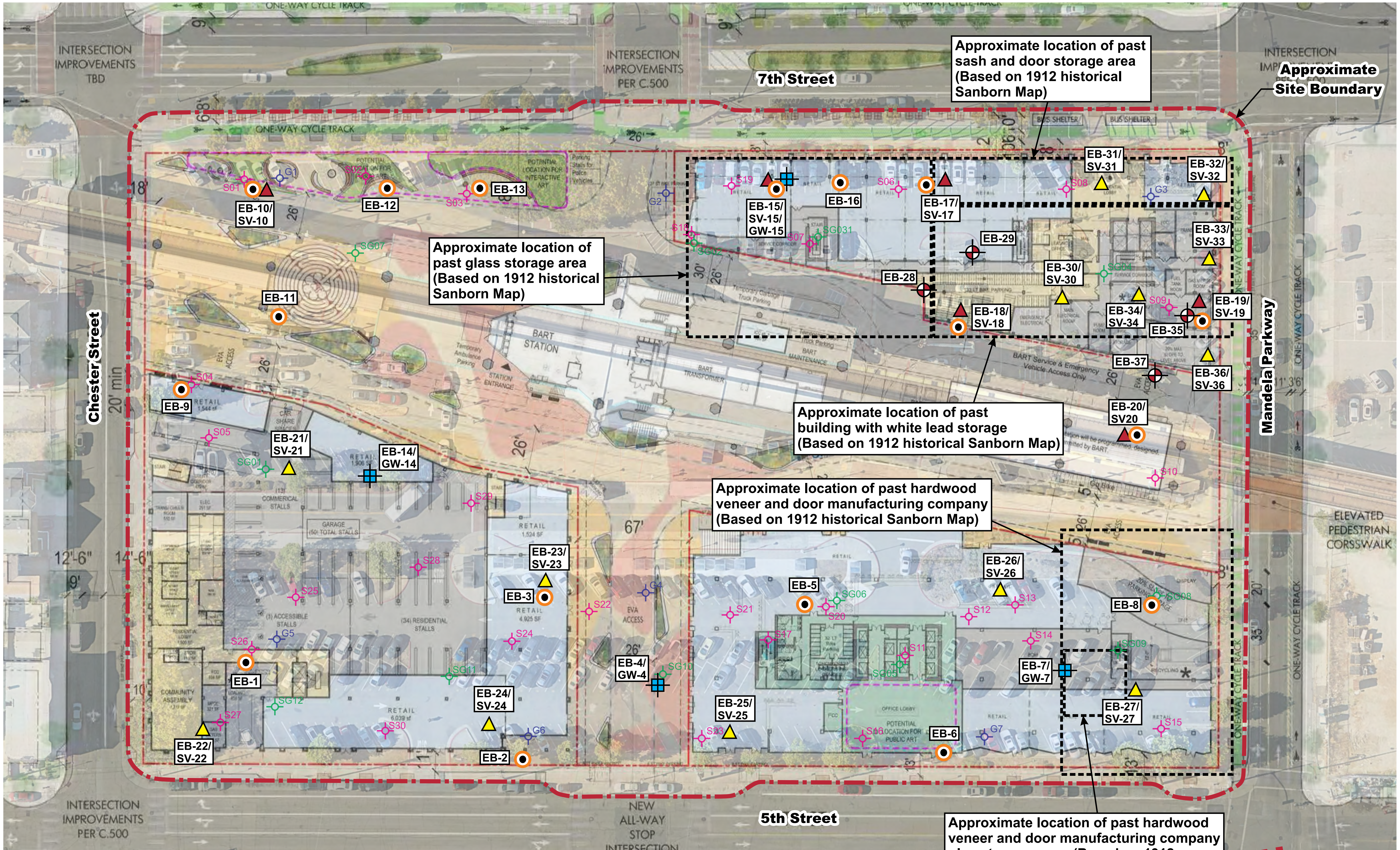
FIGURES

CORNERSTONE EARTH GROUP

Vicinity Map

West Oakland BART Station
1451 7th Street
Oakland, CA

Project Number	1261-1-4
Figure Number	Figure 1
Date	August 2024
Drawn By	RRN



Legend

- Approximate location of exploratory boring for soil and groundwater sample collection (EB/GW) (Cornerstone, 2018)
- Approximate location of exploratory boring for soil sample collection (EB) (Cornerstone, 2018)
- Approximate location of exploratory boring for soil vapor sample collection (SV) (Cornerstone, 2018)
- Approximate location of exploratory boring for soil and soil vapor sample collection (EB/SV) (Cornerstone, 2021)
- S01 Approximate location of soil sample and ID (Weiss Associates, 2007)
- SG01 Approximate location of soil gas sample and ID (Weiss Associates, 2007)
- G1 Approximate location of groundwater sample and ID (Weiss Associates, 2007)
- Approximate location of exploratory boring for soil sample collection (EB) (Cornerstone, 2021)

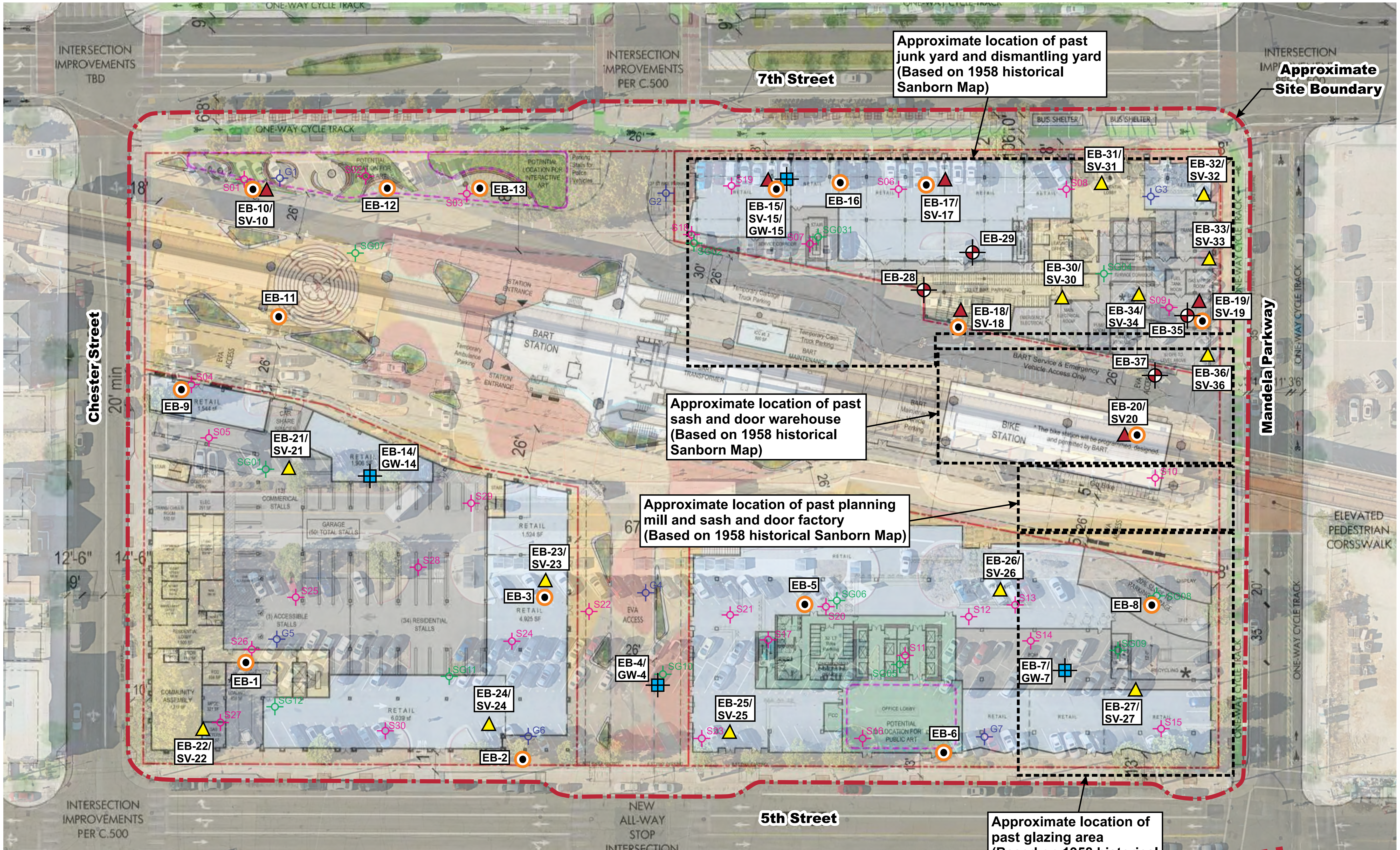
Base by Google Earth, dated 04/01/2022
Overlay by JRDV Architects, Inc., Site Plan - A-9.01, dated 07/24/2020

Site Plan with Selected 1912 Site Features

West Oakland BART Station
1451 7th Street
Oakland, CA

Project Number 1261-1-4
Figure Number Figure 2A
Date December 2024
Drawn By RRN

CORNERSTONE EARTH GROUP



Legend

- Approximate location of exploratory boring for soil and groundwater sample collection (EB/GW) (Cornerstone, 2018)
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- G1 Approximate location of groundwater sample and ID (Weiss Associates, 2007)
- Approximate location of exploratory boring for soil sample collection (EB) (Cornerstone, 2021)

N

0 60 120
APPROXIMATE SCALE (FEET)

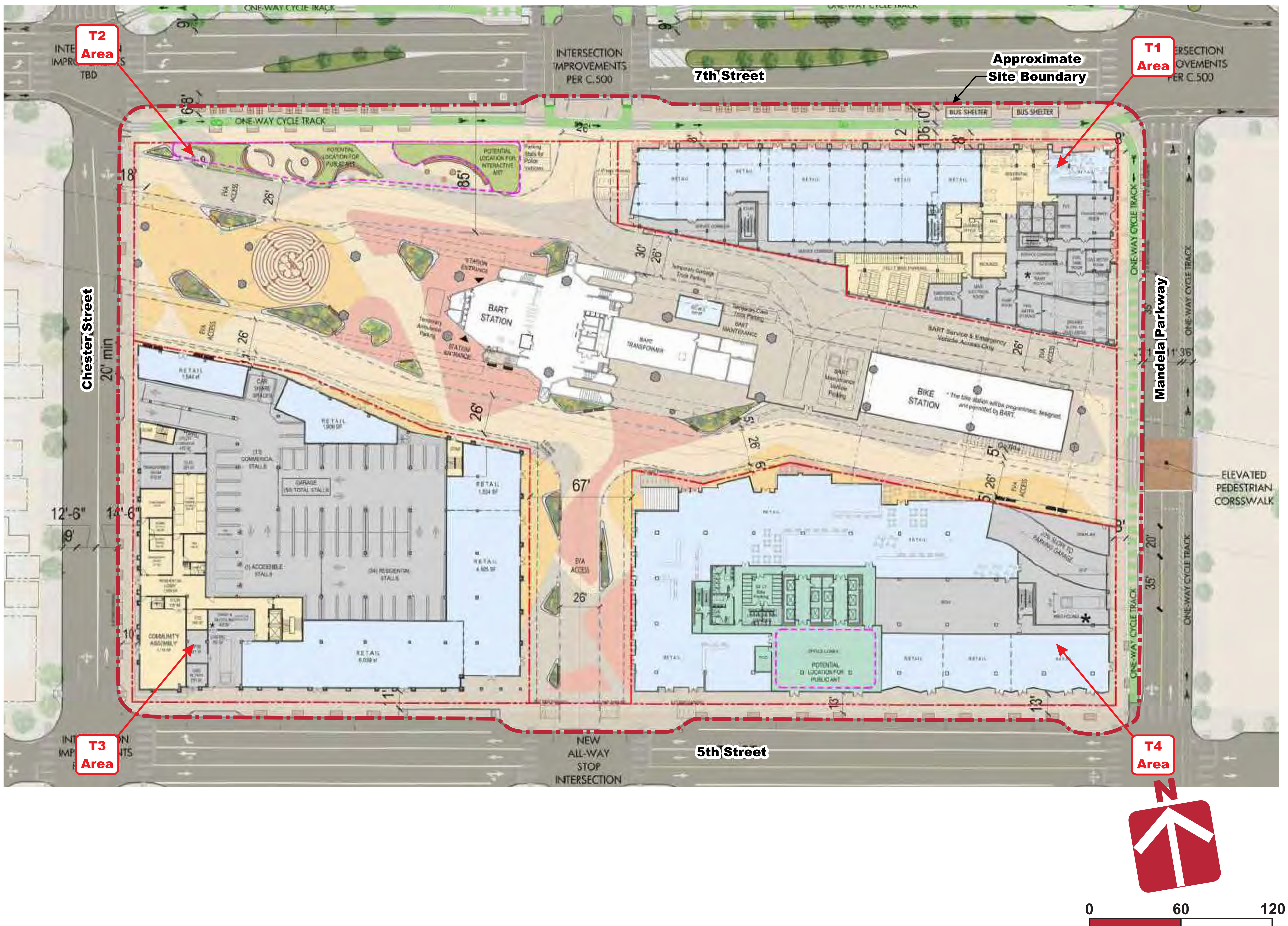
Base by Google Earth, dated 04/01/2022
Overlay by JRDV Architects, Inc., Site Plan - A-9.01, dated 07/24/2020

Site Plan with Selected 1958 Site Features

West Oakland BART Station
1451 7th Street
Oakland, CA

CORNERSTONE EARTH GROUP

Project Number	1261-1-4
Figure Number	Figure 2B
Date	December 2024
Drawn By	RRN



Site Development Plan

West Oakland BART Station
1451 7th Street
Oakland, CA

Project Number: 1261-1-4

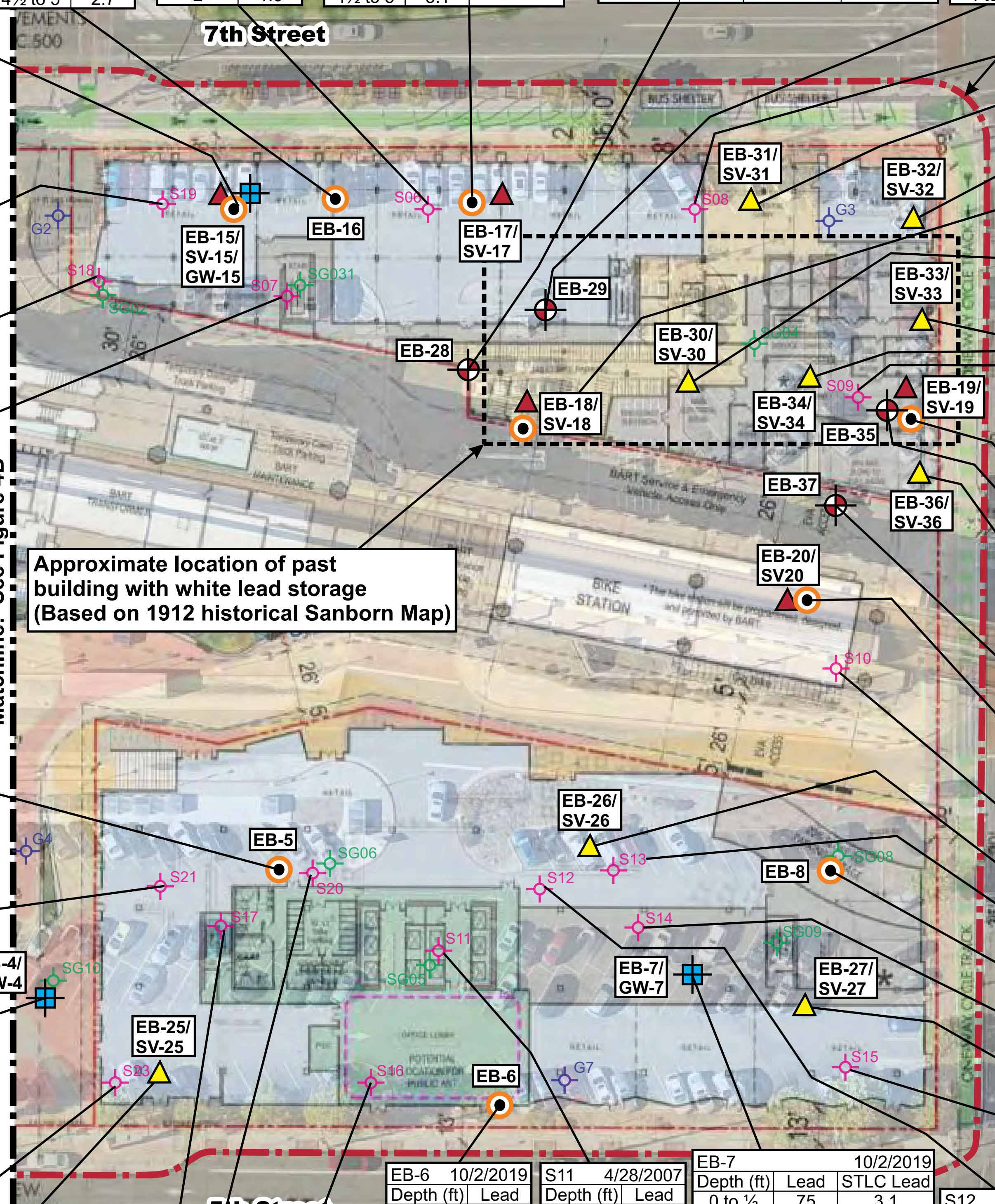
Figure Number: Figure 3

Date: August 2024

Drawn By: RRN

CORNERSTONE EARTH GROUP

Base by JRDV Architects, Inc., Site Plan - A-9.01, dated 07/24/2020



EB-15	10/4/2019
Depth (ft)	Lead
0 to ½	22
2½ to 3	4.9
4½ to 5	2.7
7½ to 8	4.7
9 to 10	3.2
14 to 15	3.6

EB-16	10/3/2019
Depth (ft)	Lead
0 to ½	14
2½ to 3	4.7
4½ to 5	2.7

S06	4/28/2007
Depth (ft)	Lead
½	1.8
2	1.6

EB-17		10/3/2019
Depth (ft)	Lead	STLC Lead
0 to ½	**620**	**31**
2½ to 3	3.0	---
4½ to 5	3.1	---

EB-28			2/16/2021
Depth (ft)	Lead	STLC Lead	TCLP Lead
0 to 1	**1,720**	---	**18.3**
2 to 3	**492**	**16.7**	<0.20
4 to 5	**132**	**8.44**	0.247

EB-29	2/16/2021
Depth (ft)	Lead
0 to 1	26.5
2 to 3	---
4 to 5	3.59

S08	4/28/2007
Depth (ft)	Lead
½	5.1
2	5.2

EB-31		2/16/2021
Depth (ft)	Lead	STLC Lead
0 to 1	54	**13.1**
2 to 3	3.67	---
4 to 5	3.35	---

EB-32	2/16/2021
Depth (ft)	Lead
0 to 1	20.3
2 to 3	6.9
4 to 5	8.3

EB-18			10/4/2019
Depth (ft)	Lead	STLC Lead	TCLP Lead
0 to ½	**800**	**33**	0.59
2½ to 3	**5,100**	---	**28**
4½ to 5	62	<0.50	---

EB-30			2/16/2021
Depth (ft)	Lead	STLC Lead	TCLP Lead
0 to 1	**570**	**40.2**	0.885
2 to 3	**340**	**6.07**	---
4 to 5	5.25	---	---

EB-33			2/16/2021
Depth (ft)	Lead	STLC Lead	TCLP Lead
0 to 1	**369**	**15.9**	0.387
2 to 3	**90.5**	4.88	---
4 to 5	16.6	---	---

EB-34			2/16/2021
Depth (ft)	Lead	STLC Lead	TCLP Lead
0 to 1	**236**	**16.9**	0.779
2 to 3	**3,930**	---	**59.8**
4 to 5	24	---	---

S09	4/28/2007
Depth (ft)	Lead
½	**370**
2	**6,300**

EB-19		10/4/2019
Depth (ft)	Lead	STLC Lead
0 to ½	**300**	**18**
2½ to 3	**23,000**	---
4½ to 5	**260**	1.6

EB-35	2/16/2021
Depth (ft)	Lead
7 to 8	<3.0
9 to 10	<3.0

EB-36			2/16/2021
Depth (ft)	Lead	STLC Lead	TCLP Lead
0 to 1	**221**	**49.4**	2.73
2 to 3	**595**	**172**	0.294
4 to 5	5.75	---	---

EB-37		2/16/2021
Depth (ft)	Lead	TCLP Lead
0 to 1	**1,260**	0.314
2 to 3	32.6	---
4 to 5	27.4	---

EB-20		10/4/2019
Depth (ft)	Lead	STLC Lead
0 to ½	68	0.5
2½ to 3	**230**	**14**
4½ to 5	**370**	**16**

S10	4/28/2007
Depth (ft)	Lead
½	**140**
2	14

EB-26		2/17/2021
Depth (ft)	Lead	STLC Lead
0 to 1	**175**	**11.1**
2 to 3	<3.0	---
4 to 5	<3.0	---

S13	4/28/2007
Depth (ft)	Lead
½	2.1
2	10

EB-8		10/2/2019
Depth (ft)	Lead	STLC Lead
0 to ½	54	**5.1**
2½ to 3	4.5	---
4½ to 5	3.2	---
7½ to 8	5.1	---
9 to 10	3.8	---

S14	4/28/2007
Depth (ft)	Lead
½	1.7
2	1.5

EB-27			2/17/2021
Depth (ft)	Lead	STLC Lead	TCLP Lead
0 to 1	**112**	**6.41**	<0.20
2 to 3	<3.0	---	---
4 to 5	4.39	---	---

S15	4/28/2007
Depth (ft)	Lead
½	1.6
2	1.4

S12	4/28/2007
Depth (ft)	Lead
½	1.6
2	1.6

EB-7		10/2/2019
Depth (ft)	Lead	STLC Lead
0 to ½	75	3.1
2½ to 3	3.2	---
4½ to 5	3.1	---
7½ to 8	3.6	---
9 to 10	4.2	---
14 to 15	3.5	---

S11	4/28/2007
Depth (ft)	Lead
½	13
2	1.9

EB-6	10/2/2019
Depth (ft)	Lead
0 to ½	2.6
2½ to 3	2.2
4½ to 5	2.8
7½ to 8	3.9
9 to 10	2.8

S16	4/28/2007
Depth (ft)	Lead
½	1.7
2	1.6

S17	4/28/2007
Depth (ft)	Lead
½	**190**
2	2.0

S20	5/6/2007
Depth (ft)	Lead
½	7.6
2	4.4

EB-25			2/17/2021
Depth (ft)	Lead	STLC Lead	TCLP Lead
0 to 1	**2,070**	---	3.6
2 to 3	53.5	0.504	---
4 to 5	3.04	---	---

S23	5/6/2007
Depth (ft)	Lead
½	61
2	**190**

EB-4		10/2/2019
Depth (ft)	Lead	STLC Lead
0 to ½	**540**	---
2½ to 3	**230**	**19**
4½ to 5	3.7	---
7½ to 8	4.1	---
9 to 10	3.3	---
14 to 15	3.5	---

S21	5/6/2007
Depth (ft)	Lead
½	**220**
2	**1,300**

EB-5		10/2/2019
Depth (ft)	Lead	STLC Lead
0 to ½	**840**	**97**
2½ to 3	5.8	---
4½ to 5	2.7	---
7½ to 8	3.4	---
9 to 10	4.0	---

S07	4/28/2007
Depth (ft)	Lead
½	48
2	3.7

S18	5/6/2007
Depth (ft)	Lead
½	30
2	14

S19	5/6/2007
Depth (ft)	Lead
½	28
2	33

Screening Levels

Lead 80 [1] mg/kg
STLC Lead 5.0 [2] mg/L
TCLP Lead 5.0 [3] mg/L

1 Department of Toxic Substance Control Recommended Screening Level (SL), residential soil, HERO Note 3 - April 2019

2 Soluble Threshold Limit Concentration - California Code of Regulations, Title 22, Chapter 11, Article 3

3 Toxicity Characteristics Leaching Procedure - 40 Code of Federal Regulations (CFR) Section 261.24

--- Not Analyzed

< Not detected at or above laboratory reporting limit

BOLD Concentration exceeds selected environmental screening criteria

Legend

- Approximate location of exploratory boring for soil and groundwater sample collection (EB/GW) (Cornerstone, 2018)
- Approximate location of exploratory boring for soil sample collection (EB) (Cornerstone, 2018)
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0 60 120
APPROXIMATE SCALE (FEET)

N

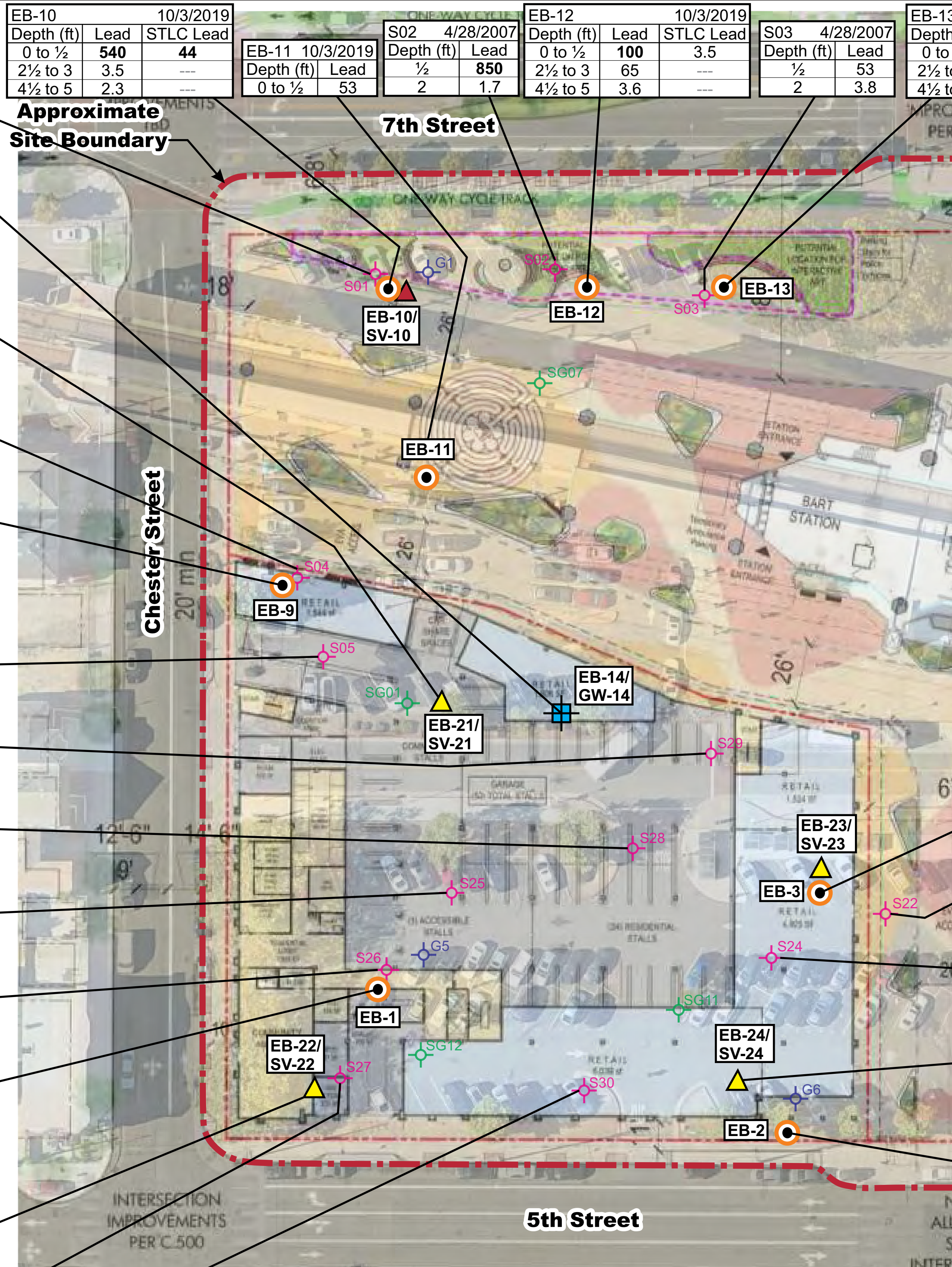
Base by Google Earth, dated 04/01/2022
Overlay by JRDV Architects, Inc., Site Plan - A-9.01, dated 07/24/2020

Selected Lead Analytical Results

West Oakland BART Station
1451 7th Street
Oakland, CA

Project Number 1261-1-4
Figure Number Figure 4A
Date August 2024
Drawn By RRN

CORNERSTONE EARTH GROUP



S01	4/28/2007
Depth (ft)	Lead
½	**500**
2	1.9

EB-14	10/3/2019
Depth (ft)	Lead
0 to ½	3.0
2½ to 3	2.3
4½ to 5	2.5
7½ to 8	3.9
9 to 10	3.7
14 to 15	4.0

EB-21			2/16/2021
Depth (ft)	Lead	STLC Lead	TCLP Lead
0 to 1	**192**	**27**	<0.20
2 to 3	<3.0	---	---
4 to 5	<3.0	---	---

S04	4/28/2007
Depth (ft)	Lead
½	1.7
2	1.4

EB-9	10/3/2019
Depth (ft)	Lead
0 to ½	3.9
2½ to 3	3.4
4½ to 5	6.0
7½ to 8	4.6
9 to 10	3.4

S05	4/28/2007
Depth (ft)	Lead
½	1.5
2	1.6

S29	5/6/2007
Depth (ft)	Lead
½	7.3
2	1.7

S28	5/6/2007
Depth (ft)	Lead
½	2.1
2	2.0

S25	5/6/2007
Depth (ft)	Lead
½	**1,200**
2	1.9

S26	5/6/2007
Depth (ft)	Lead
½	**220**
2	2.4

EB-1	10/2/2019
Depth (ft)	Lead
0 to ½	7.2
2½ to 3	4.3
4½ to 5	5.6
7½ to 8	3.4
9 to 10	3.6

EB-22	2/17/2021
Depth (ft)	Lead
0 to 1	8.05
2 to 3	5.35
4 to 5	3.93

S27	5/6/2007
Depth (ft)	Lead
½	1.8
2	2.9

S30	5/6/2007
Depth (ft)	Lead
½	**220**
2	2.3

EB-10		10/3/2019
Depth (ft)	Lead	STLC Lead
0 to ½	**540**	**44**
2½ to 3	3.5	---
4½ to 5	2.3	---

EB-11	10/3/2019
Depth (ft)	Lead
0 to ½	53

S02	4/28/2007
Depth (ft)	Lead
½	**850**
2	1.7

EB-12		10/3/2019
Depth (ft)	Lead	STLC Lead
0 to ½	**100**	3.5
2½ to 3	65	---
4½ to 5	3.6	---

S03	4/28/2007
Depth (ft)	Lead
½	53
2	3.8

EB-13		10/3/2019
Depth (ft)	Lead	STLC Lead
0 to ½	**90**	2.8
2½ to 3	**400**	**18**
4½ to 5	3.3	---

EB-3		10/2/2019
Depth (ft)	Lead	STLC Lead
0 to ½	**910**	**120**
2½ to 3	**280**	**26**
4½ to 5	5.4	---
7½ to 8	2.8	---
9 to 10	3.6	---

S22	5/6/2007
Depth (ft)	Lead
½	**630**
2	**94**

S24	5/6/2007
Depth (ft)	Lead
½	47
2	**730**

EB-24		2/17/2021
Depth (ft)	Lead	STLC Lead
0 to 1	31	---
2 to 3	53.5	**16.3**
4 to 5	8.95	---

EB-2		10/2/2019
Depth (ft)	Lead	TCLP Lead
0 to ½	**1,100**	0.5
2½ to 3	**2,500**	1.9
4½ to 5	8.2	---
7½ to 8	4.1	---
9 to 10	4.1	---

Screening Levels

Lead	80 [1] mg/kg
STLC Lead	5.0 [2] mg/L
TCLP Lead	5.0 [3] mg/L

1 Department of Toxic Substance Control Recommended Screening Level (SL), residential soil, HERO Note 3 - April 2019

2 Soluble Threshold Limit Concentration - California Code of Regulations, Title 22, Chapter 11, Article 3

3 Toxicity Characteristics Leaching Procedure - 40 Code of Federal Regulations (CFR) Section 261.24

--- Not Analyzed

< Not detected at or above laboratory reporting limit

BOLD Concentration exceeds selected environmental screening criteria

Legend

- Approximate location of exploratory boring for soil and groundwater sample collection (EB/GW) (Cornerstone, 2018)
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0 60 120
APPROXIMATE SCALE (FEET)

Base by Google Earth, dated 04/01/2022
Overlay by JRDV Architects, Inc., Site Plan - A-9.01, dated 07/24/2020

Selected Lead Analytical Results

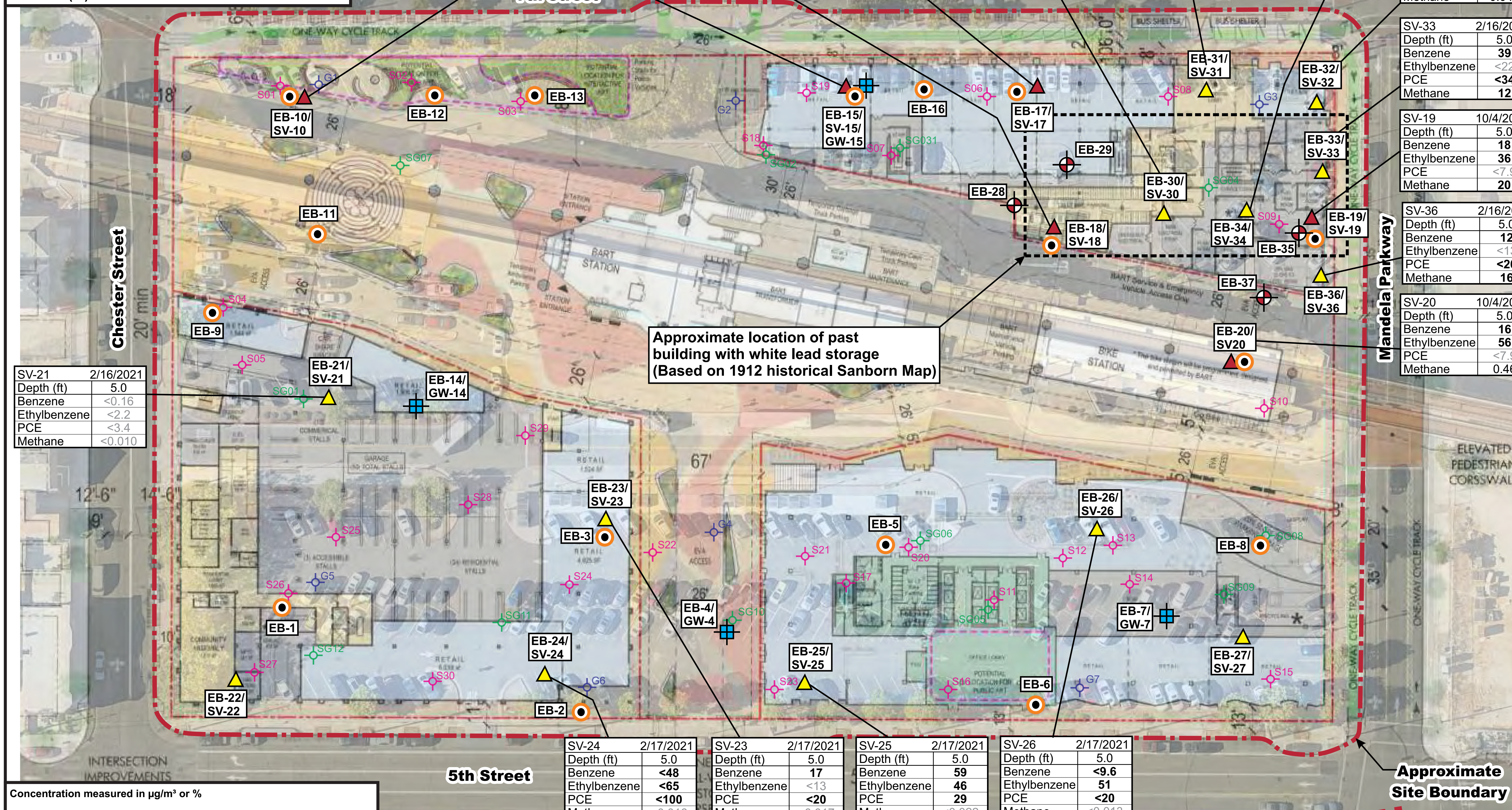
West Oakland BART Station
1451 7th Street
Oakland, CA

Project Number 1261-1-4
Figure Number Figure 4B
Date August 2024
Drawn By RRN

CORNERSTONE EARTH GROUP

Screening Levels

	Residential Screening Criteria	Commercial Screening Criteria
Benzene	2.91 [1] µg/m³	12.6 [1] µg/m³
Ethylbenzene	33 [2] µg/m³	147 [2] µg/m³
PCE	13.8 [1] µg/m³	60 [1] µg/m³
Methane (%)	5.0 [3] %	5.0 [3] %



Sample	Date	Depth (ft)	Benzene	Ethylbenzene	PCE	Methane
SV-10	10/4/2019	5.0	**4.2**	<4.9	<7.6	<0.00022
SV-15	10/4/2019	5.0	<3.7	11	<7.9	<0.00023
SV-18	10/4/2019	5.0	**10**	<5.8	<9.0	0.00045
SV-17	10/4/2019	5.0	<3.6	5.2	<7.6	<0.00022
SV-30	2/16/2021	5.0	2.5	<2.2	9.6	0.28
SV-31	2/16/2021	5.0	2.7	<2.2	11	<0.021
SV-34	2/16/2021	5.0	**30**	<22	**<34**	**7.0**
SV-32	2/16/2021	5.0	**<4.8**	<6.5	<10	0.047
SV-33	2/16/2021	5.0	**39**	<22	**<34**	**12**
SV-19	10/4/2019	5.0	**18**	**36**	<7.9	**20**
SV-36	2/16/2021	5.0	**12**	<13	**<20**	**16**
SV-20	10/4/2019	5.0	**16**	**56**	<7.9	0.46
SV-21	2/16/2021	5.0	<0.16	<2.2	<3.4	<0.010
SV-24	2/17/2021	5.0	**<48**	**<65**	**<100**	<0.016
SV-23	2/17/2021	5.0	**17**	<13	**<20**	<0.017
SV-25	2/17/2021	5.0	**59**	**46**	**29**	<0.022
SV-26	2/17/2021	5.0	**<9.6**	**51**	**<20**	<0.013

Concentration measured in µg/m³ or %

1 Calculated screening level based on the Residential/Commercial ambient air Department of Substances Control Recommended Screening Level (DTSC, HERO Note 3 - June 2020) and an attenuation factor of 1/30

2 Calculated screening level based on the Residential/Commercial ambient air Regional Screening Level (RSL, USEPA Region 9 - November 2020) and an attenuation factor of 1/30

3 Lower Explosive Limit for methane

< Not detected at or above laboratory reporting limit

BOLD Concentration exceeds selected environmental screening criteria

Base by Google Earth, dated 04/01/2022
Overlay by JRDV Architects, Inc., Site Plan - A-9.01, dated 07/24/2020

Legend

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- G1 Approximate location of groundwater sample and ID (Weiss Associates, 2007)
- Approximate location of exploratory boring for soil sample collection (EB) (Cornerstone, 2021)

N

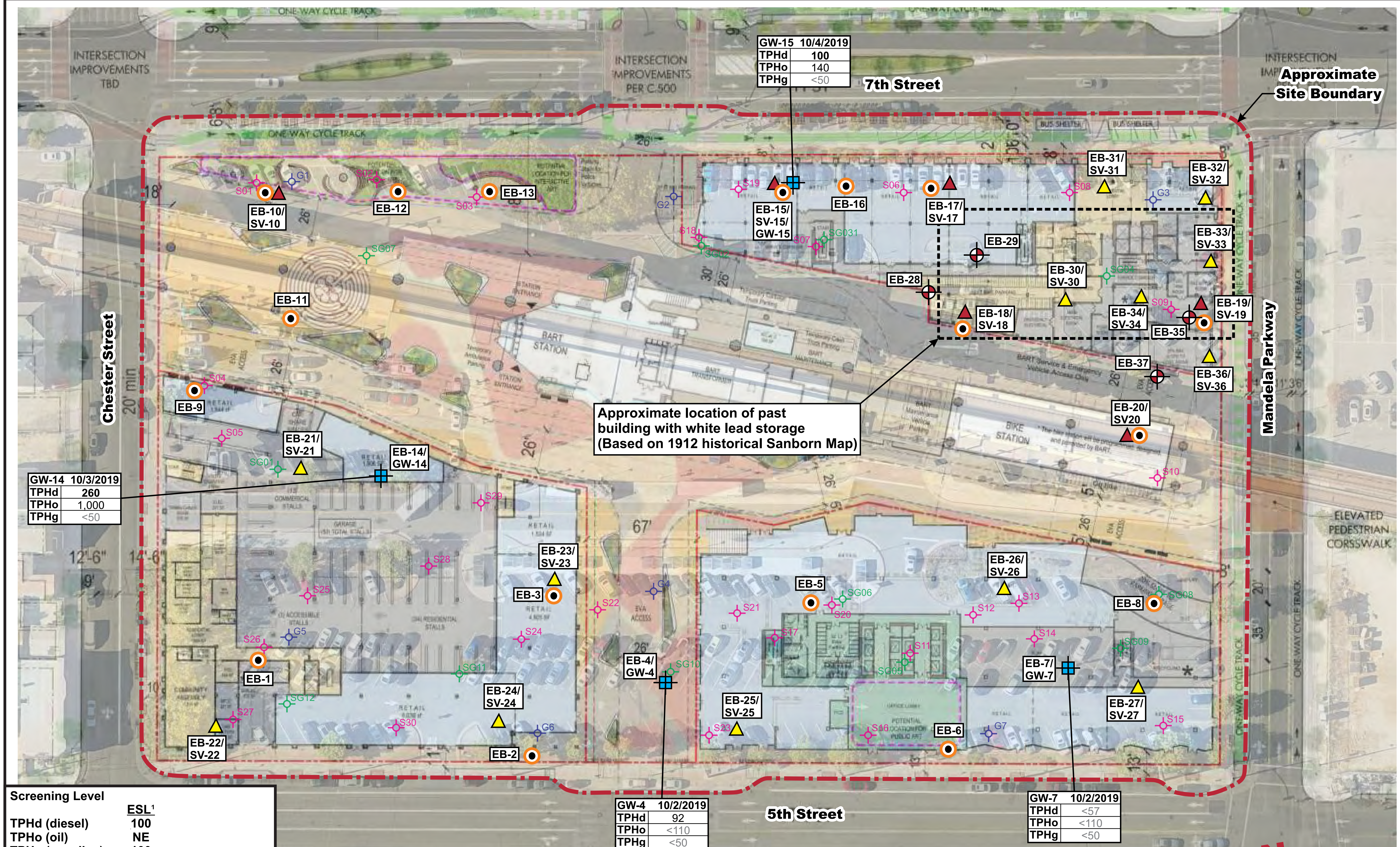
0 60 120
APPROXIMATE SCALE (FEET)

Selected Soil Vapor Analytical Results

West Oakland BART Station
1451 7th Street
Oakland, CA

Project Number 1261-1-4
Figure Number Figure 5
Date August 2024
Drawn By RRN

CORNERSTONE EARTH GROUP



Screening Level

	ESL[1]
TPHd (diesel)	100
TPHo (oil)	NE
TPHg (gasoline)	100

Concentrations measured in µg/L

1 Environmental Screening Levels [Tier 1] (ESL), San Francisco Bay Region Water Quality Control Board, January 2019

< Not detected at or above laboratory reporting limit

NE Not Established

BOLD Concentration exceeds selected environmental screening criteria

Base by Google Earth, dated 04/01/2022
Overlay by JRDV Architects, Inc., Site Plan - A-9.01, dated 07/24/2020

Legend

- Approximate location of exploratory boring for soil and groundwater sample collection (EB/GW) (Cornerstone, 2018)
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- G1 Approximate location of groundwater sample and ID (Weiss Associates, 2007)
- Approximate location of exploratory boring for soil sample collection (EB) (Cornerstone, 2021)

N

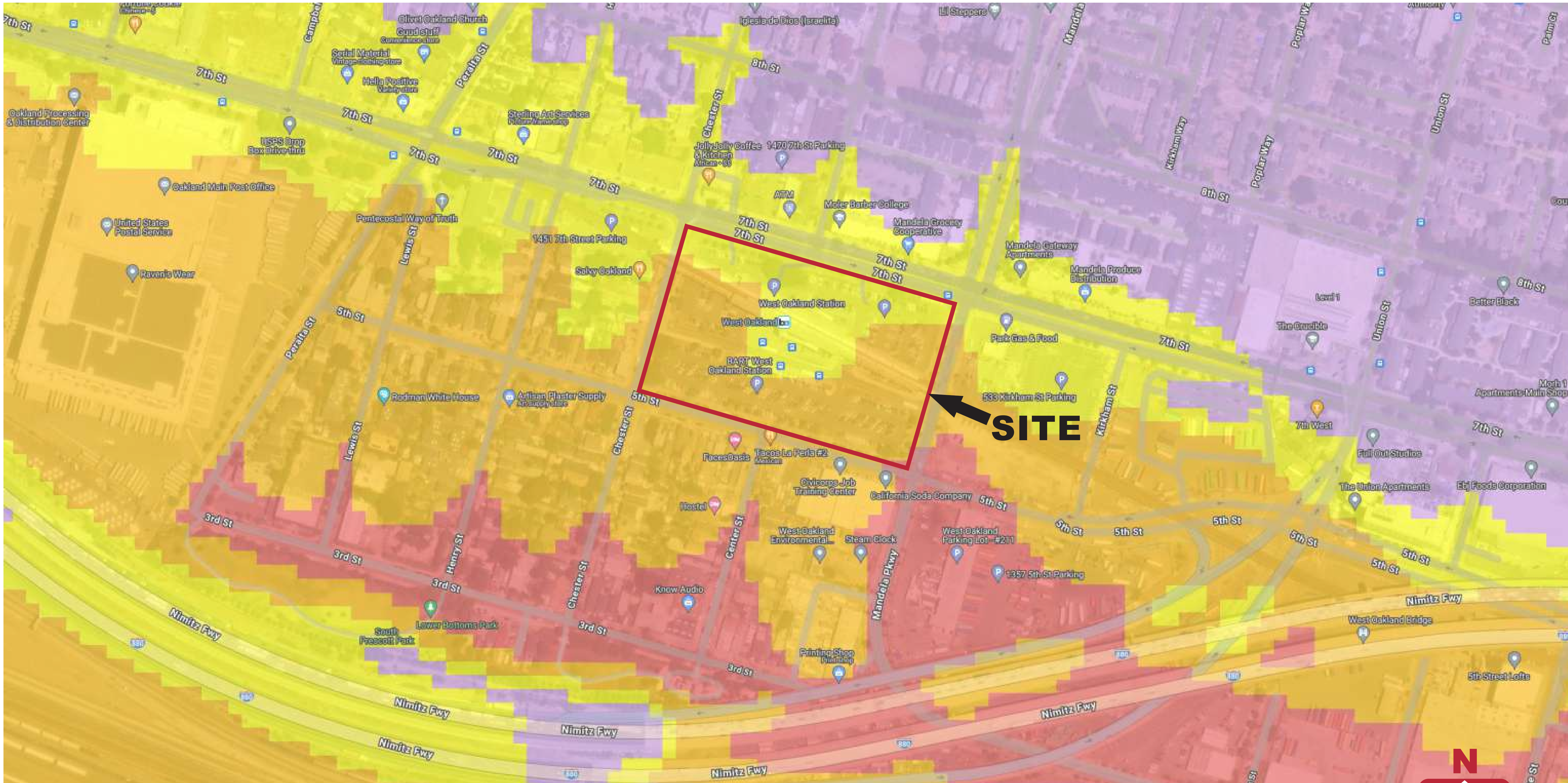
0 60 120
APPROXIMATE SCALE (FEET)

Selected Groundwater Analytical Results

West Oakland BART Station
1451 7th Street
Oakland, CA

Project Number	Figure Number	Date	Drawn By
1261-1-4	Figure 6	August 2024	RRN

CORNERSTONE EARTH GROUP



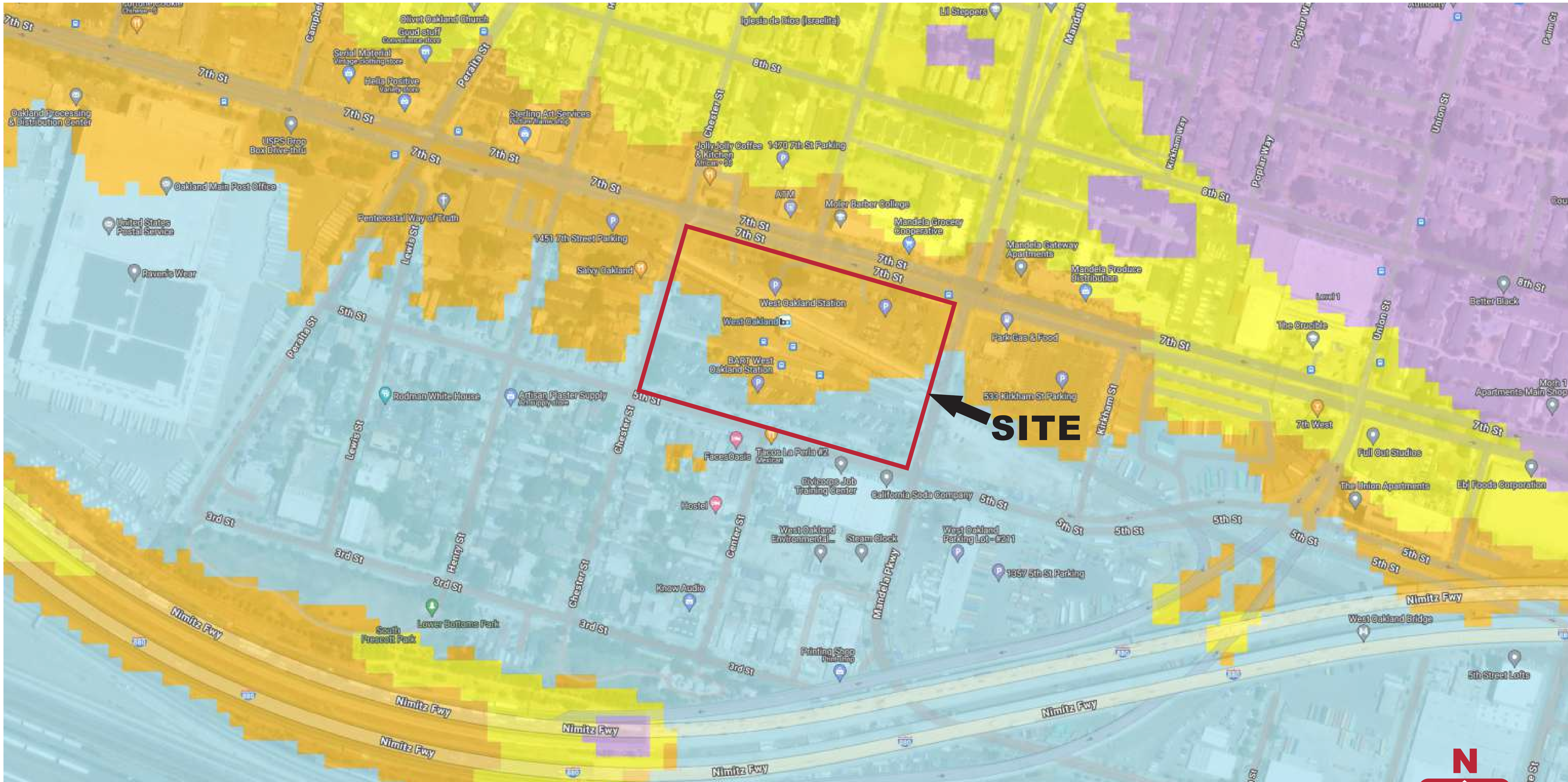
Marine Inundation (MHHW sea level)
Water Table at Surface (Emergent)
Water Table Between 0-1m Depth (Very Shallow)
Water Table Between 1-2m Depth (Shallow)
Water Table Between 2-5m Depth (Moderate)

N

0 250 500
APPROXIMATE SCALE (FEET)

Base: OCOF/CoSMoS, https://ourcoastourfuture.org/hazard-map/, 100 cm SLR, more permeable soils, undated

CORNERSTONE EARTH GROUP	Projected Depth to Groundwater at 100 cm of Sea Level Rise	Project Number 1261-1-4
	West Oakland BART Station 1451 7th Street Oakland, CA	Figure Number Figure 7A
		Date August 2024 / Drawn By RRN

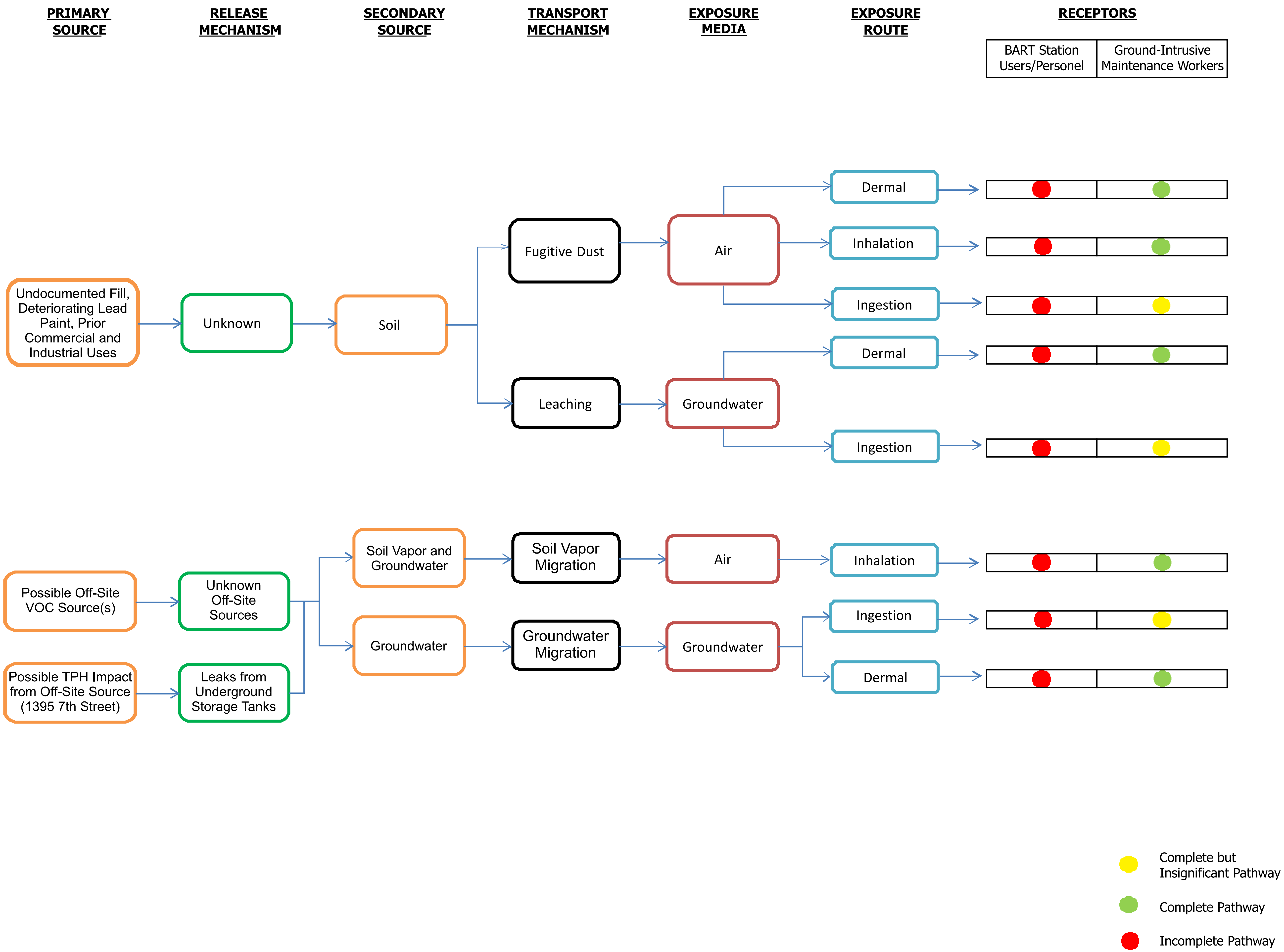


Marine Inundation (MHHW sea level)
Water Table at Surface (Emergent)
Water Table Between 0-1m Depth (Very Shallow)
Water Table Between 1-2m Depth (Shallow)
Water Table Between 2-5m Depth (Moderate)

Base: OCOF/CoSMoS, https://ourcoastourfuture.org/hazard-map/, 200 cm SLR, more permeable soils, undated

CORNERSTONE EARTH GROUP

Projected Depth to Groundwater at 200 cm of Sea Level Rise	Project Number 1261-1-4	
West Oakland BART Station 1451 7th Street Oakland, CA	Figure Number Figure 7B	
	Date August 2024	Drawn By RRN



Conceptual Site Model - Existing Conditions

West Oakland BART Station
1451 7th Street
Oakland, CA

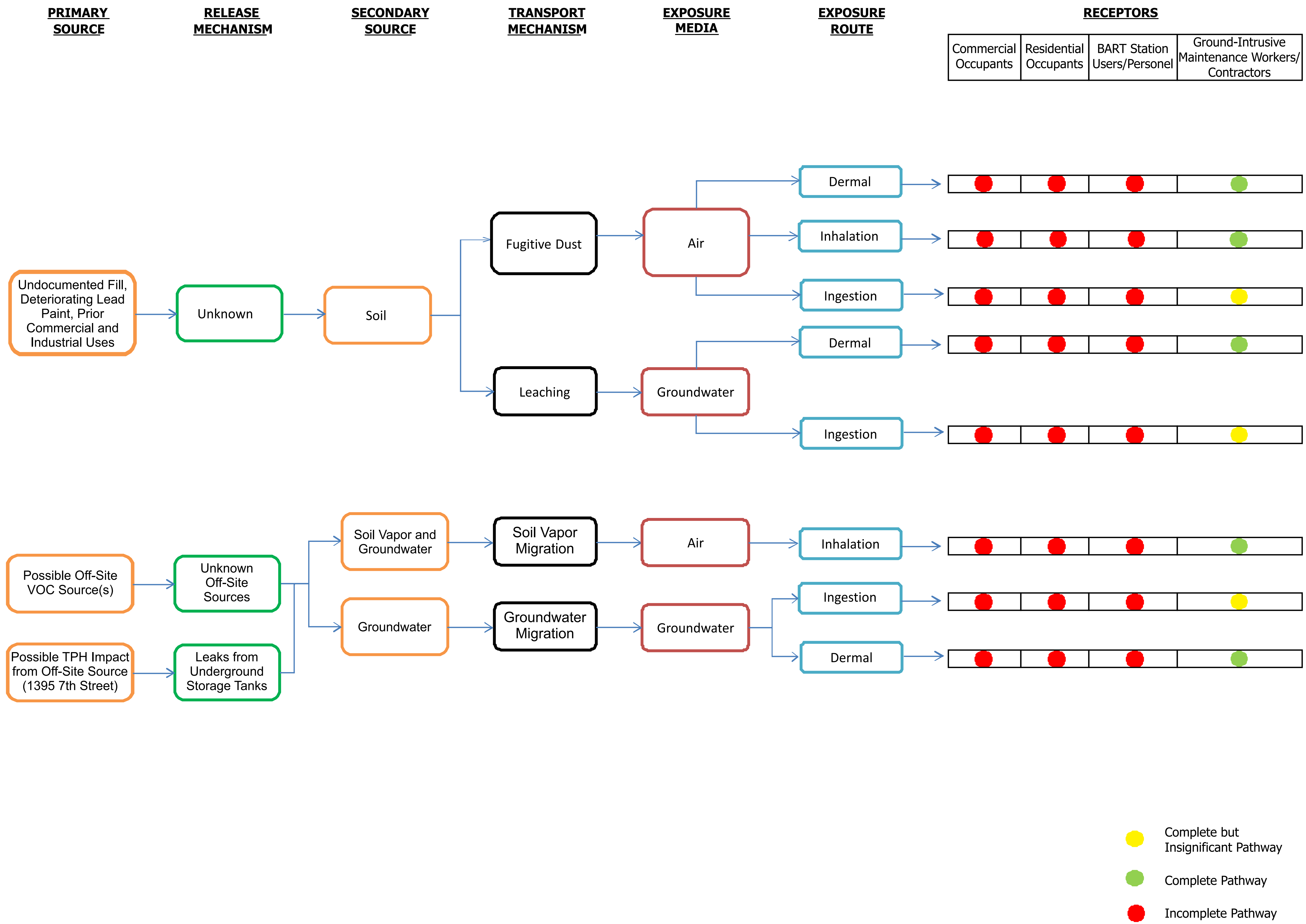
Project Number 1261-1-4

Figure Number Figure 8A

Date December 2024

Drawn By RRN

CORNERSTONE EARTH GROUP



Conceptual Site Model - Conditions After Proposed RAP Implementation

West Oakland BART Station
1451 7th Street
Oakland, CA

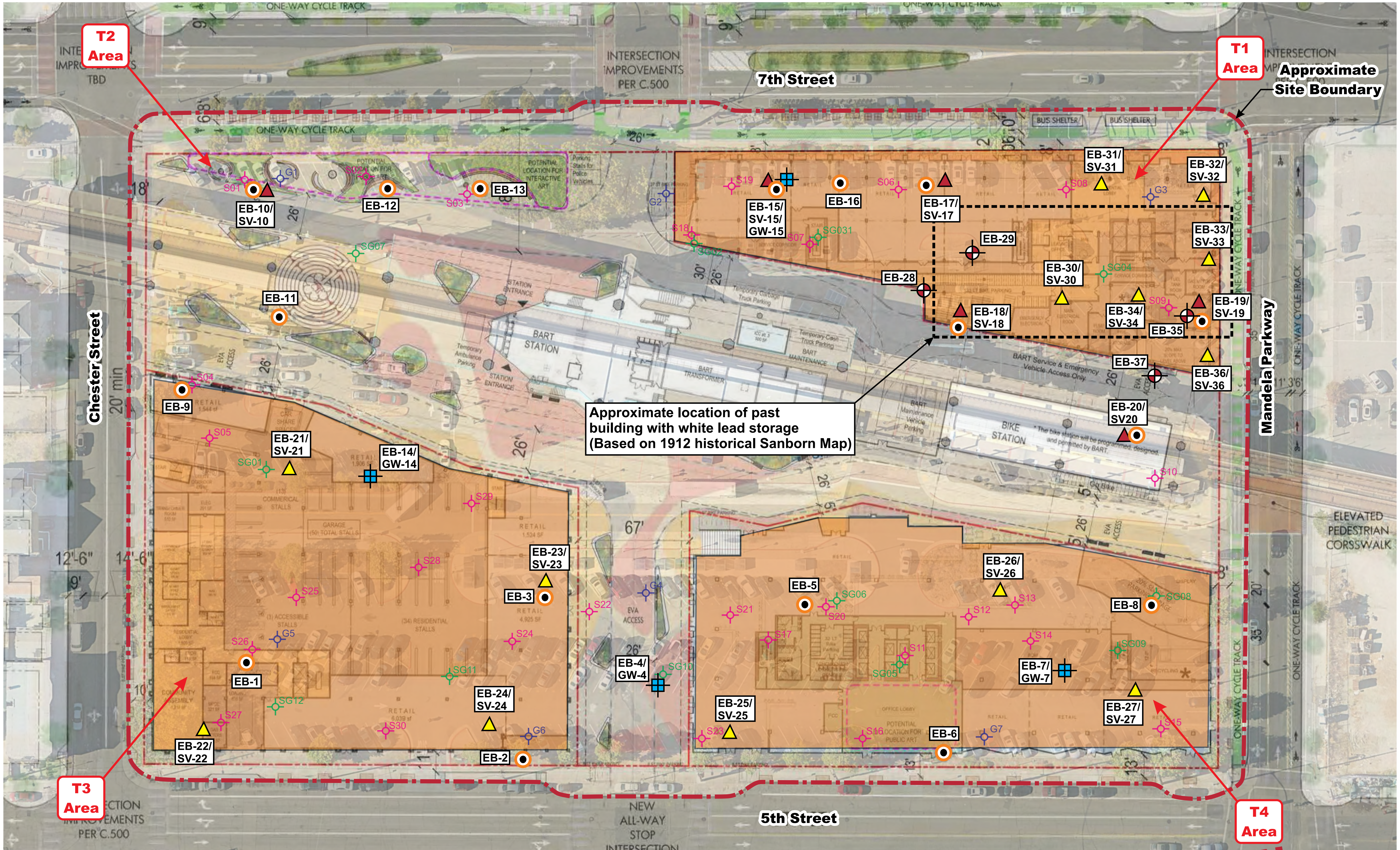
Project Number 1261-1-4

Figure Number Figure 8B

Drawn By RRN

Date December 2024

CORNERSTONE EARTH GROUP



Preliminary Approximate Construction Excavation Depths

4 feet

Legend

- Approximate location of exploratory boring for soil and groundwater sample collection (EB/GW) (Cornerstone, 2018)
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N

0 60 120
APPROXIMATE SCALE (FEET)

Base by Google Earth, dated 04/01/2022
Overlay by JRDV Architects, Inc., Site Plan - A-9.01, dated 07/24/2020

Project Number 1261-1-4
Figure Number Figure 9
Drawn By RRN
Date September 2024

Preliminary Excavation Plan

West Oakland BART Station
1451 7th Street
Oakland, CA

CORNERSTONE EARTH GROUP

SUMMARY TABLES

CORNERSTONE EARTH GROUP

Data Table 1. Analytical Results of Selected Soil Samples - Metals (2019)

(Concentrations in mg/kg, unless otherwise stated)

Boring ID	Sample ID	Date	Depth (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Lead - STLC (mg/L)	Lead - TCLP (mg/L)	Mercury	Molybdenum	Nickel	Selenium	Silver	Vanadium	Zinc
Residential Screening Criteria				31 [1]	11 [2]	15,000 [1]	16 [3]	7.1 [3]	85,000 [1]	23 [1]	3,100 [1]	80 [3]	5 [4]	5 [5]	1 [3]	390 [1]	820 [3]	390 [1]	390 [1]	390 [1]	23,000 [1]
Commercial Screening Criteria				470 [1]		220,000 [1]	230 [3]	79 [3]	360,000 [1]	350 [1]	47,000 [1]	500 [3]			4.4 [3]	5,800 [1]	11,000 [3]	5,800 [1]	5,800 [1]	5,800 [1]	350,000 [1]
EB-1	EB-1 (0-0.5)	10/2/2019	0-½	<1.6	<3.1	52	<0.31	<0.39	33	4.2	9.2	7.2	---	---	0.032	<1.6	21	<3.1	<0.78	24	25
	EB-1 (2.5-3)	10/2/2019	2½-3	<1.2	2.6	56	0.24	<0.30	42	11	7.1	4.3	---	---	<0.015	<1.2	29	<2.4	<0.60	36	21
	EB-1 (4.5-5)	10/2/2019	4½-5	<1.1	3.1	75	0.42	<0.29	92	5.1	14	5.6	---	---	0.016	<1.1	48	<2.3	<0.57	52	33
	EB-1 (7.5-8)	10/2/2019	7½-8	<1.1	<2.3	62	<0.23	<0.29	49	6.5	8.3	3.4	---	---	<0.016	<1.1	41	<2.3	<0.57	33	26
	EB-1 (9-10)	10/2/2019	9-10	<1.5	<3.1	62	<0.31	<0.38	61	7.3	7.9	3.6	---	---	<0.015	<1.5	44	<3.1	<0.76	35	28
EB-2	EB-2 (0-0.5)	10/2/2019	0-½	9.8	3.8	320	<0.25	1.8	200	5.4	120	**1,100**	---	0.5	**54**	3.1	23	<2.5	<0.62	24	630
	EB-2 (2.5-3)	10/2/2019	2½-3	28	**110**	830	<0.58	**9.7**	230	14	1,600	**2,500**	---	1.9	**140**	59	100	9.4	<1.4	46	3,500
	EB-2 (4.5-5)	10/2/2019	4½-5	<1.2	3.2	63	0.31	<0.30	44	7.8	12	8.2	---	---	0.15	<1.2	47	<2.4	<0.59	35	40
	EB-2 (7.5-8)	10/2/2019	7½-8	<1.1	2.8	73	0.3	<0.26	46	6.5	9.5	4.1	---	---	<0.014	<1.1	43	<2.1	<0.53	35	26
	EB-2 (9-10)	10/2/2019	9-10	<1.1	2.4	62	0.27	<0.28	40	6.3	8.4	4.1	---	---	<0.015	<1.1	37	<2.3	<0.56	31	26
EB-3	EB-3 (0-0.5)	10/2/2019	0-½	6.9	**11**	370	<0.29	2	53	7.7	830	**910**	**120**	---	**4.5**	<1.5	52	<2.9	<0.74	29	1,300
	EB-3 (2.5-3)	10/2/2019	2½-3	<1.1	5.2	220	<0.23	1.7	40	7.2	75	**280**	**26**	---	0.8	<1.1	30	<2.3	<0.57	27	580
	EB-3 (4.5-5)	10/2/2019	4½-5	<1.3	<2.7	64	<0.27	<0.34	37	4.7	8.3	5.4	---	---	0.023	<1.3	22	<2.7	<0.67	25	360
	EB-3 (4.5-5)-DUP	10/2/2019	4½-5-DUP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	EB-3 (7.5-8)	10/2/2019	7½-8	<1.2	<2.4	38	<0.24	<0.30	32	2.7	5.4	2.8	---	---	<0.016	<1.2	23	<2.4	<0.60	22	16
	EB-3 (9-10)	10/2/2019	9-10	<1.2	<2.4	71	0.25	<0.30	57	4.9	8.3	3.6	---	---	0.03	<1.2	44	<2.4	<0.60	34	24
EB-4	EB-4 (0-0.5)	10/2/2019	0-½	4.5	**17**	240	<0.29	2.4	45	4.7	420	**540**	---	---	**36**	2.6	30	<2.9	<0.73	16	1,100
	EB-4 (2.5-3)	10/2/2019	2½-3	<1.3	<2.6	100	<0.26	0.36	26	3.9	24	**230**	**19**	---	0.48	<1.3	18	<2.6	<0.65	17	140
	EB-4 (4.5-5)	10/2/2019	4½-5	<1.2	<2.4	53	<0.24	<0.30	29	3.2	5.5	3.7	---	---	<0.015	<1.2	17	<2.4	<0.60	20	14
	EB-4 (7.5-8)	10/2/2019	7½-8	<1.0	2.9	45	0.32	<0.26	43	7.8	9	4.1	---	---	<0.016	<1.0	37	<2.1	<0.52	40	19
	EB-4 (9-10)	10/2/2019	9-10	<1.6	<3.3	58	<0.33	<0.41	43	6	7.9	3.3	---	---	<0.015	<1.6	40	<3.3	<0.82	32	22
	EB-4 (14-15)	10/2/2019	14-15	<1.6	<3.1	54	<0.31	<0.39	43	5.4	6.9	3.5	---	---	<0.015	<1.6	35	<3.1	<0.79	30	23
EB-5	EB-5 (0-0.5)	10/2/2019	0-½	7.7	3.8	330	<0.26	1.9	98	6.4	140	**840**	**97**	---	**7.9**	2.4	24	<2.6	<0.65	25	730
	EB-5 (2.5-3)	10/2/2019	2½-3	<1.1	<2.2	87	<0.22	<0.27	27	16	6.5	5.8	---	---	0.017	<1.1	20	<2.2	<0.54	23	20
	EB-5 (4.5-5)	10/2/2019	4½-5	<1.1	<2.1	58	<0.21	<0.27	30	3.1	5.6	2.7	---	---	<0.015	<1.1	20	<2.1	<0.53	21	14
	EB-5 (7.5-8)	10/2/2019	7½-8	<1.5	<3.0	61	<0.30	<0.38	50	6.2	8	3.4	---	---	<0.014	<1.5	40	<3.0	<0.76	34	23
	EB-5 (9-10)	10/2/2019	9-10	<1.4	<2.9	70	0.29	<0.36	50	6.4	7.7	4	---	---	<0.016	<1.4	44	<2.9	<0.72	37	24
EB-6	EB-6 (0-0.5)	10/2/2019	0-½	<1.3	<2.5	65	<0.25	<0.31	28	4.1	6.2	2.6	---	---	<0.015	<1.3	19	<2.5	<0.63	21	17
	EB-6 (2.5-3)	10/2/2019	2½-3	<1.1	<2.2	50	<0.22	<0.28	25	3.3	5.2	2.2	---	---	<0.016	<1.1	18	<2.2	<0.56	18	15
	EB-6 (4.5-5)	10/2/2019	4½-5	<1.0	<2.0	58	<0.20	<0.25	30	8.2	5.6	2.8	---	---	<0.016	<1.0	25	<2.0	<0.50	24	14
	EB-6 (7.5-8)	10/2/2019	7½-8	<1.4	<2.7	59	<0.27	<0.34	54	4.8	8	3.9	---	---	0.028	<1.4	36	<2.7	<0.68	37	21
	EB-6 (9-10)	10/2/2019	9-10	<1.6	<3.1	52	<0.31	<0.39	44	3.6	6	2.8	---	---	0.018	<1.6	32	<3.1	<0.78	25	19
EB-7	EB-7 (0-0.5)	10/2/2019	0-½	<1.0	2.3	110	<0.21	<0.26	24	4	18	75	3.1	---	0.16	<1.0	19	<2.1	<0.51	16	170
	EB-7 (2.5-3)	10/2/2019	2½-3	<1.1	<2.3	79	<0.23	<0.28	26	4	7	3.2	---	---	<0.017	<1.1	20	<2.3	<0.56	20	19
	EB-7 (4.5-5)	10/2/2019	4½-5	<1.4	<2.7	59	<0.27	<0.34	34	6.3	6.7	3.1	---	---	0.044	<1.4	29	<2.7	<0.68	27	18
	EB-7 (7.5-8)	10/2/2019	7½-8	<1.1	2.2	61	0.24	<0.28	47	5.6	7.8	3.6	---	---	<0.017	<1.1	39	<2.2	<0.55	34	23
	EB-7 (9-10)	10/2/2019	9-10	<1.7	<3.4	66	<0.34	<0.43	57	7.6	8.4	4.2	---	---	<0.014	<1.7	45	<3.4	<0.86	39	28
	EB-7 (14-15)	10/2/2019	14-15	<1.6	<3.1	56	<0.31	<0.39	61	6.3	8.4	3.5	---	---	<0.015	<1.6	42	<3.1	<0.79	28	27
EB-8	EB-8 (0-0.5)	10/2/2019	0-½	<1.2	<2.4	84	<0.24	<0.30	29	4.2	12	54	**5.1**	---	0.11	<1.2	19	<2.4	<0.60	21	68
	EB-8 (2.5-3)	10/2/2019	2½-3	<1.2	<2.3	69	<0.23	<0.29	27	4.2	6.9	4.5	---	---	0.038	<1.2	19	<2.3	<0.58	19	18
	EB-8 (4.5-5)	10/2/2019	4½-5	<1.2	<2.4	60	<0.24	<0.29	32	4.2	6.5	3.2	---	---	<0.017	<1.2	21	<2.4	<0.59	22	17
	EB-8 (7.5-8)	10/2/2019	7½-8	<1.7	<3.3	69	<0.33	<0.41	72	4.6	11	5.1	---	---	0.018	<1.7	46	<3.3	<0.83	44	28
	EB-8 (9-10)	10/2/2019	9-10	<1.3	<2.7	58	<0.27	<0.33	49	5.9	7.3	3.8	---	---	<0.015	<1.3	43	<2.7	<0.67	35	27
EB-9	EB-9 (0-0.5)	10/3/2019	0-½	<1.6	<3.2	68	<0.32	<0.40	38	3.4	6.5	3.9	---	---	<0.016	<1.6	21	<3.2	<0.81	27	20
	EB-9 (2.5-3)	10/3/2019	2½-3	<1.2	<2.4	52	<0.24	<0.30	39	5.5	7	3.4	---	---	<0.016	<1.2	26	<2.4	<0.61	29	17
	EB-9 (4.5-5)	10/3/2019	4½-5	<1.2	3.5	110	0.51	<0.30	82	6.4	13	6	---	---	0.041	<1.2	55	<2.4	<0.60	61	32
	EB-9 (7.5-8)	10/3/2019	7½-8	<1.9	<3.7	83	<0.37	<0.47	67	6.3	9.2	4.6	---	---	<0.016	<1.9	49	<3.7	<0.93	42	27
	EB-9 (9-10)	10/3/2019	9-10	<1.1	2.1	49	<0.21	<0.27	41	5.8	6.8	3.4	---	---	<0.014	<1.1	37	<2.1	<0.53	30	22
	EB-9 (9-10)-DUP	10/3/2019	9-10-DUP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

CORNERSTONE EARTH GROUP

Data Table 1. Analytical Results of Selected Soil Samples - Metals (2019)

(Concentrations in mg/kg, unless otherwise stated)

Boring ID	Sample ID	Date	Depth (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Lead - STLC (mg/L)	Lead - TCLP (mg/L)	Mercury	Molybdenum	Nickel	Selenium	Silver	Vanadium	Zinc
Residential Screening Criteria				31 [1]	11 [2]	15,000 [1]	16 [3]	7.1 [3]	85,000 [1]	23 [1]	3,100 [1]	80 [3]	5 [4]	5 [5]	1 [3]	390 [1]	820 [3]	390 [1]	390 [1]	390 [1]	23,000 [1]
Commercial Screening Criteria				470 [1]		220,000 [1]	230 [3]	79 [3]	360,000 [1]	350 [1]	47,000 [1]	500 [3]			4.4 [3]	5,800 [1]	11,000 [3]	5,800 [1]	5,800 [1]	5,800 [1]	350,000 [1]
EB-10	EB-10 (0-0.5)	10/3/2019	0-½	<1.3	6.2	370	<0.26	1.2	36	4.5	58	**540**	**44**	---	0.87	<1.3	24	<2.6	<0.65	27	560
	EB-10 (2.5-3)	10/3/2019	2½-3	<1.2	<2.4	61	<0.24	<0.30	36	3.8	6.8	3.5	---	---	<0.015	<1.2	19	<2.4	<0.61	24	16
	EB-10 (4.5-5)	10/3/2019	4½-5	<1.8	<3.6	36	<0.36	<0.45	32	2.4	<5.4	2.3	---	---	<0.014	<1.8	16	<3.6	<0.89	20	12
EB-11	EB-11 (0-0.5)	10/3/2019	0-½	<1.7	3.8	140	<0.33	<0.42	36	8.7	39	53	---	---	0.19	<1.7	37	<3.3	<0.83	47	93
EB-12	EB-12 (0-0.5)	10/3/2019	0-½	<1.4	5.6	100	<0.28	0.35	32	7.6	45	**100**	3.5	---	0.25	<1.4	22	<2.8	<0.69	36	120
	EB-12 (2.5-3)	10/3/2019	2½-3	<1.3	<2.6	92	<0.26	<0.33	49	6.4	15	65	---	---	0.097	<1.3	33	<2.6	<0.66	33	77
	EB-12 (4.5-5)	10/3/2019	4½-5	<1.5	<2.9	51	<0.29	<0.36	31	3.4	6	3.6	---	---	0.023	<1.5	16	<2.9	<0.73	21	18
EB-13	EB-13 (0-0.5)	10/3/2019	0-½	1.3	6.7	260	0.35	0.64	42	11	63	**90**	2.8	---	0.25	1.8	46	<2.2	<0.55	40	110
	EB-13 (2.5-3)	10/3/2019	2½-3	<1.9	<3.8	110	<0.38	<0.48	58	5.4	20	**400**	**18**	---	0.32	<1.9	28	<3.8	<0.95	26	170
	EB-13 (4.5-5)	10/3/2019	4½-5	<1.3	<2.5	57	<0.25	<0.31	32	7	6.4	3.3	---	---	<0.015	<1.3	20	<2.5	<0.63	24	20
EB-14	EB-14 (0-0.5)	10/3/2019	0-½	<1.4	<2.8	67	<0.28	<0.35	32	3.8	6.1	3	---	---	<0.017	<1.4	18	<2.8	<0.69	23	17
	EB-14 (2.5-3)	10/3/2019	2½-3	<1.5	<3.0	45	<0.30	<0.38	31	3.1	5.3	2.3	---	---	<0.017	<1.5	15	<3.0	<0.75	22	13
	EB-14 (4.5-5)	10/3/2019	4½-5	<1.3	<2.5	43	<0.25	<0.31	33	7	6.1	2.5	---	---	<0.015	<1.3	20	<2.5	<0.63	24	15
	EB-14 (7.5-8)	10/3/2019	7½-8	<1.4	<2.8	75	0.3	<0.35	80	6.3	10	3.9	---	---	0.023	<1.4	54	<2.8	<0.69	40	28
	EB-14 (9-10)	10/3/2019	9-10	1.7	2.6	71	<0.26	<0.32	77	8.2	9.9	3.7	---	---	<0.016	<1.3	49	<2.6	<0.65	43	27
	EB-14 (14-15)	10/3/2019	14-15	<1.2	2.8	63	<0.24	<0.30	66	6	11	4	---	---	0.019	7.3	28	<2.4	<0.60	29	31
EB-15	EB-15 (0-0.5)	10/4/2019	0-½	<1.8	<3.6	77	<0.36	<0.45	33	5.4	10	22	---	---	0.083	<1.8	19	<3.6	<0.91	21	49
	EB-15 (2.5-3)	10/4/2019	2½-3	<1.6	<3.2	68	<0.32	<0.40	38	5.7	7.1	4.9	---	---	<0.014	<1.6	20	<3.2	<0.80	23	19
	EB-15 (4.5-5)	10/4/2019	4½-5	<1.6	<3.2	56	<0.32	<0.40	36	3.9	6.4	2.7	---	---	<0.016	<1.6	20	<3.2	<0.80	23	15
	EB-15 (7.5-8)	10/4/2019	7½-8	<1.8	<3.5	80	0.37	<0.44	67	4.8	9.5	4.7	---	---	<0.016	<1.8	45	<3.5	<0.88	42	27
	EB-15 (9-10)	10/4/2019	9-10	<1.6	<3.1	54	<0.31	<0.39	51	7.9	8	3.2	---	---	<0.016	<1.6	46	<3.1	<0.79	32	26
	EB-15 (14-15)	10/4/2019	14-15	<1.2	2.5	58	<0.25	<0.31	45	8.1	8.1	3.6	---	---	<0.017	<1.2	39	<2.5	<0.62	32	25
EB-16	EB-16 (0-0.5)	10/3/2019	0-½	<1.8	<3.7	91	<0.37	<0.46	32	5	19	14	---	---	0.078	<1.8	20	<3.7	<0.92	23	220
	EB-16 (2.5-3)	10/3/2019	2½-3	<1.8	<3.5	63	<0.35	<0.44	36	5.4	7.8	4.7	---	---	<0.015	<1.8	22	<3.5	<0.88	26	19
	EB-16 (4.5-5)	10/3/2019	4½-5	<1.8	<3.7	51	<0.37	<0.46	34	3.8	6.1	2.7	---	---	<0.016	<1.8	21	<3.7	<0.92	24	15
EB-17	EB-17 (0-0.5)	10/3/2019	0-½	11	**15**	370	<0.23	2.2	59	12	1,400	**620**	**31**	---	**2.1**	1.5	39	4	<0.58	31	1,100
	EB-17 (2.5-3)	10/3/2019	2½-3	<1.1	7.4	66	<0.23	<0.29	33	6.8	7.3	3	---	---	<0.014	<1.1	22	<2.3	<0.57	25	150
	EB-17 (4.5-5)	10/3/2019	4½-5	<1.2	3.6	59	<0.24	<0.30	38	5.7	6.9	3.1	---	---	<0.015	<1.2	27	<2.4	<0.61	28	40
EB-18	EB-18 (0-0.5)	10/4/2019	0-½	4	6.3	220	<0.39	1.1	41	5.5	74	**800**	**33**	0.59	0.59	<1.9	28	<3.9	<0.97	22	950
	EB-18 (2.5-3)	10/4/2019	2½-3	7.4	**18**	400	<0.23	**17**	32	5.2	290	**5,100**	**---**	**28**	**2.1**	<1.1	26	<2.3	0.91	20	260
	EB-18 (4.5-5)	10/4/2019	4½-5	<1.5	<3.0	58	<0.30	<0.38	31	7.8	8.9	62	<0.050	---	<0.014	<1.5	23	<3.0	<0.76	22	250
	EB-18 (4.5-5)-DUP	10/4/2019	4½-5-DUP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
EB-19	EB-19 (0-0.5)	10/4/2019	0-½	<1.9	4.4	170	<0.39	0.72	45	6.5	41	**300**	**18**	---	0.82	<1.9	31	<3.9	<0.97	28	270
	EB-19 (2.5-3)	10/4/2019	2½-3	**51**	4.1	91	<0.20	1.2	31	4.9	250	**23,000**	**---**	---	0.77	<1.0	25	<2.0	<0.51	20	590
	EB-19 (4.5-5)	10/4/2019	4½-5	<1.6	<3.3	82	<0.33	<0.41	29	6.5	9.5	**260**	1.6	---	0.029	<1.6	19	<3.3	<0.81	21	46
EB-20	EB-20 (0-0.5)	10/4/2019	0-½	<1.6	8.3	55	<0.31	<0.39	11	8	32	68	0.5	---	0.21	<1.6	11	<3.1	<0.78	28	170
	EB-20 (2.5-3)	10/4/2019	2½-3	2.9	10	200	<0.27	0.65	31	9	50	**230**	**14**	---	0.48	1.6	22	<2.7	<0.68	31	530
	EB-20 (4.5-5)	10/4/2019	4½-5	4	5.9	150	<0.23	0.84	41	7.5	82	**370**	**16**	---	0.48	<1.1	30	<2.3	<0.56	26	470

1 Regional Screening Level (RSL), HQ = 1.0, USEPA Region 9 - November 2024

2 Duverge, 2011. Establishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region

3 Department of Toxic Substance Control Recommended Screening Level (SL), HERO Note 3 - June 2020 - Revised May 2022

4 Soluble Threshold Limit Concentration. California Title 22 hazardous waste limit

5 Toxicity Characteristic Leaching Procedure, EPA RCRA Hazardous Waste allowable limit

< Not detected at or above laboratory reporting limit

NE Not Established

--- Not Analyzed

BOLD Concentration exceeds selected environmental screening criteria

(green shading) Analyte concentration exceeds selected residential environmental screening criteria

(orange shading) Analyte concentration exceeds selected commerical environmental screening criteria

Data Table 2. Analytical Results of Selected Soil Samples - Non-Metals (2019)

(Concentrations in mg/kg)

Boring ID	Sample ID	Date	Depth (feet)	VOCs: Acetone	Petroleum: TPHd	Petroleum: TPHo	Petroleum: TPHg	Semi-VOCs: Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(g,h,i)perylene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[k]fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	PCBs: Aroclor 1254	PCBs: Aroclor 1260
Residential Screening Criteria				70,000 [1]	230 [2]	5,100 [2]	430 [2]	NE	17,000 [3]	1.1 [3]	NE	0.11 [3]	1.1 [3]	11 [3]	110 [3]	0.028 [3]	2,400 [3]	2,300 [3]	1.1 [3]	2 [3]	NE	1,800 [3]	0.24 [3]	0.24 [3]
Commercial Screening Criteria				1,100,000 [1]	1,200 [2]	180,000 [2]	2,000 [2]		130,000 [3]	12 [3]		1.3 [3]	13 [3]	130 [3]	1,300 [3]	0.31 [3]	18,000 [3]	17,000 [3]	13 [3]	6.5 [3]		13,000 [3]	0.59 [3]	0.6 [3]
EB-1	EB-1 (0-0.5)	10/2/2019	0-½	---	---	---	---	<0.066	<0.066	<0.32	<0.13	<0.066	<0.066	<0.066	<0.13	<0.066	<0.066	<0.066	<0.066	<0.13	<0.13	<0.066	<0.049	<0.049
	EB-1 (2.5-3)	10/2/2019	2½-3	---	<1.9	<48	---	<0.063	<0.063	<0.31	<0.12	<0.063	<0.063	<0.063	<0.12	<0.063	<0.063	<0.063	<0.063	<0.12	<0.12	<0.063	<0.048	<0.048
	EB-1 (4.5-5)	10/2/2019	4½-5	<0.048	2.3	<47	<0.24	---	---	---	---	---	---	---	---	---	---	---	---	<0.0095	---	---	---	---
	EB-1 (7.5-8)	10/2/2019	7½-8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	EB-1 (9-10)	10/2/2019	9 - 10	<0.04	8.8	<47	<0.20	---	---	---	---	---	---	---	---	---	---	---	---	<0.0081	---	---	---	---
EB-2	EB-2 (0-0.5)	10/2/2019	0-½	---	---	---	---	0.66	0.31	**1.6**	4.6	**3.9**	**3.7**	1.4	2.2	**0.44**	4.4	<0.13	**2.8**	0.25	1.2	6.3	<0.049	0.18
	EB-2 (2.5-3)	10/2/2019	2½-3	---	95	130	---	<0.066	<0.066	<0.32	<0.13	<0.066	<0.066	<0.066	<0.13	<0.066	<0.066	<0.066	<0.066	<0.13	<0.13	0.069	**0.24**	<0.049
	EB-2 (4.5-5)	10/2/2019	4½-5	<0.041	38	60	<200	---	---	---	---	---	---	---	---	---	---	---	---	<0.0081	---	---	---	---
	EB-2 (7.5-8)	10/2/2019	7½-8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	EB-2 (9-10)	10/2/2019	9 - 10	<0.041	<1.9	<48	<0.21	---	---	---	---	---	---	---	---	---	---	---	---	<0.0082	---	---	---	---
EB-3	EB-3 (0-0.5)	10/2/2019	0-½	---	---	---	---	<0.32	<0.32	<1.6	1.6	**1.5**	**2.1**	0.59	1.4	<0.32	2.3	<0.32	1	<0.63	1.2	2.6	**0.33**	<0.049
	EB-3 (2.5-3)	10/2/2019	2½-3	---	78	150	---	<0.13	<0.13	<0.63	0.33	**0.38**	0.43	0.16	0.35	<0.13	0.65	<0.13	0.23	<0.25	0.45	0.76	0.076	<0.048
	EB-3 (4.5-5)	10/2/2019	4½-5	<0.048	<1.9	<48	<0.24	<0.064	<0.064	<0.32	<0.12	<0.064	<0.064	<0.064	<0.12	<0.064	<0.064	<0.064	<0.064	<0.12	<0.12	<0.064	---	---
	EB-3 (4.5-5)-DUP	10/2/2019	4½-5-DUP	0.28	---	---	<0.23	---	---	---	---	---	---	---	---	---	---	---	---	<0.0091	---	---	---	---
	EB-3 (7.5-8)	10/2/2019	7½-8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	EB-3 (9-10)	10/2/2019	9 - 10	<0.037	4.2	<49	<0.18	---	---	---	---	---	---	---	---	---	---	---	---	<0.0073	---	---	---	---
EB-4	EB-4 (0-0.5)	10/2/2019	0-½	---	---	---	---	0.11	<0.066	<0.33	0.82	**0.53**	0.57	0.19	0.33	**0.11**	0.51	<0.066	0.51	<0.13	0.26	0.67	**1.3**	<0.23
	EB-4 (2.5-3)	10/2/2019	2½-3	---	37	190	---	<0.066	<0.066	<0.33	<0.13	0.08	0.087	<0.066	<0.13	<0.066	0.11	<0.066	0.067	<0.13	<0.13	0.14	<0.048	<0.048
	EB-4 (4.5-5)	10/2/2019	4½-5	<0.045	<2.0	<49	<0.22	---	---	---	---	---	---	---	---	---	---	---	---	<0.0089	---	---	---	---
	EB-4 (7.5-8)	10/2/2019	7½-8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	EB-4 (9-10)	10/2/2019	9 - 10	<0.043	<1.9	<48	<0.22	---	---	---	---	---	---	---	---	---	---	---	---	<0.0087	---	---	---	---
	EB-4 (14-15)	10/2/2019	14-15	<0.041	2.2	<48	<0.20	---	---	---	---	---	---	---	---	---	---	---	---	<0.0082	---	---	---	---
EB-5	EB-5 (0-0.5)	10/2/2019	0-½	---	---	---	---	<0.063	<0.063	<0.31	0.22	**0.19**	0.22	0.067	0.13	<0.063	0.27	<0.063	0.15	<0.12	<0.12	0.35	<0.24	**0.53**
	EB-5 (2.5-3)	10/2/2019	2½-3	---	<1.9	<47	---	<0.064	<0.064	<0.32	<0.12	<0.064	<0.064	<0.064	<0.12	<0.064	<0.064	<0.064	<0.064	<0.12	<0.12	<0.064	<0.049	<0.049
	EB-5 (4.5-5)	10/2/2019	4½-5	0.097	<1.9	<48	<0.23	---	---	---	---	---	---	---	---	---	---	---	---	<0.009	---	---	---	---
	EB-5 (7.5-8)	10/2/2019	7½-8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	EB-5 (9-10)	10/2/2019	9 - 10	<0.043	<1.9	<48	<0.22	---	---	---	---	---	---	---	---	---	---	---	---	<0.0086	---	---	---	---
EB-6	EB-6 (0-0.5)	10/2/2019	0-½	---	---	---	---	<0.065	<0.065	<0.32	<0.13	<0.065	<0.065	<0.065	<0.13	<0.065	<0.065	<0.065	<0.065	<0.13	<0.13	<0.065	<0.049	<0.049
	EB-6 (2.5-3)	10/2/2019	2½-3	---	<2.0	<49	---	<0.064	<0.064	<0.31	<0.12	<0.064	<0.064	<0.064	<0.12	<0.064	<0.064	<0.064	<0.064	<0.12	<0.12	<0.064	<0.049	<0.049
	EB-6 (4.5-5)	10/2/2019	4½-5	<0.044	<1.9	<49	<0.22	---	---	---	---	---	---	---	---	---	---	---	---	<0.0088	---	---	---	---
	EB-6 (7.5-8)	10/2/2019	7½-8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	EB-6 (9-10)	10/2/2019	9 - 10	<0.044	<2.0	<49	<0.22	---	---	---	---	---	---	---	---	---	---	---	---	<0.0088	---	---	---	---
EB-7	EB-7 (0-0.5)	10/2/2019	0-½	---	---	---	---	0.083	0.28	0.63	0.3	**0.51**	0.49	0.2	0.75	**0.084**	0.93	0.094	0.22	<0.12	1.3	1.4	<0.049	<0.049
	EB-7 (2.5-3)	10/2/2019	2½-3	---	2	<48	---	<0.066	<0.066	<0.32	<0.13	<0.066	<0.066	<0.066	<0.13	<0.066	<0.066	<0.066	<0.066	<0.13	<0.13	<0.066	<0.048	<0.048
	EB-7 (4.5-5)	10/2/2019	4½-5	<0.045	<1.9	<48	<0.22	---	---	---	---	---	---	---	---	---	---	---	---	<0.009	---	---	---	---
	EB-7 (7.5-8)	10/2/2019	7½-8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	EB-7 (9-10)	10/2/2019	9 - 10	<0.039	2.2	<49	<0.20	---	---	---	---	---	---	---	---	---	---	---	---	<0.0078	---	---	---	---
	EB-7 (14-15)	10/2/2019	14-15	<0.042	2.9	<48	<0.21	---	---	---	---	---	---	---	---	---	---	---	---	<0.0084	---	---	---	---
EB-8	EB-8 (0-0.5)	10/2/2019	0-½	---	---	---	---	0.093	0.074	<0.31	0.43	**0.43**	0.48	0.18	0.37	**0.071**	0.66	<0.063	0.31	<0.12	0.37	0.83	<0.047	<0.047
	EB-8 (2.5-3)	10/2/2019	2½-3	---	5.6	<47	---	<0.066	<0.066	<0.32	<0.13	<0.066	<0.066	<0.066	<0.13	<0.066	<0.066	<0.066	<0.066	<0.13	<0.13	<0.066	<0.048	<0.048
	EB-8 (4.5-5)	10/2/2019	4½-5	0.042	2.8	<47	<0.20	---	---	---	---	---	---	---	---	---	---	---	---	<0.0081	---	---	---	---
	EB-8 (7.5-8)	10/2/2019	7½-8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	EB-8 (9-10)	10/2/2019	9 - 10	0.09	2.7	<48	<0.26	---	---	---	---	---	---	---	---	---	---	---	---	<0.011	---	---	---	---
EB-9	EB-9 (0-0.5)	10/3/2019	0-½	---	---	---	---	<0.063	<0.063	<0.31	<0.12	<0.063	<0.063	<0.063	<0.12	<0.063	<0.063	<0.063	<0.063	<0.12	<0.12	<0.063	<0.047	<0.047
	EB-9 (2.5-3)	10/3/2019	2½-3	---	<2.0	<49	---	<0.066	<0.066	<0.32	<0.13	<0.066	<0.066	<0.066	<0.13	<0.066	<0.066	<0.066	<0.066	<0.13	<0.13	<0.066	<0.048	<0.048
	EB-9 (4.5-5)	10/3/2019	4½-5	<0.043	<1.9	<47	<0.21	---	---	---	---	---	---	---	---	---	---	---	---	<0.0085	---	---	---	---
	EB-9 (7.5-8)	10/3/2019	7½-8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	EB-9 (9-10)	10/3/2019	9 - 10	<0.044	<1.9	<47	<0.22	---	---	---	---	---	---	---	---	---	---	---	---	<0.0087	---	---	---	---
	EB-9 (9-10)-DUP	10/3/2019	9-10-DUP	0.058	---	---	<0.21	---	---	---	---	---	---	---	---	---	---	---	---	<0.0085	---	---	---	---

CORNERSTONE EARTH GROUP

Data Table 2. Analytical Results of Selected Soil Samples - Non-Metals (2019)

(Concentrations in mg/kg)

Boring ID	Sample ID	Date	Depth (feet)	VOCs: Acetone	Petroleum: TPHd	Petroleum: TPHo	Petroleum: TPHg	Semi-VOCs: Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(g,h,i)perylene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[k]fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	PCBs: Aroclor 1254	Aroclor 1260
Residential Screening Criteria				70,000 [1]	230 [2]	5,100 [2]	430 [2]	NE	17,000 [3]	1.1 [3]	NE	0.11 [3]	1.1 [3]	11 [3]	110 [3]	0.028 [3]	2,400 [3]	2,300 [3]	1.1 [3]	2 [3]	NE	1,800 [3]	0.24 [3]	0.24 [3]
Commercial Screening Criteria				1,100,000 [1]	1,200 [2]	180,000 [2]	2,000 [2]		130,000 [3]	12 [3]		1.3 [3]	13 [3]	130 [3]	1,300 [3]	0.31 [3]	18,000 [3]	17,000 [3]	13 [3]	6.5 [3]		13,000 [3]	0.59 [3]	0.6 [3]
EB-10	EB-10 (0-0.5)	10/3/2019	0-½	---	---	---	---	<1.3	<1.3	<6.3	<2.5	<1.3	<1.3	<1.3	<2.5	<1.3	<1.3	<1.3	<1.3	<2.5	<2.5	<1.3	<0.049	<0.049
	EB-10 (2.5-3)	10/3/2019	2½-3	---	<1.9	<48	---	<0.066	<0.066	<0.32	<0.13	<0.066	<0.066	<0.066	<0.13	<0.066	<0.066	<0.066	<0.066	<0.13	<0.13	<0.066	<0.048	<0.048
	EB-10 (4.5-5)	10/3/2019	4½-5	<0.043	<1.9	<49	<0.21	---	---	---	---	---	---	---	---	---	---	---	---	<0.0086	---	---	---	---
EB-11	EB-11 (0-0.5)	10/3/2019	0-½	---	---	---	---	<1.3	<1.3	<6.5	<2.6	<1.3	<1.3	<1.3	<2.6	<1.3	<1.3	<1.3	<1.3	<2.6	<2.6	<1.3	<0.049	<0.049
EB-12	EB-12 (0-0.5)	10/3/2019	0-½	---	---	---	---	<0.066	<0.066	<0.32	<0.13	0.1	0.1	<0.066	<0.13	<0.066	0.11	<0.066	0.073	<0.13	<0.13	0.14	<0.049	<0.049
	EB-12 (2.5-3)	10/3/2019	2½-3	---	12	<47	---	<0.066	<0.066	<0.32	<0.13	<0.066	<0.066	<0.066	<0.13	<0.066	<0.066	<0.066	<0.066	<0.13	<0.13	<0.066	<0.048	<0.048
	EB-12 (4.5-5)	10/3/2019	4½-5	<0.072	<1.9	<49	<0.36	---	---	---	---	---	---	---	---	---	---	---	---	<0.014	---	---	---	---
EB-13	EB-13 (0-0.5)	10/3/2019	0-½	---	---	---	---	<0.064	<0.064	<0.32	<0.12	<0.064	<0.064	<0.064	<0.12	<0.064	<0.064	<0.064	<0.064	<0.12	<0.12	<0.064	<0.049	<0.049
	EB-13 (2.5-3)	10/3/2019	2½-3	---	10	<49	---	<0.065	<0.065	<0.32	<0.13	<0.065	<0.065	<0.065	<0.13	<0.065	<0.065	<0.065	<0.065	<0.13	<0.13	<0.065	<0.048	<0.048
	EB-13 (4.5-5)	10/3/2019	4½-5	<0.073	<2.0	<49	<0.36	---	---	---	---	---	---	---	---	---	---	---	---	<0.015	---	---	---	---
EB-14	EB-14 (0-0.5)	10/3/2019	0-½	---	---	---	---	<0.063	<0.063	<0.31	<0.12	<0.063	<0.063	<0.063	<0.12	<0.063	<0.063	<0.063	<0.063	<0.12	<0.12	<0.063	<0.049	<0.049
	EB-14 (2.5-3)	10/3/2019	2½-3	---	<1.9	<47	---	<0.065	<0.065	<0.32	<0.13	<0.065	<0.065	<0.065	<0.13	<0.065	<0.065	<0.065	<0.065	<0.13	<0.13	<0.065	<0.049	<0.049
	EB-14 (4.5-5)	10/3/2019	4½-5	<0.042	<2.0	<50	<0.21	---	---	---	---	---	---	---	---	---	---	---	---	<0.0085	---	---	---	---
	EB-14 (7.5-8)	10/3/2019	7½-8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	EB-14 (9-10)	10/3/2019	9 - 10	<0.042	<1.9	<48	<0.21	---	---	---	---	---	---	---	---	---	---	---	---	<0.0083	---	---	---	---
	EB-14 (14-15)	10/3/2019	14-15	<0.07	39	240	<0.35	---	---	---	---	---	---	---	---	---	---	---	---	<0.014	---	---	---	---
EB-15	EB-15 (0-0.5)	10/4/2019	0-½	---	---	---	---	<0.064	<0.064	<0.31	<0.12	<0.064	<0.064	<0.064	<0.12	<0.064	<0.064	<0.064	<0.064	<0.12	<0.12	<0.064	<0.048	<0.048
	EB-15 (2.5-3)	10/4/2019	2½-3	---	<2.0	<50	---	<0.066	<0.066	<0.32	<0.13	<0.066	<0.066	<0.066	<0.13	<0.066	<0.066	<0.066	<0.066	<0.13	<0.13	<0.066	<0.048	<0.048
	EB-15 (4.5-5)	10/4/2019	4½-5	0.12	<2.0	<49	<0.23	---	---	---	---	---	---	---	---	---	---	---	---	<0.009	---	---	---	---
	EB-15 (7.5-8)	10/4/2019	7½-8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	EB-15 (9-10)	10/4/2019	9 - 10	<0.038	<2.0	<49	<0.19	---	---	---	---	---	---	---	---	---	---	---	---	<0.0075	---	---	---	---
	EB-15 (14-15)	10/4/2019	14-15	<0.042	<2.0	<50	<0.21	---	---	---	---	---	---	---	---	---	---	---	---	<0.0084	---	---	---	---
EB-16	EB-16 (0-0.5)	10/3/2019	0-½	---	---	---	---	<0.065	<0.065	<0.32	<0.13	<0.065	<0.065	<0.065	<0.13	<0.065	<0.065	<0.065	<0.065	<0.13	<0.13	<0.065	<0.049	<0.049
	EB-16 (2.5-3)	10/3/2019	2½-3	---	<1.9	<48	---	<0.066	<0.066	<0.32	<0.13	<0.066	<0.066	<0.066	<0.13	<0.066	<0.066	<0.066	<0.066	<0.13	<0.13	<0.066	<0.049	<0.049
	EB-16 (4.5-5)	10/3/2019	4½-5	<0.046	<1.9	<48	<0.23	---	---	---	---	---	---	---	---	---	---	---	---	<0.0092	---	---	---	---
EB-17	EB-17 (0-0.5)	10/3/2019	0-½	---	---	---	---	<0.26	<0.26	<1.3	<0.51	<0.26	<0.26	<0.26	<0.51	<0.26	<0.26	<0.26	<0.26	<0.51	<0.51	<0.26	<0.049	0.13
	EB-17 (2.5-3)	10/3/2019	2½-3	---	<1.9	<49	---	<0.065	<0.065	<0.32	<0.13	<0.065	<0.065	<0.065	<0.13	<0.065	<0.065	<0.065	<0.065	<0.13	<0.13	<0.065	<0.048	<0.048
	EB-17 (4.5-5)	10/3/2019	4½-5	<0.049	<1.9	<48	<0.25	---	---	---	---	---	---	---	---	---	---	---	---	<0.0098	---	---	---	---
EB-18	EB-18 (0-0.5)	10/4/2019	0-½	---	---	---	---	<0.32	<0.32	<1.6	1.3	**2**	**2.3**	0.78	1.1	**0.37**	1.2	<0.32	**1.1**	<0.62	<0.62	1.6	<0.047	0.075
	EB-18 (2.5-3)	10/4/2019	2½-3	---	29	76	---	<0.065	<0.065	<0.32	<0.13	<0.065	<0.065	<0.065	<0.13	<0.065	<0.065	<0.065	<0.065	<0.13	<0.13	<0.065	<0.049	<0.049
	EB-18 (4.5-5)	10/4/2019	4½-5	<0.042	2.3	<49	<0.21	---	---	---	---	---	---	---	---	---	---	---	---	<0.0084	---	---	---	---
	EB-18 (4.5-5)-DUP	10/4/2019	4½-5-DUP	<0.042	---	---	<0.21	---	---	---	---	---	---	---	---	---	---	---	---	<0.0083	---	---	---	---
EB-19	EB-19 (0-0.5)	10/4/2019	0-½	---	---	---	---	<0.065	<0.065	<0.32	0.15	**0.15**	0.17	<0.065	<0.13	<0.065	0.21	<0.065	0.1	<0.13	<0.13	0.22	<0.049	<0.049
	EB-19 (2.5-3)	10/4/2019	2½-3	---	**1,600**	2,600	---	3.4	3	**16**	15	**20**	**21**	7.1	19	**2.8**	24	0.86	**11**	<1.3	7	32	<0.048	<0.048
	EB-19 (4.5-5)	10/4/2019	4½-5	0.082	62	79	<0.23	---	---	---	---	---	---	---	---	---	---	---	---	<0.0091	---	---	---	---
EB-20	EB-20 (0-0.5)	10/4/2019	0-½	---	---	---	---	<0.066	<0.066	<0.32	<0.13	<0.066	<0.066	<0.066	<0.13	<0.066	<0.066	<0.066	<0.066	<0.13	<0.13	<0.066	<0.048	<0.048
	EB-20 (2.5-3)	10/4/2019	2½-3	---	56	120	---	<0.066	<0.066	<0.33	0.24	**0.26**	0.28	0.1	0.17	<0.066	0.27	<0.066	0.17	<0.13	0.19	0.31	<0.049	<0.049
	EB-20 (4.5-5)	10/4/2019	4½-5	<0.037	160	260	<0.19	---	---	---	---	---	---	---	---	---	---	---	---	<0.0075	---	---	---	---

1 Regional Screening Level (RSL), HQ = 1.0, USEPA Region 9 - November 2024

2 Environmental Screening Levels (Tier 1), San Francisco Bay Regional Water Quality Control Board, January 2019

3 Department of Toxic Substance Control Recommended Screening Level (SL), HERO Note 3 - June 2020 - Revised May 2022

< Not detected at or above laboratory reporting limit

NE Not Established

--- Not Analyzed

BOLD Concentration exceeds selected environmental screening criteria

(green) Analyte concentration exceeds selected residential environmental screening criteria

(orange) Analyte concentration exceeds selected commerical environmental screening criteria

Data Table 3. Analytical Results of Selected Ground Water Samples (2019)

(Concentrations in µg/L)

Sample ID	Date	Depth (feet)	TPHd	TPHo	TPHg	VOCs
GW-4	10/2/2019	8.1	92	<110	<50	ND
GW-7	10/2/2019	5.3	<57	<110	<50	ND
GW-14	10/3/2019	6.8	**260**	1000	<50	ND
GW-15	10/4/2019	8.7	**100**	140	<50	ND
Screening Criteria			100	NE	100	Varies
Basis			ESL[1]		ESL[1]	

1 Environmental Screening Levels (Tier 1), San Francisco Bay Regional Water Quality Control Board, January 2019

< Not detected at or above laboratory reporting limit

ND Not detected at or above reporting limit

NE Not Established

Data Table 4. Analytical Results of Selected Soil Vapor Samples (2019)

(Concentrations in µg/m³)

Sample Location	Date	Depth (feet)	1,2,4-Trimethylbenzene	1,3-Butadiene	1,4-Dioxane	2,2,4-Trimethylpentane	2-Butanone (Methyl Ethyl Ketone)	Acetone	Benzene	Carbon Disulfide	Cyclohexane	Ethanol	Ethyl Benzene	Freon 11	Freon 12	Heptane	Hexane	m,p-Xylene	o-Xylene	Toluene	Methane (%)
SV-10	10/4/2019	5	<5.5	<2.5	**18**	<5.2	<13	44	**4.2**	<14	<3.8	15	<4.9	<6.3	<5.5	<4.6	9.4	<4.9	<4.9	39	<0.00022
SV-15	10/4/2019	5	<5.7	<2.6	<17	<5.4	<14	55	<3.7	<14	<4.0	<8.8	11	<6.5	57	5.1	6.2	47	12	16	<0.00023
SV-17	10/4/2019	5	<5.5	<2.5	<16	<5.2	<13	49	<3.6	<14	<3.8	16	5.2	6.4	<5.5	<4.6	<3.9	18	5.2	27	<0.00022
SV-18	10/4/2019	5	<6.6	**24**	<19	7.3	21	120	**10**	<17	8.1	14	<5.8	<7.5	<6.6	15	44	27	8.3	43	0.00045
SV-19	10/4/2019	5	7.6	**7.7**	<17	91	100	400	**18**	86	300	29	36	<6.5	<5.8	33	170	170	56	68	**20**
SV-20	10/4/2019	5	7.4	**14**	<17	9.4	23	180	**16**	37	27	<8.8	**56**	<6.5	<5.8	14	39	300	91	55	0.46
Residential Screening Criteria			2,100 [1]	0.56 [2]	18.6 [1]	NE	173,333 [1]	960,000 [3]	3.23 [2]	24,333 [1]	210,000 [1]	NE	36.6 [1]	NE	3,333 [1]	14,000 [1]	24,333 [1]	3,333 [1]	3,333 [1]	10,333 [2]	5 [4]
Commercial Screening Criteria			8,667 [1]	2.4 [2]	83.3 [1]		733,333 [1]	4,200,000 [3]	14 [2]	103,333 [1]	866,667 [1]		163.3 [1]		14,667 [1]	60,000 [1]	103,333 [1]	14,667 [1]	14,667 [1]	43,333 [2]	

1 Soil Vapor Screening Level calculated by applying an attenuation factor of 30 for future buildings to the indoor air residenitial Regional Screening Level (RSL), USEPA Region 9 - November 2018

2 Soil Vapor Screening Level calculated by applying an attenuation factor of 30 for future buildings (DTSC, 2011) to the DTSC-modified screening levels (DTSC-SL) California Department of Toxic Substance Control, Human and Ecological Risk Office (HERO) HHRA Note 3, April 2019

3 Soil Vapor Environmental Screening Level (ESL), RWQCB, San Francisco Bay Region - January 2019, Revision 1

4 Lower explosive limit for methane

< Not detected at or above laboratory reporting limit

NE Not Established

--- Not Analyzed

BOLD Concentration exceeds selected environmental screening criteria

(green shading) Analyte concentration exceeds selected residential environmental screening criteria

(orange shading) Analyte concentration exceeds selected commerical environmental screening criteria

CORNERSTONE EARTH GROUP

APPENDIX G – OPINION OF ESTIMATED REMOVAL COSTS

Table G1. Opinion of Estimated Costs

Alternative 2 - Soil Removal for Construction and On-Site Capping In-Place Remaining Soil Exceeding Cleanup Levels

Task	Description	Assumptions	Preliminary Opinion of Estimated Cost - RA-2
T1 Building Pad - Excavation, direct loading and disposal of soil with treatment/disposal of some soil.	Excavate approximately 29,000 square foot (sf) area to approximately 4 feet deep (4,300 cubic yards [cy]) for geotechnical subgrade preparation and construction of T1 building foundation. Assumes approximately 10,000 square foot area to depth of approximately 4 feet (approximately 1,500 cy) stabilized (either in-place or on-Site after excavation) and disposed as non-RCRA hazardous waste. Assumes an additional approximately 15,000 square foot area excavcated to depth of approximately 1 foot (approximately 550 cy) disposed as a non-RCRA hazardous waste. The remainder of soil excavated for construction is assumed to be "clean" and disposal costs are not included.	Stabilize RCRA Class I Hazardous Waste and disposal as Class I non-RCRA hazardous waste: 1,500 cy at 1.6 tons per cy = 2,400 tons at $210 per ton.	$ 504,000
		Non-RCRA Class 1 California Hazardous Waste: 550 cy at 1.6 tons per cy = 880 tons at $150 per ton.	$ 132,000
		Contractor Guidance, Agency Coordination, Verification Sampling/Analyses and Preparation of a Completion Report	$ 100,000
		BOE Generator Fee (2024)	$ 164,000
T2 Plaza - Excavation, direct loading and disposal of soil from landscape areas	Assumes approximately 500 cy of soil to be removed from 5,000 sf area	Non-RCRA Class 1 California Hazardous Waste: 500 cy at 1.6 tons per cy = 800 tons at $150 per ton.	$ 120,000
		Contractor Guidance, Agency Coordination, Verification Sampling/Analyses and Preparation of a Completion Report	$ 25,000
		BOE Generator Fee (2024)	$ 40,000
T3 Building Pad - Excavation, direct loading and disposal of soil	Excavate approximately 49,000 sf area to approximately 4 feet (7,300 cy) for geotechnical subgrade preparation and construction of T3 building foundation. Assumes approximately 200 cy at location of EB-2 disposed as RCRA hazardous waste, and approximately 2,000 cy of soil disposed as non-RCRA hazardous waste. The remainder of soil excavated for construction is assumed to be "clean" and disposal costs are not included.	RCRA Class I Hazardous Waste: 200 cy at 1.6 tons per cy = 320 tons at $350 per ton.	$ 112,000
		Non-RCRA Class 1 California Hazardous Waste: 2,000 cy at 1.6 tons per cy = 3,200 tons at $150 per ton.	$ 480,000
		Contractor Guidance, Agency Coordination, Verification Sampling/Analyses and Preparation of a Completion Report	$ 100,000
		BOE Generator Fee (2024)	$ 176,000
T4 Building Pad - Excavation, direct loading and disposal of soil	Excavate approximately 38,000 sf area to approximately 4 feet (5,600 cy) for geotechnical subgrade preparation and construction of T4 building foundation. Assumes soil in approximately 21,000 sf area removed to assumed depth of 4 feet for disposal as non-RCRA hazardous waste (approximately 3,100 cy), plus approximately 100 cy at EB-26 and 100 cy at EB-27. The remainder of soil excavated for construction is assumed to be "clean" and disposal costs are not included.	Non-RCRA Class 1 California Hazardous Waste: 3,300 cy at 1.6 tons per cy = 5,280 tons at $150 per ton.	$ 792,000
		Contractor Guidance, Agency Coordination, Verification Sampling/Analyses and Preparation of a Completion Report	$ 100,000
		BOE Generator Fee (2024)	$ 264,000
Excess Construction Soils (trench excavation, street subgrade preparation) outside building footprints	Approximately 500 cy of soil assumed disposed as non-RCRA hazardous waste	Non-RCRA Class 1 California Hazardous Waste: 500 cy at 1.6 tons per cy = 800 tons at $150 per ton, plus BOE Generator Fee (2024) of $50/ton.	$ 160,000
Institutional Controls (e.g., Land Use Covenant (LUC)	A LUC will be prepared to ensure compliance with the land use restrictions, and the capped soil is not disturbed withour regulatory approval.	Preparation of the LUC document by legal and regulatory professionals	$ 10,000
Sub-Total			$ 3,279,000
		20 Percent Contingency	$ 655,800
Credit for incremental cost for excavation/disposal of soil if it		Approximately 8,550 cy of soil (13,680 tons assuming 1.6 tons/cy), typical cost for	$ 615,000
Estimated Total			$ 3,319,800

In providing this estimate of potential soil removal costs, Mandela Station Partners, LLC understands that these costs are approximate and are made on the basis of our professional experience.

A minimum 20 percent contingency (included above) is recommended.

We recommend obtaining estimates from environmental contractors for excavation, transportation, disposal of soil. We additionally recommend that the project civil engineer calculate volume of soil to be removed for construction.

Soil volumes based on excavation areas and depths provided by Mandela Station Partners, LLC

CORNERSTONE EARTH GROUP

Table G2. Opinion of Estimated Costs
Alternative 3 - Removal and Off-Site Disposal of Soil Exceeding Soil Cleanup Levels

Task	Description	Assumptions	Preliminary Opinion of Estimated Cost - RA-2
T1 Building Pad - Excation, direct loading and disposal of soil with treatment/disposal of some soil.	Within T1 area, approximately 10,000 square foot area excavated to depth of approximately 5 feet (approximately 1,900 cubic yards [cy]), with soil stabilized (either in-place or on-Site after excavation) and disposed as non-RCRA hazardous waste. Assumes an additional approximately 15,000 square foot area within T1 is excavated to depth of approximately 1 foot (approximately 550 cy), with soil disposed as a non-RCRA hazardous waste. The remainder of the approximately 29,000 square foot (sf) T1 area assumed to be excavated to approximately 4 feet deep for geotechnical subgrade preparation. The remainder of soil excavated from the T1 area for construction is assumed to be "clean" and disposal costs are not included.	Stabilize RCRA Class I Hazardous Waste and disposal as Class I non-RCRA hazardous waste: 1,900 cy at 1.6 tons per cy = 3,040 tons at $210 per ton.	$ 639,000
		Non-RCRA Class 1 California Hazardous Waste: 550 cy at 1.6 tons per cy = 880 tons at $150 per ton.	$ 132,000
		Contractor Guidance, Agency Coordination, Verification Sampling/Analyses and Preparation of a Completion Report	$ 100,000
		BOE Generator Fee (2024)	$ 196,000
T2 Plaza - Excavation, direct loading and disposal of soil	Assumes approximately 1,500 cy of soil to be removed from 20,000 sf area	Non-RCRA Class 1 California Hazardous Waste: 1,500 cy at 1.6 tons per cy = 2,400 tons at $150 per ton.	$ 360,000
		Contractor Guidance, Agency Coordination, Verification Sampling/Analyses and Preparation of a Completion Report	$ 25,000
		BOE Generator Fee (2024)	$ 120,000
T3 Building Pad - Excavation, direct loading and disposal of soil	Excavate approximately 49,000 sf area to approximately 4 feet (7,300 cy) for geotechnical subgrade preparation and construction of T3 building foundation. Assumes approximately 200 cy at location of EB-2 disposed as RCRA hazardous waste, and approximately 2,000 cy of soil disposed as non-RCRA hazardous waste. The remainder of soil excavated from the T3 area for construction is assumed to be "clean" and disposal costs are not included.	RCRA Class I Hazardous Waste: 200 cy at 1.6 tons per cy = 320 tons at $350 per ton.	$ 112,000
		Non-RCRA Class 1 California Hazardous Waste: 2,000 cy at 1.6 tons per cy = 3,200 tons at $150 per ton.	$ 480,000
		Contractor Guidance, Agency Coordination, Verification Sampling/Analyses and Preparation of a Completion Report	$ 100,000
		BOE Generator Fee (2024)	$ 176,000
T4 Building Pad - Excavation, direct loading and disposal of soil	Excavate approximately 38,000 sf area to approximately 4 feet (5,600 cy) for geotechnical subgrade preparation and construction of T4 building foundation. Assumes soil in approximately 21,000 sf area removed to assumed depth of 4 feet for disposal as non-RCRA hazardous waste (approximately 3,100 cy), plus approximately 100 cy at EB-26 and 100 cy at EB-27. The remainder of soil excavated from the T2 area for construction is assumed to be "clean" and disposal costs are not included.	Non-RCRA Class 1 California Hazardous Waste: 3,300 cy at 1.6 tons per cy = 5,280 tons at $150 per ton.	$ 792,000
		Contractor Guidance, Agency Coordination, Verification Sampling/Analyses and Preparation of a Completion Report	$ 100,000
		BOE Generator Fee (2024)	$ 264,000
Contingency for removal of soil exceeding residential/unrestricted cleanup levels	Assume 20 percent additional volume of soil removed as a non-RCRA hazardous waste	Non-RCRA Class 1 California Hazardous Waste: 1,800 cy at 1.6 tons per cy = 2,900 tons at $150 per ton plus $50/ton BOE Generator Fee (2024)	$ 580,000
Excess Construction Soils (trench excavation, street subgrade preparation) outside building footprints	Approximately 500 cy of soil assumed disposed as non-RCRA hazardous waste	Non-RCRA Class 1 California Hazardous Waste: 500 cy at 1.6 tons per cy = 800 tons at $150 per ton plus $50/ton BOE Generator Fee (2024)	$ 160,000
Sub-Total			$ 4,336,000
		20 Percent Contingency	$ 867,200
Credit for incremental cost for excavation/disposal of soil if it were uncontaminated		Approximately 10,700 cy of soil (17,100 tons assuming 1.6 tons/cy), typical cost for excavation, transportation, disposal as a non-contaminated (normal construction cost) of $45/ton	$ 770,000
Estimated Total			$ 4,433,200

In providing this estimate of potential soil removal costs, Mandela Station Partners, LLC understands that these costs are approximate and are made on the basis of our professional experience.
A minimum 20 percent contingency (included above) is recommended.
We recommend obtaining estimates from environmental contractors for excavation, transportation, disposal of soil. We additionally recommend that the project civil engineer calculate volume of soil to be removed for construction.
Soil volumes based on excavation areas and depths provided by Mandela Station Partners, LLC

Appendix H

HUD's Acceptable Separation Distance (ASD) Electronic Assessment Tool Results and Supporting Documentation

Lamphier-Gregory, November 2020

Home (/) > **Programs (/programs/)** > **Environmental Review (/programs/environmental-review/)** > ASD Calculator

Acceptable Separation Distance (ASD) Electronic Assessment Tool

The Environmental Planning Division (EPD) has developed an electronic-based assessment tool that calculates the Acceptable Separation Distance (ASD) from stationary hazards. The ASD is the distance from above ground stationary containerized hazards of an explosive or fire prone nature, to where a HUD assisted project can be located. The ASD is consistent with the Department's standards of blast overpressure (0.5 psi-buildings) and thermal radiation (450 BTU/ft^2 - hr - people and 10,000 BTU/ft^2 - hr - buildings). Calculation of the ASD is the first step to assess site suitability for proposed HUD-assisted projects near stationary hazards. Additional guidance on ASDs is available in the Department's guidebook "Siting of HUD- Assisted Projects Near Hazardous Facilities" and the regulation 24 CFR Part 51, Subpart C, Sitting of HUD-Assisted Projects Near Hazardous Operations Handling Conventional Fuels or Chemicals of an Explosive or Flammable Nature.

Note: Tool tips, containing field specific information, have been added in this tool and may be accessed by hovering over the ASD result fields with the mouse.

Acceptable Separation Distance Assessment Tool

Is the container above ground?	**Yes:** ☑ **No:** ☐
Is the container under pressure?	**Yes:** ☐ **No:** ☑
Does the container hold a cryogenic liquified gas?	**Yes:** ☐ **No:** ☐
Is the container diked?	**Yes:** ☑ **No:** ☐
What is the volume (gal) of the container?	
What is the Diked Area Length (ft)?	155
What is the Diked Area Width (ft)?	155
Calculate Acceptable Separation Distance	
Diked Area (sqft)	24025
ASD for Blast Over Pressure (ASDBOP)	
ASD for Thermal Radiation for People (ASDPPU)	
ASD for Thermal Radiation for Buildings (ASDBPU)	
ASD for Thermal Radiation for People (ASDPNPD)	584.27
ASD for Thermal Radiation for Buildings (ASDBNPD)	115.25

For mitigation options, please click on the following link: Mitigation Options (/resource/3846/acceptable-separation-distance-asd-hazard-mitigation-options/)

Providing Feedback & Corrections

After using the ASD Assessment Tool following the directions in this User Guide, users are encouraged to provide feedback on how the ASD Assessment Tool may be improved. Users are also encouraged to send comments or corrections for the improvement of the tool.

Please send comments or other input using the **Contact Us (https://www.hudexchange.info/contact-us/)** form.

Related Information

- **ASD User Guide (/resource/3839/acceptable-separation-distance-asd-assessment-tool-user-guide/)**
- **ASD Flow Chart (/resource/3840/acceptable-separation-distance-asd-flowchart/)**

Acceptable Separation Distance (ASD) Electronic Assessment Tool

The Environmental Planning Division (EPD) has developed an electronic-based assessment tool that calculates the Acceptable Separation Distance (ASD) from stationary hazards. The ASD is the distance from above ground stationary containerized hazards of an explosive or fire prone nature, to where a HUD assisted project can be located. The ASD is consistent with the Department's standards of blast overpressure (0.5 psi-buildings) and thermal radiation (450 BTU/ft^2 - hr - people and 10,000 BTU/ft^2 - hr - buildings). Calculation of the ASD is the first step to assess site suitability for proposed HUD-assisted projects near stationary hazards. Additional guidance on ASDs is available in the Department's guidebook "Siting of HUD- Assisted Projects Near Hazardous Facilities" and the regulation 24 CFR Part 51, Subpart C, Sitting of HUD-Assisted Projects Near Hazardous Operations Handling Conventional Fuels or Chemicals of an Explosive or Flammable Nature.

Note: Tool tips, containing field specific information, have been added in this tool and may be accessed by hovering over the ASD result fields with the mouse.

Acceptable Separation Distance Assessment Tool

Is the container above ground?	**Yes:** ☑ **No:** ☐
Is the container under pressure?	**Yes:** ☐ **No:** ☑
Does the container hold a cryogenic liquified gas?	**Yes:** ☐ **No:** ☐
Is the container diked?	**Yes:** ☑ **No:** ☐
What is the volume (gal) of the container?	
What is the Diked Area Length (ft)?	155
What is the Diked Area Width (ft)?	155
Calculate Acceptable Separation Distance	
Diked Area (sqft)	24025
ASD for Blast Over Pressure (ASDBOP)	
ASD for Thermal Radiation for People (ASDPPU)	
ASD for Thermal Radiation for Buildings (ASDBPU)	
ASD for Thermal Radiation for People (ASDPNPD)	584.27
ASD for Thermal Radiation for Buildings (ASDBNPD)	115.25

For mitigation options, please click on the following link: Mitigation Options (/resource/3846/acceptable-separation-distance-asd-hazard-mitigation-options/)

Providing Feedback & Corrections

After using the ASD Assessment Tool following the directions in this User Guide, users are encouraged to provide feedback on how the ASD Assessment Tool may be improved. Users are also encouraged to send comments or corrections for the improvement of the tool.

Please send comments or other input using the **Contact Us (https://www.hudexchange.info/contact-us/)** form.

Related Information

- **ASD User Guide (/resource/3839/acceptable-separation-distance-asd-assessment-tool-user-guide/)**
- **ASD Flow Chart (/resource/3840/acceptable-separation-distance-asd-flowchart/)**

Pacific Operations

PROVIDING SAFE, RELIABLE ENERGY TRANSPORTATION AND STORAGE

KINDER MORGAN

Through its Pacific Operations unit, Kinder Morgan operates approximately 3,000 miles of refined products pipeline that serves Arizona, California, Nevada, New Mexico, Oregon, Washington and Texas. With roots dating back to 1956, this is the largest products pipeline in the Western U.S., transporting more than one million barrels per day of gasoline, jet fuel and diesel fuel to our customers. Additionally, our company-owned terminals provide services such as liquid petroleum product storage and loading facilities for delivery trucks.

Kinder Morgan's Pacific Operations unit is comprised of the Northern Region and Southern Region gathering systems, pipelines and terminals.

The Kinder Morgan entities that operate Pacific Region assets include SFPP, LP; CALNEV Pipe Line, LLC; Kinder Morgan Liquids Terminals, LLC; Kinder Morgan Cochin, LLC; Kinder Morgan Phoenix Holdings, LLC; and Lomita Rail, LLC.

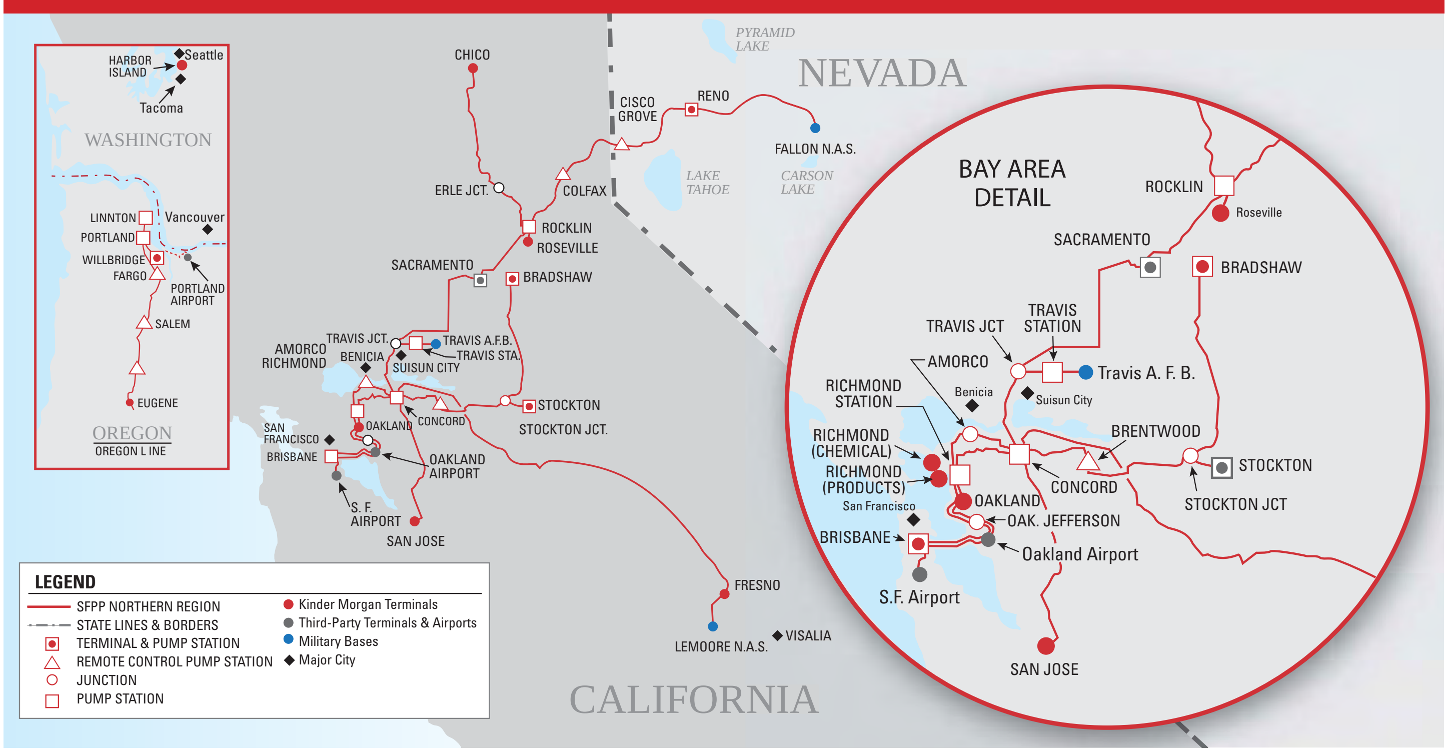
Pacific Operations Northern Region

The Northern Region consists of a gathering system in Portland, Oregon, which offers third-party terminal connectivity to Portland Station for shipments to Kinder Morgan's Willbridge Terminal, including a connection to the Portland Airport, and also to Kinder Morgan's Eugene Terminal.

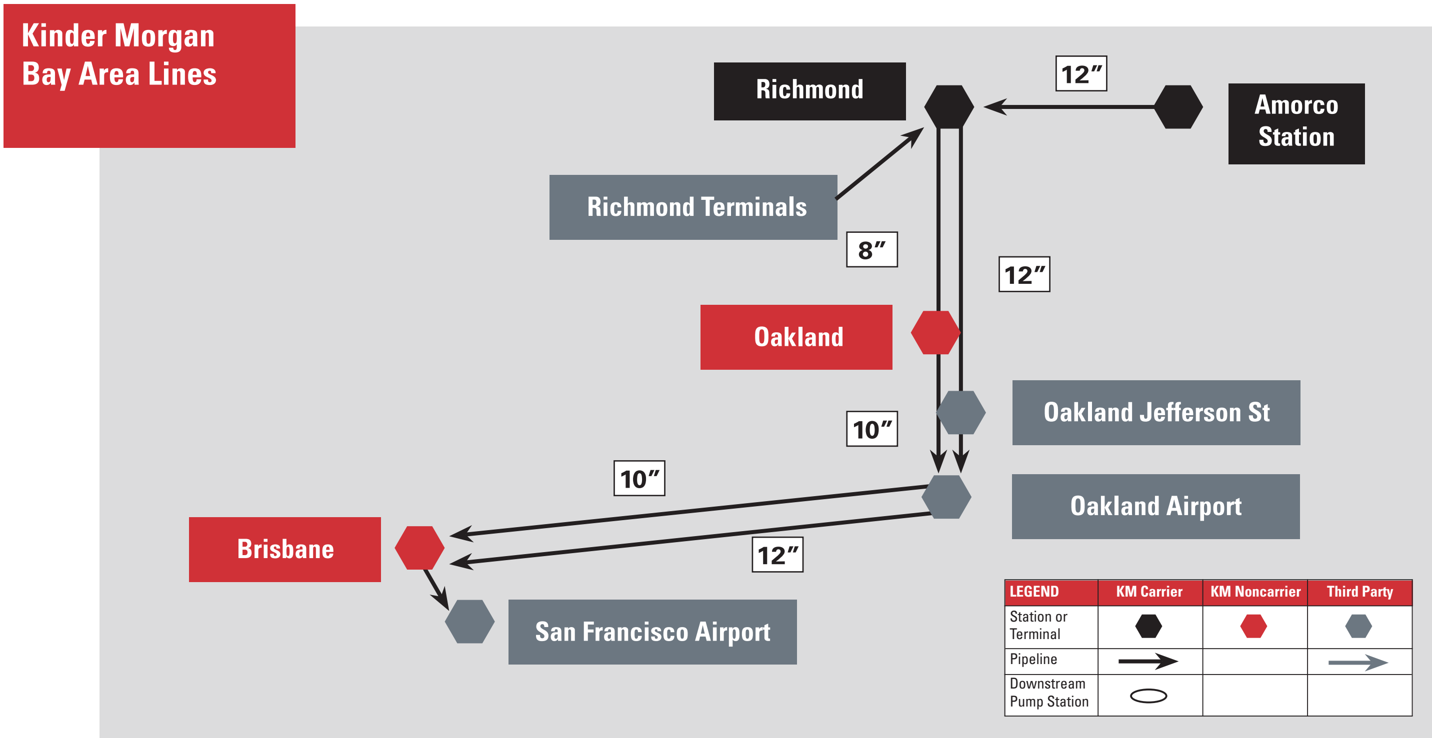
The region also includes gathering systems at Concord and Richmond, California, which connect refineries and third-party terminals to multiple destinations in the Bay Area and northern and central regions of California, and in Reno, Nevada.

Schematics for gathering systems, pipelines and terminals follow, along with specifications and services provided at each Kinder Morgan terminal.

Northern Region Systems Map



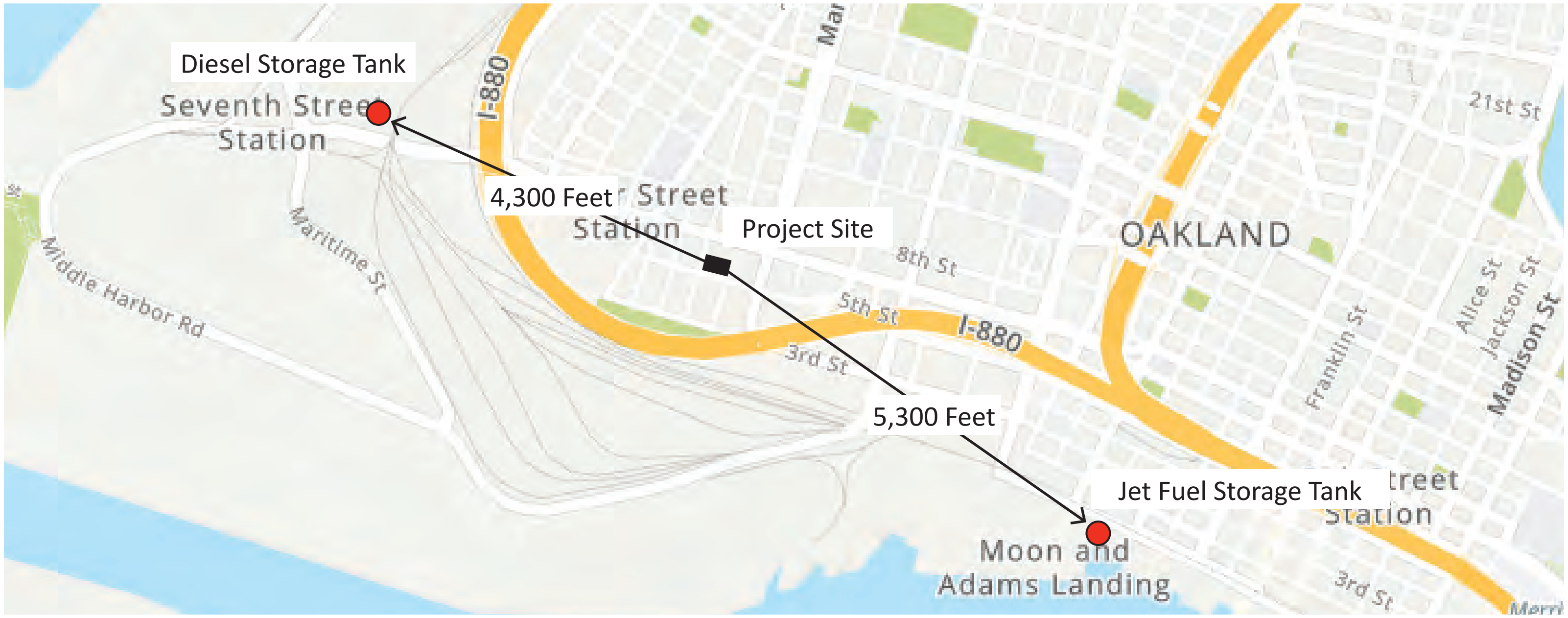
KINDER MORGAN



ORIGINS	
Richmond Area Supply	Richmond direct access through gathering lines; Bay Area pipelines origin
Concord Area Supply	Richmond direct access through 12″ LS 37 line

DESTINATIONS		
Richmond	Deliveries to third-party terminals	Gasoline, diesel
Richmond	KM Terminal	Gasoline, diesel
Oakland	Deliveries to railroad yard	Diesel
Oakland Jefferson St	Deliveries to third-party terminal	Jet fuel
Oakland Airport	Deliveries into airport storage	Jet fuel
Brisbane	KM terminal	Gasoline, diesel, jet fuel
San Francisco Airport	Deliveries to airport storage	Jet fuel

Notes:
- Lines are operated by SFPP, LP
- Turbine service via 10″ line from Richmond to Oakland Airport and Brisbane Terminal
- Turbine service via 12″ line from Richmond to Oakland Jefferson St., Oakland Airport, Brisbane Terminal and San Francisco International Airport
- Gasoline/diesel service via 8″ line to Oakland railroad yard, then 10″ to Brisbane
- No breakout storage available at Richmond



Diesel Storage Tank


Jet Fuel Storage Tank

Existing Above Ground Storage Tank Facilities and Locations


2,425 Square Foot
Dike


HIERO
2MUCH
Google Earth
© 2020 Google
10 ft

Jet Fuel Above Ground Storage Tank at Jefferson

Appendix I

Historic and Cultural Resources Evaluation for Section 106 Review

Lamphier-Gregory and PaleoWest Archaeology, March 2021

Historic and Cultural Resources Evaluation for Section 106 Review

T-3 Project at Mandela Station

Prepared for the City of Oakland and Mandela Station Partners LLC

April 2021

YEARS 40

Lamphier-Gregory

Historic and Cultural Resources Evaluation for Section 106 Review
T-3 Project at Mandela Station

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Attachments

Attachment A: City of Oakland Cultural Heritage Survey, *State of California Resources Agency - Department of Parks and Recreation Historic Resources Inventory Form* (DPR 523 Primary Record), South Prescott Area of Secondary Importance, 1987

Attachment B: City of Oakland Cultural Heritage Survey and Caltrans, *State of California Resources Agency - Substitute Department of Parks and Recreation Historic Resources Inventory Form* (DPR 523 Primary Record), South Prescott Neighborhood, September 3, 1990

Attachment C: PaleoWest Archaeology, Cultural Resources Assessment in Support of the West Oakland BART Project (T-3), February 3, 2021

Executive Summary

Mandela Station Partners, LLC (the Project applicant) proposes to use federal funding sources from the U.S. Department of Housing and Urban Development (HUD) as administered by the City of Oakland, to construct a mixed-use affordable housing project known as the T-3 Project at Mandela Station (the Project). To secure HUD release of funds for the Project, the City of Oakland, acting as Responsible Entity on behalf of HUD, must provide a suitable federal Environmental Review Record to HUD, prepared according to the requirements of the National Environmental Policy Act (NEPA) and HUD's own Environmental Regulations as found in 24 CFR Part 58. The appropriate level of federal environmental review in this case is an Environmental Assessment leading to a Finding of No Significant Impact (FONSI). Both the Environmental Assessment and FONSI must be prepared for signature by the Certifying Officer for the City of Oakland.

To achieve a FONSI, HUD requires that the Environmental Assessment demonstrate that the Project complies with all applicable federal laws and regulations, including Section 106 of the National Historic Preservation Act. Regulations pertaining to Section 106 Review are found in 36 CFR Part 800.

As concluded in this Historic Resource Evaluation, there are no historic buildings within the Project site. Historic properties are present in the vicinity, and cultural resources may be present at the Project site, but these resources will not be adversely affected by the Project.

Background

Regulatory Context for Evaluation of Historical and Architectural Significance

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of their undertakings on historic properties. The Section 106 process seeks to accommodate historic preservation concerns with the needs of federal undertakings through consultation among the agency official and other interested parties. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess the effects of the undertaking, and seek ways to avoid, minimize or mitigate any adverse effects on historic properties. To evaluate the significance of an historical resource, its integrity, and the ability of a property to convey that significance, a building is evaluated according to the criteria of National Register of Historic Places (National Register).

According to the Guidelines of the National Register Criteria for Evaluation,[1] the quality of significance in American history, architecture, archeology, engineering and culture is present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association, and:

- that are associated with events that have made a significant contribution to the broad patterns of our history; or
- that are associated with the lives of persons significant in our past; or

1 National Park Service, *Guidance for National Register of Historic Places*, accesses at: https://www.nps.gov/subjects/nationalregister/guidance.htm

- that embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- that have yielded, or may be likely to yield information important in prehistory or history

Section 106 compliance requires the City of Oakland to obtain the views of the State Historic Preservation Officer (SHPO) as to whether any of the Project activities could have an adverse effect on the setting or character-defining features of any historically significant property in the Area of Potential Effects (APE). A historically significant property is one that would be eligible for listing on the National Register, whether it is currently listed or not.

Oakland Cultural Heritage Survey/Historical and Architectural Rating System

To understand the description of historic resources as presented in subsequent sections of this report, the following provides a brief explanation of the City of Oakland's Cultural Heritage Survey (OCHS).[2]

<u>Individual Property Ratings</u>

The OCHS rating system, as adopted in the Oakland General Plan's Historic Preservation Element, is shorthand for the relative historic importance of properties. The system uses letters A to E to rate individual properties. Individual properties can have dual ratings, with the first rating for "existing", and a second "contingency" (or potential rating under certain condition, such as "if restored", or "when older", or "with more information"). In general, A and B ratings indicate Oakland Landmarks and California/National Register-eligible buildings. Properties with C ratings and certain D ratings are considered of local interest and are classified as "Potential Designated Historic Properties" (or PDHPs). The rating system is summarized below.

> *A - Highest Importance*: Outstanding architectural example or extreme historical importance (about 150 properties in all of Oakland)
>
> *B - Major Importance*: Especially fine architectural example, major historical importance (about 600 properties in Oakland)
>
> *C - Secondary Importance*: Superior or visually important example, or very early (pre-1906) - Cs "warrant limited recognition" (about 10,000 properties in Oakland)
>
> *D - Minor Importance*: Representative example (about 10,000 D-rated buildings are PDHPs, either because they have a higher contingency rating (e.g., "Dc") or because they are in districts (e.g., "D2+")
>
> *E* - Of no particular interest
>
> *F, or ** - Less than 45 years old or modernized. Some Es, Fs, and *s are also PDHPS because they have higher contingency ratings or are in districts.
>
> X - Used as a shorthand during the OCHS Survey for "Not a PDHP", such as "D3" (minor Importance or representative example, not in a District), or "*/F" (too recent to rate).

---

[2] Derived from City of Oakland *Historic Preservation Element*, as amended 1998

District Rating System

The OCHS system also provides a rating of the relative historic importance of districts. The system uses numbers 1 to 3 to rate individual districts. The district rating system is summarized below.

1 - In an Area of Primary Importance (API) or National Register-quality (or eligible) district

2 - In an Area of Secondary Importance (ASI) or district of local interest

3 - Not in a historic district

Areas of Primary Importance (APIs) are historically or visually cohesive areas, or groups of properties that usually contain a high proportion of individual properties with ratings of "C" or higher, and appear eligible for the National Register of Historic Places, either as a district or as a historically related complex.

- At least two-thirds of the properties in an API must be "contributors" to the API (they must reflect the API's principal historical or architectural themes and must not have had their historic character changed by major alterations). The OCHS rating system identified properties that contribute to a historic district with “+” symbol.
- Properties that do not contribute to an API because of alterations, but that could contribute if the alterations are at least partly reversed, are "potential contributors" to the API. The OCHS rating system identified properties that contribute to a historic district with “*” symbol.
- Properties which do not reflect the API themes are "non-contributors." The OCHS rating system identified properties that contribute to a historic district with “-” symbol.

Areas of Secondary Importance (ASIs) are similar to APIs, except that ASIs are not considered historic resources pursuant to CEQA, and do not appear eligible for the National Register.

Undertaking/Project Description

T-3 Project at Mandela Station, 1451 7th Street, Oakland, Alameda County, California (Assessor Parcel Number 004-0077-003)

Project Location and Setting

The Project site is located near the South Prescott neighborhood of West Oakland at the corner of 5th Street and Chester Street, in a portion of the Bay Area Rapid Transit District's (BART) West Oakland BART Station parking lot.

The Project site is located within an urbanized area, and surrounding land uses include large institutional uses, commercial uses, mixed-use residential/commercial development, and single-family and multi-family residential uses (see **Figure 1**). The properties to the south and west consist primarily of single-family residential housing with scattered commercial and industrial uses in the South Prescott neighborhood. In addition to the West Oakland BART Station, the other large institutional use in the vicinity is the Main Oakland US Postal Service Building, a massive structure with parking and loading docks for mail distribution and delivery vehicles located about three blocks to the west on 7th Street. Across 7th Street from the BART Station is Mandela Gateway, a complex of affordable rental apartments, townhomes and condominiums with over 20,000 square feet of retail space, an outdoor play area for children, as well as community spaces for residents, and a range of resident services including youth and adult educational classes, job readiness, computer learning and after-school programs.

Much of the other more recently constructed housing developments in the general area, particularly further to the west along Wood Street, are predominantly market-rate rental apartments, beyond the reach of the majority of long-term area residents. Other than certain subsidized affordable housing projects, rents and housing costs in West Oakland are generally rising, making home ownership and rental of decent housing effectively prohibitive for the majority of people in the area.

Pursuant to the City of Oakland Housing Element, the entirety of West Oakland is designated as a Priority Development Area for needed housing production.[3] The City of Oakland's West Oakland Specific Plan (WOSP) identifies the Project site as part of the 7th Street Opportunity Area, and as one of the more important Opportunity Sites for redevelopment (see **Figure 2**). The WOSP establishes a development framework for the West Oakland BART Station area as a new transit-oriented development (TOD) neighborhood, to be built on the currently vacant sites and parking lots surrounding the West Oakland BART Station (see also Figure 2). The TOD is envisioned as a mix of residential and commercial uses designed to maximize access to public transportation and encourage transit ridership. A dense mix of land uses is intended to attract residents, workers and visitors. This TOD would maximize use of the existing BART regional transit system, increase transit ridership, provide for centralized growth in an interconnected urban center, discourage sprawl, and reduce the cost of providing new infrastructure. The Project site is planned, zoned and anticipated for new development.

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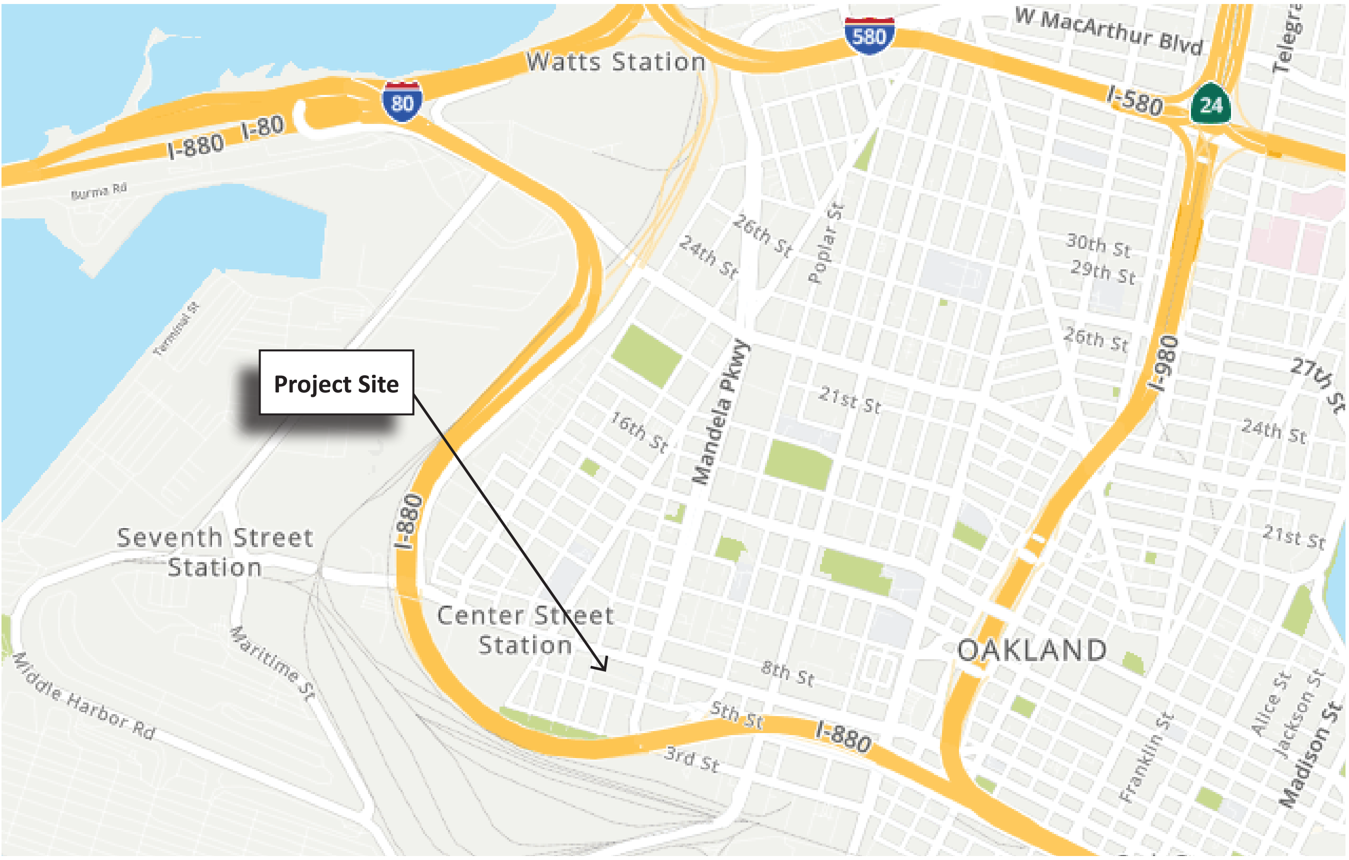
3 City of Oakland, Housing Element, 2015–2023, December 2014



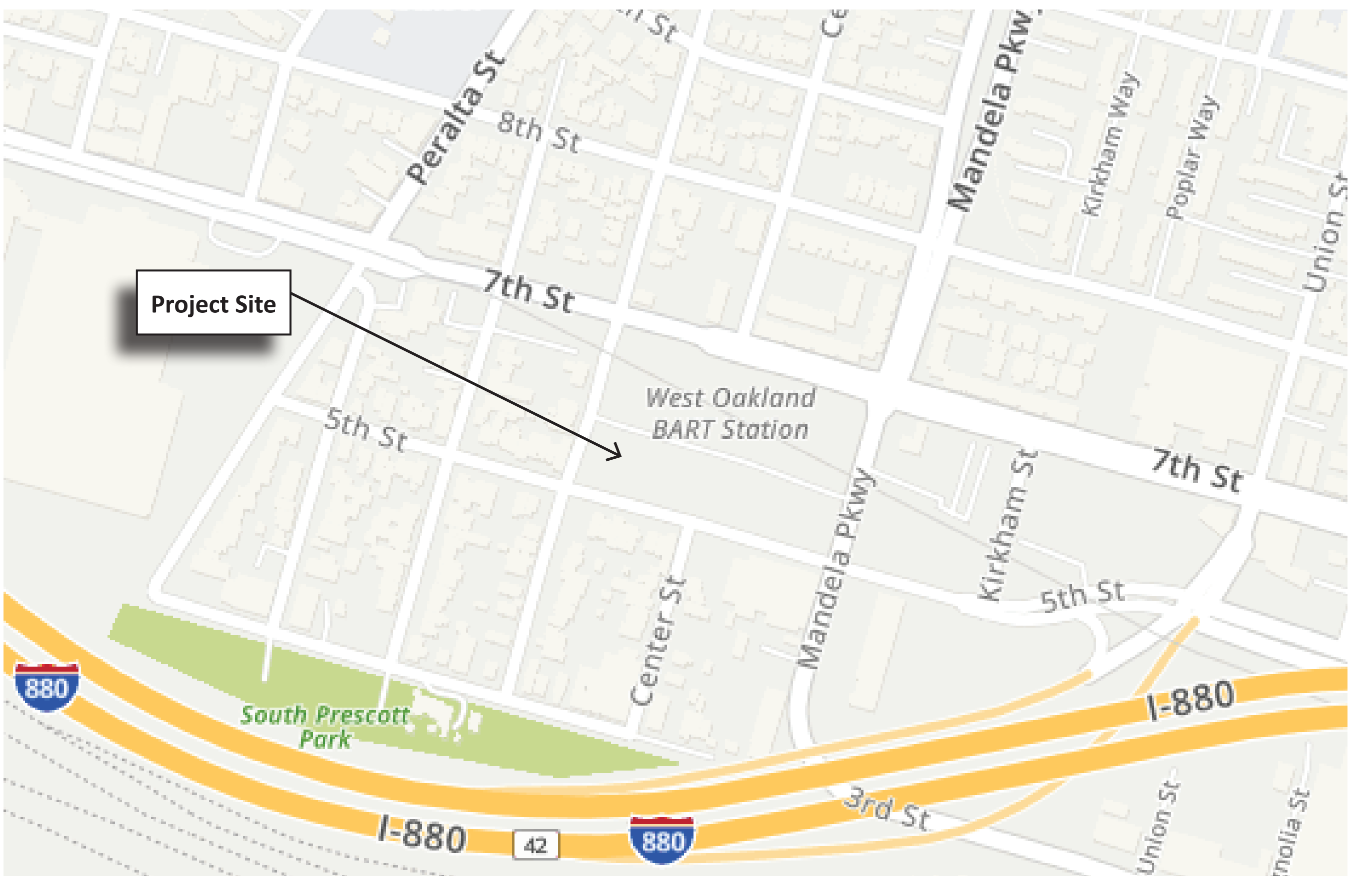


Figure 1
Project Location

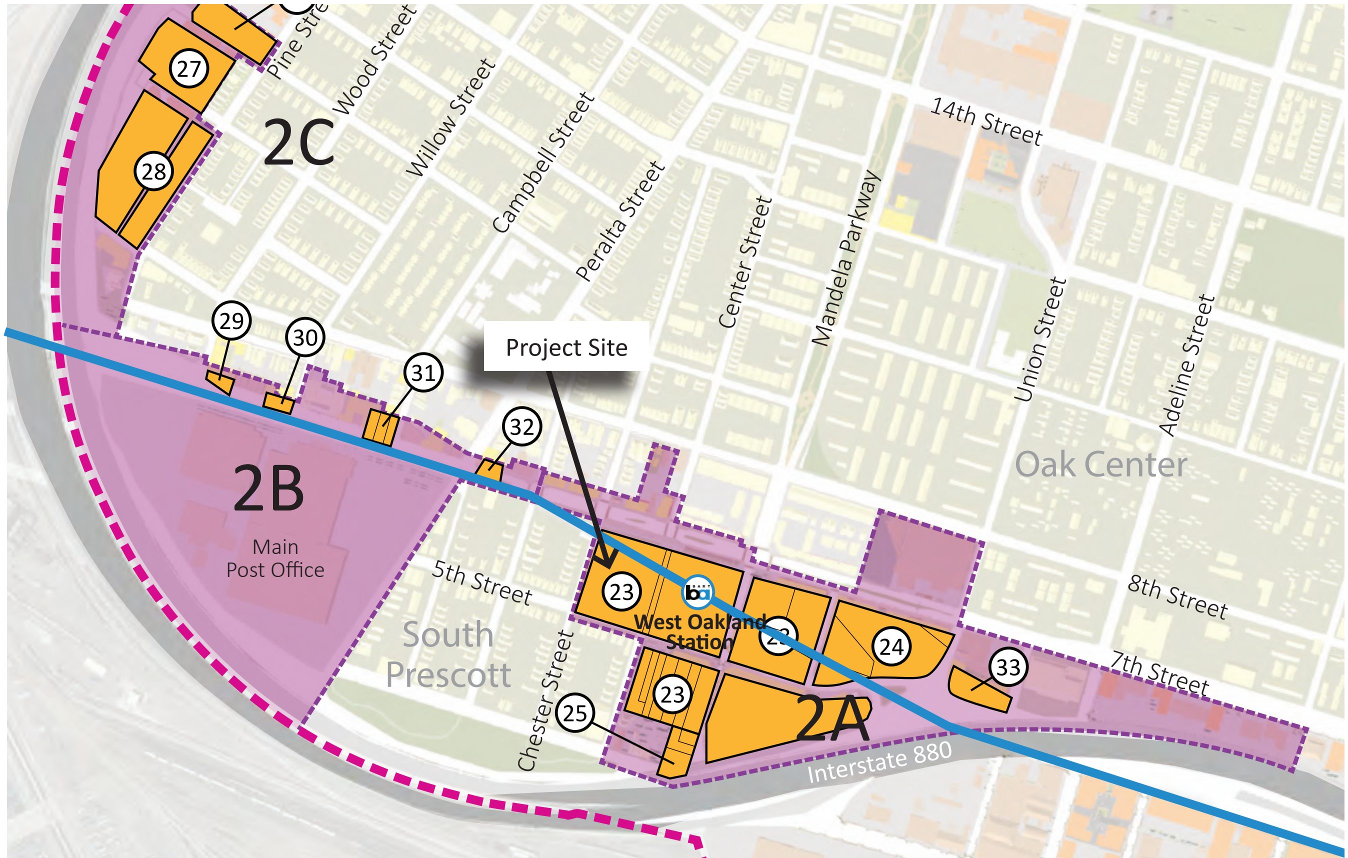


Figure 2
West Oakland Specific Plan, 7th Street Opportunity Area and BART Station TOD Concept

Source: City of Oakland, West Oakland Specific Plan, 2014

Project Site

The T-3 Project site represents the southwesterly one-fourth of the nearly 5.6-acre West Oakland BART station property (see **Figure 3**).

Immediately to the north of the Project site is the elevated BART track, and immediately to the northeast is the BART Station itself. The property to the immediate east of the Project site is also a BART parking lot. The Project site is a flat surface parking lot owned by BART and used as parking for BART patrons. Approximately 100 parking stalls are located within the footprint of the proposed T-3 Project site, at the corner of 5th Street and Chester Street. The T-3 Project site contains no existing structures. The Project's site characteristics and location provide few, if any impediments to redevelopment.

Project Description

Mandela Station Partners LLC (Project applicants) propose to construct an 8-story, 253,774 square-foot mixed-use development on a 60,984 square-foot (1.4-acre) site at the corner of 5th Street and Chester Street in Oakland, California (see **Figure 4**).

The Project would contain 240 affordable housing units; approximately 16,000 square feet of retail space, a lobby and amenity spaces, and an associated 50-space parking garage on the ground floor (see **Figure 5**). Open space would be provided in two large courtyards located on the roof of the first floor podium, as well as via private decks and terraces. The Project's design includes a building height transition that steps down from 80 feet to 38 feet along the Chester Street frontage, providing a less substantial building mass fronting onto the historic district west of Chester Street (see **Figure 6**). The mix of residential units would include 42 studio units, 135 one-bedroom units, 49 two-bedroom units and 14 three-bedroom units. The residential component of the Project would be 100 percent affordable housing. The affordability range for the proposed 240 residential units would include:

- Two (2) units designated for affordability at moderate income levels (i.e., households earning 120 percent of the region's Area Median Income, or AMI)
- 148 units designated for affordability at low income (households earning between 50 and 60 percent of the AMI)
- 11 units designated for affordability at very low income (households earning between 30 and 50 percent of the AMI), and
- 79 units designated for affordability at extremely low income (households earning less than 30 percent of the AMI)

Redevelopment of the current BART parking lot with new affordable housing provides for needed complimentary, quality affordable housing for a diverse mix of all income levels, helping the City of Oakland to meet a portion of its Regional Housing Needs Allocation.

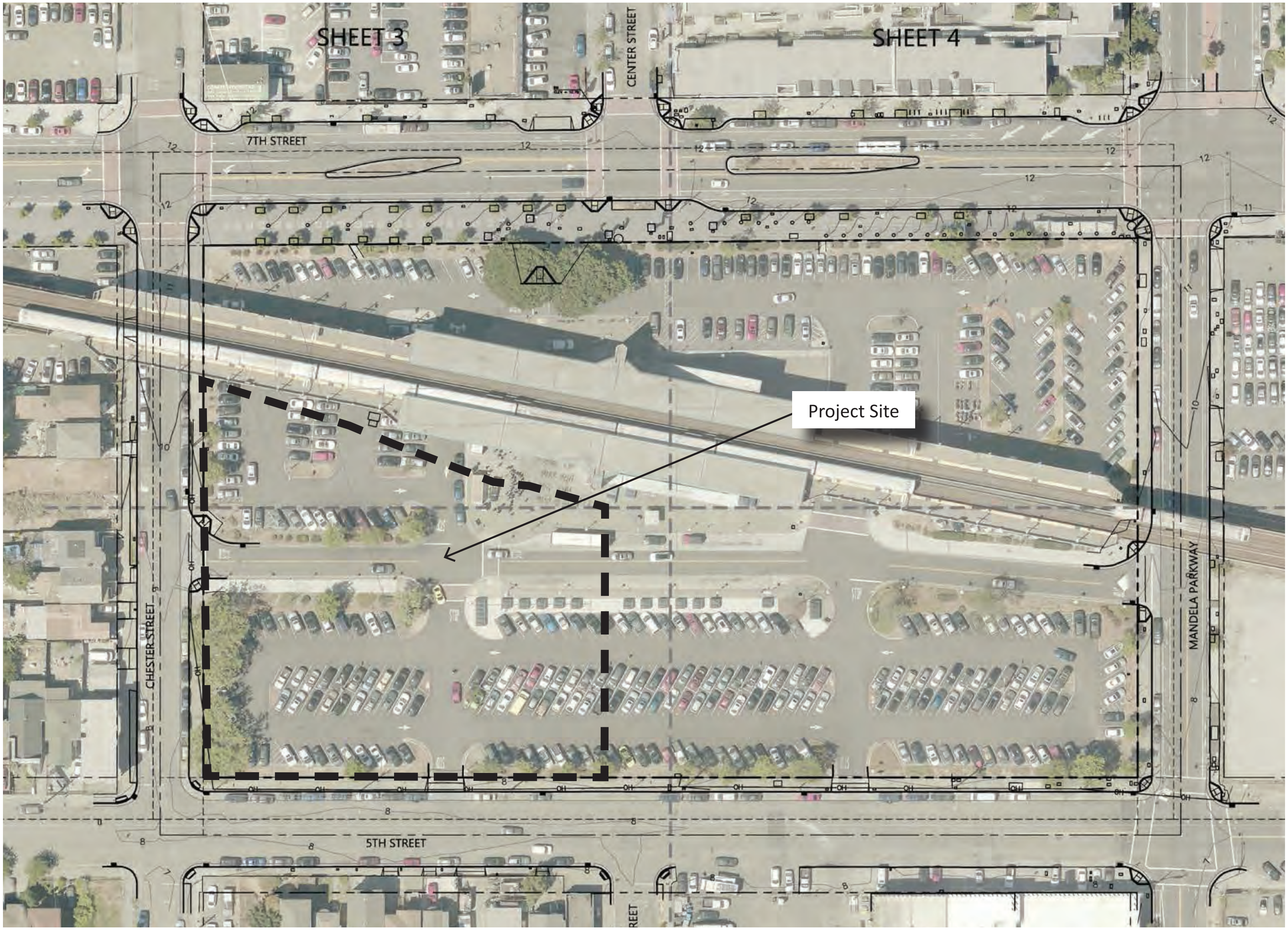


Figure 3
Project Site- at West Oakland BART Station

Rendering - Mandela Station PUD Project

Rendering - T-3 Project

Figure 4
Mandela Station and T-3 Project Renderings

Source: JRDV Urban Intl., October 2020

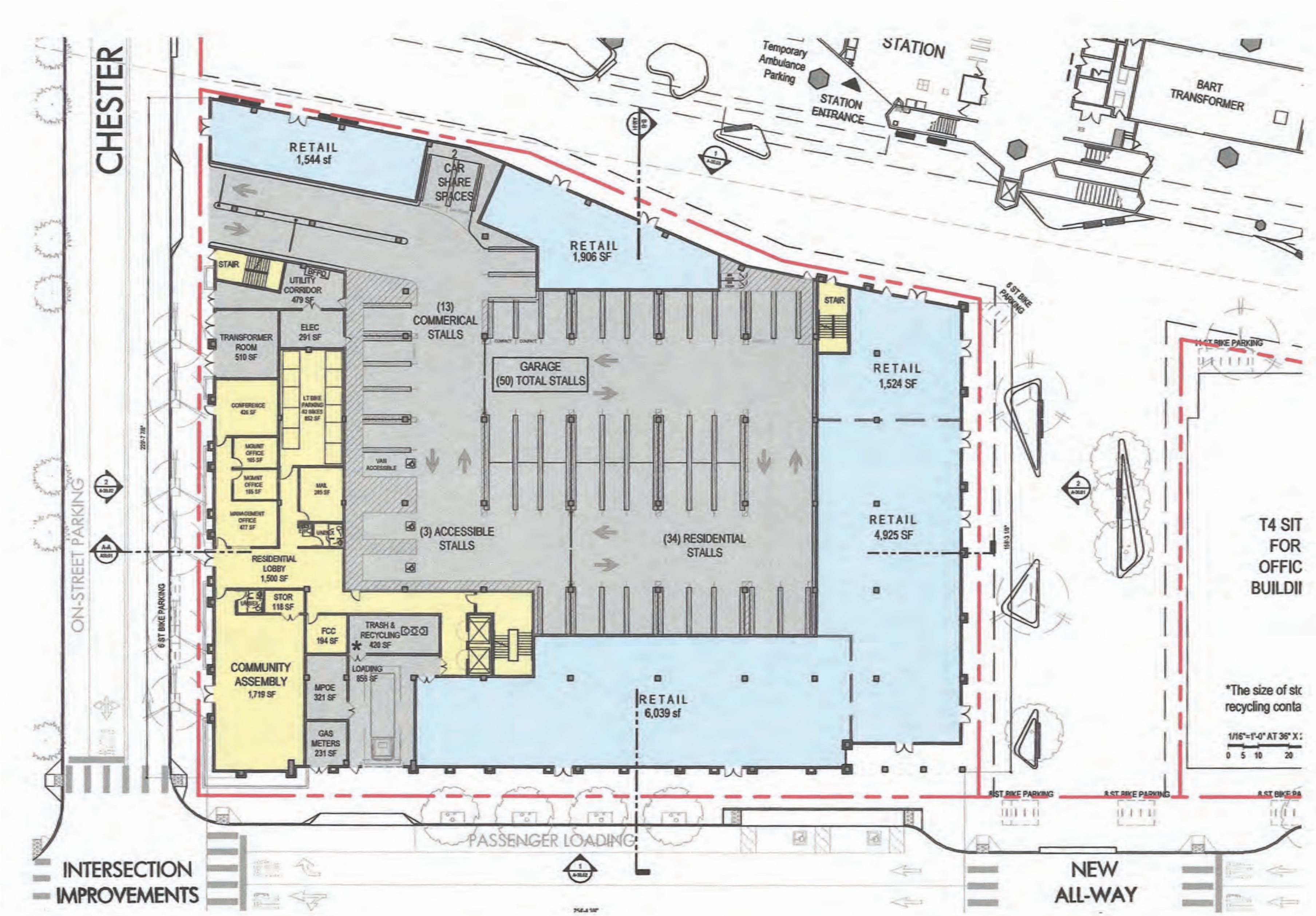


Figure 5
T-3 Project, Site Plan

Source: T-3 Final Development Plan, JRDV Urban Intl., et.al., 10-13-2020

Figure 6
T-3 Project Floor Plan, Levels 4 through 7, and Step-Down Design at Chester Street

Source: T-3 Final Development Plan, JRDV Urvan Intl., et.al., 10-13-2020

Status of Local Approvals

In February of 2019, the City of Oakland approved the Project applicant's proposed Planned Unit Development (PUD) permit for a transit-oriented development (TOD) project on the entire approximately 5.58-acre BART-owned property at the West Oakland BART station. This PUD permit provides approval for a Preliminary Development Plan that would include the removal of all 451 parking spaces at the West Oakland BART station's surface parking lots, to be replaced with construction of three new mid-rise/high-rise buildings that would contain up to 762 residential units, approximately 382,500 square feet of office space, and up to 75,000 square feet of ground-floor retail uses. The currently proposed T-3 Project is an integral component of the land use and development program of this PUD permit. The PUD permit also provides for construction of 400 parking spaces in underground parking garages, a surface plaza, pedestrian and bicycle circulation improvements, and retention of the BART station and elevated tracks.

In June of 2020, the BART Board of Directors (as underlying landowners) approved the same transit-oriented development project at the West Oakland BART Station, inclusive of the 762 total housing units, with more than 30 percent of those housing units to be designated as affordable housing.

In October of 2020, the City approved a series of minor amendments to the February 2019 PUD permit, including amending the Preliminary Development Plan for the T-3 site to increase its development program up to 240 total residential units, to remove the previously proposed underground parking garage, and to instead provide for a 50-space parking garage at ground level. The entire TOD PUD permit was renamed as the Mandela Station project. Concurrent with approval of the Mandela Station amendments to the 2019 PUD permit, the City also approved the Final Development Plan and Design Review of the first phase of development, which is the same T-3 Project as analyzed in this Historic Resources Evaluation.

Prior Environmental Review

West Oakland Specific Plan EIR

In 2014, the City of Oakland approved the WOSP and certified the Environmental Impact Report (EIR) prepared for that Specific Plan. As part of the WOSP EIR, an analysis of the Specific Plan's impacts on historic resources was conducted, including an examination of the WOSP's proposal for a high-density transit-oriented development on vacant sites and parking lots around the West Oakland BART Station, next to the South Prescott neighborhood. That EIR concluded the adjacent South Prescott neighborhood was an Area of Secondary Importance (ASI) and was not considered an historic resource under CEQA (see further discussion on this topic, below). The WOSP EIR concluded that the Specific Plan's proposal for new building heights and massing at the West Oakland BART Station would provide a transition to the adjacent South Prescott neighborhood, with building heights of two to three stories on Chester Street, stepping up to four stories over a parking podium on 5th Street, with taller buildings further to the east. At the building heights and massing as proposed in the WOSP, and with consideration of local context as part of subsequent Design Review of individual development projects, the WOSP EIR concluded that new development at the West Oakland BART Station would not result in a significant adverse change in the character of the South Prescott neighborhood ASI, or any of its individual historic resources. It also concluded that new development at the West Oakland BART Station would not jeopardize the potential eligibility of the South Prescott neighborhood's listing as a local historic resource or its potential eligibility for listing on the National, should this neighborhood ASI be reevaluated or re-designated in the future.

With respect to archaeological, paleontological, Native American resources and human remains, the WOSP EIR concluded that the entire WOSP's planning area has a moderate to high potential for unrecorded historic-period archaeological and/or Native American resources. Compliance with the City's Standard Conditions of Approval (SCAs) pertaining to Archaeological and Paleontological Resources - Discovery During Construction, Archaeologically Sensitive Areas - Pre-Construction Measures, and Human Remains - Discovery During Construction, would ensure that any impacts related to discovery of unrecorded resources during construction would be mitigated to a less than significant level.

West Oakland BART Station TOD Addendum

Pursuant to its February 2019 approval of the West Oakland BART Station PUD, the City of Oakland approved an Addendum to the WOSP EIR specific to that PUD. That Addendum concluded that the West Oakland BART Station properties do not contain any historically significant structures, are not adjacent to any historically significant districts, no potential significant historic impacts were identified, and no mitigation was found as being applicable. Compliance with City SCAs would ensure that any impacts related to discovery of unrecorded resources during construction at the Project site are mitigated to a less than significant level.

Historic Resources

Historic Resource APE

The Area of Potential Effects (APE) for historic resources (see **Figure 7**) includes the Project site and 17 additional properties that are either adjacent to the Project site, or that are immediately across the street from the Project side along 5th Street and Chester Street (see **Table 1 and Figures 8A and 8B**).

Table 1: Project's Historic Resource APE - Individual Properties

APN #	Address	Individual Historic Status	Date of Construction	OCHS Rating
4-73-01	368 Center St.	-	vacant	*/
4-75-10	375 Center	-	1994	F/2-
4-75-09	1453 5th Street	Local Register	1875	B-/2+
4-75-08	1455 5th Street	-	1952	*/2-
4-75-07	1463 5th Street	PDHP	1872	C/2+
4-75-06	1469 5th Street	PDHP	1894	C/2+
4-75-05	1473 5th Street	PDHP	1911	D/2+
4-75-04	1477 5th Street	PDHP	1875	C/2+
4-75-03	1485 5th Street	PDHP	1909	Ed/2*
4-75-02 and -01	1489 and 1495 5th Street	-	vacant	*/
4-103-33	358 Chester Street	PDHP	1875	C/2+
4-101-11	1502 5th Street	PDHP	1909	Dc/2+
4-101-10	517 Chester St.	PDHP	1875/1953	Ec/2*
4-101-09	521 Chester St.	PDHP	1870/1911	Dc/2+
4-101-08	527 Chester St.	PDHP	1881/1848	Dc/2+
4-101-07 and -06	531 and 533 Chester St.	-	vacant	*/
4-101-05	537 Chester St.	PDHP	1871	Dc/2+
4-101-04	541 Chester St.	PDHP	1874	Dc/2+
004 077 003	1451 7th Street (Project Site)	-	1971	*/3
004 077 003	1451 7th Street (parcel remainder)	-	1971	*/3
004 071 003	1451 7th Street (adjacent BART parcel)	-	N/A	*/3

OCHS Rating Key:

Capital letter: Existing Rating – Properties receiving an Existing rating of A, or potentially B are considered potentially eligible for the National Register

Lowercase letter = potential rating, if rehabilitated

/Number = District rating (1= Contributor to a National Register-quality (or eligible) district; 2+ = Contributor to a locally important district (ASI), 2* = in a locally important district (ASI) but not a contributor, and 3= Not in a district

Source: City of Oakland, Planning and Zoning Map, accessed December 2020

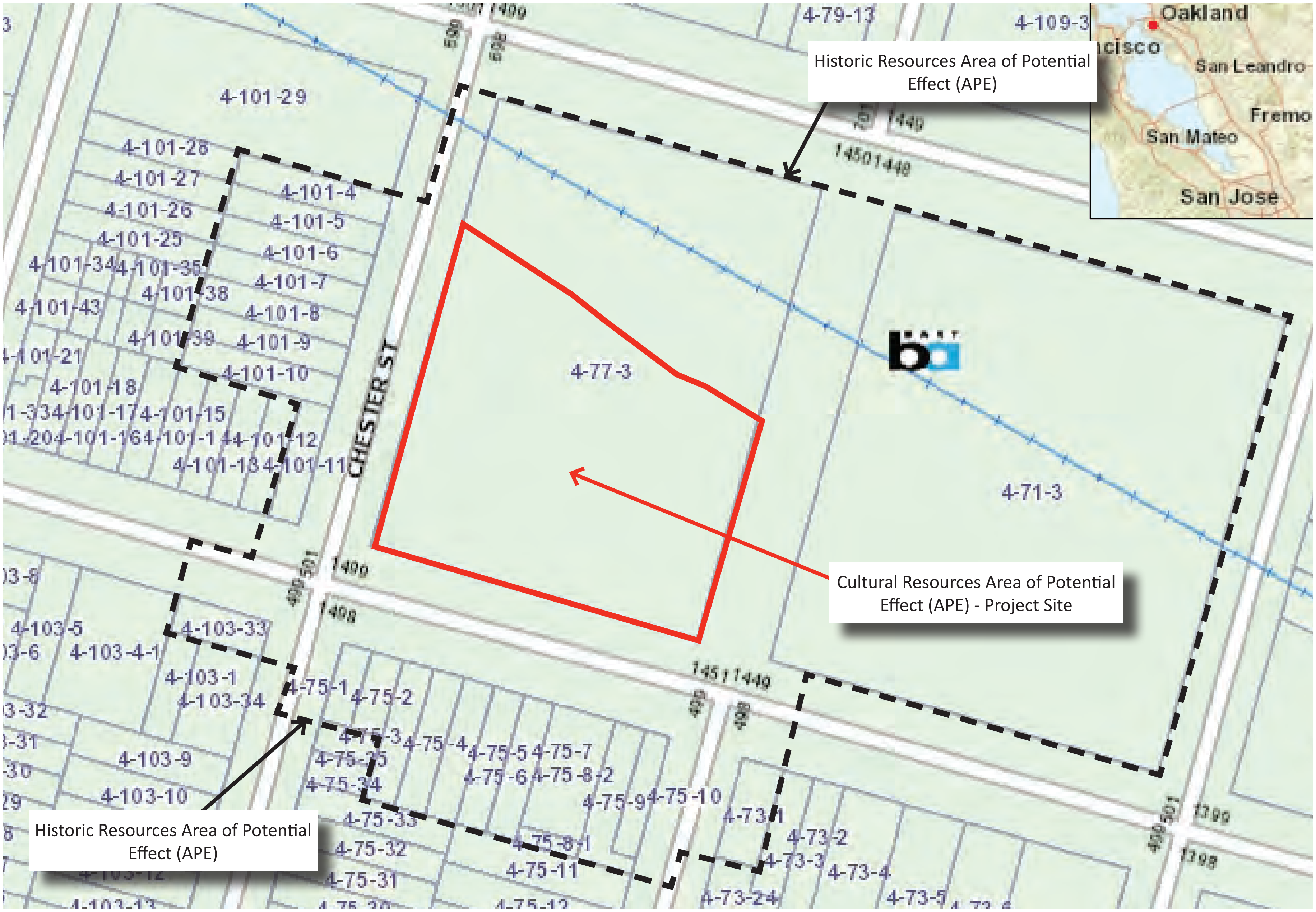


Figure 7
Historic and Cultural Resources Areas of Potential Effect (APEs)

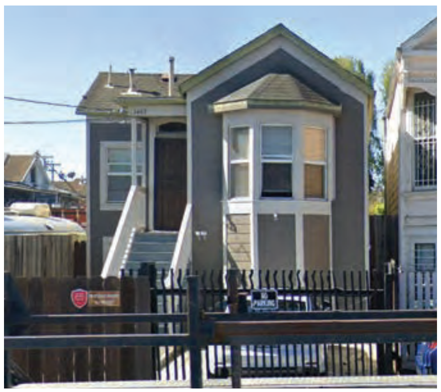
Source: Alameda County Assessors Office, accessed at:
http://gis.acgov.org/Html5Viewer/index.html?viewer=parcel_viewer

4-73-1: Corner of 5th and Center St.

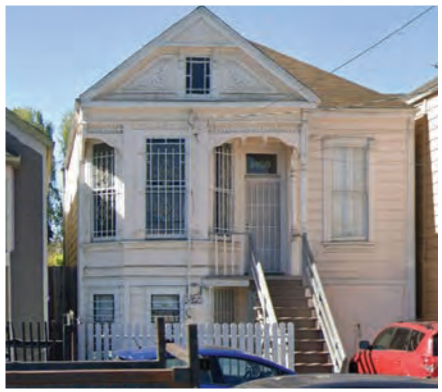
4-75-10: 375 Center

4-75-09: 1453 5th Street (Local Register)

4-75-08: 1455 5th St.

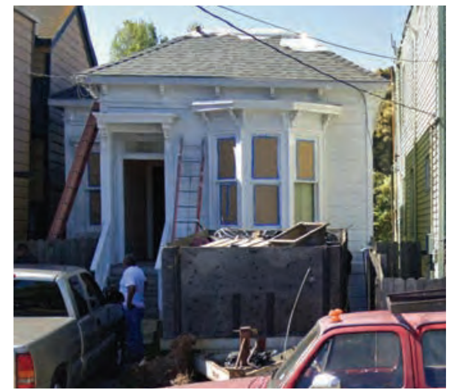


4-75-07: 1463 5th St. (PDHP)



4-75-06: 1469 5th St. (PDHP)

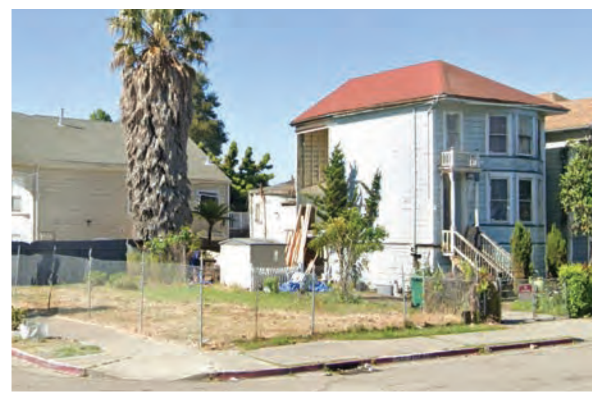
4-75-05: 1473 5th St. (PDHP)



4-75-04: 1477 5th St. (PDHP)

4-75-03: 1485 5th St. (PDHP)

4-77-02 & -01: 1489 & 1495 5th St.



4-103-33: 358 Chester St. (PDHP)

Figure 8A
Images of Buildings within the Historic Resources Area of Potential Effect

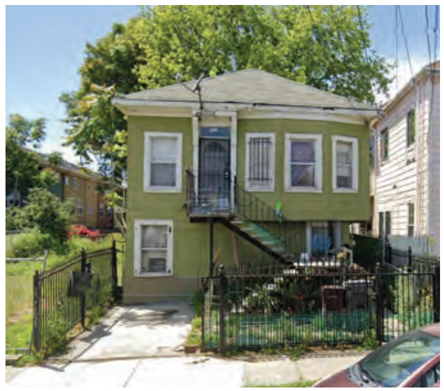

4-101-11: 1502 5th St. (PDHP)


4-101-10: 517 Chester St. (PDHP)


4-101-9: 521 Chester St. (PDHP)


4-101-8: 525 Chester St. (PDHP)


4-101-7 & -6: 535 & 531 Chester St.


4-101-5: 537 Chester St. (PDHP)


4-101-4: 541 Chester St. (PDP)


4-77-3: West Oakland BART Station


4-71-3: West Oakland BART Station

Figure 8B
Images of Buildings within the Historic Resources Area of Potential Effect

Historic Properties in the APE

As indicated in Table 1, the properties included within the Project's Historic Resources APE include only 1 property that is considered a historic resource by the City of Oakland:

- The property at 1453 5th Street (across 5th Street from the Project site) is on the City of Oakland's Local Register of Historic Properties. It is a residence constructed in 1875, and rated as a B-/2+, meaning it is an especially fine architectural example of major historical importance, potentially National Register-eligible, and a contributor to the South Prescott ASI.

The Historic Resources APE also includes 10 other individual properties that are considered of local historic interest, but not designated as historic resources and not considered National Register-eligible. These buildings (identified as PDHPs) are all rated as either C (warrant limited recognition), or D (of minor importance but with a higher contingency rating if restored, or in a district).

The Historic Resources APE also includes six other properties (375 Center, 1455 5th Street, 1489 and 1495 5th Street, plus the Project site and the surrounding BART property) that are either of no historic interest, have been modernized, or were less than 45 years old at the time of the OCHS assessment in 1996.

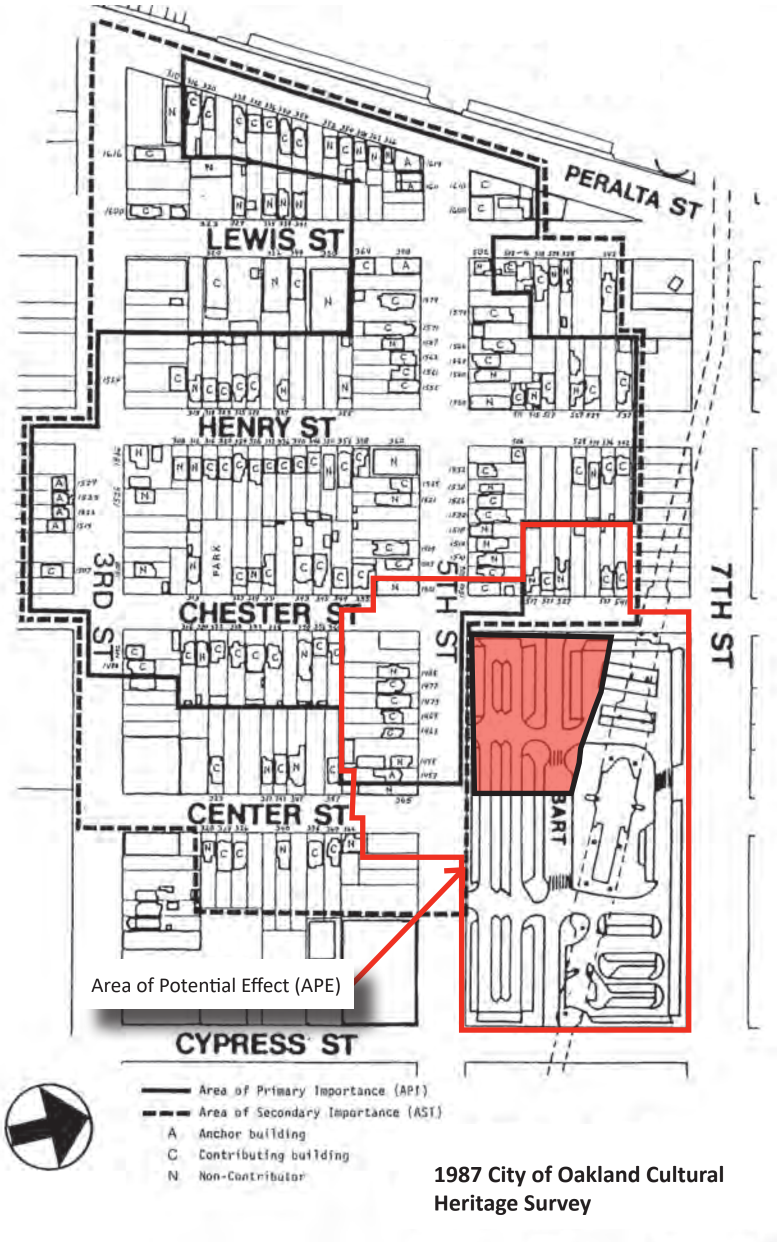
Historic Districts Represented in the APE

South Prescott Area of Secondary Importance

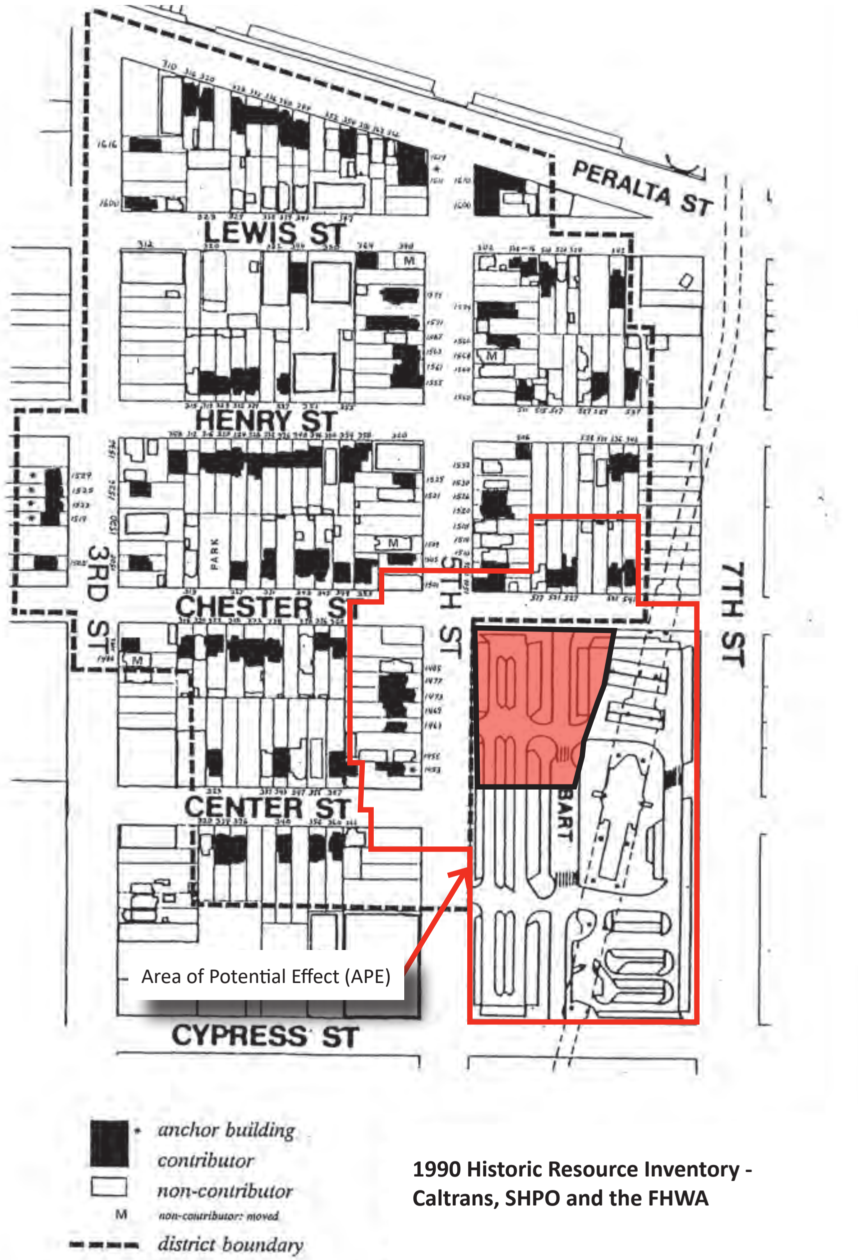
1987 Cultural Heritage Survey / Department of Parks and Recreation Form 523

The City of Oakland's Cultural Heritage Survey includes a 1987 Historic Resource Inventory/Department of Parks and Recreation (DPR) Form 523 for the South Prescott neighborhood, which is located immediately to the south and west of the West Oakland BART Station (see **Attachment A**). This DPR Form identified a significant portion of the South Prescott neighborhood, including 111 individual properties, as an Area of Primary Importance (API) that was considered "*probably eligible*" for the National Register. This API was surrounded by another 38 properties that defined a larger, less intact Area of Secondary Importance (ASI) that "*probably did not*" meet National Register standards of integrity. The City's South Prescott API/ASI included parts of eight city blocks between 7th Street, 3rd Street, Peralta Avenue and Cypress Street in West Oakland (see **Figure 9**). The buildings within this API/ASI are mostly 19th century cottages on small (25' x 125') lots, with scattered vacant lots, industry and new construction. The South Prescott neighborhood was described as "*a self-contained and well-preserved enclave of 19th century working-class houses, strongly associated with the nearby railroad yards and the early Irish, Portuguese, Black and other ethnic communities of West Oakland*." The houses in South Prescott are predominantly one-story, many raised to accommodate basement units. The most common styles of architecture are Italianate, Queen Anne and 19th century vernacular.[4]

[4] City of Oakland, Cultural Heritage Survey - Historic Resource Inventory/Department of Parks and Recreation (DPR) Form 523 for the South Prescott Neighborhood, 1987



1987 City of Oakland Cultural Heritage Survey



1990 Historic Resource Inventory - Caltrans, SHPO and the FHWA

Figure 9
South Prescott Area of Secondary Importance

Sources: City of Oakland, Cultural Heritage Survey - Historic Resource Inventory/Department of Parks and Recreation (DPR) Form 523 for the South Prescott Neighborhood (1987), and Caltrans - Historic Resource Inventory/substitute Department of Parks and Recreation (DPR) Form 523 for the South Prescott Neighborhood (1990)

1990 Substitute Department of Parks and Recreation Form 523 (Revised 5/90)

In 1989, the Loma Prieta earthquake damaged many of West Oakland's historic buildings and brought down the Cypress Freeway. In 1990, Caltrans initiated an environmental review for the I-880/Cyprus Freeway replacement that now skirts the South Prescott neighborhood. As part of that environmental review process, Caltrans prepared a subsequent Historic Resource Inventory (or substitute DPR Form 523) to reevaluate the South Prescott neighborhood (see **Attachment B**). Pursuant to that subsequent Historic Resource Inventory, Caltrans, SHPO and the Federal Highway Administration found that the South Prescott neighborhood was not eligible for the National Register because of compromised historic integrity. This 1990 Historic Resource Inventory found the Prescott neighborhood to be "*a neighborhood of small 19th century workers' cottages, and a rare and ephemeral example of economic, social and development patterns caused throughout the western United States by construction and operation of the transcontinental railroad. As the main surviving concentration of very early, very small 19th century working people's houses in Oakland, it is also unique. There is no other neighborhood in the city, probably in the Bay Area, comparable in the age, size, type, massing and scale of the houses, and in the extent and coherence of the district. Given restoration and reinterpretation of its integrity, its historical significance would appear to qualify the district for the National Register*".

The 1990 Historic Resource Inventory concluded that the South Prescott district had substantial integrity of location, association and feeling, and partial integrity of setting (both externally and internally). However, it also concluded that, "*its physical integrity of design, materials and workmanship has been eroded by years of mostly piecemeal alterations in the interest of low-cost maintenance and increasing usable space. The result is that, regardless of its historical significance and uniqueness as a resource type in Oakland, its present state of physical integrity and present interpretation of standards appear to qualify it as locally important, but not National Register eligible*." [5]

The 1990 Historic Resource Inventory found the South Prescott district to be of local significance (see also Figure 9), with a period of significance from 1869 (when the Central Pacific Railroad and later Southern Pacific arrived in Oakland, the tract was subdivided, and the first of its buildings built), to about 1914, when the importance of the railroad to the city's economy and political life began to decline and when the last new building was constructed. As concluded in the WOSP EIR, "*. . . the historic and architectural character of South Prescott is an important community asset. There are four individual Local Register properties in South Prescott* [including 1453 5th Street within the Project's Historic Resource APE]*, two properties on the City's Preservation Study List, and the district is an obvious candidate for S-20 (Preservation Combining zoning district) designation*."[6]

Potential Effects on Historic Resources

Secretary of the Interior's Standards

The Secretary of the Interior's Standards for the Treatment of Historic Properties (Standards) provide guidance for reviewing projects that may affect historic resources.[7] The intent of the Standards is to assist the long-term preservation of a property's significance through the preservation, rehabilitation

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[5] Caltrans, Historic Resource Inventory/substitute Department of Parks and Recreation (DPR) Form 523 for the South Prescott Neighborhood, 1990

[6] City of Oakland, *West Oakland Specific Plan EIR*, page 4.4-45

[7] National Park Service, *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, accessed at: https://www.nps.gov/tps/standards.htm

and maintenance of historic materials and features. The Standards pertain to historic buildings of all materials, construction types, sizes and occupancy, and encompass the exterior and interior of the buildings. The Standards also encompass related landscape features, and the building's site and environment. The Standards encourage maintaining the integrity of a historic district through appropriate design of infill buildings at vacant sites, or sites where new buildings replace non-contributing buildings. Standards for Rehabilitation expand the discussion to sites and neighborhoods. As written in the Rehabilitation Standards, there is a distinction, but not a fundamental difference between the concerns for additions to historic buildings and new construction, or "infill" adjacent to historic buildings on a property or within a district.

New construction that is adjacent to or related to an existing historic resource (including an historic district) is best addressed in Standard 9 of the Secretary of the Interior's Standards for Rehabilitation. Standard 9 states, "*New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale and architectural features to protect the historic integrity of the property and its environment*." [8]

Project Effects

The Project proposes new construction of an eight-story, mixed-use commercial and residential building on the West Oakland BART Station parking lot. This site is not identified as an historic resource, nor is it within a historic district of local or National Register significance.

Direct Effects

Development of the Project will not directly destroy any historic materials or features that characterize the one historic resource within the Project's Historic Resource APE (which includes the Project site and 17 additional adjacent properties). The one historic resource within the Historic Resources APE is the Local Register property at 1453 5th Street that is potentially eligible for National Register designation, based on its "B" rating pursuant to the OCHS. No direct modifications to this historic building would occur, and no destruction of existing spatial relationships associated with this building to the locally important South Prescott historic district would occur.

The Project will not directly destroy any historic materials or features that characterize the locally important South Prescott ASI (integrity of design, materials, workmanship, location, setting, feeling, and association). No direct modifications to any historic buildings would occur, and no destruction of existing spatial relationships associated with any buildings within this local historic district of secondary importance that are within the Project's Historic Resource APE would occur.

Indirect Effects

The Project will alter the setting and spatial relationships between the Project site and the adjacent historic resource property at 1453 5th Street by inserting a new, large building on a current surface parking lot across the street from this property. In order for this alteration of setting to be considered a substantial adverse change, the integrity and/or significance of the property at 1453 5th Street would need to be materially impaired by the Project. There is nothing about the Project that would materially impair this historic property, and the building at 1453 5th Street it will continue to convey its historic significance after the Project is constructed. The original setting of the property at 1453 5th Street (and

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8 National Park Service, *Secretary of the Interior's Standards for Rehabilitation*, accesses at: https://www.nps.gov/tps/standards/rehabilitation/rehab/stand.htm

other similar housing that was located at the BART Station site) was substantially altered by construction of the original Cypress freeway, the construction of the West Oakland BART Station in the 1970s, and construction of the I-880/Cypress freeway relocation in the 1990s.

Although not considered a CEQA historic resource or a National Register-eligible historic district, the integrity of setting or spatial relationships within the South Prescott ASI will not be materially impaired by the Project. The Project site is not located within this ASI. Further, as indicated in the 1990 Historic Resource Inventory, this ASI has endured, “decades of industrial zoning, construction of the Cypress freeway, expanding Southern Pacific Railroad ownership, condemnation for the adjoining US Post Office and the West Oakland BART station, and the loss of many buildings due to uncertainty and neglect.” The transformation of the West Oakland BART Station parking lot to provide for needed affordable housing adjacent to this residential ASI does not represent the greatest change in integrity or setting that this district has endured, and the affordable housing Project will be a more compatible land use than is the existing BART patron parking lot.

The Project will be substantially taller (at a maximum of eight stories) as compared to the predominantly 1 and 2-story buildings within the adjacent Historic Resources APE, and the Project will also have a substantially larger building mass fronting along 5th Street and Chester Street. However, the Project’s design includes a building height transition that steps down from 80 feet to 38 feet along the Chester Street frontage, providing a less substantial building mass fronting onto the historic district west of Chester Street (see prior Figures 4 and 6).

Although the height and mass of the new building would block or alter certain views and sightlines to and from the residences within the South Prescott neighborhood, the majority of views and sightlines to and from this district are already substantially altered by the overhead BART tracks and the BART Station (see **Figure 10**), as well as by the nearby Main US Postal Service building on 7th Street.

The Project’s modern architectural style and materials will be differentiated from the architectural style and building materials of the remaining early buildings within the Historic Resource APE. The Project would not pose an inherent incompatibility with the historic materials, features, size, scale and proportional massing that would jeopardize the remaining integrity of buildings and districts represented in the Historic Resource APE.

Recommended Determination

For purposes of Section 106 Review of this undertaking, Lamphier Gregory recommends that the Agency Official for HUD (City of Oakland) concur with the Area of Potential Effect for historic resources, and determine that no historic properties will be adversely affected by the undertaking.

Existing View - 5th & Henry

Existing View - 5th & Chester

Future View - 5th & Henry

Future View - 5th & Chester

Figure 10
Existing and Future Views Across the Site from South Prescott Neighborhood

Source: JRDV Urban International, T-3 Final Development Plan, September 2020

Historic Period Archaeological Resources and Tribal Cultural Resources

A Cultural Resources Assessment (CRA) was prepared for the subject property by PaleoWest Archaeology, February 3, 2021 (see **Attachment C**). This report summarizes the methods and results of the cultural resource investigation of the Project site. This investigation included background research, communication with the Native American Heritage Commission (NAHC) and interested Native American tribal groups, a field study, and management recommendations. The purpose of the investigation was to determine, in accordance with Section 106, potential impacts to cultural resources. The major points and recommendations of this report are summarized below.

Cultural/Archaeological Resources APE

The Project involves development of a roughly 1.23-acre site south of the West Oakland BART station in Oakland, Alameda County, California. The Project site is at Alameda County APN 4-77-3, Block 494. The proposed Project site is currently in use as parking for the BART station.

The Cultural Resources APE for the Project is defined as the 1.23-acre Project site (see prior Figure 7). Although the vertical Cultural Resources APE will extend up to 80 feet above the current ground surface, the maximum depth of ground disturbance has not yet been defined. Current plans for ground disturbance include limited grading and excavation work for foundations, footings, and utilities. It is estimated that construction activities associated with the Project will extend approximately six feet in depth.

Historic Period Archaeological Resources

Brief History of the Project Site

The 1889 Sanborn Fire Insurance map for Oakland (see **Figure 11**) lists twenty dwellings of mixed single and double story construction and associated outbuildings, a stable, a store, leatherworking facility, and other ancillary buildings, such as water tanks and windmills, on the block where the Project is located.

- The buildings at 808 to 816 Chester Street were single-story, wood framed houses, some with small outbuildings abutting each other at the fence. The two-story dwelling at 818 Chester Street had a single-story addition at the rear of the building, with a windmill with a water tank. The two-story dwellings at both 818 and 820 Chester Street had small outbuildings abutting another outbuilding along their rear fence line with properties along Center Street.
- The lot at 815 Center Street had two single-story and one, two-story outbuildings detached from the single-story dwelling. The property at 813 Center Street had two single-story dwellings on the lot. The lot at 811 Center Street had a two-story wood framed dwelling as well as a single-story outbuilding along its rear fence, and what is listed as a two-story Leather Strap Factory. The lot at 809 Center Street had a single-story dwelling, as well as a single-story outbuilding.
- Along 5th Street, there are a total of nine dwellings and seven outbuildings, a stable, and a store occupying addresses 1454-1478 5th Street. Of the nine dwellings, only the residence listed at 1466 5th Street was a two-story construction. The lots at 1458 and 1460 as well as 1466-1472 5th Street all possessed single story outbuildings of various size. A two-story store at 1454 5th Street had a wraparound awning that would have extended over the sidewalk at the corner of 5th and Center Street; associated with this store was a stable and attached outbuilding.

Figure 11
1889 Sanborn Fire Insurance Map for the Project Site

Source: PaleoWest, 2021

The 1902 Sanborn Fire Insurance map indicates that numerous additions, conversions, and new constructions occurred within the Project's Cultural Resource APE since 1889.

- A single-story dwelling was constructed at a new 806 Chester Street address. The windmills and water tanks found at 808 Chester Street was not recorded
- The Leather Strap Factory at 811 Center Street was now a shed, indicated it had been razed.
- The store at 1454 5th Street was now a two-story storage building, and its stable was now an outbuilding. A home was constructed at a newly established address at 1456 5th Street. Dwellings at 1458-1460 and 1476 5th Street had been converted from single-family residences to multi-residence apartment flats with new ½ addresses. The single-story dwelling at 1478 5th Street had a second-story addition and the building was converted to a store with an awning extending over the sidewalk at the corner of 5th and Chester Street.

By 1912, the Sanborn Fire Insurance maps detail numerous changes since 1902.[9]

- Along Chester Street, the removal of the windmill and tank at 808 Chester Street was confirmed; the one at 818 was still extant. The single-story dwelling at 812 Chester Street had been expanded towards the street, and some of the dwelling at 806 Chester Street had been converted into storage.
- The dwelling at 1472 5th Street had been converted into an apartment flat and a brick outbuilding was placed on the property. The shed that had originally been the stable associated with 1454 5th Street was now partitioned into two sheds for 1454 and 1456 5th Street. The property at 1454 5th Street had been converted into an apartment flat.
- The dwelling at 811 Center Street had been converted to an apartment flat.

By 1951, the Cultural Resource APE had undergone numerous changes.

- A single change had occurred along Chester Street, with an addition at the rear of 522 Chester Street.
- Along 5th Street, multiple changes had occurred: A shed had been removed at 1476 5th Street, the dwelling at 1470 5th Street expanded and subdivided into two flats. A detached dwelling with an attached garage was constructed at the rear of the property with the address of 1470 ½ 5th Street. At 1460 5th Street, there was an addition to the rear of the dwelling. A detached building had been constructed at the rear of 521 Center Street, and given an address of 521 ½, and the addresses had been adjusted at 531 Center Street. The dwelling identified as 529 Center Street on the 1912 Sanborn had been torn down, and the dwelling initially designated 533 Center Street had been given the address 531 Center Street.

All the buildings on the 1951 Sanborn maps appear to be visible on aerial photographs from 1951 and continuing to 1959.

By 1968, all the buildings that occupied the Project's Cultural Resource APE had been demolished, and the site was an open lot. Between 1968 and 1980, all buildings and structures within the Project's Cultural Resource APE were razed, and the land was redeveloped as the parking lot for the adjacent

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[9] Oakland street addresses were comprehensively renumbered in 1910-1912. The 800 block of Chester and Center Streets (1889 and 1912 Sanborn citations) is the same as the 500 block (1951 Sanborn)

West Oakland BART station in 1974. From 1980 to 2016, the historic aerials indicate that there have been no development changes to the site.

Potential Historic Period Significance of the Site

An historic records search of the Project site indicates that two cultural resource studies (S-26045 and S-37362) have been completed within the Cultural Resource APE, and 24 cultural resource studies have been conducted within ½-mile of the APE.

The records search results identified 99 cultural resources within ½ mile of the Cultural Resource APE. Two of these resources represent prehistoric archaeological sites. The remaining 97 resources date to the historic period. The NWIC identified one historic district, the Bay View Homestead Tract/South Prescott Neighborhood (P-01-004189), in the Cultural Resources APE. However, a review of the Historic Resources Inventory Record indicates that the Bay View Homestead Tract/South Prescott Neighborhood lies south of 5th Street and west of Chester Street. As such, the district is adjacent to, but outside of the Cultural Resources APE (portions of this locally important historic district are within the Historic Resource APE). The district was previously recommended ineligible for listing in the NRHP due to a lack of integrity. There are no listed historic properties, historical resources, or historic landmarks recorded in the Cultural Resources APE.

Based on the results of the records search and the development history of the area, the Cultural Resource APE is characterized by a high level of sensitivity for buried archaeological deposits dating to the late 19th and early 20th centuries. Recent investigations conducted near the Cultural Resource APE have found that historic period archaeological remains tend to be concentrated in the upper two feet of sediment. Given the extent of ground disturbance associated with the construction of the BART station and parking lot in the 1970s, it is unlikely that significant intact historic period archaeological deposits are extant in the Cultural Resources APE.

A pedestrian archaeological survey of the 1.23-acre Cultural Resources APE was conducted on December 29, 2020. Results of the survey confirm that much of the APE is paved and developed by a parking lot. Ground visibility was less than 20 percent, with areas of exposed ground surface largely limited to landscaped areas that lay along the borders of the property and within curbed parking islands. During the survey, several possible historic-era artifacts were identified, exposed on the ground surface along the southern border of the Project site. Specifically, the remains were located in a landscaped area that contained numerous trees and shrubs that showed signs of extensive disturbance. Identified items include a glass bottle fragment, several pieces of white-ware and transfer print ceramic dishware, and a ceramic mason's jar lid. None of the artifacts exhibited markers or temporally diagnostic characteristics that would allow the remains to be dated. The potential historic-era artifacts were intermixed with modern refuse.

Conclusions

The findings of the Cultural Resource Assessment indicate that no historic properties are present in the Cultural Resources APE for the Project (defined as the 1.23-acre Project site). A review of the resource record finds that the Bay View Homestead Tract/South Prescott Neighborhood (a locally important historic district) lies adjacent to, but outside of the Cultural Resources APE. All of the historic period buildings and structures that were once present in the Cultural Resources APE were razed for the construction of the West Oakland BART station and parking lot in the 1970s. As such, there are no historic period built environment resources in the Cultural Resources APE.

Although early development within the Cultural Resources APE suggests a high level of sensitivity for buried historic-period archaeological deposits, given the extent of ground disturbance associated with construction of the BART station and associated parking lot, it is unlikely that significant intact historic period archaeological deposits are extant in the Cultural Resources APE.

Based on the findings of the study, the CRA recommends a finding of no historic period archaeological resources affected by the proposed undertaking.

Native American Tribal Cultural Resources and Consultation

On November 20, 2020, PaleoWest contacted the Native American Heritage Commission (NAHC), requesting a review of the Sacred Lands File (see **Attachment C**). The objective of the Sacred Lands File search was to determine whether the NAHC had any knowledge of Native American cultural resources (e.g., traditional use or gathering area, place of religious or sacred activity, etc.) within the APE or its immediate vicinity. The NAHC response dated December 2, 2020, stated, "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced Project. The results were positive." The NAHC response provided a list of Native American contacts, which included:

- Irenne Zwierlein, Amah Mutsun Tribal Band of San Juan Bautista
- Tony Cerda, Costanoan Rumsen Carmel Tribe
- Donald Duncan, Guidiville Indian Rancheria
- Ann Marie Sayers, Chairperson, Indian Canyon Mutsun Band of Costanoan
- Kanyon Sayers-Roods, Indian Canyon Mutsun Band of Costanoan
- Monica Arellano, Muwekma Ohlone Indian Tribe of the SF Bay Area
- Timothy Perez, North Valley Yokuts Tribe
- Katherine Perez, North Valley Yokuts Tribe
- Andrew Galvan, The Ohlone Indian Tribe, and
- Corrina Gould, The Confederated Villages of Lisjan

PaleoWest contacted these Native American representatives by email on December 8, 2020, informing them of the Project and requesting any comments, concerns or information they may wish to share regarding cultural resources or sacred sites within the immediate Project area (see also Attachment C for copies of these letters). Follow up phone calls were made on December 15, 2020 and December 30, 2020.

On February 18, 2021, a separate letter was sent to each of these same Native American contacts, as well as Silvia Burley representing the California Valley Miwok Tribe (see **Attachment D**). That February 2021 letter indicated that the City of Oakland was conducting environmental review of the Project to comply with Section 106 of the National Historic Preservation Act and its implementing regulations at 36 CFR Part 800, and invited each of these representatives to be a consulting party in this review, to help identify historic properties in the area that may have religious and cultural significance, and to help assess how the Project might affect those properties, if they exist.

In response to this outreach and requests for consultation, the City received three responses:

- Timothy Perez of the North Valley Yokuts Tribe responded on December 8, 2020, recommending that Native American monitoring be conducted for the Project.
- On March 23, 2021, Kanyon Sayers-Roods of the Indian Canyon Band of Costanoan Ohlone People, requested consultation with the City of Oakland, and specifically requested that a Native American monitor and an archaeologist be present on-site. On March 24, 2021, the City of Oakland provided Kanyon Sayers-Roods with a copy of the archeological analysis prepared for the site, agreed with the request for a Tribal Monitor, and requested the Tribes further thoughts, concerns and/or comments on the archeological analysis. No further comments on the analysis were received.
- Corrina Gould of the Confederated Villages of Lisjan responded on December 8, 2021 and again on February 25, 2021 requesting additional time to respond. On April 2, 2021, Corrina Gould requested consultation with the City of Oakland, and on April 7, 2021, the City of Oakland provided Corrina Gould with a copy of the archeological report and requested the Tribe's thoughts and comments on that analysis. Corrina Gould responded on April 21 that they had no comments on the cultural resources analysis, but did request that a Tribal monitor be present on-site during construction.

No other responses to either the December 2020 letter requesting information on sacred sites, or the February 2021 letter requesting consultation pursuant to Section 106 have been received.

Mitigation Measures/Protocols

Given the prior disturbance of the site for construction of the existing BART station and parking lot, and the relatively minimal extent of grading required of the Project, the PaleoWest Cultural Resources Analysis did not recommend archaeological monitoring during construction for historic period archaeological resources. The CRA does recommend preparation of an ALERT Sheet and training by a qualified archaeologist, as well as implementation of appropriate protocols in the event of a construction period discovery or archaeological resources or human remains. These recommendations are fully consistent with the Conditions of Approval that have already been adopted for the Project by the City of Oakland pursuant to prior local land use approvals.

However, based on subsequent recommendations and consultation with those three Tribes which did respond to the City's outreach efforts and consultation requests, the City has agreed to additional mitigation measures for the Project that require preparation of a Tribal Cultural Resources/ Archaeological Monitoring Program to be implemented during all ground-disturbing activities associated with the Project (see additional mitigation, below).

Archaeological and Paleontological Resources – Discovery during Construction**:** Pursuant to CEQA Guidelines section 15064.5(f), in the event that any historic or prehistoric subsurface cultural resources are discovered during ground disturbing activities, all work within 50 feet of the resources shall be halted and the project applicant shall notify the City and consult with a qualified archaeologist or paleontologist, as applicable, to assess the significance of the find. In the case of discovery of paleontological resources, the assessment shall be done in accordance with the Society of Vertebrate Paleontology standards. If any find is determined to be significant, appropriate avoidance measures recommended by the consultant and approved by the City must be followed unless avoidance is determined unnecessary or infeasible by the City. Feasibility of avoidance shall be determined with consideration of factors such as the nature of the find, project design, costs, and other considerations. If avoidance is unnecessary or infeasible, other appropriate measures (e.g., data recovery, excavation) shall be instituted. Work may proceed on other parts of the project site while measures for the cultural resources are implemented.

In the event of data recovery of archaeological resources, the project applicant shall submit an Archaeological Research Design and Treatment Plan (ARDTP) prepared by a qualified archaeologist for review and approval by the City. The ARDTP is required to identify how the proposed data recovery program would preserve the significant information the archaeological resource is expected to contain. The ARDTP shall identify the scientific/historic research questions applicable to the expected resource, the data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. The ARDTP shall include the analysis and specify the curation and storage methods. Data recovery, in general, shall be limited to the portions of the archaeological resource that could be impacted by the proposed project. Destructive data recovery methods shall not be applied to portions of the archaeological resources if nondestructive methods are practicable. Because the intent of the ARDTP is to save as much of the archaeological resource as possible, including moving the resource, if feasible, preparation and implementation of the ARDTP would reduce the potential adverse impact to less than significant. The project applicant shall implement the ARDTP at his/her expense.

In the event of excavation of paleontological resources, the project applicant shall submit an excavation plan prepared by a qualified paleontologist to the City for review and approval. All significant cultural materials recovered shall be subject to scientific analysis, professional museum curation, and/or a report prepared by a qualified paleontologist, as appropriate, according to current professional standards and at the expense of the project applicant.

When Required: During construction
Initial Approval: N/A
Monitoring/Inspection: Bureau of Building

Human Remains – Discovery During Construction: Requirement: Pursuant to CEQA Guidelines, section 15064.5(e)(1), in the event that human skeletal remains are uncovered at the project site during construction activities, all work shall immediately halt and the project applicant shall notify the City and the Alameda County Coroner. If the County Coroner determines that an investigation into the cause of death is required, or that the remains are Native American, all work shall cease within 50 feet of the remains until appropriate arrangements are made. In the event that the remains are Native American, the City shall contact the California Native American Heritage Commission (NAHC), pursuant to subdivision (c) of section 7050.5 of the California Health and Safety Code. If the agencies determine that avoidance is not feasible, then an alternative plan shall be prepared with specific steps and timeframe required to resume construction activities. Monitoring, data recovery, determination of significance, and avoidance measures (if applicable) shall be completed expeditiously and at the expense of the project applicant.

When Required: During construction
Initial Approval: N/A
Monitoring/Inspection: Bureau of Building

The CRA indicates that recent archaeological investigations conducted in the vicinity have found that historic period archaeological remains are generally concentrated in the upper two feet of sediment, and that with the extent of prior ground disturbance associated with the construction of the BART parking lot, it is unlikely that significant intact historic period archaeological deposits are extant at the Cultural Resources APE. However, the Project site is located in an area identified as having a high sensitivity for archaeological resources, and the following City of Oakland's prior condition of Project approval still applies:

Archaeologically Sensitive Areas – Pre-Construction Measures: The project applicant shall implement either Provision A (Intensive Pre- Construction Study) or Provision B (Construction ALERT Sheet) concerning archaeological resources.

Provision A: Intensive Pre-Construction Study: The project applicant shall retain a qualified archaeologist to conduct a site-specific, intensive archaeological resources study for review and approval by the City prior to soil-disturbing activities occurring on the project site. The purpose of the site-specific, intensive archaeological resources study is to identify early the potential presence of history-period archaeological resources on the project site. At a minimum, the study shall include:

a. Subsurface presence/absence studies of the project site. Field studies may include, but are not limited to, auguring and other common methods used to identify the presence of archaeological resources.

b. A report disseminating the results of this research.

c. Recommendations for any additional measures that could be necessary to mitigate any adverse impacts to recorded and/or inadvertently discovered cultural resources.

If the results of the study indicate a high potential presence of historic-period archaeological resources on the project site, or a potential resource is discovered, the project applicant shall hire a qualified archaeologist to monitor any ground disturbing activities on the project site during construction and prepare an ALERT sheet pursuant to Provision B below that details what could potentially be found at the project site. Archaeological monitoring would include briefing of construction personnel about the type of artifacts that may be present (as referenced in the ALERT sheet, required per Provision B below) and the procedures to follow if any artifacts are encountered, field recording and sampling in accordance with the Secretary of Interior's Standards and Guidelines for Archaeological Documentation, notifying the appropriate officials if human remains or cultural resources are discovered, and preparing a report to document negative findings after construction is completed if no archaeological resources are discovered during construction.

Or -

Provision B: Construction ALERT Sheet: The project applicant shall prepare a construction "ALERT" sheet developed by a qualified archaeologist for review and approval by the City prior to soil-disturbing activities occurring on the project site. The ALERT sheet shall contain, at a minimum, visuals that depict each type of artifact that could be encountered on the project site. Training by the qualified archaeologist shall be provided to the project's prime contractor, any project subcontractor firms (including demolition, excavation, grading, foundation, and pile driving), and utility firms involved in soil- disturbing activities within the project site. The ALERT sheet shall state, in addition to the basic archaeological resource protection measures contained in other standard conditions of approval, all work must stop and the City's Environmental Review Officer contacted in the event of discovery of the following cultural materials: concentrations of shellfish remains; evidence of fire (ashes, charcoal, burnt earth, fire- cracked rocks); concentrations of bones; recognizable Native American artifacts (arrowheads, shell beads, stone mortars [bowls], humanly shaped rock); building foundation remains; trash pits, privies (outhouse holes); floor remains; wells; concentrations of bottles, broken dishes, shoes, buttons, cut animal bones, hardware, household items, barrels, etc.; thick layers of burned building debris (charcoal, nails, fused glass, burned plaster, burned dishes); wood structural remains (building, ship, wharf); clay roof/floor tiles; stone walls or footings; or gravestones. Prior to any soil-disturbing activities, each contractor shall be responsible for ensuring that the ALERT sheet is circulated to all field personnel, including machine operators, field crew, pile drivers, and supervisory personnel. The ALERT sheet shall also be posted in a visible location at the project site.

When Required: Prior to approval of construction-related permit; during construction
Initial Approval: Bureau of Building; Bureau of Planning
Monitoring/Inspection: Bureau of Building

Additional Mitigation Measures

In addition to the protocols required pursuant to City Standard Conditions of Approval, the following mitigation measures are recommended specifically to address the potential for discovery of Native American cultural resources:

Mitigation Measure Tribal Resources-1, Archeological Monitoring Plan - Native American Monitor(s): The Project applicant shall be required to prepare an Archeological Monitoring Plan/Alert Sheet for the Project, and to retain and compensate for the services of a Tribal monitor(s) who is/are approved by the North Valley Yokuts Tribe, the Indian Canyon Band of Costanoan Ohlone People, and the Confederated Villages of Lisjan Tribal governments, and that is/are listed under the NAHC's Tribal Contact list for the area of the Project location. The Archeological Monitoring Plan/Alert Sheet shall be provided to these Tribes for their review and approval. The monitor(s) will be present on-site during the timeframe as specified within the Archeological Monitoring Plan/Alert Sheet, and shall complete daily monitoring logs that provide a description of the day's construction activities, and any cultural materials identified.

Mitigation Measure Tribal Resources-2, Unanticipated Discovery of Tribal Cultural and Archaeological Resources: Upon discovery of any archaeological resources, construction activities shall cease in the immediate vicinity of the find until the find can be evaluated the Tribal Monitor(s). If the discovered resources are of Native American origin, the Tribal Monitor(s) shall determine the tribal origin of the discovery, alert that Tribal government, and arrange for coordination with the landowner/developer regarding treatment and curation of these resources, as outlined in the Archeological Monitoring Plan/Alert Sheet.

Recommended Determination

For purposes of Section 106 Review of this undertaking, Lamphier Gregory recommends that the Agency Official for HUD (City of Oakland) concur with the Area of Potential Effect for cultural/archaeological/Tribal cultural resources, determine that no historic period archaeological resources will be adversely affected by the undertaking with implementation of protocol measures pursuant to City of Oakland Standard Conditions of Approval as required of the Project, and determine that no Tribal cultural resources will be adversely affected by the undertaking with implementation of additional mitigation measures requiring Native American monitor(s) and additional protocols in the event of a discovery of such resources.

Attachment A

City of Oakland Cultural Heritage Survey

State of California Resources Agency Department of Parks and Recreation Historic Resources Inventory Form (DPR 523 Primary Record), South Prescott Area of Secondary Importance, 1987

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

HISTORIC RESOURCES INVENTORY

Ser. No. — —
HABS ____ HAER ____ Loc ____ SHL No. ____ NR Status 5
UTM: A 10/562110/4184240 C 10/561700/4184000
B 10/562180/4183880 D 10/561870/4184300

IDENTIFICATION

1. Common name: South Prescott Neighborhood ASI
2. Historic name: Bay View Homestead Tract
3. Street or rural address: parts of 1400-1600 blocks of 3rd and 5th Streets; parts of 300-500 blocks of Peralta, Lewis, Henry, Chester, and Center Streets.
   City Oakland Zip 94607 County Alameda
4. Parcel number: See continuation pages
5. Present Owner: Various Address: ____
   City ____ Zip ____ Ownership is: Public ____ Private X
6. Present Use: Domestic;Commerce;Industry Original use: Domestic;Commerce;Industry

DESCRIPTION

7a. Architectural style: Various; predominantly Italianate and 19th century vernacular
7b. Briefly describe the present *physical appearance* of the site or structure and describe any major alterations from its original condition:

The South Prescott Neighborhood ASI is a group of 146 buildings occupying parts of 8 city blocks between 7th, 3rd, Peralta, and Cypress Streets in West Oakland. The buildings are mostly 19th century cottages on small lots (25'x 125'), with scattered vacant lots, industry, and new construction. Intrusions are relatively few: of the 51 noncontributing buildings in the ASI, 36 are old ones remodeled, which could theoretically contribute if restored. The most intact portion of the district, consisting of 111 properties, is considered an Area of Primary Importance (API), probably eligible for the National Register. This form describes the larger Area of Secondary Importance (ASI), which shares the history and physical character of the API but includes more buildings whose integrity has suffered from remodeling or deterioration.

South Prescott is an active one- and two-family residential neighborhood,

(see continuation page 3)

8. Construction date:
   Estimated ____ Factual 1870s-198
   predominantly 1870s-80s
9. Architect Various, mostly unknown
10. Builder Various, mostly unknown
11. Approx. property size (in feet)
    Frontage ____ Depth ____
    or approx. acreage 30 acres; parts of 8 city blocks
12. Date(s) of enclosed photograph(s)

Photo No: 502- 8
Date: 09/24/87
Location: SOUTH PRESCOTT ASI
VIEW SOUTH ON HENRY FROM 336

13. Condition: Excellent ____ Good X Fair ____ Deteriorated ____ No longer in existence ____

14. Alterations: Basement units, siding, windows, steps

15. Surroundings: (Check more than one if necessary) Open land ____ Scattered buildings X Densely built-up ____
Residential ____ Industrial X Commercial X Other: Institutional: rapid transit and post office

16. Threats to site: None known ____ Private development ____ Zoning ____ Vandalism ____
Public Works project ____ Other: ____

17. Is the structure: On its original site? Most Moved? Some Unknown? ____

18. Related features: None

SIGNIFICANCE

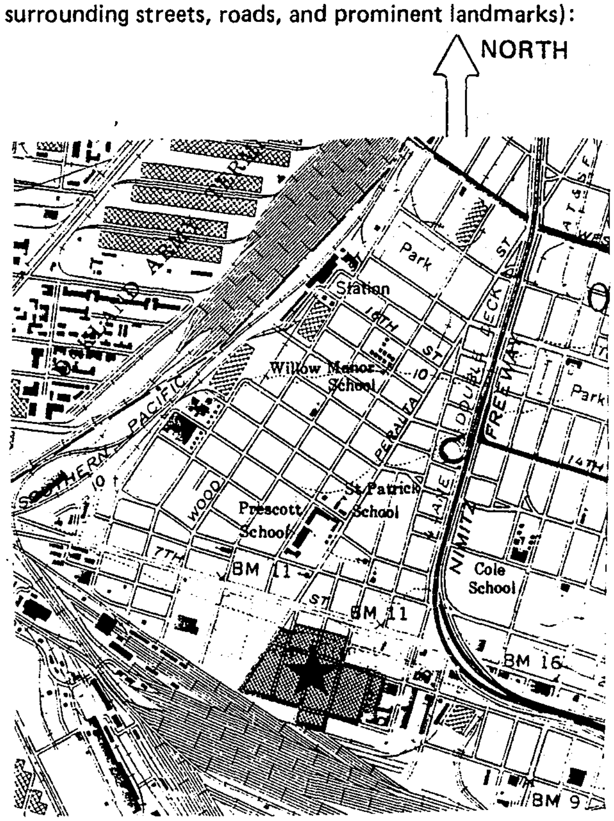
19. Briefly state historical and/or architectural importance (include dates, events, and persons associated with the site.)

The South Prescott neighborhood is a self-contained and well-preserved enclave of 19th century working-class houses, strongly associated with the nearby railroad yards and the early Irish, Portuguese, Black and other ethnic communities of West Oakland. The most intact portion (111 properties) appears eligible for the National Register; the larger neighborhood (149 properties) is considered an Area of Secondary Importance, locally significant for history and architecture though probably not meeting National Register standards of integrity.

South Prescott's boundaries today are still essentially those of Bay View Homestead, a 26-acre tract filed April 15, 1869, just as the transcontinental railroad was arriving in West Oakland. Wedged between the 7th Street local tracks and the 1st Street transcontinental tracks just east of where they converged at the Oakland Point wharf and yards, Bay View Homestead became a

(see continuation page 6)

Locational sketch map (draw and label site and surrounding streets, roads, and prominent landmarks):



20. Main theme of the historic resource: (If more than one is checked, number in order of importance.)
Architecture 1 Arts & Leisure ____
Economic/Industrial 2 Exploration/Settlement ____
Government ____ Military ____
Religion ____ Social/Education 3

21. Sources (List books, documents, surveys, personal interviews and their dates).

See continuation page 10

22. Date form prepared September 30, 1988
By (name) Staff
Organization Oakland Cultural Heritage Survey
Address: 1 City Hall Plaza, 6th Floor
City Oakland, CA Zip 94612
Phone: (415)273-3941

Street or rural address: South Prescott Neighborhood ASI

7b. Physical Description (continued from page 1)

enclosed on all sides by sharply contrasting uses. To the southeast and south are industries of roughly the types historically there - manufacturing and freight warehouses along Cypress, auto wreckers along Third. Seventh Street to the north is the heavily-traveled thoroughfare it always was, but most of its commercial activity is gone (see 7th Street ASI). To the northeast the Bay Area Rapid Transit Oakland West station occupies two former blocks of the South Prescott neighborhood (one residential, one industrial), and to the west across Peralta Street the Oakland Main Post Office and its parking lots occupy an area as large as, and once similar in character to, the remaining South Prescott neighborhood.

The houses in South Prescott are predominantly one-story, many raised to accommodate basement units. By far the commonest types are Italianate and 19th-century vernacular. Of the two dozen Queen Anne style houses in the district, perhaps 12 incorporate 1870s buildings behind 1890s facades. Almost half the buildings in the district date from the 1870s, with or without additions and alterations, and enough of those are reasonably intact to establish the area visually as one of the oldest neighborhoods in Oakland. Another 30 houses were built in the 1880s and about 12 during the 1890s. Scattered among the small, old houses are half a dozen late 19th and early 20th century commercial buildings, mostly corner stores with flats above (1501 5th and 528 Lewis are the bottom floors of two more such buildings). With 6 Colonial Revival flats and houses (1473, 1485, 1555, and 1566 5th, 354 Peralta, 343 Chester), this accounts for all the post-Victorian development in the district other than industry until the 1980s. Three industrial buildings were built between 1910 and 1940; a rather industrial-style church in 1951-54, and 7 new houses and 2 artists studio complexes since 1980.

Areas with particularly strong period character are the south side of 3rd Street between Chester and Henry (1507 through 1529 3rd), with 4 matching plain boxy Italianate raised-basement cottages that helped inspire the folklore that South Prescott was railroad company housing; the south side of 5th Street between Henry and Lewis (1555 to 1579 5th), which has some of the district's bigger and better-kept buildings including one of the corner stores and a rare 2-story Italianate; and the east side of Peralta Street from 5th to 3rd (1611 5th to 316 Peralta), the north end anchored by the 1887-88 Italianate Davidson store and flats buildings (1611 & 1619 5th), and the houses well displayed because of the angle of the street.

Characteristic 1870s building forms and features which recur around the district are deep gable roofs with returns, boxy houses with low hip roofs, false fronts, and tiny saltbox cottages. On several houses, corbeled brick chimneys call attention to the older rear portion of the building. Most of these early houses are only slightly ornamented - hence the style label "Italianate/19th century vernacular" for many of them.

Alterations are common in the district, generally more in the nature of low-cost maintenance and expanded use than cosmetic modernization: basement

(see continuation page 4)

Street or rural address: South Prescott Neighborhood ASI

7b. Physical Description (continued from page 3)

garages and units, aluminum sash, stucco and vinyl and tarpaper siding, roll roofing, replacement steps and porches, security doors and window grilles. 362 and 366 Peralta, with their false fronts removed and gables edged with tile, and 320 Chester, redone in 1975 with artificial stone and wrought iron, are among the few houses actually restyled. Front yards are small, sometimes paved, not intensely landscaped, but pepper trees, used as street trees, give the neighborhood a well planted look. Along 3rd Street, where there are many vacant lots, its character is almost semi-rural (at least temporarily). On weekdays, however, the traffic and parking overflow from the Oakland West BART station is a clear reminder of the neighborhood's urban location.

There are about 50 vacant lots in the district, many sites where sub-standard houses were demolished. All but a dozen of the houses in the district were built before 1910. The nine new buildings constructed since 1980 include 3 manufactured houses (1539 & 1567 5th St. and 350 Henry St.), a small plain 1-story house (534 Henry St.), 2 very plain 2-story houses (1560 5th St. and 524 Lewis St.), a rustic, barn-like 2-story house (322 Lewis St.), and, most recently, 2 artist studio complexes (360 Henry St. & 350 Lewis St.) in a well-designed, contemporary rustic style. A similar building is slated for construction in the near future, perhaps suggesting a new trend for the remaining vacant lots.

Photo No: 502-14
Date: 09/24/87
Location: SOUTH PRESCOTT ASI
WEST SIDE HENRY; 323 @ CENTER

Street or rural address: South Prescott Neighborhood ASI

19. Historical and/or Architectural Importance (continued from page 2)

natural place for railroad workers to settle. As the dates of the surviving buildings in the neighborhood show (almost half built between 1870 and 1879), it developed quickly. The Snow and Roos birdseye map of c.1870 shows street trees around several blocks, and a single cluster of small buildings at about the location of 502-508 Lewis. The 1870-71 tax roll shows about a third of the lots still owned, undeveloped, by P.M. Batchelder, the owner of the original 26 acres. By 1876 (the first available tax records arranged by location) the tract was well built up. The Oakland Tribune Holiday Number of January 1, 1877, notes 45 new buildings in the tract during 1876 (mostly "one-story frames, average price $800"). There are and were no mansions or estates in South Prescott. 1579 5th, a fairly plain bay-windowed Italianate built in 1886-87 and occupied by S.P. conductor George Rowland, stands out in the district as a real two-story house on a double lot. Though other houses are as big, their origin as raised-basement cottages is obvious and gives them an entirely different character. After the tract's rapid development in the 1870s and 80s, subsequent growth most often took the form of adding to existing buildings. The 1889 Alameda County block book includes descriptive notes such as "front addition making the house at least twice as large as before" (537 Henry), "imps. on lot 17 raised and story built under" (332 Chester), "old imps. moved in rear and added on to new imps." (542 Lewis), and so on; other remodelings are inferred from assessments, Sanborn maps, and the buildings themselves. After the turn of the century, especially along 3rd Street nearest the tracks and the marsh where lots had remained undeveloped, a number of seemingly very old buildings were moved onto their present sites: 1616, 1554, 1492, and 1488 3rd, 316 Peralta, 323 Henry, etc. Their former locations are unknown. Also unknown are the names of designers or builders of the pre-earthquake houses: only a few carpenters' names can be conjectured.

From the beginning the neighborhood was a mixture of owner-occupied houses and rentals. Many of the owners of rental houses lived in the neighborhood, and developed an extra property or two; they included 7th Street merchants (grocer John Clonen, 325, 536, and 542 Henry; saloonkeeper Thomas Jarvis, 1561 5th and 358 Henry; piano maker Franz Klier, 1430 to 1436 3rd), carpenters (Thomas Dolan, 329 Chester; Phares J. Batchelder, probably a son of P.M., 518 Lewis; William Dickerson, 511 and 515 Henry), and railroad employees (laborer Patrick Sugrue, 340 Center, 354 and 360 Chester; engineer James Davidson, 1611 and 1619 5th, 358 and 362 Peralta). A number of other residents of such modest occupations as railway laborers and dressmakers continued to own and rent out their South Prescott houses for many years after moving elsewhere. Some other rental and speculative houses were the work of downtown developers and investors (coal dealer G.W. Frasher, 339 and 341 Lewis; physician Stephen Porter, 1519 to 1529 3rd). Two prominent downtown educators and churchmen - Henry Durant and Laurentine Hamilton - were large owners in the tract in the early years, but got out without developing their land.

Stephen Porter's group of four matching cottages, and the age, small size, and plainness of the South Prescott houses in general, have given rise to the tradition that they were Southern Pacific company housing, when in fact they

(see continuation page 7)

Street or rural address: South Prescott Neighborhood ASI

19. Historical and/or Architectural Importance (continued from page 6)

are the products of 19th century homeownership, often by S.P. employees. (The Southern Pacific owned the marsh/waterfront land along the overland tracks, but only began to acquire land in the residential neighborhood after the turn of the century, and especially around the mid-20th century. In 1975 the railroad owned 40 parcels - 9 with houses and the rest cleared lots - which it disposed of that year.) Perhaps a third of the 19th and early 20th century owners and residents whose occupations have been identified* worked for the railroad, as laborers, car cleaners, car repairers, engineers, signalmen, firemen, oilers, machinists, switchmen, carpenters, ship carpenters, sailors, cooks, and porters. In the early years a few South Prescott carpenters also worked for the Pacific Improvement Co. and Western Development Co., land development subsidiaries of the Central Pacific. The car shops were located just west of Peralta Street between 3rd and the tracks (a huge establishment with planing mill, lumber and metal yards, machine shops, creosoting plant, etc.), and railroad uses and railroad jobs extended west from there to the wharf. Part of this complex still exists at the foot of Pine and Wood Streets. By about 1910 there were also S.P. freight depots occupying the former marsh blocks east of South Prescott from Cypress to Poplar Street. Railroad-related commercial activities (hotels, saloons, "female boarding houses") were concentrated along 7th Street and to some extent in the blocks west of Peralta; South Prescott itself remained residential.

"A Sightseeing Tour of West Oakland in the Late Eighties and Early Nineties" published in 1941 in the West of Market Boys' Journal (a West Oakland old-timers' club) calls South Prescott "that section `South of the border,' 7th Street car tracks the border." The memoirist mentions Chris Nor's Livery Stable (predecessor of his garage at 1575 7th), a pickle factory at 3rd and Lewis, engineer James Davidson and a score of other railroad employees (including Richard Towns "who lost both of his legs down there in the railroad yards"), and two early black residents, Ewen Cowan, a whitewasher (335 Lewis St.), and "ebony chimney sweep" Robert Watters (1557 1/2 7th Street) mentioned for his participation in Native Sons of the Golden West parades. Surnames mentioned are almost all Irish, English, and German, which corresponds to the 1890s block books and voting registers and the 1880 census.

Irish-born residents were numerous before 1900; most worked for the railroad, as laborers, signalmen, and car repairers, and most owned their homes. The dozen German families identified and researched by the Survey, who arrived in South Prescott between 1876 and 1915, were headed by independent tradespeople rather than railroad workers: printer, brewer, plumber, upholsterer, etc. By the time of the 1910 census, by far the largest

* The Oakland Cultural Heritage Survey has a rather large index of names of owners and residents associated with each existing building. For the most part these people are associated with the site for several years and/or in more than one source. Names are found in census records, county assessor's map books, building permits, etc. and researched in city directories and other sources at the Oakland History room.

(see continuation page 8)

Street or rural address: South Prescott Neighborhood ASI

19. Historical and/or Architectural Importance (continued from page 7)

immigrant group in South Prescott was the Portuguese (many coming from the Azores or by way of Hawaii). Italians and Slavonians also first appear in large numbers in the neighborhood in the 1910 census. The Portuguese and the Slavonians and other immigrants from the Austrian empire (Dalmatian, etc.) worked mainly as laborers with the railroad in those years, and the Italians included a large number of food and produce merchants.

Portuguese immigrants settled in Southern Alameda County (San Leandro and vicinity) in the 1860s as farmers, and formed a large and recognized community: thus many of the turn-of-century Portuguese families in South Prescott include California-born adult children. In 1892 (Oakland Enquirer, July 16) there were reported to be 4000 Portuguese in Alameda County, 6 branches of the Portuguese benevolent organization U.P.E.C. (at East Oakland, San Leandro, Centerville, Pleasanton, and Mission San Jose), two Portuguese Catholic churches (St. Joseph's in West Oakland, just opened, and one in Centerville), and a new Portuguese newspaper A Patria published in Oakland. The following year (Enquirer, June 22, 1893) a Portuguese evening adult school was established at Campbell and Pacific near South Prescott.

St. Joseph's was a Portuguese national or nonterritorial parish for Portuguese immigrants regardless of residence, a rarity on the West Coast. (The parish church for this part of West Oakland was St. Patrick's, largely Irish, at 10th and Peralta.) St. Joseph's was founded in 1891, and the church at 7th and Chestnut Streets (7 blocks east of South Prescott) was dedicated by Archbishop Riordan in 1892. Its first priest was Rev. Guilherme Gloria, and from 1902 to 1932 Rev. Joseph Galli and his assistant Rev. Henry Ferreira, both fluent in many languages, were "well known to all Portuguese and Italians living in West Oakland." West Oakland's annual Holy Ghost procession went from the Portuguese hall at Campbell and Pacific, up Peralta to 7th (along the present borders of South Prescott), and out 7th to St. Joseph's (West of Market Boys' Journal). In 1915 St. Joseph's established a mission in Kennedy Tract, Oakland's other urban Portuguese neighborhood, Mary Help of Christians, which still retains its ethnic character. St. Joseph's was disbanded and the building demolished in 1965 when its neighborhood was redeveloped. Portuguese fraternal organizations in South Prescott, among 47 Alameda County Portuguese societies listed as active in the 1938 WPA history of Oakland, included branches of U.P.E.C. (Uniao Portuguesa do Estado da California), A.P.U.M.E.C. (Associacao Portuguesa Uniao Madeirense do Estado da California), and I.D.E.S. (Irmandade do Divinho Espirito Santo), the first two sharing a 3-story brick lodge hall at 7th and Henry built in 1912-13. A number of Portuguese names - Farinha, Guzman, Corea, Avalos, Valim, etc. - are still found among the owners in South Prescott, now intermingled with many similar Hispanic names.

By 1910 South Prescott also had a large black community, about the same number of households as the Portuguese community but smaller households, and somewhat more often renters, since over half the men with recorded occupations traveled with the railroads as cooks or porters, and several of the women worked in other people's homes as nurses or servants. The earliest identified black

(see continuation page 9)

Street or rural address: South Prescott Neighborhood ASI

19. Historical and/or Architectural Importance (continued from page 8)

family in South Prescott was that of Carl Deguzee, a sailor and restaurant keeper from the West Indies, who lived at 327 (gone), 323, and 357 Center from 1877. Whitewasher Ewen Cowan (335 Lewis, c. 1884), messenger William Johnson (316 Henry, 1889), jockey Albert Lycurgus (541 Chester, 1910), and mail clerk William Bolivar (527 Chester, 1908) represent several occupations commonly held by black West Oaklanders at this period.

To the east and south South Prescott adjoined marshland. Not developed with housing in the early years, these blocks south of 3rd and east of Center were gradually filled and put to use by the railroad and industries. The marshiest blocks east of Cypress from 1st to 3rd were used as a garbage dump by 1902 (Sanborn map) and S.P. freight depot by 1912. Industries appeared on the surrounding blocks from about the turn of the century, and were largely food processing: Washington Brewery and Consumers Yeast and Vinegar Works on 5th west of Cypress, a winery at 3rd and Center, pickle factory at 3rd and Lewis, Anheuser-Busch Brewery (1907), Buffalo Bottling Co. (1907), and National Ice Cream Co. (1925) on Cypress north of 3rd, the Rochdale Wholesale Grocery Co. at 319 Center and 1513 3rd (1906), Sun Milling Co. (breakfast cereal) at 320 Lewis (1910-11), and the Oakland Mercantile and Warehouse Company's seed factory at 1564 5th (1911). Later industries on the outskirts of the district were Western Door and Sash Co. (5th and Cypress, c. 1920), Oscar Lehnus Foundry (3rd and Center, 1942), Best Fertilizer Co. (3rd and Center, 1940s), Walter Cole Tank Works (3rd and Cypress, 1940s), and several auto wrecking and scrap metal yards along 3rd Street and at 323 Lewis (from about 1960).

By at least 1946 South Prescott - and everything west of Peralta - was zoned for heavy industry, and remained so until 1974 when it was rezoned residential. During those decades of industrial zoning, expanding S.P. ownership, and condemnation for the post office and BART station, the neighborhood lost many buildings to uncertainty and neglect even though not much heavy industry was developed. In the mid-1970s when the area was rezoned, S.P. sold its holdings to residents, and the neighborhood organized to obtain curbs and gutters and rehabilitation funds from the city. According to news stories from this period, South Prescott came through its industrial era with a high level of owner-occupancy and "fiercely loyal" residents: "Most of the people have been around for 40 years or more. It may not look like much to outsiders, but there's a real strong community feeling here." (Bay Guardian, December 5, 1975)

HISTORIC RESOURCES INVENTORY

CP

Street or rural address: South Prescott ASI

21. Sources (continued from page 2)

Sanborn maps, 1889-1901, 1902-11, 1912-45
City and County tax rolls and block books, 1869-1960
Abstract of title books, Western Title Co., Hayward
City directories and telephone books, 1869-1988
U.S. census, 1880, 1900, and 1910
Edwards Transcript of Records, Alameda County, 1880s-1910
California Architect and Building News, index by John Snyder
Building and alteration permits, City of Oakland Inspectional Services
Bird's eye sketch maps of Oakland, c.1871 (Snow & Roos) and 1881 (Enquirer)
Biographical indexes and files (obituaries, county histories, newspaper clippings), Oakland History Room, Oakland Public Library

Hinkel & McCann, Oakland, 1852-1938, 1938 (ethnic institutions)

Elliott, Oakland and Surroundings, 1885

West of Market Boys' Journal, Summer 1941 "Sightseeing Tour" series, Spring 1945 "Reminiscing" series, July 1943 "Letter from Harry Lemos"

Almeida, Carlos, Portuguese Immigrants, U.P.E.C., San Leandro, 1980

Thernstrom, Stephan, Harvard Encyclopedia of American Ethnic Groups, Cambridge, Mass., 1980, "Portuguese"

Oakland Daily Transcript, January 1, 1877, "New Buildings"

Alameda County Illustrated, Oakland Tribune, 1898 "A Network of Railroads"

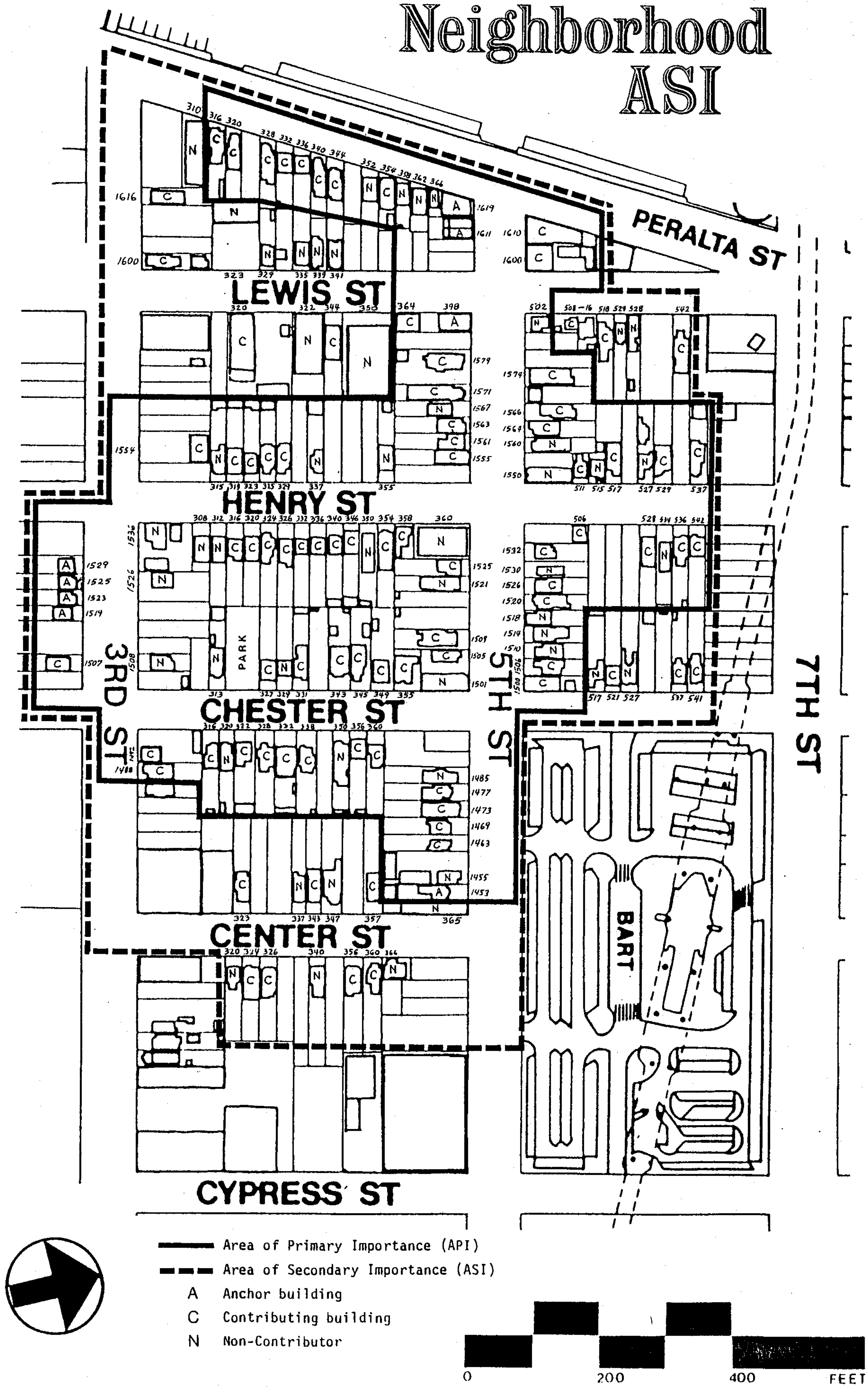
Blake, Evarts J., Greater Oakland, 1911, "Sun Milling Company"

Oakland Tribune, Annual Number, January 17, 1912

Oakland Tribune articles on South Prescott (redevelopment etc.), Nov. 9, 1961; May 28, 1965; November 2, 1969; April 10, 1975; May 11, 1978

San Francisco Bay Guardian, December 5, 1975, "West Oakland Fights Blight"

South Prescott Neighborhood ASI



Area of Primary Importance (API)
Area of Secondary Importance (ASI)
A Anchor building
C Contributing building
N Non-Contributor

Attachment B

City of Oakland Cultural Heritage Survey and Caltrans

State of California Resources Agency - Substitute Department of Parks and Recreation Historic Resources Inventory Form (DPR 523 Primary Record), South Prescott Neighborhood, September 3, 1990

Serial Number: NONE
UTMA 10/562110/4184240 B10/562180/4183880
C10/561700/4184000 D10/561870/4184300
NR: 4b, 5
( ) LISTED ( ) DETERMINED ELIGIBLE
( ) APPEARS ELIGIBLE (X) APPEARS INELIGIBLE

HISTORIC RESOURCES INVENTORY

IDENTIFICATION

1. Common name: South Prescott Neighborhood
2. Historic name: Bay View Homestead Tract
3. Street address: Center to Peralta St.(300-500 blocks), 3rd & 5th Sts. (1400-1600 blocks) Oakland, CA 94607 County: Alameda
4. Parcel Number: various, see individual property forms
5. Present Owner: various, see individual property forms

Ownership: private

6. Present use: Domestic/single dwelling, multiple dwelling
   Original use: Domestic/single dwelling, multiple dwelling

DESCRIPTION

7a. Architectural Style: 19th century vernacular, Italianate, Queen Anne

7b. Briefly describe the present physical appearance and any major alterations:

The Bay View Homestead Tract/South Prescott Neighborhood district (Area of Secondary Importance, not currently considered National Register eligible because of compromised integrity) is a district of 147 buildings occupying parts of 8 city blocks between 7th, 3rd, Peralta, and Cypress Streets in West Oakland. The buildings are mostly 19th century cottages on narrow (25' x 125') parcels, with scattered vacant lots, industry, and new construction. Intrusions are relatively few, but many of the buildings have been altered over the years. Even with alterations, the district conveys a strong sense of time and place, as a highly coherent neighborhood whose unique character is established by the large number of very small and very early houses.

South Prescott is a lively if somewhat run-down one- and two-family residential neighborhood, whose boundaries are defined on all sides by sharply contrasting land uses. To the east and south are industries of roughly the types historically there--food processing, manufacturing, and freight warehouses and auto wreckers along Cypress and Third, and the railroad tracks and yards south

(see continuation page 3)

Sub

8. Construction Date: 1870s-1980s
   predominantly 1870s-1880s
9. Architect:
   various, mostly unknown
10. Builder:
    various, mostly unknown
11. Approx. property size (in feet)
    Frontage: Depth:
    or approx. acreage: 30.
12. Photo number: 536-3
    Photo date: 06/26/90
    1517-19 through 1529 3rd St., Stephen Porter cottages, 1877-78

Serial Number: NONE

13. Condition: good to fair
14. Alterations: various: siding, windows, steps, basement units
15. Surroundings: densely built up, scattered buildings, industrial
16. Threats: public works project
17. Is the structure: On its original site? (X) Unknown? ( ) Moved? (10+)
18. Related features: Oakland Point District, SPRR West Oakland Shops Historic District

SIGNIFICANCE

19. Briefly state historical and/or architectural importance (include dates, events, and persons associated with the site):

Bay View Homestead Tract/South Prescott Neighborhood, a neighborhood of small 19th century workers' cottages, is a rare and ephemeral example of economic, social and development patterns caused throughout the western United States by construction and operation of the transcontinental railroad. Given restoration or reinterpretation of its integrity, its historical significance would appear to qualify the district for the National Register of Historic Places under Criterion A. The district is of local significance, and its period of significance is from 1869, when the Central Pacific Railroad (later Southern Pacific) arrived in Oakland and the tract was subdivided and the first of its buildings built, to about 1914, when the importance of the railroad to the city's economy and political life began to decline and when the last new building was constructed in the district: no more buildings were constructed in Bay View Homestead until 1940.

It is well known and well documented that cities and towns throughout the West were built, and grew and prospered because the railroad was built. Oakland

(see continuation page 10)

20. Main themes of the historic resource:
    Economic/Industrial, Architecture, Ethnic heritage

Locational Sketch Map:

21. Sources:
    City & county tax rolls & block books, 1869-1960; Sanborn maps, 1889-1901, 1902-11, 1912-51, 1970s; city directories & telephone books; U.S. census; building & alteration permits; biographical & subject indexes, Oakland History Room SEE CONTINUATION PAGE 21

22. Date form prepared: 09/03/90
    By: Staff and Consultants
    Org: Oakland Cultural Heritage Survey
    One City Hall Plaza
    Oakland, CA 94612
    Phone: (415) 273-3941

HISTORIC RESOURCES INVENTORY CONTINUATION PAGE

Address: Bay View Homestead Tract/South Prescott Neighborhood district

7b. Physical Description (continued)

of 3rd Street. Seventh Street to the north is the heavily-traveled thoroughfare it always was, though most of its commercial activity is gone. To the northeast is the Bay Area Rapid Transit Oakland West station, and to the west across Peralta Street the new (1970s) Oakland Main Post Office and its parking lots occupy the sites of the Gibbons and Bovee Tracts, an area twice as large as, and once similar in character to, the South Prescott neighborhood. The present physical boundaries of South Prescott are almost exactly those of the historic Bay View Homestead tract (see maps).

The houses in South Prescott are predominantly one-story, many raised to accommodate basement units (either originally or later). By far the commonest styles are a simple Italianate and a plain, gable-roofed 19th-century vernacular version of Greek Revival. Almost half the buildings in the district (66) date from the 1870s, with or without additions and alterations, and enough are reasonably intact to establish the area visually as one of the oldest neighborhoods in Oakland. Another 30 houses were built in the 1880s and about 12 during the 1890s. Of the two dozen Queen Anne style houses in the district, half incorporate 1870s buildings behind 1890s facades. Scattered among the small, old houses are half a dozen late 19th and early 20th century commercial buildings, mostly corner stores with flats above. Another 6 Colonial Revival houses and flats (1473, 1485, 1555, and 1566 5th, 354 Peralta, 343 Chester) account for almost all the post-Victorian development in the district. The Sun Milling Co. (320 Lewis St.) was built in 1910-11, the warehouse at 323 Lewis in 1940, a rather industrial-looking church in 1951-54, and 7 new houses and 5 artists studio complexes since 1980.

Blocks with particularly strong period character are the south side of 3rd Street between Chester and Henry (1507 through 1529 3rd), with 4 matching plain boxy Italianate raised-basement cottages that helped inspire the legend that South Prescott was railroad company housing; the south side of 5th Street between Henry and Lewis (1555 to 1579 5th), which has some of the district's bigger and better-kept buildings; and the east side of Peralta Street from 3rd to 5th (316 Peralta to 1611 5th), the north end anchored by the 1887-88 Italianate Davidson store and flats buildings (1611 & 1619 5th), and the houses well displayed because of the angle of the street.

Characteristic 1870s building forms and features which recur around the district are deep gable roofs with returns, boxy houses with low hip roofs, false fronts, and tiny saltbox cottages. On several houses, corbeled brick chimneys call attention to the older rear portion of the building. Most of these early houses are only slightly ornamented--hence the style label "Italianate/19th century vernacular" for many of them. The Stick and Queen Anne cottages, with their distinctive bays, nested roofs, and stepped-back plans, are less numerous but also a character-defining element of the district, representing infill and completion of development during the period of significance. Except along part of Lewis Street where the new studio

HISTORIC RESOURCES INVENTORY CONTINUATION PAGE

Address: Bay View Homestead Tract/South Prescott Neighborhood district

7b. Physical Description (continued)

buildings are clustered, there are few breaks in the continuity of small houses on small lots, with similar setbacks and a distinctive range of roof shapes, porches, etc. These features contribute to integrity of feeling and design.

Front yards are small, sometimes paved, not intensely landscaped. The curbs, gutters, and street trees are all recent, obtained by concerned residents in the mid-1970s. There are about 40 vacant lots in the district, many of them sites where Southern Pacific demolished houses in the 1960s: density today is less than it was at the end of the period of significance in the 1910s, or about what it was in the 1880s (see statistical supplement, with counts of total buildings, flats, and non-residential buildings at various years from 1876 to 1990). Even with vacancies, the district still conveys the character or feeling of a dense neighborhood of small houses close together on narrow lots. For individual buildings, setting might be considered in two ways: specifically, whether each building has its historic neighbors on either side and across the street (some do, some do not); and more generally, whether it is part of a coherent neighborhood or block (all except the 300 block of Lewis Street would probably qualify).

The external setting of the district as a whole is contributing only on the south, where the S.P. tracks run behind the houses on 3rd Street, an important element of association for this railroad-era district. Elsewhere the boundaries coincide with those of the original tract (also association), but they are physically marked today by 20th century development which does not enhance the district's significance.

Alterations are common in the district, affecting but not destroying integrity of design, materials, and workmanship. Changes are generally in the nature of low-cost maintenance and expanded use: basement garages and units, aluminum sash, stucco and vinyl and tarpaper siding, roll roofing, replacement steps and porches, security doors and window grilles. Most of them seem reversible. Alteration permits record tarpaper brick and stucco as the characteristic resurfacing materials of the 1930s-50s, vinyl and aluminum siding in the 1960s and 70s, and plywood in the 1980s. New steps are commonly skeletal constructions of wood. The number of basement units ("flats" on Sanborn maps), showed its greatest increases between 1889 and 1902 (from 2 to 30) and between 1911 and 1935 (29 to 62). Garages--basement or attached--are less common than in some more affluent neighborhoods: fewer than 40 of the houses have them. Major restylings of building are rare.

362 and 358 Peralta, with false fronts removed and gables edged with tile in 1947, and 320 Chester, redone in 1975 with artificial stone and wrought iron, are among the few houses actually restyled. Even these are recognizable for what they were--320 Chester because it has a reasonably intact twin next door, and the two on Peralta by remnants of 2-over-2 windows, rustic siding, and

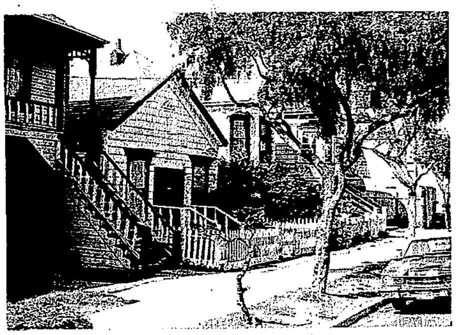
7b. Physical Description (continued)

their general form and scale--gable roof, flat front with door and two windows, raised basement. They cannot be considered to contribute to the district in their present state, though they might contribute if restored. They are not readily recognizable: one requires a clue from the twin, and the other two have lost their original roof treatment and do not clearly indicate what it was.

Many houses with surface alterations nevertheless strongly convey the area's age and origins. For the most part houses in this tract were not ornate, and their size and shape were always their primary character-defining elements. 1510 and 1514 5th Street, 1526 3rd, and 352 Peralta are all false-front cottages with at least one major feature grossly remodeled--rustic siding replaced by stucco or shingles, windows reshaped and sash replaced, trim and cornices removed, new steps and railings. Only one is considered a (marginal) contributor. However, their age and original character are still easy to discern, because of the falsefront form, cornices, and other elements. A similar example is 1508 3rd, a gabled 1870s cottage with corbeled chimney, unraised basement, but reshaped aluminum windows, missing window and door hoods, and asbestos shingles. To the extent that such buildings' age and form are recognizable, they can be considered to support rather than detract from the district's associations and overall character.

Photo number: 502-14A
Photo date: 09/24/87

319 to 329 Henry St.



7b. Physical Description (continued)

STANDARDS OF PHYSICAL INTEGRITY: REGISTRATION REQUIREMENTS

The Bay View Homestead/South Prescott district has substantial integrity of location (4 buildings moved after the period of significance), association (trackside location, original tract boundaries, documented occupancy by employees of the railroad and related industries), and feeling (small, simple, densely placed houses), and partial integrity of setting both externally and internally. Its physical integrity of design, materials, and workmanship has been eroded by years of mostly piecemeal alterations in the interest of low-cost maintenance and increasing usable space. The result is that, regardless of its historical significance and uniqueness as a resource type in Oakland, its present state of physical integrity and present interpretation of standards appear to qualify it as locally important but not national Register eligible. The Oakland Cultural Heritage Survey feels that this district is important enough to deserve documentation, consideration in at least local planning, and a discussion of the integrity issue.

The Oakland Cultural Heritage Survey uses a 4-way rating system for physical integrity of buildings (exterior alterations, relating to the integrities of design, materials, and workmanship):

Excellent: no alterations, or very minor;
Good: minor changes which do not affect overall character;
Fair: overall character changed but recognizable;
Poor: altered beyond recognition.

OCHS's general principle is that buildings with excellent or good integrity contribute to National Register districts (Areas of Primary Importance) and that buildings with fair integrity may also contribute to locally important districts (Areas of Secondary Importance).

A basic issue in considering the physical integrity of Bay View Homestead is the interpretation of "recognizable," which is also a key concept in Bulletin 15. Most of the individual buildings in the district fall into the categories of "good" or "fair" physical integrity. The 37 classified as "fair"--changed but recognizable--are considered by the OCHS to contribute to the district as a locally important resource. In our opinion they clearly help convey the district's historical significance, and certainly do not invalidate it.

This seems to us to be in keeping with the language of National Register Bulletin 15 ("the property must retain the essential physical features that enable it to convey its past identity or character," "conveys overall a sense of time and place," "enough of its historic appearance to recall that association," "majority of the components ... must possess integrity," "ideally might retain <u>some</u> features pertaining to all seven," "not eligible if today it primarily has the physical features of a later period," "rarity ... may justify accepting a greater degree of alteration," etc.).

7b. Physical Description (continued)

Prevailing standards of interpretation, as communicated by representatives of the State Office of Historic Preservation in July-August 1990, appear considerably more restrictive: two-thirds rather than a majority of contributing components, and a much higher degree of integrity than that implied by "essential features to convey past identity." For example, OHP representatives suggested in the field that basement garages added after the (pre-1914) period of significance might be unacceptable compromises to integrity for a district contributor. Their position paper of August 15, 1990, "conclude[s] that the physical property does not convey the qualities for which it may be significant *to a sufficient degree to meet the standards for eligibility to the National Register of Historic Places*. However, we do not deny that the district has qualities which would merit consideration for other listings or designations..." (emphasis added).

The Oakland Cultural Heritage Survey finds the integrity of 20 of the pre-1914 buildings in Bay View Homestead to be excellent, 35 good, 37 fair ("changed but recognizable"), and 31 poor ("beyond recognition"; in addition there are 19 new buildings, one 1911 industrial building, and 4 moved after the period of significance). This count is based on a fairly strict application of the OCHS standards: in addition to changes to basic form and massing by major incongruous additions or removal of a major feature (e.g., the missing falsefronts of 358 and 362 Peralta), buildings like the stripped and stuccoed Queen Anne at 366 Center and the Italianate falsefronts at 1510 and 1514 5th are rated "poor" for loss of original materials and detailing (design, workmanship) even though their age, style, form, and residential character are all clearly recognizable.

The following types of alterations generally put a building into the category of "fair" integrity in this district, by changing the overall character-defining elements relevant to the district's significance.

Siding: asbestos, tarpaper, aluminum, vinyl, plywood, etc. The characteristic historic material for this mainly 19th century district is horizontal rustic siding, with occasional clapboard and shingles on the later buildings. Since most buildings in this district were not elaborately ornamented, siding is often their main surface feature. A relatively ornate building like 322 Chester is perhaps less compromised by its asbestos siding.

Window shape and location: windows shortened and/or widened, usually involving also a change of sash material, and ornament and siding as well. Even when roof forms and other features keep the building's age and type clearly recognizable, this is a major change of character, especially for the older buildings in the district, where tall double-hung windows, often paired, often flanking a recessed entry on a symmetrical gabled front, are important character defining elements. A change from vertical to horizontal proportions is particularly damaging.

7b. Physical Description (continued)

Removal of ornament: This often accompanies a change of siding or window/door configuration. If the building's age and basic style and type are still recognizable, the informed observer can fill in what is missing, but character is changed by removal of important defining elements, which include window and door hoods on the plain Italianate and Greek Revival cottages, cornices on the falsefronts, gable end and porch ornament on the Queen Annes.

Porch enclosures, additions: Alterations which fall short of obliterating the building's basic form and massing but change its character include partial or complete enclosure of a front porch, and conspicuous garages and second entries.

Alterations that are considered less damaging (depending on overall effect, a building might have one or more and still be considered to have good or excellent integrity) are basement garages or units, stairs, and window sash or front door if the surrounds are intact. Alterations below the first floor line--basements and stairs--arguably can leave the character of a raised basement cottage intact.

For this locally important district, houses which recognizably date from the period of significance and convey their characteristic scale and forms, and have had no more than one major alteration of historic material or character-defining elements, or no more than two or three minor alterations, will generally be considered contributors. An older house, more central to the theme of the district, might sustain greater alteration and still contribute than one like the vinyl-clad Colonial at 1485 5th, which represents a stage in the historical evolution of the district, but not its unique qualities.

Contributing buildings make up about 2/3 of Bay View Homestead/South Prescott as a local district. In addition, 31 of its 55 noncontributors are pre-1914 buildings which are heavily altered but considered potential contributors, in that most of the alterations are reversible. All those that are considered restorable still visibly share the general form, scale, and massing of the contributing buildings, and form a solid background of recognizably early buildings, reinforcing and reinforced by the more pristine examples. In that limited sense they make a visual contribution to the district, just as they make a contribution to its historical significance by their documented age.

Some parts of the district are clearly more intact than others. The percentage of contributors (for either local or National Register purposes) can be raised without much difficulty by adjusting the boundaries of the district. Excluding parts of 3rd Street, Lewis Street, Center Street, and the blocks north of 5th Street produces a smaller district with about 60% of buildings whose present level of integrity is excellent or good. There is also one very small sub-district deserving of mention, the four matching houses at 1517-19 through 1529 3rd Street (A-254, 255, 256, 258), which could become eligible with fairly minimal restoration of integrity.

19. Historical and/or Architectural Importance (continued)

Photo number: 502-8
Photo date: 9/24/87

336 to 308 Henry St.

Photo number: 470-3
Photo date: 07/29/87

340-46 Center St., 1889; built as flats/tenements by Patrick Sugrue, neighbor and Southern Pacific laborer

19. Historical and/or Architectural Importance (continued)

fought hard and successfully to become the western terminus of the transcontinental line. From its completion in 1869 until after its monopoly was broken forty years later, the Central Pacific (later Southern Pacific) Railroad was directly or indirectly responsible for much of Oakland's economic well being. The City's population tripled (from 10,500 to 34,555) between 1870 and 1880 as a direct response to the jobs created by the railroad's large facilities located in West Oakland and industries served by the railroad. Three neighborhoods survive from that period: (1) The two and three story commercial blocks built downtown at Ninth and Broadway to house real estate offices and related activities which managed the business of building a city to house the new population. Today, this area is known as Old Oakland or Victorian Row and is being rehabilitated after years of neglect. (2) The substantial residential neighborhood developed in West Oakland to house the families of laborers, mechanics, businessmen, and professionals, some working directly for the railroad and others commuting to San Francisco by ferry or to downtown Oakland by train. Historically known as "the Point," and today called the Prescott neighborhood, the Oakland Point district has more than 300 houses built during the 1870s. And finally (3) the most ephemeral and fragile of the three neighborhoods, Bay View Homestead Tract with more than 60 small houses surviving from the first decade of the railroad's impact on Oakland.

In nearly every way Bay View Homestead Tract is most closely associated with the railroad. It was a tract of land located between the tracks on 7th Street and those on 1st Street. It was subdivided in 1869, the same year the transcontinental line was completed. Its houses were simple, inexpensive, small, and located right next to the railroad yards. For at least 40 years, the railroad employed about half the men living in the tract. Together with other similar tracts west of Peralta Street (now gone), this was private enterprise's closest approximation of a "company town." South Prescott, as Bay View Homestead Tract is known today, has long been associated with the railroad, many people believing it was built by the railroad as housing for its employees. There is nothing similar in Oakland and probably not in the state, at least not containing such a large concentration of 1870s houses.

As the main surviving concentration of very early, very small 19th century working people's houses in Oakland, it is also unique. There is no other neighborhood in the city--probably in the Bay Area--comparable in the age, size, type, massing and scale of the houses, and in the extent and coherence of the district. (The closest approximations in Oakland are what the Oakland Cultural Heritage Survey calls the Oakland Point ASI, an 11-building remnant at the far west end including two 1860s houses, and Jingletown--North Kennedy Tract--in East Oakland, which is similar in scale, extent, and integrity, but a decade or two newer.) Half the buildings in Bay View Homestead date from the 1870s, and over 80%--and all but a dozen of the houses--from before 1906. The period character is strong despite surface alterations (see 7b), and the neighborhood's boundaries are still essentially those of the original tract.

19. Historical and/or Architectural Importance (continued)

ORIGINS AND EARLY DEVELOPMENT

The subdivision map for Bay View Homestead Tract was filed in 1869, just as the transcontinental railroad was arriving in West Oakland. The original town of Oakland was laid out in 1852 at the foot of present Broadway, about two miles to the east of what was to become Bay View Homestead Tract. Most of West Oakland was flat alluvial grassland ringed on the west and south by marsh and mudflats. The ferry connection to San Francisco from the foot of Broadway was inconvenient because of shoals in the Estuary, so West Oakland was the focus of early efforts to develop a link to San Francisco. In 1861-1862, Rodmond Gibbons and associates built the San Francisco and Oakland Railroad, from Broadway out 7th Street and over a three-quarter mile long wharf to deep water and the San Francisco ferry. This railroad was primarily a commuter line. Once it was operating, West Oakland began to develop with scattered houses of people who worked in San Francisco and people associated with the railroad and ferries. The railroad and ferry workers, not yet very numerous, first settled at the far west end closest to the wharf, and a very few, very early houses survive there (see 714 and 941 Pine, 1769 Goss, 1777, 1778, and 1781 8th Street, and Oakland Point district form).

The completion of the transcontinental railroad and establishment of Oakland as its terminus initiated a new phase in the development of West Oakland. The main line of the Central Pacific (later Southern Pacific) ran down 1st Street and out to the Oakland Point wharf and yards. The West Oakland yards were headquarters for maintenance of rolling stock and for all building operations of the entire expanding railroad and its land development subsidiary, the Pacific Improvement Company. The yards were an enormous complex of tracks, storage yards, a round house, tool houses, blacksmith and machine shops, and a full-scale shipyard. By 1874, several hundred men were on the payroll of the Oakland yards and many more worked on a temporary or day-labor basis. Within a few years, most of these workers were West Oakland residents.

On April 15, 1869, P.M. Batchelder, described in the 1871-72 city directory as a farmer, filed a 26-acre tract called Bay View Homestead between the tracks of the San Francisco-Oakland line on 7th Street and the new Central Pacific overland line on 1st Street, just north of the yards and east of where the tracks converged at the Oakland Mole. The tract was bounded by Peralta Street to the west and Center Street to the east, and was laid out in 8 whole or partial 250' x 460' blocks that were an extension of the city street grid. The tract bordered marsh land at the east and south. Batchelder had bought the land as Plot 372, one of the large farm-sized parcels originally created in West Oakland from the Peralta Rancho. Many of these big plots were subdivided into homesites in the late 1860s, with the coming of the railroads.

Batchelder very likely intended to sell his small (25' x 125') house lots to people working for the railroad. By 1871, two-thirds of the lots had been sold. The Snow and Roos birdseye map of Oakland c.1870-71 shows what appear

19. Historical and/or Architectural Importance (continued)

to be street trees around several blocks of Bay View Homestead, and a single cluster of small buildings at about the location of 502-508 Lewis. The streets were surveyed but probably not surfaced at first (when they were, it was macadam: well into the 1920s "permanent paved streets" were rare outside the central business district). Sewers, gas lines, and water also probably took a while to arrive. By 1876 (the first available tax records arranged by location) the tract was well built up. The Oakland Tribune Holiday Number of January 1, 1877, noted 45 new buildings constructed in the tract during 1876 (mostly "one-story frames, average price $800").

A typical block by 1889 (the earliest Sanborn map) had 34 to 40 lots, mostly with one-story houses, a few raised basement or one and a half story houses, one or two two-story houses, a couple of stables, a windmill with a water tank, and three to ten vacant lots. An average of one lot in each block had a second dwelling at the rear of the lot, and a couple of blocks had one or two-story side-by-side duplexes, flats, or tenements (e.g. 340-46 Center, 1611-17 5th). An example of the common house of this early period, in original condition, is 336 Peralta Street (1877-78). This is a small square house with a single tall window to each side of a center front stair, and probably a rear porch. Like most area houses of the 1870s, it is ornamented with minimal Italianate trim. The hip-roofed version is most common in the district, but falsefront (e.g., 322 Peralta) and gabled (e.g., 1453 5th) forms also occur. When it was built, such a house was lit by oil or gas lamps, heated by wood or coal in a brick fireplace or iron stove, and probably had city water fairly early, but a backyard outhouse.

Half the houses now standing in the district were built in the 1870s. Parcels were held singly or in small numbers, many built upon immediately with small, wood-frame, single-family houses. Most of the houses were probably built by carpenter-builders, a few of whose names can be conjectured when they appear as owners. No architects are known in the early years of the area's development. There are and were no mansions in the tract. 1579 5th Street, a fairly plain bay-windowed Italianate built in 1886-87 and occupied by S.P. conductor George Rowland, stands out in the district today as an original two-story house on a double lot. Though other early houses are as big, their origin as raised-basement cottages is obvious and gives them an entirely different character. Assessed values here were lower overall than in the neighborhoods above the tracks: see appendix of statistical data.

RESIDENTS AND OCCUPATIONS

From the beginning, the neighborhood was a mixture of owner-occupied houses and rentals. Many of the owners of rental property were neighborhood residents who developed an extra house or two; they included 7th Street merchants (grocer John Clonen, 325, 536, and 542 Henry; saloonkeeper Thomas Jarvis, 1561 5th and 358 Henry; piano maker Franz Klier, 1430 to 1436 3rd), carpenters (Thomas Dolan, 329 Chester; Phares J. Batchelder, probably a son of

19. Historical and/or Architectural Importance (continued)

P.M., 518 Lewis; William Dickerson, 511 and 515 Henry), and railroad employees (laborer Patrick Sugrue, 340 Center, 354 and 360 Chester; engineer James Davidson, 1611 and 1619 5th, 358 and 362 Peralta). A number of other residents who had such modest occupations as railway laborers and dressmakers continued to own and rent out their Bay View Homestead houses for many years after moving elsewhere. A few speculative and rental houses were built by downtown developers and investors--G.W. Frasher, a coal dealer, built 339 and 341 Lewis (1870-71), and Stephen Porter, a physician, built and owned 4 houses at 1517-19 to 1529 3rd Street (1877-78. See resource inventory forms, A-254, 255, 256, 258; this group might become eligible for the National Register with fairly minor restoration of integrity.)

Stephen Porter's group of four matching cottages, and the age, small size, and plainness of the tract's houses in general, have given rise to the tradition that they were Southern Pacific company housing, when in fact they are the products of 19th century homeownership and entrepreneurship, often by S.P. employees. The Southern Pacific owned the marsh/waterfront land along the overland tracks, but only began to acquire land in the residential neighborhood after the turn of the century, and especially around the mid-20th century. In 1975 the railroad owned 40 parcels--9 with houses and the rest cleared lots--which it disposed of that year.

Until the 1920s the railroad was the largest single employer of working people in the district (see appendix of statistical data). Half to a third of the 19th and early 20th century owners and residents whose occupations have been identified in research on the extant buildings worked for the railroad, as laborers, car cleaners, car repairers, engineers, signalmen, firemen, oilers, machinists, switchmen, carpenters, ship carpenters, sailors, cooks, and porters. Laborers were most numerous, engineers the most prestigious railroad workers in the district. Some of Bay View Homestead's carpenters also worked for the Pacific Improvement Co. and Western Development Co., land development subsidiaries of the Central Pacific. Other neighborhood residents worked in railroad-related commerce including the hotels, saloons, and "female boarding houses" (per 1911 Sanborn map and 1910 census) concentrated along 7th Street and west of Peralta near the yards. Others ran neighborhood-serving businesses such as groceries and coal yards, mostly on 7th Street, and others were employed or self-employed as artisans or in the building trades.

Passages in the West of Market Boys' Journal, published by a 1930s-40s West Oakland old timers' club, record the pervasive influence of the railroad in West Oakland. In "A Sightseeing Tour Along Seventh Street in the Late Eighties or Early Nineties" (Nov. 1939):

> ...That is Morrison's cigar store and club rooms in the rear. On the arrival of the Pay Car the stakes at poker compared favorably with those of bonanza days. ...This section around here is a sort of a hang out. They say that it is a regular rendezvous for

19. Historical and/or Architectural Importance (continued)

> politicians. Guess that there is soon to be election as I see a group of prominent S.P. politicians with their heads together up the street. ... Right here on the corner is Lozier's Grocery. Mr. Lozier is a fine, generous man who has a large book account and he is liked by all of the people in this neighborhood. The railroad strike at a later date broke him.

Another memoir recalled "The Old Central Pacific Pay Car" (c.Aug. 1940):

> For many years the employees of the Central Pacific Railroad were paid in cash from the pay car. This car, once a month, went over the entire system paying employees at different points of the road. ...All of these employees lived in West Oakland, or the POINT as it was then called. No paper money was in circulation here at that time and there was a premium on gold coin and the men were paid part gold and part silver. Each pay day a large number of beggars, peddlers, etc., would gather around the pay car and the railroad men were noted for being very generous on that day. ...Those thrills that came on pay day will ever be remembered by what few old timers are still here. The wages were not what they are today, but no one was broke...

An 1896 description of the railroad yards (Illustrated Album of Alameda County) includes a detailed list of the jobs in the "department of motive power and machinery," and also indicates approximately what they earned. (The other main division of the yards was the bridge and building department, which included the shipyard, and employed about 450.) Many of these men were residents of Bay View Homestead.

> The department employs one hundred and ten men, and the pay roll is growing larger every month. These are classed as follows: Mechanics, thirty-four, comprising smiths, carpenters, boiler makers, machinists, and painters; helpers, twenty-six; laborers, twenty-two; wipers, fifteen, being boys who are in the line of eventually becoming engineers; watchmen and dispatchers, eleven; a foreman of the roundhouse and a foreman of the machine shop. The engineers number ninety-five, and the firemen ninety-eight. The monthly pay roll amounts to $21,000, of which the engineers receive $10,000, the repairing branch $6,000, and the firemen $5,000.

In contrast to the Oakland Point neighborhood north of 7th Street, where there was a wider range of wealth and occupations represented, and a significant number of businesspeople and professionals who worked in downtown Oakland or San Francisco, in Bay View Homestead occupations were mainly those provided by the railroad and in the neighborhood. Contemporaries reportedly thought of the neighborhood as distinct--"that section 'south of the border,' 7th Street car tracks the border" (West of Market Boys' Journal, 1941). Separated from

19. Historical and/or Architectural Importance (continued)

Oakland Point by 7th Street, Bay View Homestead shared 7th Street as a shopping street, shared the railroad as a main source of employment, and shared churches, schools, and other central facilities. Few of these centers were in Bay View Homestead, which was distinguished by both its modest scale and its solidly residential character.

From the beginning, the population of the area was mixed in ethnic origin. Before 1900, Irish-born residents were numerous, though they never seem to have dominated the neighborhood to the extent that they did across 7th Street in Oakland Point. There were also English, Germans, Italians, many Portuguese by 1900, and a few Chinese and blacks. There seem to have been some ethnic patterns in employment: Irish-born residents in the tract before 1900 mostly worked for the railroad or in building trades, while the dozen early German families were more often headed by independent tradespeople: printer, brewer, plumber, upholsterer, etc. By the time of the 1910 census, the neighborhood's largest immigrant group by far was the Portuguese (many coming from the Azores or by way of Hawaii), who were also increasingly visible as property owners. A Portuguese church and Portuguese lodge hall adjoined the district as early as the 1890s. Italians and Slavonians also first appear in large numbers in the neighborhood in the 1910 census. The Portuguese and the Slavonians (and other immigrants from the Austrian empire--Dalmatian, Bohemian, etc.) worked mainly as laborers with the railroad in those years, and the Italians included a large number of food and produce merchants.

By 1910, Bay View Homestead also had a large black community. There were almost as many African-American as Portuguese households, but the black families were generally smaller, and somewhat more often renters, since over half the men with recorded occupations traveled with the railroads as cooks or porters, and several of the women worked in other people's homes as nurses or servants. The earliest identified black family in the tract was that of Carl Deguzee, keeper of the restaurant on the S.P. ferry, from the West Indies, who lived at 327 (gone), 323, and 357 Center from 1877. Whitewasher Ewen Cowan (335 Lewis, c.1884), messenger William Johnson (316 Henry, 1889), jockey Albert Lycurgus (541 Chester, 1910), and mail clerk William Bolivar (527 Chester, 1908) represent several occupations commonly held by black West Oaklanders at this period.

The 1910 census appears to show that in many households there were more people than in 1900, often including one or more lodgers. More often than before, the occupation of working people is given as laborer, especially in large European immigrant households. These households of extended families or unrelated lodgers in mostly unskilled jobs are a newly prominent feature of the neighborhood in the 1910 census. There are also many more women and teenage girls employed outside the home than in 1900, especially at the two canneries and box factory that had opened within a few blocks of the district during the 1900s (see resource inventory forms for Del Monte Cannery, A-156, Pacific Coast Canning Co., A-220, and Western Paper Box Co., A-271).

19. Historical and/or Architectural Importance (continued)

LATER EVOLUTION

In the last three decades of the 19th century West Oakland was the fastest growing part of Oakland. By the 1890s few new houses were being built in Bay View Homestead--most of the lots were already built upon--but the area grew by enlarging and subdividing existing houses. The 1889 Alameda County block book includes descriptive notes such as "front addition making the house at least twice as large as before" (537 Henry), "imps. on lot 17 raised and story built under" (332 Chester), "old imps. moved in rear and added on to new imps." (542 Lewis), and so on; other remodelings are inferred from assessments, Sanborn maps, and the buildings themselves. Between 1889 and 1902 some houses became larger in ground area by virtue of expansions, and some acquired more varied configurations including bay windows and recessed areas for better light, in the process of updating to Stick or Queen Anne styles.

By 1902 the majority of single-family one-story houses are mapped as one-story and basement, indicating either a change in mapping practices or an increase in usable space under the original living area, probably created by raising the house. (In this marshy area, a one-story house was probably always some distance above ground. The gradual filling of the marshes that accompanied railroad and harbor improvements must have helped make basements more usable.) In some cases, the maps show new "two-story" porches on these "1B" houses. In the 7 block tract, 2 buildings (out of 168 total) appear in 1889 as "flats"; in 1902 the proportion was 30 out of 192.

The 1906 earthquake, which had such a profound effect on the growth of Oakland, giving rise to new neighborhoods of single family houses partly to accommodate people leaving San Francisco, had less direct effect on Bay View Homestead. Probably some more houses were raised and became flats or tenements or lodging houses, but such changes were already underway. In 1911 29 of 212 buildings are mapped as flats, not much different from 1900. After the turn of the century, especially along 3rd Street nearest the tracks and the marsh where lots had remained undeveloped, a number of seemingly very old buildings appear, possibly moved onto their present sites from unknown locations: 1616, 1554, 1492, and 1488 3rd, 316 Peralta, 323 Henry.

From 1900 to 1910, there seems to have been a drop in the overall socio-economic level of the neighborhood. By contrast with the new post-earthquake developments, Bay View Homestead and the rest of West Oakland began to look dated and less desirable. As the dates of the houses in the district show, new construction in West Oakland virtually came to a stop after the earthquake, leaving the area in very much its 19th century form.

After the turn of the century, the marsh blocks south of 3rd Street and east of Center were gradually filled and put to use by the railroad and industries. The marshiest blocks east of Cypress from 1st to 3rd Streets were used as a garbage dump by 1902 (Sanborn map) and S.P. freight depot by 1912. Industries

19. Historical and/or Architectural Importance (continued)

in and around the district were largely food processing: Consumers Yeast and Vinegar Works on 5th west of Cypress (A-272), a winery at 3rd and Center, pickle factory at 3rd and Lewis, Anheuser-Busch Brewery (1907), Buffalo Bottling Co. (1907) and National Ice Cream Co. (A-56, 1925) on Cypress north of 3rd, Sun Milling Co. (breakfast cereal) at 320 Lewis (A-146, 1910-11).

The Western Pacific Railroad came to Oakland in 1910, after the S.P. monopoly was broken, and established its own large yards and train shops just south of Bay View Homestead. During World War I the growth of the nearby Moore Dry Dock and other war-related industries greatly increased the demand for housing, and probably resulted in additional subdivision of houses into flats and tenements. There was a slow decline in the dominance of Southern Pacific in the life of West Oakland, without, however, changing the basic function of the area as a residential neighborhood for an industrial labor force.

In 1935, the city's first comprehensive zoning ordinance zoned all of Bay View Homestead and surrounding areas of West Oakland industrial. Planning Commission and WPA studies from the late 1930s provide maps of "substandard" housing (as well as contagious diseases, juvenile delinquency, and "non-white occupants") in Oakland, and these substantiate the impression of Bay View Homestead, and West Oakland as a whole, as an older, "declining" area. These reports were used in the selection of Oakland's public housing Project Area No. 1 in 1938. The site of Peralta Villa (8th/12th/Cypress/Union: see resource inventory form for 935 Union St., A-228) was chosen over many other comparably deteriorated areas all over West Oakland; Bay View Homestead was probably eliminated from consideration by its heavy industrial zoning and somewhat unsavory trackside location.

Bay View Homestead remained industrially zoned until 1974. During those decades of industrial zoning, expanding S.P. ownership, and condemnation for the adjoining post office and BART station, the neighborhood lost many buildings to uncertainty and neglect even though not much heavy industry was developed. In the mid-1970s when the area was rezoned residential, S.P. sold its holdings to residents, and the neighborhood organized to obtain curbs and gutters and rehabilitation funds from the city. According to news stories from this period, the neighborhood--by then called South Prescott--came through its industrial era with a high level of owner-occupancy and "fiercely loyal" residents: "Most of the people have been around for 40 years or more. It may not look like much to outsiders, but there's a real strong community feeling here." (Bay Guardian, December 5, 1975) In the past few years, neighborhood revitalization has taken the form of infill construction of artists' live-work complexes: 351 Henry, 360 Henry, 347 Lewis, 350 Lewis, 1520 3rd Street.

19. Historical and/or Architectural Importance (continued)

STATISTICAL DATA ON BAY VIEW HOMESTEAD TRACT

Censuses, assessor's block books, and Sanborn maps offer occasional statistical pictures of Bay View Homestead. At various points in the late 19th and early 20th centuries it is possible to quantify population and household size, density, homeownership, occupations, and ethnic composition of the neighborhood. The sources for this part of Oakland are 1889, 1902, and 1911 (update) Sanborn maps, 1880, 1900, and 1910 censuses plus later summaries, and yearly block books which show the existence and location of improvements. The 1884 and 1886 county block books distinguish owner- and tenant-occupied properties, and the 1884 book in addition names the tenants and gives many of the owners' and tenants' occupations. For this summary of the tract as it existed in its period of significance, these sources were examined for the seven blocks which are substantially extant today (assessor's blocks 452, 468-471, 495, 496: current numbers 0-392 and 4-75, 77, 99, 101, 103, 105, 107); figures below are based on all buildings which existed in the past, not just those which stand today.

OCCUPATIONS.

Source	railroad (identified)	other occupations (adult males)	% railroad
1884 block book	44	39	53%
1910 census	203	264	43%

The 1910 census gives both "trade or profession" and "establishment in which this person works," so railroad employees are clearly identified. (The largest number are "laborers," and by this time many are immigrants from the Austrian empire.) The earlier censuses have a single column for occupation, and only occasionally specify workplace (e.g. "machinist RR"). The identified railroad workers in those censuses indicate a bare minimum percentage; many of the generic laborers, machinists, carpenters, and porters in 1880 and 1900 certainly worked for the railroad. The 1884 block book includes lists of the taxpayers on each block, and states the occupations of many; over half of those with stated jobs work for the CPRR. (Other common occupations are laborer, carpenter, painter, "store," and "works SF.") Other research in city directories, carried out for the extant buildings in the district, confirms the finding that the railroad for many years employed around half the men in Bay View Homestead. By 1910 it is clear from the census that other industries are becoming large employers of residents of the tract, and the railroad no longer dominated the West Oakland economy as it had in the first decades.

19. Historical and/or Architectural Importance (continued)

NUMBER OF BUILDINGS AND RESIDENTIAL UNITS.

Source	total bldgs	flats/duplexes	comm/ind'l	# resid.units
1876 block bk	73 apx.	not shown	not shown	
1881 block bk	122 apx.	"	"	122+
1884 block bk	146	"	"	145+
1889 Sanborn	168	2	3	167 apx.
1902 Sanborn	192	30	6+	220 apx.
1911 Sanborn	212	29	15	230 apx.
1935 Sanborn	214	62	18	260 apx.
1951 Sanborn	211	52	14	250 apx.
c.1980 Sanborn	185	54	12	230 apx.
1990 survey	146	-	-	-

The tract was built up to about 2/3 its highest number of buildings, and 1/2 its residential units, in the first decade after it was subdivided in 1869. The greatly increased number of flats buildings between 1889 and 1902 came about more by raising or otherwise subdividing existing houses (at least 15) than by new construction (about 9). Some of the conversions involved adding 1890s-style fronts to the houses, which are recorded in Sanborn maps, in remarks in the assessor's records (e.g., "raised and new front"), and in the physical evidence of the houses. The district was very nearly built out by 1902, almost entirely with houses; the last pieces of infill in the 1900s and early 1910s were mostly commercial. After 1914 remodeling and addition of units continued, but the next extant building constructed in the tract was built in 1940.

ASSESSED VALUE OF IMPROVEMENTS IN 1880.

	Total $	#Imps	Avg.
BVHT Block 470 (Chester/Henry/3rd/5th)	$7,500	33	$227
OAK PT Block 702 (Pine/Wood/9th/10th)	$7,700	13	$592
OAK PT Block 557 (Chester/Center/9th/10th)	$17,800	17	$1,047

This shows the significant differences in the assessed value of buildings in West Oakland: in Bay View Homestead Tract the average value was about 1/3 that of the most modest buildings at the west end of Oakland Point (Block 702) and about 1/5 that of the more substantial ones in Block 557.

19. Historical and/or Architectural Importance (continued)

POPULATION AND HOUSEHOLD SIZE.

Census	# people	# households	average hh. size	city avg.
1880	439	103	4.26	4.8 (1890)
1900	741 (840?)	179 (200?)	4.97	4.4
1910	1094	241	4.54	4.1
1930	1100 approx.	(c.250: Sanborn)	4.4	3.4

Censuses consistently show slightly fewer households than the block books and Sanborn maps show buildings or units: enumerators missed some, and some were vacant on census day. The 1900 census in OCHS files is missing block 468: figures in parentheses are estimates for the whole 7 blocks. The 1930 approximation is from a 1938 Planning Commission annual report. The same report summarizes trends in family size in Oakland from 1890 to 1930, the city (and state and nation) showing a steady decrease that was not paralleled in this aging neighborhood.

HOMEOWNERSHIP.

Source	owner hh's	renter hh's	% owners
1884 block book	65	71	48%
1886 block book	64	86	43%
1900 census	79	105	43%
1910 census	73	151	33%
1990 h/o exemption	30	over 79	under 28%

From the beginning, the neighborhood was a mixture of owner-occupied houses and rentals. The census and block book counts are for units (especially after 1900, one building might have a resident owner plus one or more renter households), while the present-day figures refer to whole buildings or parcels. Owners of rental houses in the 19th and early 20th centuries were often neighbors, or former neighborhood residents. The decline of owner-occupancy almost certainly has some relation to the amount of deferred and unsympathetic maintenance in the district today.

Address: Bay View Homestead Tract/South Prescott Neighborhood district

21. Sources (continued)

Sanborn maps, 1889-1901, 1902-11, 1912-45
City and County tax rolls and block books, 1869-1960
Abstract of title books, Western Title Co., Hayward
City directories and telephone books, 1869-1988
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Edwards Transcript of Records, Alameda County, 1880s-1910
California Architect and Building News, index by John Snyder
Building and alteration permits, City of Oakland Inspectional Services
Bird's eye sketch maps of Oakland, c.1871 (Snow & Roos), 1881 (Enquirer)
Biographical indexes and files (obituaries, county histories, newspaper clippings), Oakland History Room, Oakland Public Library
Oakland Cultural Heritage Survey, research files on all buildings in district

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Cardwell, Mary, "Oakland Point," MS history for Oakland Cultural Heritage Survey, c.1981

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Hegemann, Werner, Report on a City Plan for...Oakland and Berkeley..., 1915

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Oakland Daily Transcript, January 1, 1877, "New Buildings"

Oakland Tribune, Annual Number, January 17, 1912

Oakland Tribune articles on South Prescott (redevelopment etc.), November 9, 1961; May 28, 1965; November 2, 1969; April 10, 1975; May 11, 1978

San Francisco Bay Guardian, December 5, 1975, "West Oakland Fights Blight"

Thernstrom, Stephan, Harvard Encyclopedia of American Ethnic Groups, Cambridge, Mass., 1980, "Portuguese"

West of Market Boys' Journal, Summer 1941 "Sightseeing Tour" series, Spring 1945 "Reminiscing" series, July 1943 "Letter from Harry Lemos"

BUILDINGS LOCATED WITHIN THE BOUNDARIES OF THE DISTRICT

RESOURCE NUMBER	IN APE	ADDRESS	CONSTRUCTION DATE(S)	CONTRIBUTOR STATUS
A-24	Yes	320 CENTER ST	1886-87 rem 1977	NC
A-25	Yes	323 CENTER ST	1887-88	C2
A-26	Yes	324 CENTER ST	1896-97	C2
A-27	Yes	326 CENTER ST	1885-86 rem 1889 etc.	C2
A-28	Yes	337 CENTER ST	1889? moved?	NC
A-29	Yes	340-46 CENTER ST	1888-89	C2
A-30	Yes	343 CENTER ST	1877-78 rem 1890s	C2
A-31	Yes	347 CENTER ST	1873-86 rem 1940 & 1990	NC
-	Yes	355 CENTER ST	1980s	NC
A-32	Yes	356 CENTER ST	1893-94 alt	C2
A-33	Yes	357 CENTER ST	1874-75	C2
A-34	Yes	360 CENTER ST	1887-88	C2
A-35	Yes	366-68 CENTER ST	1902? alt	NC
A-39	Yes	313-15 CHESTER ST	1877-78 rem 1890 & 1950	NC
A-40	Yes	316 CHESTER ST	1874-75	C2
A-41	Yes	320 CHESTER ST	1874-75 rem 1979	NC
A-42	Yes	322 CHESTER ST	1875-76	C2
A-43	Yes	326-28 CHESTER ST	1873-74 rem 1888-89	C2
A-44	Yes	327 CHESTER ST	1888-89	C2
A-45	Yes	331-33 CHESTER ST	1874-75 rem 1890s	C2
A-46	Yes	332-34 CHESTER ST	1872-74 rsd 1889	C2
A-47	Yes	338 CHESTER ST	1874-75	C2
A-48	Yes	343 CHESTER ST	1905-06	C2
A-49	Yes	345-47 CHESTER ST	1870-72	C2
A-50	Yes	349-51 CHESTER ST	1882-83 rem 1906	C2
A-51	Yes	350-52 CHESTER ST	1909 rem 1957	NC
A-52	Yes	355 CHESTER ST	1888-89 rem 1900-01	C2
A-53	Yes	356 CHESTER ST	1883-84 rsd 1900s	C2
A-54	Yes	360 CHESTER ST	1874-75 rem 1887?	C2
-	No	517 CHESTER ST	1875-76 rem 1953 etc.	NC
-	No	521 CHESTER ST	1870s moved 1911-12	C2
-	No	527 CHESTER ST	1881-82 rem 1948 etc.	C2
-	No	537 CHESTER ST	1871-72 rem 1920 etc.	C2
-	No	541 CHESTER ST	1874-75 rem 1910a	C2
A-119	Yes	308 HENRY ST	1873-74 alt	C2
A-120	Yes	312 HENRY ST	1886-87 rem 1953	NC
A-121	Yes	315-17 HENRY ST	1890-91 rem 1950 etc.	NC
A-122	Yes	316 HENRY ST	1886-87 rem 1900-10s	C2
A-123	Yes	318-20 HENRY ST	1878-79 rem 1885 etc.	C2
A-124	Yes	319-21 HENRY ST	1891-92 rsd before 1902	C2
A-125	Yes	323 HENRY ST	1870s moved 1891-92	C2
A-126	Yes	324 HENRY ST	1871-72 rem 1896 etc.	C2
A-127	Yes	325-27 HENRY ST	1890-91	C2
A-128	Yes	326-28 HENRY ST	1874-76	C2
A-129	Yes	329-31 HENRY ST	1899 inc 1875-76	C2
A-130	Yes	332 HENRY ST	1874-75 rem 1900-10s	C2
A-131	Yes	336 HENRY ST	1886-87	C2
A-132	Yes	337-39 HENRY ST	1878-79	C2
A-133	Yes	340-42 HENRY ST	1889	C2
A-134	Yes	346 HENRY ST	1873-74 rem 1910a	C2
-	Yes	350 HENRY ST	1987	NC
A-135	Yes	354 HENRY ST	1885-86 rem 1900s	C2
A-136	Yes	355 HENRY ST	1889-90 rem 1984	NC
A-137	Yes	358 HENRY ST	1883-84	C2
-	Yes	360 HENRY ST/1533 5TH ST	1986-87	NC
-	No	506 HENRY ST	1873-74 add 1905 etc.	C2

Individual Historic Resources Inventory forms are included for all resources that have that have been assigned a resource number. "C2" indicates a contributor to an ASI.

BUILOINGS LOCATED WITHIN THE BOUNDARIES OF THE DISTRICT

RESOURCE NUMBER	IN APE	ADDRESS	CONSTRUCTION DATE(S)	CONTRIBUTOR STATUS
-	No	511 HENRY ST	1876-77	C2
-	No	515 HENRY ST	1876-77 rem 1946-48	NC
-	No	517 HENRY ST	1874-75 rem 1909 & 1953	NC
-	No	527 HENRY ST	1874-75 rem 1906 & 1967	NC
-	No	528 HENRY ST	1873-74 rem 1967 etc.	NC
-	No	529 HENRY ST	1870s moved 1884	C2
-	No	534 HENRY ST	1980	NC
-	No	536 HENRY ST	1890-91	C2
-	No	537 HENRY ST	1889 inc circa 1874	C2
-	No	542 HENRY ST	1877-78 rem 1890-91	C2
-	Yes	312 LEWIS ST/NE COR 3RD ST	1980s	NC
A-146	Yes	320 LEWIS ST	1910-11	NC
-	Yes	322 LEWIS ST	1982	NC
A-147	Yes	323 LEWIS ST	1940	NC
A-148	Yes	329 LEWIS ST	1877-78 alt	NC
A-149	Yes	335-37 LEWIS ST	1877-78 rem 1924 etc.	NC
A-150	Yes	339 LEWIS ST	1870-71 alt	NC
A-151	Yes	341 LEWIS ST	1870-71 rem 1979	NC
A-152	Yes	344-46 LEWIS ST	1877-78 rem 1904-05	C2
-	Yes	347 LEWIS ST	1990	NC
-	Yes	350 LEWIS ST	1987-88	NC
A-153	Yes	362-64 LEWIS ST	circa 1872	C2
A-154	Yes	398 LEWIS ST/1589-91 5th ST	1890s moved 1925-31	NC
-	No	502 LEWIS ST//1598 5TH ST	1870/77 moved 1900s	NC
-	No	508-14 LEWIS ST	1870-76 add 1910 & 1940	C2
-	No	518 LEWIS ST	1875-76	C2
-	No	524 LEWIS ST	1984-85	NC
-	No	528 LEWIS ST	1870s rem 1966	NC
-	No	542 LEWIS ST	1888-89 inc 1876-77	C2
-	Yes	310 PERALTA ST	1951 add 1954	NC
A-173	Yes	316-18 PERALTA ST	1880a moved 1906-07	C2
A-174	Yes	320-22 PERALTA ST	1894 inc 1876-77	C2
A-175	Yes	328 PERALTA ST	1890-91	C2
A-176	Yes	332 PERALTA ST	1887-88	C2
A-177	Yes	336 PERALTA ST	1877-78	C2
A-178	Yes	340 PERALTA ST	1889 inc 1870-71	C2
A-179	Yes	344 PERALTA ST	1870-71 rem 1886-87	C2
A-180	Yes	352 PERALTA ST	1885-86 alt	NC
A-181	Yes	354-56 PERALTA ST	1906	C2
A-182	Yes	358-60 PERALTA ST	1876-77 rem 1947?	NC
A-183	Yes	362-64 PERALTA ST	1876-77 rem 1947	NC
A-184	Yes	366 PERALTA ST	1890s rem before 1935	NC
A-250	Yes	1488 3RD ST	1890s moved 1916	NC
A-251	Yes	1492 3RD ST	1870s moved 1912-13	C2
A-252	Yes	1505-07 3RD ST	1876-77 rsd circa 1894	C2
A-253	Yes	1508 3RD ST	1874-76 alt	C2
A-254	Yes	1517-19 3RD ST	1877-78	C2
-	Yes	1520 3RD ST	1989-90	NC
A-255	Yes	1523 3RD ST	1877-78	C2
A-256	Yes	1525 3RD ST	1877-78	C2
A-257	Yes	1526-28 3RD ST	1880-81 alt	C2
A-258	Yes	1529 3RD ST	1877-78	C2
A-259	Yes	1536-38 3RD ST/302 HENRY ST	1907 alt	NC
A-260	Yes	1600 3RD ST/315 LEWIS	1880-81	C2
A-261	Yes	1616 3RD ST	1904-05 moved?	C2
A-274	Yes	1453 5TH ST/365-1/2 CENTER	1875-76	C2

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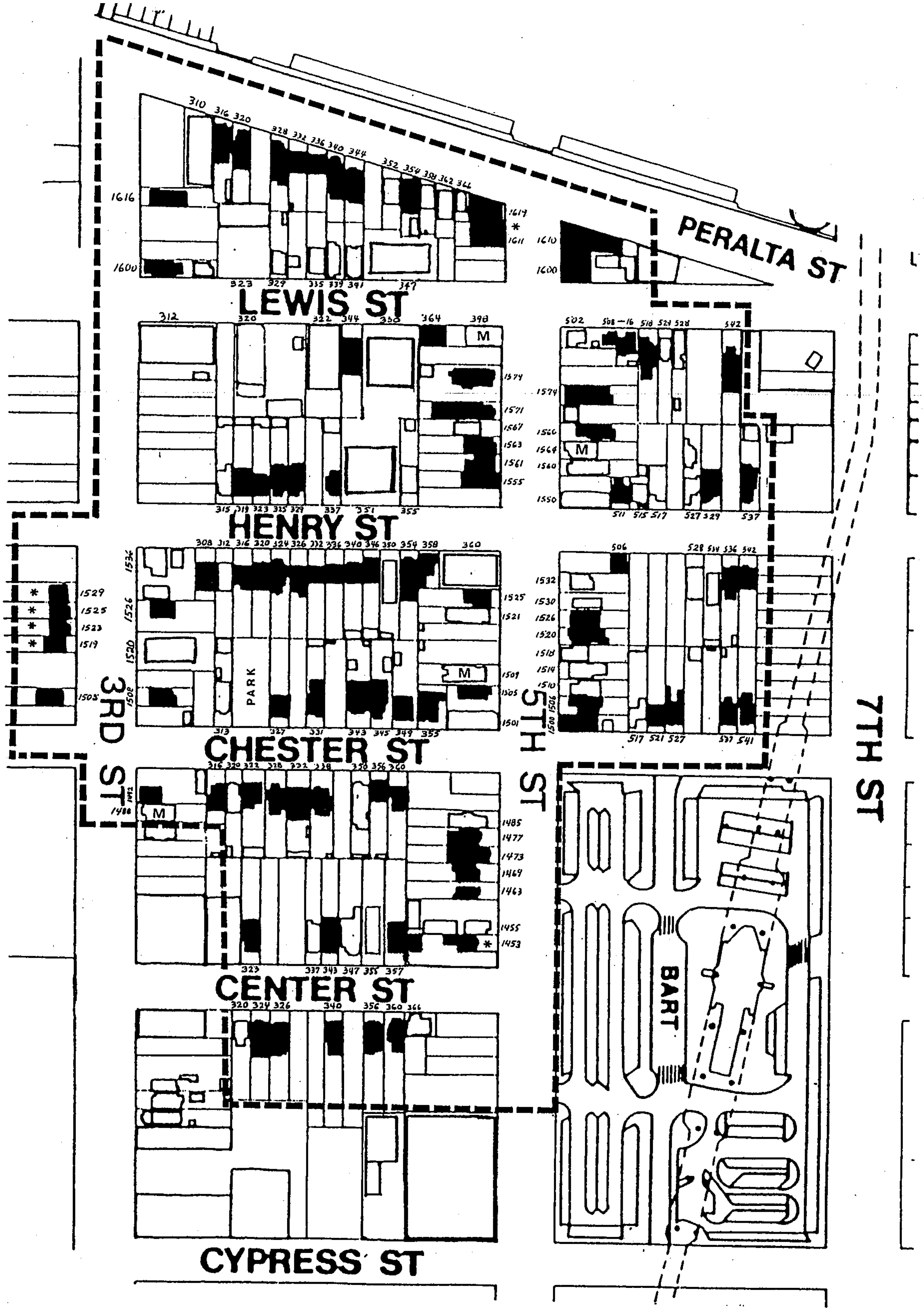
BUILDINGS LOCATED WITHIN THE BOUNDARIES OF THE DISTRICT

RESOURCE NUMBER	IN APE	ADDRESS	CONSTRUCTION DATE(S)	CONTRIBUTOR STATUS
-	Yes	1455 5TH ST	1952 add 1955	NC
A-275	Yes	1463 5TH ST	1872-73	C2
A-276	Yes	1469 5TH ST	1894-95	C2
A-277	Yes	1473 5TH ST	1911 inc ?	C2
A-278	Yes	1477 5TH ST	1875-76	C2
A-279	Yes	1481-85 5TH ST	1909-10 rem 1979	NC
-	No	1500 5TH ST/501 CHESTER ST	1909	C2
A-280	Yes	1501 5TH ST/SW COR CHESTER	1896-97 rem 1978	NC
A-281	Yes	1505 5TH ST.	1875-76 rem 1907-08	C2
-	No	1506 5TH ST	1883-84	C2
A-282	Yes	1509 5TH ST	1886-87 moved 1954	NC
-	No	1510 5TH ST	1878-89 alt	NC
-	No	1514 5TH ST	1883-84 rem 1956	NC
-	No	1518 5TH ST	1878-79 rem 1910-11	NC
-	No	1520 5TH ST	1876-77 rsd circa 1890	C2
A-283	Yes	1521 5TH ST	1878-79 rem 1945 & 1955	NC
A-284	Yes	1525-27 5TH ST	1878-79 add 1881-2?	C2
-	No	1526 5TH ST	1874-75	C2
-	No	1530 5TH ST	1982-83	NC
-	No	1532 5TH ST	1876-77 alt	NC
-	No	1550 5TH ST//509 HENRY ST	1951+ inc?	NC
A-285	Yes	1555-57 5TH ST	1907	C2
-	No	1560 5TH ST	1981-83 inc?	NC
A-286	Yes	1561 5TH ST	1875-76 rem 1901?	C2
A-287	Yes	1563 5TH ST	1875-76 rem 1901?	C2
-	No	1564 5TH ST	1890a moved 1925	NC
-	No	1566 5TH ST	1912-13	C2
-	Yes	1567-69 5TH ST	1983	NC
A-288	Yes	1571 5TH ST	1885-86 rem 1914	C2
-	No	1574 5TH ST	1912 inc 1892-93	C2
A-289	Yes	1579 5TH ST	1886-87	C2
-	No	1600 5TH ST/515 LEWIS ST	1914	C2
-	No	1610 5TH ST//500 PERALTA ST	1904-05 alt	C2
A-290	Yes	1611-17 5TH ST	1887-89	C2
A-291	Yes	1619 5TH ST/370 PERALTA	1887-88 rem 1945	C2

Individual Historic Resources Inventory forms are included for all resources that have that have been assigned a resource number. "C2" indicates a contributor to an ASI.



■ * *anchor building*

■ *contributor*

□ *non-contributor*

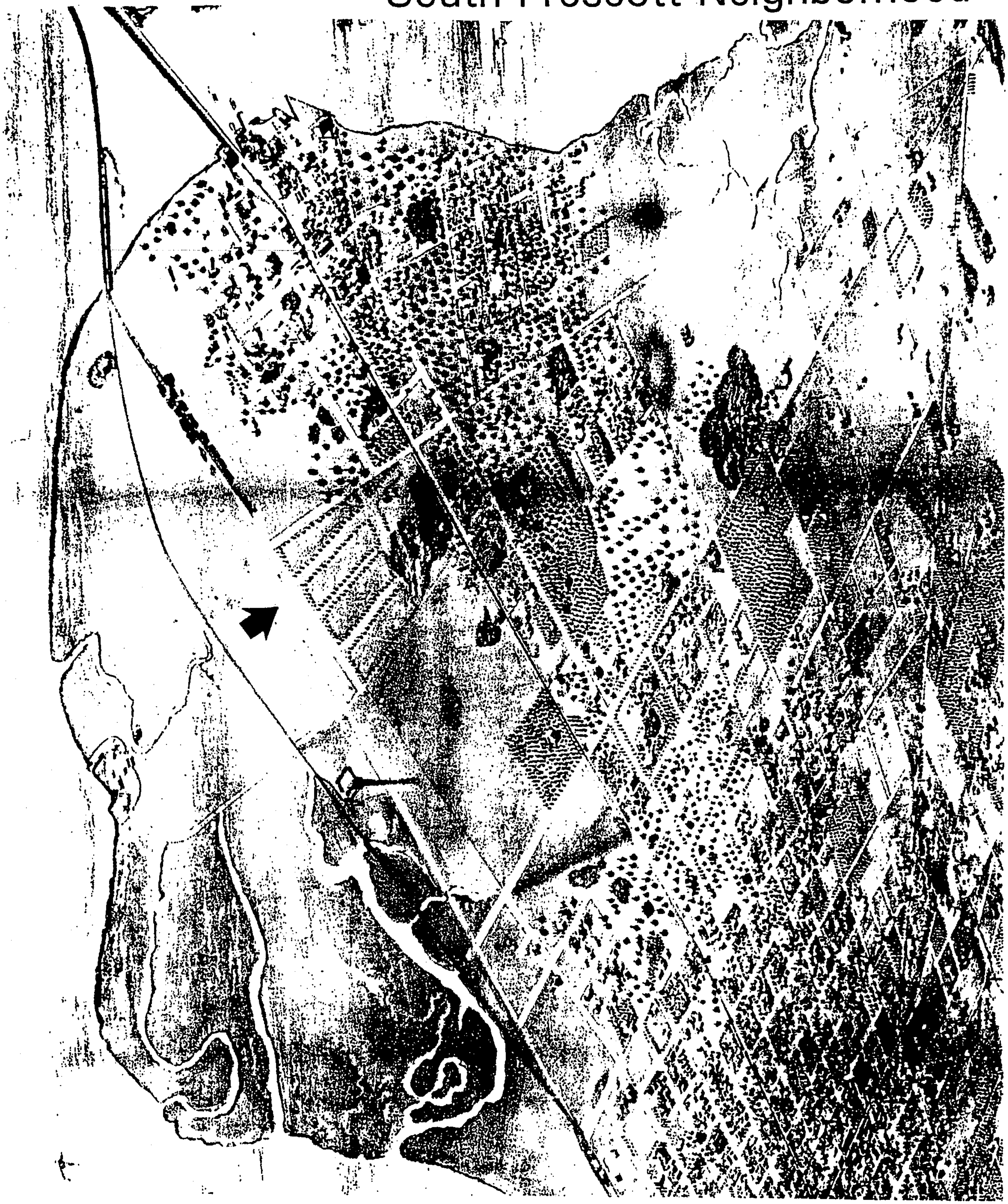
M *non-contributor: moved*

- - - - *district boundary*

BAY VIEW HOMESTEAD TRACT
SOUTH PRESCOTT NEIGHBORHOOD

100 200 400 ft.

Bay View Homestead Tract/ South Prescott Neighborhood



Snow & Roos birdseye map, 1870-71, showing Bay View Homestead (tree-lined trapezoid near center), marsh, tracks, and wharf at Oakland Point.

Project area, there is a moderate to high potential for the presence of unrecorded Native American resources within the Project area.

Enclosed is a map that shows the Project site and an additional area of potential indirect effects. The Project site is a portion of a larger parcel currently used as parking for BART patrons (Assessor Parcel Number 004-0077-003) with an address at 1451 7th Street. Mandela Station LP (the applicant) has proposed construction of an eight-story residential and commercial building (see attached rendering) that includes 240 affordable housing units and approximately 16,000 square feet of commercial floor area. The Project includes an affordable housing density bonus, and affordable housing waivers for number of parking spaces, building height and on-site open space.

To meet Project timeframes, if you would like to be a consulting party to this Project, please let us know of your interest within 30 days, and include in your reply the name and contact information for the tribe's principal representative in the consultation. If you have any initial concerns with impacts of the Project on religious or cultural properties, please note those concerns in your response. If you do not wish to consult on this Project, please inform us of that decision, too.

We value your assistance and look forward to consulting further if there are historic properties of religious and cultural significance to your tribe that may be affected by this Project. Thank you very much.

Sincerely,

Scott Gregory, on behalf of:

Heather Klein, Planner IV, Zoning Area Supervisor
City of Oakland
Email: HKlein@oaklandca.gov
Phone: 510-238-3659

Attachments: Project Site (Area of Potential Effect)

Attachment C

PaleoWest Archaeology

Cultural Resources Assessment in Support of the West Oakland BART Project (T-3), March 8, 2021

CULTURAL RESOURCES ASSESSMENT IN SUPPORT OF THE WEST OAKLAND BART PROJECT, OAKLAND, ALAMEDA COUNTY, CALIFORNIA

Final

2/3/2021

CULTURAL RESOURCES ASSESSMENT IN SUPPORT OF THE WEST OAKLAND BART PROJECT, OAKLAND, ALAMEDA COUNTY, CALIFORNIA

Prepared by:
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February 3, 2021

Keywords: Oakland, West Oakland, BART, NHPA, Section 106

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MANAGEMENT SUMMARY

Lamphier-Gregory retained PaleoWest, LLC (PaleoWest) to conduct a cultural resources assessment for the Project applicant, Mandela Station Partners, LLC, who has proposed construction of an eight-story, mid-rise residential apartment in the city of Oakland, Alameda County, California. The West Oakland BART Project (Project) is receiving federal funding for the US Department of Housing and Urban Development (HUD), which constitutes a federal undertaking as defined in 36 Code of federal Regulations [CFR] 800.16(y). Therefore, the Project requires compliance with Section 106 of the National Historic Preservation Act of 1966. In accordance with relevant federal guidelines, this report identifies historic properties within the Project's Area of Potential Effects (APE) and assesses the potential of the Project to result in adverse effects on historic properties.

This report summarizes the methods and results of the cultural resource investigation within the APE. This investigation included background research, communication with the Native American Heritage Commission (NAHC) and interested Native American tribal groups, a field study, and management recommendations.

On December 9, 2020, a cultural resource records search and literature review was conducted at the Northwest Information Center of the California Historical Resource Information System housed at Sonoma State University (NWIC File No. 20-1051). The records search indicated that two cultural resource studies have been completed in the APE with an additional 24 cultural resource studies conducted within ½-mile of the APE. A total of 99 cultural resources have been previously recorded within ½-mile of the APE. With the exception of two prehistoric archaeological sites, all of the known cultural resources date to the historic period. No cultural resources have been identified in the APE.

As part of the cultural resource assessment of the APE, PaleoWest also requested a search of the Sacred Lands File (SLF) from the NAHC. The NAHC response dated December 2, 2020 stated that the results for the current Project were positive. The NAHC response also provided a list of Native Americans who may have more information regarding the area. PaleoWest contacted the Native American representatives by email on December 8, 2020 informing them of the Project. A follow up email and phone call were made on December 15, 2020 and December 30, 2020, respectively.

On December 29, 2020, PaleoWest staff archaeologist Nathaniel Ramos conducted a survey of the 1.23-acre APE. Most of the APE was paved and developed, with small, landscaped areas of exposed ground surface. During the survey, several possible historic-era cultural materials were observed along the southern border of the APE. The historic period materials derived from clearly disturbed sediments and were intermixed with modern refuse.

Historical maps indicate that the APE was first developed in the late 1800s with numerous buildings and structures present on the property until 1974, at which time the area was razed for the construction of the West Oakland Bay Area Rapid Transit (BART) station parking lot. Although the early development of the APE suggests a high level of sensitivity for buried archaeological deposits dating to the late 19th and early 20th centuries, recent investigations conducted in the vicinity of the APE found that historic period archaeological remains were concentrated in the upper two feet of sediment. Given the extent of ground disturbance associated with the construction of the BART parking lot, it is unlikely that significant intact historic period archaeological deposits are present in the APE. Based on the findings of the study, PaleoWest recommends a finding of no historic properties affected for the proposed undertaking.

CHAPTER 1. INTRODUCTION

Lamphier-Gregory retained PaleoWest, LLC (PaleoWest) to conduct a cultural resources assessment for the Project applicant, Mandela Station Partners, LLC, who has proposed construction of an eight-story, mid-rise residential apartment in Oakland, Alameda County, California. The West Oakland BART Project (Project) is receiving federal funding for the US Department of Housing and Urban Development (HUD), which constitutes a federal undertaking as defined in 36 Code of federal Regulations [CFR] 800.16(y). Therefore, the Project requires compliance with Section 106 of the National Historic Preservation Act of 1966 (NHPA). In accordance with relevant federal guidelines, this report identifies historic properties in the Project's Area of Potential Effects (APE) and assesses the potential of the Project to result in adverse effects on historic properties. The HUD is the Lead Agency for the purposes of Section 106 of the NHPA

1.1 PROJECT LOCATION AND DESCRIPTION

The Project involves development of a roughly 1.23-acre site south of the West Oakland Bay Area Rapid Transit (BART) station, Alameda County, California (Figure 1-1, 1-2). The Project would include a multi-story mixed use development with 15,000 square feet of publicly accessible retail and commercial space as well as 240 residential units including affordable housing.

The Project site is at Alameda County APN 4-77-3, Block 494. The Project is bounded by BART station parking to the east (historically Center Street prior to the street being removed to conjoin parking lots when West Oakland BART was constructed in 1974), the West Oakland BART station to the north, Chester Street to the west, and 5th Street to the south. The proposed Project site is currently in use as parking for the BART station. The site is identified as an Opportunity Site within the West Oakland Specific Plan (WOSP) and evaluated in the WOSP EIR (certified June 2014).

1.2 AREA OF POTENTIAL EFFECTS

The horizontal APE for the Project is defined as the entire 1.23-acre Project site (Figure 1-3). Although the vertical APE will extend up to 80 feet above the current ground surface, the maximum depth of ground disturbance has not yet been defined. Current plans for ground disturbance include grading and excavation work for foundations, footings, and utilities. It is estimated that construction activities associated with the Project will extend approximately six feet in depth. Once subsurface plans are completed, the vertical APE will be updated accordingly.

1.3 REPORT ORGANIZATION

This report documents the results of a cultural resource investigation conducted for the proposed Project. Chapter 1 has introduced the Project location and description and defined the APE. Chapter 2 states the regulatory context for the Project. Chapter 3 synthesizes the natural and cultural setting of the APE and surrounding region. The results of the cultural resource literature and records search conducted at the Northwest Information Center (NWIC) and the

Sacred Lands File (SLF) search, along with a summary of the Native American communications are presented in Chapter 4. The field methods employed during this investigation and findings are outlined in Chapter 5. The management recommendations are provided in Chapter 6. This is followed by bibliographic references and appendices.

Figure 1-1. Project vicinity map.

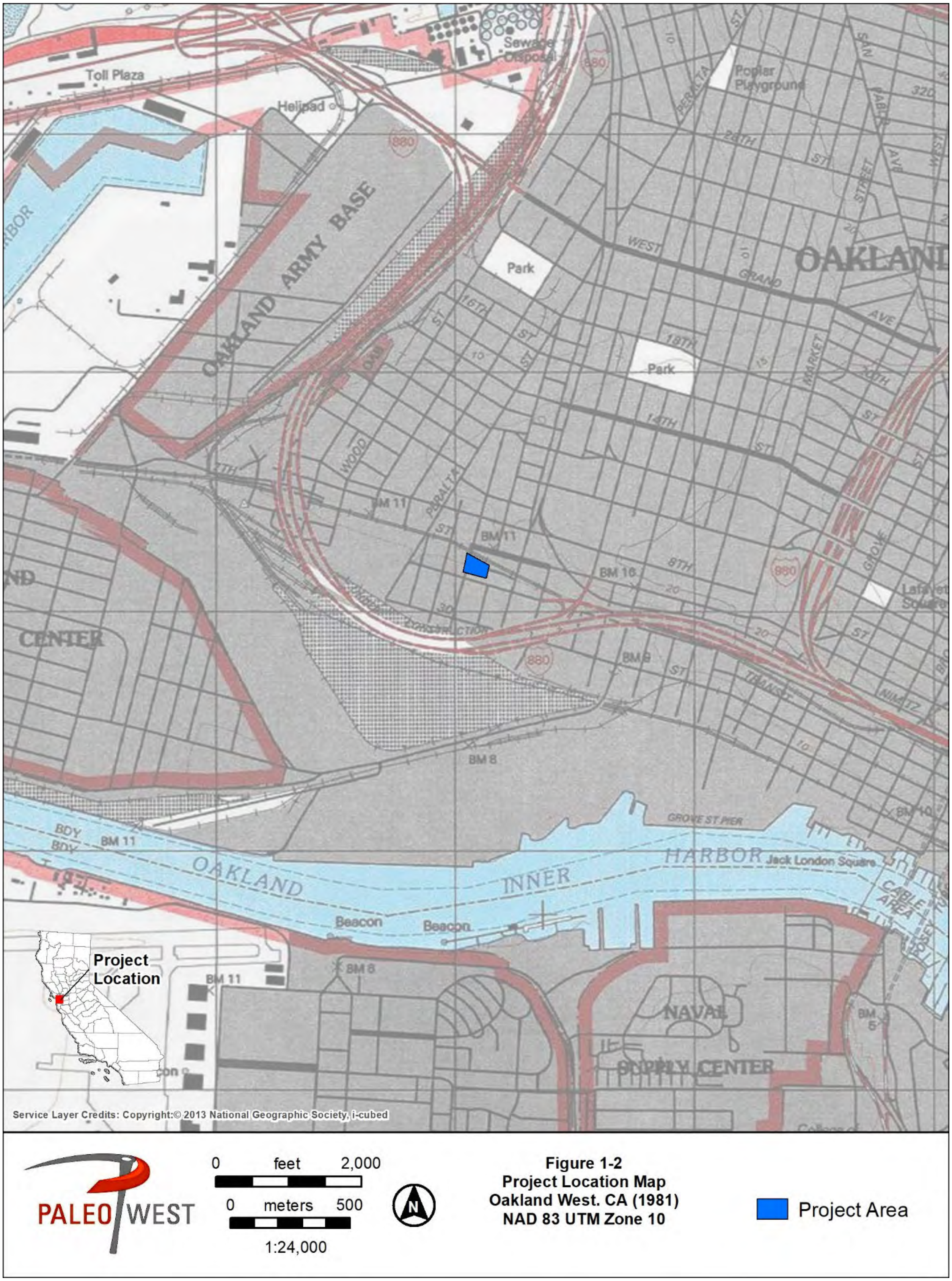

Figure 1-2. Project location map.

Figure 1-3. Area of potential effects.

CHAPTER 2. REGULATORY CONTEXT

2.1 NATIONAL HISTORIC PRESERVATION ACT

HUD is the lead federal agency and is responsible for compliance with Section 106 of the NHPA. The 1966 NHPA, as amended, requires Federal agencies to consider the effects of their undertakings on "historic properties" (i.e., cultural resources eligible for or listed on the NRHP), which is done through the Section 106 process as established in 36 CFR Part 800. NEPA review and NHPA Section 106 compliance are typically coordinated, when a Federal action reviewed under NEPA constitutes an undertaking requiring NHPA Section 106 compliance.

The NRHP, created under the NHPA, is the federal list of historic, archaeological, and cultural resources worthy of preservation and is maintained and expanded by the National Park Service on behalf of the Secretary of the Interior. The Office of Historic Preservation in Sacramento, California, administers the local NRHP program under the direction of the State Historic Preservation Officer. Resources listed in the NHRP include districts, sites, buildings, structures, and objects that are significant in American history, prehistory, architecture, archaeology, engineering, and culture.

To guide the selection of properties included in the NRHP, the National Park Service has developed the NRHP Criteria for Evaluation. The criteria are standards by which every property that is nominated to the NRHP is judged. The quality of significance in American history, architecture, archaeology, and culture is possible in districts, sites, buildings, structures, and objects that meet one or more of the following criteria:

- Criterion A: A property is associated with events that have made a significant contribution to the broad patterns of our history; or
- Criterion B: A property is associated with the lives of persons significant in our past; or
- Criterion C: A property embodies the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possesses high artistic values, or that represents a significant and distinguishable entity whose components make lack individual distinction; or
- Criterion D: A property has yielded, or may be likely to yield, information important in prehistory or history (36 CFR Part 60).

In addition to meeting one or more of the four specific criteria listed above, a historic property or historic resource must possess "integrity" to qualify for listing in the NRHP. Integrity is generally evaluated with reference to qualities including location, design (i.e., site structure), materials, workmanship, setting, feeling, and association. A potentially eligible site must retain the integrity of the values that would make it significant. Typically, integrity is indicated by evidence of the preservation of the contextual association of artifacts, ecofacts, and features within the archaeological matrix (as would be required under Criterion D) or the retention of the features that maintain contextual association with historical developments or personages that render them significant (Criteria A, B, or C). Evidence of the preservation of this context is typically determined by stratigraphic analysis and analysis of diagnostic artifacts and other temporal data (e.g., obsidian hydration, radiocarbon assay) to ascertain depositional integrity or by the level of preservation of historic and architectural features that associate a property with significant events, personages, or styles.

Integrity refers both to the authenticity of a property's historic identity, as shown by the survival of physical characteristics that existed during its historic period, and to the ability of the property to convey its significance. This is often not an all-or-nothing scenario (determinations can be subjective); however, the final judgment must be based on the relationship between a property's features and its significance.

CHAPTER 3. SETTING

This section of the report summarizes information regarding the physical and cultural setting of the APE, including the prehistoric, ethnographic, and historic contexts of the general area. Several factors, including topography, available water sources, and biological resources, affect the nature and distribution of prehistoric, ethnographic, and historic-period human activities in an area. This background provides a context for understanding the nature of the cultural resources that may be identified within the region.

3.1 ENVIRONMENTAL SETTING

The San Francisco Bay region is defined by the San Francisco Peninsula on the southwest, the Marin Peninsula on the northwest, and the Berkeley Hills and the Diablo Range on the east. The heart of the region is the San Francisco Bay system, which occupies a late Pliocene trough that flooded repeatedly during the Pleistocene interglacial period, the last flooding occurring approximately 10,000 years ago. This trough extends to the south where it forms the Santa Clara and San Benito valleys and to the north where it forms the Petaluma, Napa, and Sonoma valleys (Moratto 1984:219). About 15,000 years ago the coastal shoreline extended more than 15 miles west of today's coastline. The California River flowed through the gorge that is now the Golden Gate and across what is today's submerged continental shelf, finally reaching the ocean far west of today's coastline (Moratto 1984:219).

Approximately 8,000 years ago, with the rising sea levels associated with the melting of continental glaciers, marine waters began to invade the San Francisco trough, creating a lush and bountiful marshland environment on the shores surrounding a newly created bay. Elk, deer, and waterfowl inhabited the marshlands and surrounding environs. The waters of the bay and ocean produced abalone, oyster, mussels, clams, salmon, sturgeon, seabass, shark, perch, and many other fish species. Tule and marsh grasses provided raw material for a variety of implements fashioned by the earliest inhabitants.

The flanks of the coastal mountain ranges provide the biotic zone of the coastal grasslands. These mountain ranges are the product of tectonic activity caused by the collision of the Pacific continental plate and the continent of North America. A variety of geological composition and sediment variability is the result of this activity. The geologic foundation underlying the coastal grasslands is largely granite bedrock intermixed with large areas of sedimentary shales, sandstones and composites of igneous rock (Brown 1997:86). Mineral resources for both tool manufacture and trade were abundant. Obsidian, prized for projectile points and blades, was available to the north at Anadel and Napa's Glass Mountain. Franciscan chert was found locally in streambeds and rock outcroppings while banded Monterey chert could be found in coastal deposits to the south (Moratto 1984:221).

Native grasses covered the middle-elevation hillsides in the coastal areas prior to the late 18th century. The grasses now covering the coastal grassland region are not the same as those that would have been found in the area 250 years ago. Although the types of animals inhabiting the coastal regions before the influx of humans are largely known, the type of plants that may have occupied the coastal grassland is not as well defined.

Annual precipitation in the San Francisco Bay region varies from 20 to 40 in. with precipitation concentrated in the fall, winter, and spring months. This climate is much like that found in the

Mediterranean: mild, rainy winters, and warm, dry summers. After the first rain at the end of October or early November, the vegetation becomes and remains green, but not growing, until late February, when it begins to grow rapidly. By early May, grasses have usually changed to dry golden-colored and remain that way until fall (Brown 1985:86). Due to the cooling effects of the local Bay environment, temperatures in the Project APE are mild in the summer, usually averaging 55-65°F (Moratto 1984:223).

3.2 PREHISTORIC SETTING

Research into local prehistoric cultures began in the early 1900s with the work of N. C. Nelson of the University of California at Berkeley. Nelson documented 425 shellmounds along the Bay shore and adjacent coast when the Bay was still ringed by salt marshes three to five miles wide (Nelson 1909:322-331). He maintained that the intensive use of shellfish, a subsistence strategy reflected in both coastal and bay shoreline middens, indicated a general economic unity in the region during prehistoric times, and he introduced the idea of a distinct San Francisco Bay archaeological region (Moratto 1984:227). Three sites, in particular, provided the basis for the first model of cultural succession in Central California, the Emeryville Shellmound (CA-ALA-309), the Ellis Landing Site (CA-CCO-295), and the Fernandez Site (CA-CCO-259) (Moratto 1984:227).

Investigations into the prehistory of the Central Valley of California, presaged by early amateur excavations in the 1890s, began in earnest in the 1920s. In the early 20th century, Stockton-area amateur archaeologists J. A. Barr and E. J. Dawson separately excavated several sites in the Central Valley and made substantial collections. Based on artifact comparisons, Barr identified what he believed were two distinct cultural traditions, early and late. Dawson later refined his work and classified the Central Valley sites into three "age-groups" (Schenck and Dawson 1929:402).

Professional or academic-sponsored archaeological investigations in central California began in the 1930s, when J. Lillard and W. Purves of Sacramento Junior College formed a field school and conducted excavations throughout the Sacramento Delta area. By seriating artifacts and mortuary traditions, they identified a three-phase sequence similar to Dawson's, including Early, Intermediate, and Recent cultures (Lillard and Purves 1936). This scheme went through several permutations (Heizer and Fenenga 1939; Lillard et al. 1939). In 1948 and again in 1954, Richard Beardsley refined this system and extended it to include the region of San Francisco Bay (Beardsley 1948, 1954). The resulting scheme came to be known as the Central California Taxonomic System (CCTS) (Fredrickson 1973; Hughes 1994:1). Subsequently, the CCTS system of Early, Middle, and Late Horizons was applied widely to site dating and taxonomy throughout central California.

As more data were acquired through continued fieldwork, local exceptions to the CCTS were discovered. The accumulation of these exceptions, coupled with the development of radiocarbon dating in the 1950s and obsidian hydration analysis in the 1970s, opened the possibility of dating deposits more accurately. Much of the subsequent archaeological investigation in central California focused on the creation and refinement of local versions of the CCTS.

In the 1960s and 1970s, archaeologists including Ragir (1972) and Fredrickson (1973) revised existing classificatory schemes and suggested alternative ways of classifying the prehistory of

California. Fredrickson (1973:113-114) proposed four "major chronological periods" in prehistoric California: the Early Lithic Period (described as hypothetical), a Paleoindian Period, an Archaic Period, and an Emergent Period. The Archaic and Emergent Periods were further divided into Upper and Lower Periods. Subsequently, Fredrickson (1974, 1994) subdivided the Archaic into Lower, Middle, and Upper. Milliken et al. (2007) have recently updated and further refined this scheme.

A series of "patterns," emphasizing culture rather than temporal periods, can be identified throughout California prehistory. Following Ragir, Fredrickson (1973:123) proposed that the nomenclature for each pattern relates to the location where it was first identified, such as the Windmiller, Berkeley, and Augustine Patterns.

Various modifications of the CCTS (e.g., Bennyhoff and Hughes 1987; Fredrickson 1973, 1974; Milliken and Bennyhoff 1993) sustain and extend the system's usefulness for organizing our understanding of local and regional prehistory in terms of time and space. The cultural patterns identified in the Bay Area that in a general way correspond to the CCTS scheme are the Berkeley and Augustine patterns (for information on the Berkeley and Augustine Patterns see Fredrickson 1973, Milliken et al. 2007, Moratto 1984 and Wiberg 1997). Dating techniques such as obsidian hydration analysis or radiometric measurements can further increase the accuracy of these assignments.

Most recently, Milliken et al. (2007:99-123) developed what they term a "hybrid system" for the San Francisco Bay Area, combining the Early-Middle-Late Period temporal sequence with the pattern-aspect-phase cultural sequence. Dating of the cultural patterns, aspects, and phases was based on Dating Scheme D of the CCTS, developed by Groza (2002). Groza directly dated over 100 Olivella shell beads, obtaining a series of AMS radiocarbon dates representing shell bead horizons. The new chronology she developed has moved several shell bead horizons as much as 200 years forward in time.

Milliken et al.'s (2007) San Francisco Bay Area Cultural Sequence includes:

- Early Holocene (Lower Archaic) from 8000 to 3500 B.C.
- Early Period (Middle Archaic) from 3500 to 500 B.C.
- Lower Middle Period (Initial Upper Archaic) from 500 B.C. to A.D. 430
- Upper Middle Period (Late Upper Archaic) from A.D. 430 to 1050
- Initial Late Period (Lower Emergent) from A.D. 1050 to 1550
- Terminal Late Period, post-A.D. 1550

No archaeological evidence dating to pre-8000 B.C. has been found in the Bay Area. Milliken et al. (2007) posit that this dearth of archaeological material may be related to subsequent environmental changes that submerged sites, buried sites beneath alluvial deposits, or destroyed sites through stream erosion. A brief summary of the approach presented by Milliken et al. (2007) follows.

A "generalized mobile forager" pattern marked by the use of milling slabs and handstones and the manufacture of large, wide-stemmed and leaf-shaped projectile points emerged around the periphery of the Bay Area during the Early Holocene Period (8000 to 3500 B.C.). Beginning around 3500 B.C., evidence of sedentism, interpreted to signify a regional symbolic integration of peoples, and increased regional trade emerged. This Early Period lasted until circa 500 B.C. (Milliken et al. 2007:114, 115).

Milliken et al. (2007:115) identify "a major disruption in symbolic integration systems" circa 500 B.C., marking the beginning of the Lower Middle Period (500 B.C. to A.D. 430). Bead Horizon M1, dating from 200 B.C. to A.D. 430, is described by Milliken et al. (2007:115) as marking a 'cultural climax' within the San Francisco Bay Area.

The Upper Middle Period (A.D. 430 to 1050) is marked by the collapse of the Olivella saucer bead trade in central California, abandonment of many Bead Horizon M1 sites, an increase in the occurrence of sea otter bones in those sites that were not abandoned, and the spread of the extended burial mortuary pattern characteristic of the Meganos complex into the interior East Bay. Bead Horizons M2 (A.D. 430 to 600), M3 (A.D. 600 to 800), and M4 (A.D. 800 to 1050) were identified within this period (Milliken et al. 2007:116).

The Initial Late Period, dating from A.D. 1050 to 1550, is characterized by increased manufacture of status objects. In lowland central California during this period, Fredrickson (1973, 1994) noted evidence of increased sedentism, the development of ceremonial integration, and status ascription. The beginning of the Late Period (ca. A.D. 1000) is marked by the Middle/Late Transition bead horizon. The Terminal Late Period began circa A.D. 1550 and continued until European settlement of the area.

3.3 ETHNOGRAHIC SETTING

This section provides a brief summary of the ethnography of the Project vicinity and is intended to provide a general background only. More extensive reviews of Ohlone ethnography are presented in Bocek (1986), Cambra et al. (1996), Kroeber (1970), Levy (1978), Milliken (1995), and Shoup et al. (1995).

The Project APE is within the region occupied by the Ohlone or Costanoan group of Native Americans at the time of historic contact with Europeans (Kroeber 1970:462-473). Although the term Costanoan is derived from the Spanish word Costaños, or "coast people," its application as a means of identifying this population is based in linguistics. The Costanoans spoke a language now considered one of the major subdivisions of the Miwok-Costanoan, which belonged to the Utian family within the Penutian language stock (Shipley 1978:82-84). The term "Costanoan" actually designates a family of eight languages.

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

Regarding linguistic evidence, it has been suggested that the ancestors of the Ohlone arrived in the San Francisco Bay area about A.D. 500, having moved south and west from the Sacramento-San Joaquin Delta. The ancestral Ohlone displaced speakers of a Hokan language and were probably the producers of the artifact assemblages that constitute the Augustine Pattern previously described (Levy 1978:486).

Although linguistically linked as a family, the eight Costanoan languages comprised a continuum where neighboring groups could probably understand each other. However, beyond neighborhood boundaries, each group's language was reportedly unrecognizable to the other. Each of the eight language groups was subdivided into smaller village complexes or tribal groups. These groups were independent political entities, each occupying specific territory defined by physiographic features. Each group-controlled access to the natural resources of its territory, which also included one or more permanent villages and numerous smaller campsites used as needed during a seasonal round of resource exploitation. Chochenyo or East Bay Costanoan was the language spoken by the estimated 2,000 people who occupied the "east shore of San Francisco Bay between Richmond and Mission San Jose, and probably also in the Livermore Valley" (Levy 1978:485).

A chief, who inherited the position patrilineally and could be either a woman or man, provided leadership. The chief and a council of elders served mainly as community advisers. Specific responsibility for feeding visitors, providing for the impoverished and directing ceremonies, hunting, fishing, and gathering fell to the chief. Only during warfare was the chief's role as absolute leader recognized by group members (Levy 1978:487).

Extended families lived in domed structures thatched with tule, grass, wild alfalfa, or ferns (Levy 1978:492). Semi-subterranean sweathouses were built into pits excavated in stream banks and covered with a structure against the bank. The tule raft, propelled by double-bladed paddles, was used to navigate across San Francisco Bay (Kroeber 1970:468).

Mussels were an important staple in the Ohlone diet, as were acorns of the coast live oak, valley oak, tanbark oak, and California black oak. Seeds and berries, roots and grasses, and the meat of deer, elk, grizzly, rabbit, and squirrel formed the Ohlone diet. Careful management of the land through controlled burning served to ensure a plentiful, reliable source of all these foods (Levy 1978:491).

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

The arrival of the Spanish in 1775 led to a rapid and major reduction in native California populations. Diseases, declining birth rates, and the effects of the mission system served to largely eradicate the aboriginal life ways. Brought into the missions, the surviving Ohlone, and the Esselen, Yokuts, and Miwok, were transformed from hunters and gatherers into agricultural laborers (Levy 1978; Shoup et al. 1995). Following secularization of the mission system in the 1830s, numerous ranchos were established in the 1840s. Generally, the few Indians who remained were then forced, by necessity, to work on the ranchos.

In the 1990s, some Ohlone groups (e.g., the Muwekma, Amah, and Esselen further south) submitted petitions for federal recognition (Esselen Nation 2007; Muwekma Ohlone Tribe 2007). Many Ohlone are active in preserving and reviving elements of their traditional culture and are active participants in the monitoring and excavation of archaeological sites.

3.4 HISTORICAL SETTING

The historic period in the eastern San Francisco Bay region began with the Fages-Crespi expedition of 1770. The Fages party explored the eastern shore of San Francisco Bay, eventually reaching the location of modern Fremont, where they traded with the local Costanoans. Members of the expedition eventually sighted the entrance to San Francisco Bay from the Oakland Hills. In 1772, a second Fages expedition traveled from Monterey through what are now Milpitas, San Lorenzo, Oakland, and Berkeley, finally reaching Pinole on March 28, 1772 (Cook 1957:131). From there they traveled through the locations of today's Rodeo and Crockett to Martinez, made a brief foray into the delta region of the Central Valley, and then camped somewhere near Pittsburg or Antioch. On March 31, the Fages party began the return journey to Monterey. They traveled to the vicinity of today's Walnut Creek, turned south, and then made their way to the Danville area, where they spent the night. on April 1st, they passed through today's San Ramon, Dublin, and Pleasanton, finally arriving back in the area of Milpitas on the following day.

In 1776, the Anza-Font expedition traveled through the same area and also traded with residents of native villages encountered along the way. The most significant effect of the European presence on the local California natives, however, was not felt until the Spanish missions were established in the region (Cook 1957:132).

In 1775, Captain Juan Manuel Ayala's expedition studied the San Francisco Bay and ventured up the Sacramento and San Joaquin rivers. The first mission in the region was established the following year with the completion of Mission San Francisco de Asis (Mission Dolores) in San Francisco. Mission Santa Clara followed in 1777, and Mission San Jose in 1797. The Mission era lasted approximately 60 years and proved to be the downfall of the native inhabitants of the region, who were brought to the missions to be assimilated into a new culture as well as to provide labor for the missionaries. Diseases introduced by the early explorers and missionaries, and the contagions associated with the forced communal life at the missions killed many local peoples, while changes in land use made traditional hunting and gathering practices increasingly difficult. Cook (1976) estimates that by 1832, the Costanoan population had been reduced from a high of over 10,000 in 1770 to less than 2,000.

In 1820, Sergeant Luis Maria Peralta received a grant of "10 square leagues" of land in the East Bay in recognition of his long, faithful military service in California. Peralta named his grant Rancho San Antonio. It comprised the land that lay from the water's edge to the crest of the Oakland hills between San Leandro Creek to the south and El Cerrito Creek to the north (Hendry and Bowman 1940), completely encompassing modern-day Oakland, Berkeley, Emeryville, Piedmont, Albany, Alameda, and a portion of San Leandro (Sher 1994:9).

Following the U.S. takeover of Alta California from Mexico in 1848, rancho lands were divided and acquired by Anglo migrants to the area following the initial Gold Rush of 1849. Rancho San Antonio suffered the fate of most Mexican land grants in northern California, with squatters taking quasi-legal title to lands, and the courts denying title to the original grantees (Hendry and Bowman 1940).

Early surveyors mapped parts of Oakland in the 1840s. The 1856 Survey of the Coast of the United States depicts the area that would become known as downtown and West Oakland. Although streets had been laid out near Broadway, much of the dry land remained covered in oaks and largely unpopulated. Marshland extended as far north as modern-day Fifth Street in several locations, and Gibbons Pier, at the end of Seventh Street, was the only sign of the industry to come. Oakland's early growth was concentrated near the wharves and rail lines that eventually transformed the rural outpost into a transportation center for both passengers and goods.

The first growth period followed the completion of the San Francisco & Oakland Railroad (SF&ORR) along Seventh Street in 1863, connecting Oakland to San Francisco by way of San Jose and enticing real estate speculators who saw the area as ideal for development. Only six years after the local rail connection was completed, the Big Four (Collis Huntington, Leland Stanford, Charles Crocker and Mark Hopkins) made a decision that would shape Oakland's future. The Central Pacific Railroad would locate the western terminus of its transcontinental route at Oakland Point (Scott 1959:48). Buildings were clustered at the foot of Broadway as well as at the end of the alignment of Seventh Street, where wharves extended into the bay. The businesses and residents that would soon fill the area, however, did not yet surround the local and transcontinental rail lines. City streets had been surveyed, although many blocks remained wooded or had become home to only small numbers of people. The large lot size characteristic of a more rural settlement pattern was still present, and the northeastern portions of the city were growing far slower than downtown and West Oakland.

By the turn-of-the-century, electric railways connected the most densely populated areas of Oakland to the outlying suburbs. Some previously urban middle-class families now chose a suburban life in the relatively open spaces of the East Bay, and the 1906 earthquake further encouraged some urban residents to relocate to outlying areas.

The Oakland, Antioch & Eastern Railroad (OA&E) was also depicted on the 1915 USGS map along an alignment that ran southeast to northwest, ½-mile east of the Project APE. The OA&E, an interurban line, shared the Key system ferry terminal in Oakland and made travel between San Francisco and emerging suburbs and recreation areas easier and more cost efficient. Lines between Oakland and Sacramento were operational by 1913 and eventually became part of the Sacramento Northern Railroad (Groff 2011; Western Railway Museum 2020).

World War I was a catalyst for the shipyards on the Oakland waterfront, as new workers were enticed to the area by increased economic activity. Beth Bagwell summarized the growth of Oakland's hillside neighborhoods.

After the earthquake, Oakland experienced a housing construction boom; bungalows replaced the remaining hayfields in Rockridge, Claremont, and the district north to the Berkeley border. In the 1920s, the demand continued, spurred by the post-war prosperity and by the opening of new real estate tracts made easily reachable by the automobile. Piedmont, Montclair, Trestle Glen, and the Lakeshore district were among neighborhoods that experienced their greatest growth at this time. In 1923, a graph in the Oakland Tribune Yearbook showed a 900 percent increase in the number of dwellings built over the previous five years (Bagwell 1982:200).

Oakland did not escape the consequences of the Great Depression. Although the Southern Pacific Railroad (which merged with the Central Pacific Railroad in 1885) remained solvent, large numbers of jobs were lost. The San Francisco Bay Bridge was constructed between 1933 and 1936 in the midst of the Great Depression, and although it may not have been evident at the time, the bridge would significantly change a community that had built itself around its transportation terminals.

World War II brought a degree of economic relief through another round of increased shipbuilding, and it also saw the construction of the Oakland Army Base and the Naval Supply Center. As the outlying areas of Oakland continued to fill with new immigrants and residents who had left the city center, the oldest areas of downtown struggled, as automobiles and trucks began to dominate the transportation market that had defined Oakland's early growth.

3.5 SITE SPECIFIC HISTORY

The 1889 Sanborn Fire Insurance map for Oakland lists twenty dwellings of mixed single and double story construction and associated outbuildings, a stable, a store, leatherworking facility, and other ancillary buildings, such as water tanks and windmills on the block where the Project is located (Sanborn 1889, Figure 3-1). The buildings at 808 to 816 Chester Street were single-story, wood framed houses, with the lot at 808 Chester Street having a windmill and two water tanks and the lots at 314 and 316 Chester Street having small outbuildings abutting each other at the fence line separating the two addresses. The two-story dwelling at 818 Chester Street had a single-story addition at the rear of the building and a windmill with a water tank. The two-story dwellings at both 818 and 820 Chester Street had small outbuildings abutting another outbuilding along their rear fence line at 317 and 319 Center Street. The lot at 315 Center Street had two single-story and one, two-story outbuildings detached from the single-story dwelling. The property at 313 Center Street had two single-story dwellings on the lot. The lot at 811 Center Street had a two-story wood framed dwelling as well as a single-story outbuilding along its rear fence and what is listed as a two-story Leather Strap Factory. The lot at 809 Center Street had a single-story dwelling, as well as a single-story outbuilding. Along 5th Street, there are a total of nine dwellings and seven outbuildings, a stable, and a store occupying addresses 1454-1478 5th Street. Of the nine dwellings, only the residence listed at 1466 5th Street is a two-story construction. The lots at 1458 and 1460 as well as 1466-1472 5th Street all possessed single story outbuildings of various size. A two-story store at 1454 5th Street, had a wraparound awning that would have extended over the sidewalk at the corner of 5th and Center Street; associated with this store is a stable and attached outbuilding.

The 1902 Sanborn Fire Insurance map indicates that numerous additions, conversions, and new constructions within the Project APE since 1889 (Sanborn 1902, Figure 3-2). A single-story dwelling was constructed at the new 806 Chester Street address. The windmills and water tanks found at 808 and 818 Chester Street were not recorded, and the Leather Strap Factory at 811 Center Street was now a shed, indicated they had been razed. The store at 1454 5th Street was now a two-story storage building, and its stable was now an outbuilding. A home was constructed at a newly established address at 1456 5th Street. Dwellings at 1458-1460 and 1476 5th Street had been converted from single family residences to multi-residence apartment flats with new ½ addresses. The single-story dwelling at 1478 5th Street had a second-story addition and the building converted to a store with awning extending over the sidewalk at the corner of 5th and Chester Street, the parcel was given a ½ address addition.

By 1912, the Sanborn Fire Insurance maps detail numerous changes since 1902 (Figure 3-3). Along Chester Street, the removal of the windmill and tank at 808 Chester Street was confirmed, the one at 818 was still extant. The single-story dwelling at 812 Chester Street had been expanded towards the street, and some of the dwelling at 806 Chester Street had been converted into storage (Sanborn 1912). The dwelling at 1472 5th Street had been converted into an apartment flat and a brick outbuilding was placed on the property. The shed that had originally been the stable associated with 1454 5th Street was now partitioned into two sheds for 1454 and 1456 5th Street. The property at 1454 5th Street had been converted into an apartment flat. The dwelling at 811 Center Street had been converted to an apartment flat, and a new ½ address was established.

Figure 3-1. APE on the 1889 Sanborn map.

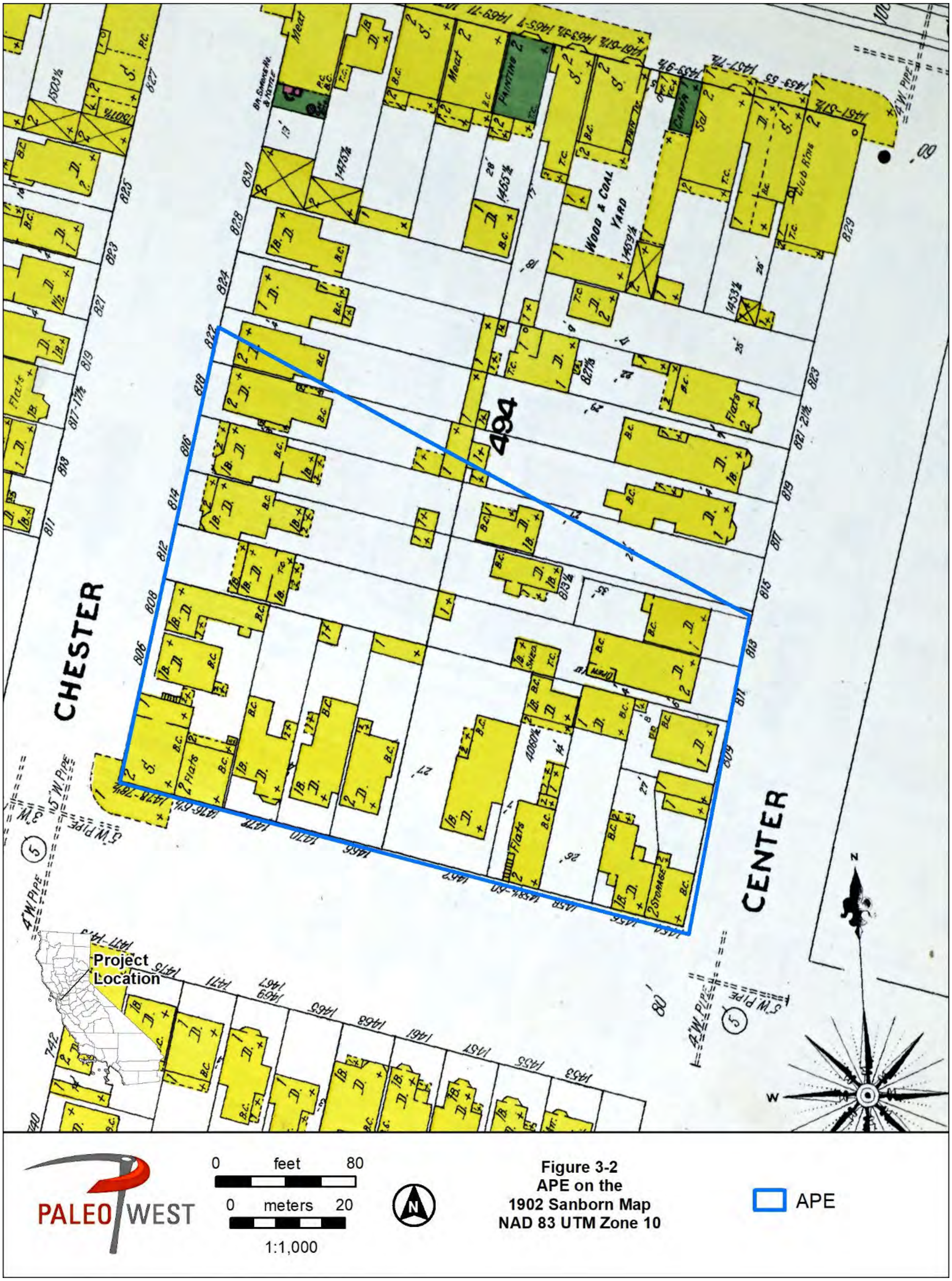

Figure 3-2. APE on the 1902 Sanborn map.

Figure 3-3. APE on the 1912 Sanborn map.

By 1951 the APE had undergone numerous changes (Figure 3-4). A single change had occurred along Chester Street with a addition at the rear of 522 Chester Street. Along 5th Street, multiple changes had occurred: A shed had been removed at 1476 5th Street, the dwelling at 1470 5th Street expanded and subdivided into two flats. A detached dwelling with an attached garage was constructed at the rear of the property with the address of 1470 ½ 5th Street. At 1460 5th Street, there was an addition to the rear of the dwelling. A detached building had been constructed at the rear of 521 Center Street, and given an address of 521 ½, and the addresses had been adjusted at 531 Center Street. The dwelling identified as 529 Center Street on the 1912 Sanborn had been torn down, and the dwelling initially designated 533 Center Street had been given the address 531 Center Street.

All the buildings on the 1951 Sanborn maps appear to be visible on aerial photographs starting in 1946 and continuing to 1959 (NETR 1946, NETR 1959). By 1968, the buildings that occupied the Project APE had been demolished and an open lot was its replacement (NETR 1968). Between 1968 and 1980, all buildings and structures within the Project APE were razed, and the land redeveloped developed as the West Oakland BART station parking lot in 1974 (NETR 1980). From 1980 to 2016, the historic aerials indicate that there have been no developmental changes to the APE (NETR 1982, 1988, 1993, 2002, 2005, 2009, 2010, 2012, 2014, 2016).

Figure 3-4. APE on the 1951 Sanborn map.

CHAPTER 4. CULTURAL RESOURCE INVENTORY

A literature review and records search was conducted by staff at the NWIC, housed at Sonoma State University in Rohnert Park, on December 9, 2020. This inventory effort included the Project APE and a ½ -mile radius around it, collectively termed the Project study area. The objective of this records search was to identify prehistoric or historical cultural resources that have been previously recorded within the study area and to identify previous cultural resource investigations within the study area.

4.1 PREVIOUS CULTURAL RESOURCE INVESTIGATIONS

The records search indicated that two cultural resource studies (S-26045 and S-37362) have been completed within the APE (Table 4-1). Additionally, 24 cultural resource studies have been conducted within ½-mile of the APE (Table 4-2).

Table 4-1. Previous Resource Studies Within the APE

Report No.	Authors	Year	Title	Publisher
S-26045	Richard Carrico, Theodore Cooley, and William Eckhardt	2000	Cultural Resources Reconnaissance Survey and Inventory Report for the Metromedia Fiberoptic Cable Project, San Francisco Bay Area and Los Angeles Basin Networks	Mooney & Associates
S-37362	N/A	1990	Historic Property Survey Report for the Proposed I-880 Reconstruction Project in the Cities of Oakland and Emeryville, Alameda County, ALA-880 32.12/34.31; ALA-580 45.99/46.95; ALA-80 1.99/3.39; 04195-190271 MEQ85001	California Department of Transportation, District 4

Table 4-2. Previous Resource Studies Within ½ Mile of the APE

Report No.	Authors	Year	Title	Publisher
S-012289	Donna M. Garaventa, Michael R. Fong, Sondra A. Jarvis, and Angela M. Banet	1990	Archaeological Survey Report, I-880/Cypress Replacement Project, 04-ALA-880 P.M. 32.4/34.3, E.A. #04195-190271 MEQ 85001, Cities of Oakland and Emeryville, Alameda County, California	Basin Research Associates, Inc.
S-018515	Grace H. Ziesing	1996	Historic Sensitivity Study for Proposed Parking Lot between 7th and 8th Sts. and Union and Cypress Sts., Oakland, California (letter report)	Sonoma State University Academic Foundation Inc.

Report No.	Authors	Year	Title	Publisher
S-018996	Mark G. Hylkema, Mara Melandry, and Robert Gross	1997	Archaeological Report of a Prehistoric Burial Find at Site CA-ALA-17 in the City of Oakland, Alameda County, California; 4-ALA-880 PM 32.6/34.2 EA 192211, Cypress Reconstruction Project	California Department of Transportation
S-021780	John Mc Ilroy	1999	Archaeological Monitoring at 1717 Chase Street, West Oakland, Alameda County, California, ASC# 50001-41/49 (letter report)	Anthropological Studies Center, Sonoma State University
S-022820	Wendy J. Nelson, Tammara Norton, Larry Chiea, and Eugenia Mitsanis	2000	Cultural Resources Survey for the Level (3) Communications Long Haul Fiber Optics Project, Segment WS07: Oakland to San Jose	Far Western Anthropological Research Group, Inc.
S-022928	Richard S. Shepard, Roger D. Mason, and Ann M. Mums	2000	Cultural Resources Records Search and Survey Report for the WS02 Oakland Re-Route Fiber Optic Connection Corridor, City of Oakland, Alameda County, California	Chambers Group Inc.
S-023778	David Chavez and Jan M. Hupman	2002	Archaeological Resources Investigations for the EBMUD East Bayshore Recycled Water Project, Alameda County, California	David Chavez & Associates
S-025244		2002	Historic Property Survey Report and Finding of No Historic Properties Affected for the Broadway-Jackson Street Interchange Improvement Project, Interstate 880 in the City of Oakland, Alameda County, 04-ALA-880 KP 49.9/52.1 (PM 31/32.4) and 04-ALA-260/61 KP 0.0/3.2 (PM 0.0/2.2), EA 04-219-260000	David Chavez & Associates
S-025526	Colin Busby, Melody Tannam, Donna Garaventa, Michael Corbett, and Woodruff Minor	1997	Historic Property Survey Report/Finding of Effect, 50-Foot Channel Navigation Improvements Project, Oakland Harbor, Alameda County	Basin Research Associates, Inc.; Corbett & Minor
S-025649	Mary Praetzellis, Suzanne B. Stewart, Erica S. Gibson, Lori Hager, Virginia Hellmann, Madeline Hirn, Jack Mc Ilroy, Michael D. Meyer, Adrian Praetzellis, Mary Praetzellis, Sunsjine Psota, Maria Ribeiro, Margo Schur, Elaine-Maryse Solari, Suzanne B. Stewart, Michael Stoyka, Rose White,	2001	Block Technical Report: Historical Archaeology, I-880 Cypress Replacement Project, Blocks 4, 5, 6 and 9	Anthropological Studies Center, Sonoma State University

Report No.	Authors	Year	Title	Publisher
	Nancy Olmsted, and Roger W. Olmsted			
S-025650	Mary Praetzellis, Erica Gibson, Sherri Gust, Virginia Hellman, Madeline Hirn, Jack Mc Ilroy, Michael Meyer, Adrian Praetzellis, Sunshine Psota, Maria Ribeiro, Peter Schulz, Margo Schur, Elaine-Maryse Solari, Suzanne Stewart, Michael Stoyka, and Rose White	2001	Block Technical Report: Historical Archaeology, I-880 Cypress Replacement Project, Blocks 19, 20, 21 and 37	Anthropological Studies Center, Sonoma State University
S-025651	Mary Praetzellis, Erica Gibson, Sherri Gust, Virginia Hellman, Madeline Hirn, Jack Mc Ilroy, Michael Meyer, Adrian Praetzellis, Sunshine Psota, Maria Ribeiro, and Peter Schulz	2001	Block Technical Report: Historical Archaeology, I-880 Cypress Replacement Project, Blocks 22, 24 and 29	Anthropological Studies Center, Sonoma State University
S-025652	Mary Praetzellis, Erica Gibson, Sherri Gust, Virginia Hellman, Madeline Hirn, Jack Mc Ilroy, Michael Meyer, Adrian Praetzellis, Sunshine Psota, Maria Ribeiro, and Peter Schulz	2001	Block Technical Report: Historical Archaeology, I-880 Cypress Replacement Project, Blocks 27, 28, and 31	Anthropological Studies Center, Sonoma State University
S-027364	Allen G. Pastron, Andrew Gottsfield, Eric Wohlgemuth, Becky Johnson, Jason Claiborne, L. Dale Beevers, Matt Calder, and Jonathan Goodrich	2003	Final Archaeological Report, East Block of the Mandela Gateway Project, City of Oakland, Alameda County, California	Archeo-Tec
S-029028	Thad Van Bueren, Scott Baxter, Anmarie Medin, Linda S. Cummings, Christie Hunter, and Kathryn Puseman	2004	A Germanic Enclave in West Oakland: Archaeological Investigations for the Mandela Park and Ride Relocation Project in the City of Oakland, California, 04-ALA-880, K.P 51.6 (PM 32.1) EA 04-446801	Caltrans
S-031997	David Stone and Karen Foster	2005	Historic Property Survey Report, BART Seismic Retrofit Project, Berkeley Hills Tunnel to Montgomery Street Station, Caltrans District 4, Alameda and San Francisco Counties, California	Science Applications International Corporation

Report No.	Authors	Year	Title	Publisher
S-032164	Harry Y. Yahata and Robert L. Gross	1999	Historic Property Survey Report and Findings of No Historic Properties Affected for the Mandela Parkway Corridor Improvement Project, City of Oakland, Alameda County, 04-Ala-880-KP, 52.5/54.9 (PM 32.6/34.1)	Caltrans District 4
S-033061	Nancy Sikes, Cindy Arrington, Bryon Bass, Chris Corey, Kevin Hunt, Steve O'Neil, Catherine Pruett, Tony Sawyer, Michael Tuma, Leslie Wagner, and Alex Wesson	2006	Mandela Parkway Corridor Improvement Project: Archaeological Sensitivity Study and Survey Report, 04-Ala-880, KP 52.5/54.9 (PM 32.6/34.1), in the City of Oakland, California, Alameda County, EA No. 292360	SWCA Environmental Consultants
S-034307	Terry L. Jones, Jennifer Darcangelo, Susan Baldry, Ken Gobalet, Jefferson W. Haney, Sandra E. Hollimon, Sarah Mellinger, Jack Meyer, Thomas Origer, Rusty Van Rossman, Craig Skinner, Krislyn Taite, and Nelson Thompson	2007	Archaeological Data Recovery at CA-ALA-17, Alameda County, 04-ALA-880, PM 31.6/35.8 EA 190270	California Polytechnic State University
S-035927	Colin I. Busby	2008	Historic Properties Survey Report: West Oakland Transit Village - 7th Street Improvements, City of Oakland, Alameda County, California Project No. STPLER 5012 (082) FHWA 080806A	Basin Research Associates, Inc.
S-042712	Carolyn Losee	2013	Cultural Resources Investigation for AT&T Mobility CCU2795 "Bay Bridge DAS" 1712 - 13th Street, Oakland, Alameda County, California 94607(letter report)	Archaeological Resources Technology
S-046249	Mary Praetzellis, Adrian Praetzellis, Marta Gutman, Paul R. Mullins, Adrian Praetzellis, Mary Praetzellis, and Mark Walker	2004	Putting the "There" there: Historical Archaeologies of West Oakland, Cypress Replacement Project Interpretive Report No. 2, I-880 Cypress Freeway Replacement Project, Alameda County, California	Anthropological Studies Center, Sonoma State University
S-048565	Heidi Koenig	2016	South Interceptor, 3rd Street Rehabilitation Project, East Bay Municipal Utility District, Oakland, Alameda County, Phase I Cultural Resources Survey Report	Environmental Science Associates
S-050531	Heidi Koenig	2018	South Interceptor Rehabilitation Project, East Bay Municipal Utility District, Oakland, Alameda County, Revised Phase I Cultural Resources Survey Report	Environmental Science Associates

4.2 PREVIOUSLY RECORDED CULTURAL RESOURCES

The records search results identified 99 cultural resources within ½ mile of the APE. Two of these resources represent prehistoric archaeological sites (Table 4-3); the remaining 97 resources date to the historic period (see Appendix A). The NWIC identified one historical district, the Bay View Homestead Tract/South Prescott Neighborhood (P-01-004189), in the APE. However, a review of the Historic Resources Inventory Record indicates that the resource lies south of 5th Street and west of Chester Street. As such, the district is adjacent to, but outside of, the APE. The district was previously recommended ineligible for listing in the NRHP due to a lack of integrity.

Table 4-3. **Prehistoric Cultural Resources Within 1/2-Mile of the APE**

Primary No.	Trinomial	Type	Age	Description
P-01-000038	[redacted]	Site	Prehistoric	No description reported.
P-01-010509	[redacted]	Site	Prehistoric	[redacted]

4.3 ADDITIONAL SOURCES

Additional sources consulted during the cultural resource literature review and records search include the NRHP, the California Office of Historic Preservation Archaeological Determinations of Eligibility, and the Built Environment Resource Director (BERD). There are no listed historic properties, historical resources, or historic landmarks recorded in the APE.

The APE is within the planning area of the West Oakland Specific Plan (WOSP), which identifies the City's plans and policies for guiding future development throughout West Oakland. The WOSP provides a comprehensive and multi-faceted strategy for development and redevelopment of vacant and underutilized commercial and industrial properties that are in strategic areas of West Oakland, known as Opportunity Areas and Opportunity sites. The APE is within the WOSP's 7th Street Opportunity Area and is part of one of the more important Opportunity Sites for redevelopment as envisioned in the WOSP.

4.4 ARCHAEOLOGICAL SENSITIVITY IN APE

Based on the results of the records search and the developmental history of the area, the APE is characterized by a high level of sensitivity for buried archaeological deposits dating to the late 19th and early 20th centuries. Recent investigations conducted in the vicinity of the APE found that historic period archaeological remains tend to be concentrated in the upper two feet of sediment (Alonso et al. 2020). Given the extent of ground disturbance associated with the construction of the BART station and parking lot in the 1970s, it is unlikely that significant intact historic period archaeological deposits are extant in the APE.

4.5 NATIVE AMERICAN COORDINATION

PaleoWest contacted the NAHC on November 20, 2020 for a review of the SLF. The objective of the SLF search was to determine if the NAHC had any knowledge of Native American cultural resources (e.g., traditional use or gathering area, place of religious or sacred activity, etc.) within the APE or its immediate. The NAHC response dated December 2, 2020, stated that "a record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced Project. The results were positive." The NAHC response also provided a list of Native American contacts (Irenne Zwierlein, Amah Mutsun Tribal Band of San Juan Bautista; Tony Cerda, Costanoan Rumsen Carmel Tribe; Donald Duncan, Guidiville Indian Rancheria; Ann Marie Sayers, Chairperson, Indian Canyon Mutsun Band of Costanoan; Kanyon Sayers-Roods, Indian Canyon Mutsun Band of Costanoan; Monica Arellano, Muwekma Ohlone Indian Tribe of the SF Bay Area; Timothy Perez, North Valley Yokuts Tribe; Katherine Perez, North Valley Yokuts Tribe; Andrew Galvan, The Ohlone Indian Tribe; and Corrina Gould, The Confederated Villages of Lisjan).

PaleoWest contacted the Native American representatives by email on December 8, 2020 informing them of the Project. Follow up phone calls were made on December 15, 2020 and December 30, 2020. Two responses were received during the follow up phone calls. Timothy Perez of the North Valley Yokuts Tribe responded on December 8, 2020, he recommended Native American monitoring for the Project. Corrina Gould, or the Confederated Villages of Lisjan responded on December 8, 2020 and asked for additional time to review the documentation. A full record of the coordination efforts can be found in Appendix B.

CHAPTER 5. SURVEY METHODS AND RESULTS

5.1 SURVEY METHODS

PaleoWest completed a pedestrian survey of the 1.23-acre APE on December 29, 2020. The survey was conducted by Nathaniel Ramos under the supervision of Christina Alonso, M.A., Register of Professional Archaeologists (RPA). During the survey, the archaeologist systematically walked over the APE and identified areas of exposed (unpaved) ground surface. These areas were carefully inspected for the presence of historic or prehistoric site indicators evidence of cultural remains. Historic-period site indicators include foundations, fence lines, ditches, standing buildings, objects or structures such as sheds, or concentrations of materials at least 50 years in age, such as domestic refuse (glass bottles, ceramics, toys, buttons or leather shoes), or refuse from other pursuits such as agriculture (e.g., metal tanks, farm machinery parts, horse shoes) or structural materials (e.g., nails, glass window panes, corrugated metal, wood posts or planks, metal pipes and fittings, etc.). Prehistoric site indicators include areas of darker sediment with concentrations of ash, charcoal, animal bone (burned or unburned), shell, flaked stone, ground stone, or even human bone.

The survey area was recorded with digital photographs that included general views of the extent and type of development, topography, and vegetation in the APE. A photo log was maintained to include, at a minimum, photo number, date, orientation, photo description, comments, and photographer's name. A sample of survey photographs is included in Appendix C.

5.2 SURVEY RESULTS

Results of the survey indicate that much of the APE is paved and developed by a parking lot (Appendix C, Figure 5-1, 5-2, and 5-3). Ground visibility was less than 20 percent with areas of exposed ground surface were largely limited to landscaped areas that lay along the borders of the property and within curbed islands. Soils within these areas consisted of a densely compacted silty clay with a Munsell reading of 10YR 4/4 with small rock and gravel inclusions. Sediments were covered with patches of moss vegetation and a variety of landscaped trees and shrubs.

During the survey, Mr. Ramos identified several possible historic-era artifacts exposed on the ground surface along the southern border of the Project APE. Specifically, the remains were located in a landscaped area that contained numerous trees and shrubs that showed signs of extensive disturbance. Identified items include a glass bottle fragment, several pieces of whiteware and transfer print ceramic dishware, and a ceramic mason jar lid. None of the artifacts exhibited markers marks or temporally diagnostic characteristics that would allow the remains to be dated. The potential historic-era artifacts were intermixed with modern refuse.

CHAPTER 6. MANAGEMENT RECOMMENDATIONS

The findings of the cultural resource assessment indicate that no historic properties are present in the APE. Although the NWIC records search results indicate that the Bay View Homestead Tract/South Prescott Neighborhood (P-41-004819) is located in the APE, a review of the resource record found that the historic district lies adjacent to, but outside of, the APE. All of the historic period buildings and structures that were once present in the APE were razed for the construction of the West Oakland BART station parking lot in the 1970s. As such, there are no historic period built-environment resources in the APE.

Although the early development of the APE suggests a high level of sensitivity for buried archaeological deposits dating to the late 19^{th} and early 20^{th} centuries, recent investigations conducted in the vicinity found that historic period archaeological remains were concentrated in the upper two feet of sediment. Given the extent of ground disturbance associated with the construction of the BART parking lot, it is unlikely that significant intact historic period archaeological deposits are extant in the APE. Based on the findings of the study, PaleoWest recommends a finding of no historic properties affected for the proposed undertaking.

PaleoWest recommends the following protocols be followed in the event of a post review discovery or if human remains are discovered.

6.1 POST REVIEW DISCOVERY PROTOCOL

In the event that potentially significant archaeological materials are encountered during Project-related ground-disturbing activities, all work should be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource. In addition, Health and Safety Code 7050.5, and Public Resources Code 5097.98 mandate the process to be followed in the unlikely event of an accidental discovery of any human remains in a location other than a dedicated cemetery. Finally, should additional actions be proposed outside the currently defined APE that have the potential for additional subsurface disturbance, further cultural resource management may be required.

6.2 HUMAN REMAINS

In the event that human remains are discovered, the provisions of Section 7050.5(b) of the California Health and Safety Code should be followed.

> In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations

> concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.94 of the Public Resources Code.

The County Coroner, upon recognizing the remains as being of Native American origin, is responsible to contact the Native American Heritage Commission within 24 hours. The Commission has various powers and duties to provide for the ultimate disposition of any Native American remains, as does the assigned Most Likely Descendant. If no satisfactory agreement can be reached as to the disposition of the remains pursuant to State law, then the remains would be reinterred with the items associated with the Native American burial on the property in a location not subject to further disturbance.

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Appendix A.
Historic Cultural Resources within ½-mile of the APE

Table A-1. Historic Cultural Resources Within 1/2-Mile of the APE

Primary No.	Trinomial	Type	Age	Description
P-01-000017		Site	Historic	Block 11, Cypress I-880 Replacement Project
P-01-000018		Site	Historic	Block 18, Cypress I-880 Replacement Project
P-01-000019		Site	Historic	Block 24, Cypress I-880 Replacement Project
P-01-000020		Site	Historic	Block 36, Cypress I-880 Replacement Project
P-01-000021		Site	Historic	Block 37, Cypress I-880 Replacement Project
P-01-000258		Site	Historic	Block 7, Cypress I-880 Replacement Project
P-01-000259		Site	Historic	Block 22, Cypress I-880 Replacement Project
P-01-000260		Site	Historic	Block 28, Cypress I-880 Replacement Project
P-01-000864		Building	Historic	Gellitch (Pierre) Garage
P-01-001092		Building	Historic	Building 29/Nor (Chris) Garage
P-01-001764		Building	Historic	Block 25, Cypress I-880 Replacement Project
P-01-001789		Site	Historic	Block 19, Cypress I-880 Replacement Project
P-01-001790		Site	Historic	Block 21, Cypress I-880 Replacement Project
P-01-001812		Building, Element of district	Historic	DeLa Montanya - Mousalemas rental house
P-01-001813		Building, Element of district	Historic	DeLa Montanya - Mousalemas Rental House
P-01-002151		Site	Historic	Block 20, Cypress I-880 Replacement Project
P-01-004666		Building	Historic	Liberty Hall; Western Market Building; Father Divine's Peace Mission
P-01-004708		Building, Element of district	Historic	Building 18/Dempsey (Patrick)-Pacheco (Frank) House
P-01-004709		Building	Historic	Building 17/MICHAEL COYNE HOUSE
P-01-004736		Building, Element of district	Historic	Building 21/JOHN FANNON PETER MARKET HOUSE
P-01-004739		Building, Element of district	Historic	Building 20/JOHN CLONEN RENTAL HOUSE
P-01-004740		Building, Element of district	Historic	Ida Newman August Franks House
P-01-004748		Building, Element of district	Historic	George W. Frasher - John & Rose Tully House
P-01-004758		Building, Element of district	Historic	Patrick Flynn Domingo Silvera House
P-01-004839		Building, Element of district	Historic	Alcatraz Masonic Hall, Booker Emery House

Primary No.	Trinomial	Type	Age	Description
P-01-004840		Building, Element of district	Historic	Gardiner, William, Confectionary / Bank Buffet
P-01-004841		Building, Element of district	Historic	Wolf, Max, Furniture Warehouse
P-01-004842		Building, Element of district	Historic	A J Tait and Mary Dearing Off & Res, Al's Shoe Repairing
P-01-004843		Building, Element of district	Historic	1st Tabernacle M. B. Church / Aboumrad (Merced) Dry Goods Store
P-01-004844		Building	Historic	Flynn (Ed.) Saloon-McAllister Plumbing
P-01-004845		Building, Element of district	Historic	Lincoln Theatre
P-01-004846		Building	Historic	Arcadia Hotel Isaacs & Schwartz Block
P-01-004847		Building, Element of district	Historic	Building 36
P-01-004853		Building, Element of district	Historic	International Brotherhood of Sleeping Car Porters
P-01-004854		Building, Element of district	Historic	Jason Smith Photo Studio, John Singer's Arcade and Café
P-01-004855		Building, Element of district	Historic	Esthers Orbit Room / Dewey Vila Restaurant
P-01-004856		Building, District	Historic	7th Street/West Oakland Commercial District
P-01-005887		Building, District	Historic	Peralta Villa
P-01-005888		Building, Element of district	Historic	Building 14
P-01-006013		Building, Element of district	Historic	Building 16
P-01-006105		Building, Element of district	Historic	Olsen (Rasmus) - (Zulim (Jakov) House
P-01-006107		Building, Element of district	Historic	Bair (Wm. R.) flats
P-01-006108		Building, Element of district	Historic	Chiesa (Luigi) flats
P-01-006109		Building, Element of district	Historic	Russell (James) - Winters (John) House
P-01-006110		Building, Element of district	Historic	Wilson (W. J.) house-Lichat (Mary) rental
P-01-006112		Building, Element of district	Historic	Building 22

Primary No.	Trinomial	Type	Age	Description
P-01-006113		Building, Element of district	Historic	Carle (Silas) - Lagorio (A.) house
P-01-006114		Building, Element of district	Historic	Building 23
P-01-006115		Building, Element of district	Historic	Carle (Silas) - Connolly (Martin) house
P-01-006117		Building, Element of district	Historic	Hoppe (John) - Fuchs (Philip) house
P-01-006119		Building, Element of district	Historic	Fuchs (Philip) - Maggio (E&F) flats
P-01-006121		Building, Element of district	Historic	Wells Fargo stable - Rossi Cigar factory
P-01-006266		Building, Element of district	Historic	Grist (Wm.H.) garage
P-01-006302		Building, Element of district	Historic	Sandelin (Elias Fred) rental house
P-01-006304		Building, Element of district	Historic	Freese (Johanna and Frederick) house
P-01-006305		Building	Historic	Fitzgerald store/flat-Hirota(M) cleaners
P-01-006306		Building	Historic	Boscacci (Pietro) rental house
P-01-006307		Building	Historic	Schulze (F.) rental-Gereich (E.) house
P-01-006308		Building, Element of district	Historic	Schirmer (August H.T.) house
P-01-006309		Building	Historic	Catera (Luca) store and restaurant
P-01-006310		Building	Historic	Wells Fargo-Railway Express wagon shed
P-01-006311		Building	Historic	True Light Missionary Baptist
P-01-006312		Building	Historic	Maggio (Elena/Fortunato) rental cottage
P-01-006313		Building	Historic	Maggio (Elena/Fortunato) rental cottage
P-01-006521		Building, Element of district	Historic	Cullen (Thomas) - Fackory (Fred A.) house
P-01-006524		Building, Element of district	Historic	Cullen (Thomas) house
P-01-006525		Building, Element of district	Historic	Winslow-Hagen House
P-01-006526		Building, Element of district	Historic	Winslow-Dickinson House
P-01-006528		Building, Element of district	Historic	Winslow-Jenkins House

Primary No.	Trinomial	Type	Age	Description
P-01-007034		Building, Element of district	Historic	Building 37
P-01-007035		Building, Element of district	Historic	Building 38
P-01-007036		Building	Historic	DeLa Montanya-Mouselemas Rental House
P-01-007037		Building, Element of district	Historic	DeLa Montanya-Mouselemas Rental House
P-01-007065		Building, District	Historic	Southern Pacific Railroad Industrial Landscape District
P-01-007195		Building	Historic	Building 15
P-01-007364		Building, District	Historic	Southern Pacific Railroad West Oakland Shops Historic District
P-01-007370		Building, Element of district	Historic	Paint Shop/Diesel Shop; Car Painting Shop
P-01-007371		Building, Element of district	Historic	Drop Pit Building
P-01-007372		Building, Element of district	Historic	Repair Yard Office; Car Repair Office
P-01-007373		Building, Element of district	Historic	Mill; Car Department Planing Mill
P-01-007374		Building	Historic	Lumber Shed
P-01-007375		Building, Element of district	Historic	P.M. Freight Dept. Store 3; Store No. 3
P-01-007377		Building, Element of district	Historic	Car Lighting Shop
P-01-007378		Building, Element of district	Historic	Service Building; Pullman Building
P-01-007381		Building, Element of district	Historic	Service Building Addition; Commissary Building
P-01-007382		Building, Element of district	Historic	Commissary Building Store Room; Laundry
P-01-007383		Building, Element of district	Historic	Master Mechanic Store Room; Master Mechanic/Master Car Repair Office
P-01-007810		Building	Historic	Haven (Charles D. and Laura) House
P-01-008186		Building	Historic	Building 13; Grandma Cookie Bakery
P-01-008187		Building	Historic	Building 12/GRANDMA COOKIE CO. FACTORY
P-01-010521		Site	Historic	Oakland Block 532
P-01-010522		Site	Historic	Oakland Block 533

Primary No.	Trinomial	Type	Age	Description
P-01-010814		Building, Element of district	Historic	Whitland (William)-Teague (William) House
P-01-011412		Building	Historic	1712 13th Street Warehouse
P-01-011925	CA-ALA-000693H	Structure	Historic	South Interceptor 3rd Street Alignment

Appendix C.
Survey Photos

Figure 1: North facing photograph of east border of project area

Figure 2: West facing photograph of southern border of project area

Figure 3: North facing photograph of western border a project area

Figure 4: South east facing photograph taken from western edge of project area in the northwest corner.

Figure 5: South east facing photograph detailing design and size of planter box areas located within parking lot. Soil coloration appears to be a 10YR 4/4.

Figure 6: South facing photograph along western edge of project area.

Figure 7: North west facing photograph taken from north west corner of project area.

Figure 8: East facing photograph along southern border of project area.

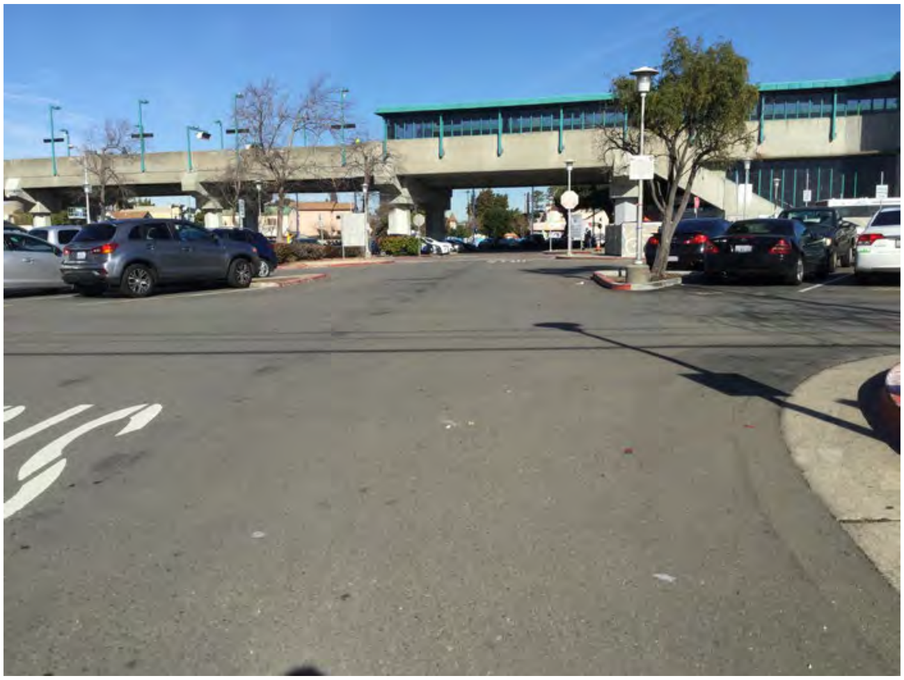

Figure 9: North facing photograph taken from center point of project area along the southern border.

Figure 10: (IO-1) Ceramic Ale Bottle Fragment found on surface of the soils located along the southern border of project area.


Figure 11: (IO-2) Ceramic White Ware Fragment found on surface of the soils located along the southern border of project area.


Figure 12: (IO-3) Smooth white paste Ceramic with brown glaze located on surface along southern border of project area, age of ceramic is questionable.

Figure 13: (IO-4) White Ware with Blue Transfer Print found on surface of the soils located along the southern border of project area

Figure 14: (IO-5) Porcelain Mason Lid found on surface of the soils located along the southern border of project area.

Figure 15: (IO-6) Ceramic Plate Fragment found on surface of the soils located along the southern border of project area.