

Communication from Public

Name: Marjan R. Abubo

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Council File No: 23-0673-S1

Comments for Public Posting: Please see attached written comment letter for the 1200 Vine Street Project, to be heard by the PLUM Committee on November 7, 2023.



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November 1, 2023

Via Email

Planning and Land Use Management Committee
City of Los Angeles
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Councilmember Monica Rodriguez
Councilmember Katy Yaroslavsky
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Re: Comment on Proposed SCPE for the 1200-1218 N. Vine Street Mixed-Use Project (CPC-2022-7047-CU-DB-SPR-HCA), November 7, 2023 City Council Planning and Land Use Management (PLUM) Committee Meeting

Dear Chair Harris-Dawson and Honorable Members of the PLUM Committee:

I am writing on behalf of the Supporters Alliance for Environmental Responsibility ("SAFER"), a California nonprofit benefit corporation, regarding the proposed development of a seven-story, 138,000 square foot mixed-use building located in the City of Los Angeles located at 1200 North Vine Street ("Project"). The City has determined that the project is exempt from environmental review under the California Environmental Quality Act ("CEQA") pursuant to Public Resources Code section 21155.1 ("Section 21155.1"), which provides an exemption for sustainable communities projects ("SCPE"). However, the Project does not meet the criteria for a SCPE and, therefore, does not qualify for an exemption from CEQA under Section 21155.1. SAFER respectfully requests that the Planning and Land Use Management Committee not approve the Project, and instead direct staff to prepare necessary environmental documents under CEQA.

SAFER previously submitted comments to the City Planning Commission for the Project on May 5, 2023, and on May 11, 2023, the City Planning Commission recommended that the City Council approve the Project. The Project was originally submitted and reviewed under the Class 32 Categorical Exemption. However, it was not until the scheduled hearing date was SAFER made aware that the Project will be reviewed under a SCPE exemption instead. SAFER

reiterates its previous comments relevant to the Project and incorporates them by reference herein. SAFER's review of the Project has been assisted by Yilin Tian and Patrick Sutton of Baseline Environmental Consulting ("Baseline") and Certified Industrial Hygienist, Francis "Bud" Offermann, PE, CIH. Baseline's July 31, 2023 detailed rebuttal prepared in response to the Applicant's Response to Comments prepared by DouglasKim+Associates, LLC (DKA), dated May 8, 2023, are attached as Exhibit A. Mr. Offermann's May 17, 2023 comments to the Planning Commission, including a detailed rebuttal prepared in response to the Applicant's Response to Comments prepared by CAJA Environmental Services, LLC ("CAJA"), dated April 13, 2023, are attached as Exhibit B.

PROJECT DESCRIPTION

The Project is located on an approximately 0.9-acre site that is currently developed with two commercial buildings and surface parking. The Project proposes to develop 151 multifamily residential units and approximately 3,690 square feet of ground floor commercial uses. The site is surrounded by commercial and residential uses, including the immediately adjacent property, which contains multiple apartment buildings. Approvals from the City of Los Angeles that are necessary for the project include a Density Bonus with two off-menu incentives, a Conditional Use Permit, and Site Plan Review.

LEGAL STANDARD

CEQA mandates that "the long-term protection of the environment . . . shall be the guiding criterion in public decisions" throughout California. (PRC § 21001(d).) To achieve its objectives of environmental protection, CEQA has a three-tiered structure. (14 CCR § 15002(k); *Committee to Save the Hollywoodland Specific Plan v. City of Los Angeles* (2008) 161 Cal.App.4th 1168, 1185-86.) First, if a project falls into an exempt category, or it can be seen with certainty that the activity in question will not have a significant effect on the environment, no further agency evaluation is required. (*Id.*) Second, if there is a possibility the project will have a significant effect on the environment, the agency must perform an initial threshold study. (*Id.*; 14 CCR § 15063(a).) If the study indicates that there is no substantial evidence that the project or any of its aspects may cause a significant effect on the environment the agency may issue a negative declaration. (*Id.*; 14 CCR §§ 15063(b)(2), 15070.) Finally, if the project will have a significant effect on the environment, an environmental impact report ("EIR") is required. (*Id.*) Here, since the County exempted the Project from CEQA entirely, the first step of the CEQA process applies.

Here, the City is alleging that the proposed Project is exempt from CEQA review under the SCPE exemption. (PRC § 21155.1.) PRC 21155.1 applies to transit priority projects which meet certain criteria and are considered sustainable communities projects and are rendered exempt from CEQA requirements. In order to qualify for a SCPE, a legislative body must find, after public hearing, that the transit priority project meets all of the requirements from PRC 21155.1 subdivision (a) and (b), and one of the requirements of subdivision (c).

Subdivision (a) lists out environmental criteria including requirements that the project can be served by existing utilities, does not impact wildlife habitat, is not included on the Cortese list, does not impact historical resources, is not located on developed open space, and is 15 percent more energy efficient than required under Title 24. Subdivision (a) also lists out specific environmental health hazards that a project cannot be subject to, including “[r]isk of a public health exposure at a level that would exceed the standards established by any state or federal agency.” (PRC § 21155.1(a)(6)(C).)

Subdivision (b) lists out land use criteria that a project must meet, including size requirements, a limit on residential units, and requirements regarding affordable housing, among others. Relevant here, subdivision (b) requires that “[a]ny applicable mitigation measures or performance standards or criteria set forth in the prior environmental impact reports, and adopted in findings, have been or will be incorporated into the transit priority project.” (PRC § 21155.1(b)(5).)

Lastly, subdivision (c) states that the transit priority project must meet at least one of the following three criteria:

(1) The transit priority project meets both of the following:

(A) At least 20 percent of the housing will be sold to families of moderate income, or not less than 10 percent of the housing will be rented to families of low income, or not less than 5 percent of the housing is rented to families of very low income.

(B) The transit priority project developer provides sufficient legal commitments to the appropriate local agency to ensure the continued availability and use of the housing units for very low, low-, and moderate-income households at monthly housing costs with an affordable housing cost or affordable rent, as defined in Section 50052.5 or 50053 of the Health and Safety Code, respectively, for the period required by the applicable financing. Rental units shall be affordable for at least 55 years. Ownership units shall be subject to resale restrictions or equity sharing requirements for at least 30 years.

(2) The transit priority project developer has paid or will pay in-lieu fees pursuant to a local ordinance in an amount sufficient to result in the development of an equivalent number of units that would otherwise be required pursuant to paragraph (1).

(3) The transit priority project provides public open space equal to or greater than five acres per 1,000 residents of the project.

(PRC § 21155.1(c).)

As discussed below, the proposed Project does not qualify for a SCPE because it fails to meet one of the criteria of subdivision (a) and one of the criteria in subdivision (b). The exemption is therefore improper, and instead, an initial study should be prepared, followed by the appropriate CEQA document, either an MND or an EIR.

DISCUSSION

I. The City Incorrectly Applied the SCPE Exemption to the Project and Instead an Initial Study is Required.

This Project fails to meet some of the necessary criteria due to its potentially significant noise and indoor air quality impacts. As such, the Project does not qualify for a SCPE and the City must prepare an initial study and either an MND or an EIR for the Project. As explained above, the Project is now being reviewed before the City under the SCPE Exemption. However, neither the Applicant nor the City provide any new data and instead relies on analyses prepared for the Project had it been reviewed under the Categorical Exemption.

II. The SCPE Fails to Adequately Analyze Noise Impacts, and Therefore Fails to Impose all Mitigation Measures.

To qualify for a SCPE, subdivision (b) makes clear that the Project must meet certain land use criteria, including that “[a]ny applicable mitigation measures or performance standards or criteria set forth in the prior environmental impact reports, and adopted in findings, have been or will be incorporated into the transit priority project.” (PRC § 21155.1(b)(5).) The City found that the applicable EIR for this SCPE was the SCAG 2020-2045 RTP/SCS Program EIR (“RTP/SCS PEIR”), and it applied one of the noise-related mitigation measures from that PEIR to the proposed Project but failed to apply PMM NOI-2.

Dr. Yilin Tian, Ph.D. of expert consulting firm Baseline reviewed the Project and associated documents and found that the Project failed to adequately analyze noise impacts. As such, SAFER therefore finds that the City failed to address all noise impacts and therefore failed to impose all applicable mitigation measures from the RTP/SCS PEIR. The Project therefore does not meet the requirements for a SCPE.

As Baseline first points out, the Project will have potentially significant noise impacts that DKA failed to identify. Specifically, [b]ased on the construction noise sound contour map provided on page 2-41 of the CE [p. 61 of the Noise Technical Report], the modeled construction-generated noise levels at the west building facades facing the project site would be around 70 to 75 dBA, which are more than 10 dBA higher than the existing ambient noise levels and would exceed the City’s significance threshold of a 5 dBA increase over existing ambient conditions. Therefore, the project’s construction noise impact would be significant, but since the City did not address this potentially significant impact, it also failed to consider any mitigation measures that would effectively and feasibly reduce the impacts to a less than significance level. As such, the City should prepare an updated report that adequately captures this impact.

a. The City Fails to Substantiate its Construction Noise Analyses.

Baseline found that the SCPE does not substantiate their analyses of construction noise reductions. As Baseline explains, “the DKA response to Comment 1 indicates that up to a 15 dBA reduction in noise levels can be achieved by noise barriers according to the Federal Transit Administration (FTA). In addition, the DKA response to Comment 1 states that ‘the analysis also considered use of mufflers, shields, and other noise reduction devices were assumed in order to achieve prescribed noise limits.’” (Ex. A., p. 1.) However, the SCPE fails to substantiate these statements, nor do they explicitly state or disclose these assumed reductions as a result of using temporary noise barriers. In either case, the SCPE is misleading because it does not clarify its analysis with additional information.

b. The SCPE Inadequately Analyzes Noise Levels at the Nearest Sensitive Receptors during Construction.

Baseline also highlights the locations from which noise levels were captured do not represent the worst-case scenario. For instance, even though the SCPE lists out all of the noise sensitive receptors, “the receptors [from which measurements were made] are not located along the [western side] building facades nearest to the project site.” DKA fails to account for this misleading analysis, meaning that it is not adequately capturing the potentially significant noise levels from receptors directly associated with the Project.

c. The SCPE fails to Adopt a Noise Mitigation Measure

Subdivision (b) provides that the Project must adopt all applicable mitigation measures in the relevant plan (PRC § 21155(b).) As applied here, the applicable sustainable communities strategy here is the 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy prepared by SCAG Connect SoCal (“2020 RTP/SCS”). Provided the information and arguments raised above, SAFER concludes that the SCPE’s failure to adopt PMM NOISE-2 is erroneous, and the City cannot proceed with a SCPE until the City adopts this mitigation measure as well.

The SCPE explains that the City actively decided not to incorporate PMM NOISE-2 into the Project “because the Project would be required to comply with similar regulations that are equal to or more effective than PMM NOISE-2.” (SCPE Table K-1, p. 58.) The Table references LAMC section 91.3307.1 as the relevant code section; however, a closer look at the section reveals that the section is not equal to or more effective than the proposed mitigation measure that the City chose not to adopt. Section 91.3307.1 explains, in part, that “[a]djoining public and private property shall be protected from damage during construction, remodeling and demolition work. Protection must be provided for footings, foundations, party walls, chimneys, skylights and roofs.” (LAMC section 91.3307.1.) On the other hand, PMM NOISE-2 provides that the City “should consider mitigation measures to reduce substantial adverse effects related to violating air quality standards, as applicable and feasible.” (SCPE Table K-1, p. 58.) Furthermore, one measure included within PMM NOISE-2 is to “[p]roperly maintain

construction equipment and outfit construction equipment with the best available noise suppression devices (e.g., mufflers, silences, wraps).” (*Id.*)

In justifying their position that the noise levels will remain below significance thresholds, the Noise Technical Report relied upon explains that “when considering ambient noise levels, the use of multiple pieces of powered equipment simultaneously would increase ambient noise negligibly. This **assumes the use of best practices techniques** required by the City’s Building and Safety code, such as temporary sound barriers.” (emph. added) (Noise Technical Report, p. 14.) This statement demonstrates the feasibility of adopting these noise-reducing measures for the Project because the City is reasonably assuming that these techniques will be incorporated into the Project. However, relying on assumptions is insufficient for the City to conclude that the Project’s potentially significant noise impacts will fall below the significance threshold, especially when safeguards such as the PMM NOISE-2 mitigation measure is not going to be adopted by the SCPE. Mitigation measures must be fully enforceable through permit conditions, agreements or other legally binding instruments. (14 CCR § 15126.4(a)(2). See *Woodward Park Homeowners Assn., Inc. v. City of Fresno* (2007) 150 Cal. App. 4th 683, 730 (project proponent’s agreement to a mitigation by itself is insufficient; mitigation measure must be an enforceable requirement); *California Clean Energy Committee v. City of Woodland* (2014) 225 Cal. App.4th 173, 195-96.) The City’s assumptions fall far short of being enforceable mitigation.

Taken altogether, the City’s decision to move forward with the SCPE exemption without properly adopting all applicable and feasible mitigation measures is a clear violation of CEQA and the City cannot proceed unless such mitigation measures have been adopted.

III. The Project Will Have a Significant Health Risk from its Air Quality Impacts.

The SCPE cannot apply if a project site is subject to “[r]isk of a public health exposure at a level that would exceed the standards established by any state or federal agency.” (PRC § 21155.1(a)(6)(C).) Here, there is substantial evidence demonstrating that the Project will have public health impacts which exceed state standards, as it relates to both diesel exhaust during construction as well as exposure to formaldehyde.

a. Substantial Evidence shows the Project will Likely have Significant Indoor Air Quality Impacts

As explained in previously submitted letters, the Project will result in significant increased cancer risks from emissions of formaldehyde. Certified Industrial Hygienist, Francis “Bud” Offermann, PE, CIH, has conducted a review of the proposed Project and relevant documents regarding the Project’s indoor air emissions. Indoor Environmental Engineering Comments (Exhibit B). Mr. Offermann concludes that it is likely that the Project will expose residents and commercial employees of the Project to significant impacts related to indoor air quality, and in particular, emissions of the cancer-causing chemical formaldehyde. Mr. Offermann is a leading expert on indoor air quality and has published extensively on the topic. Mr. Offermann’s expert comments and curriculum vitae are attached as Exhibit B.

Mr. Offermann explains that many composite wood products used in building materials and furnishings commonly found in offices, warehouses, residences, and hotels contain formaldehyde-based glues which off-gas formaldehyde over a very long time period. He states, “[t]he primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and particleboard. These materials are commonly used in building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims.” (Ex. B, p. 2-3.)

Formaldehyde is a known human carcinogen. Mr. Offermann states that future residential occupants would be exposed to a cancer risk of 120 in one million, and future commercial employees would be exposed to a cancer risk of 17.7 in one million. (Ex. B, p. 4-5.) These calculations are assuming all materials are compliant with the California Air Resources Board’s formaldehyde airborne toxics control measure. (*Id.*) These potential exposure levels exceed the South Coast Air Quality Management District’s (“SCAQMD”) CEQA significance threshold for airborne cancer risk of 10 per million. (*Id.*) Increased and sustained exposure to this cancer risk is a clear public health exposure that, left unmitigated, should disqualify the Project from proceeding under a SCPE exemption.

Mr. Offermann concludes that these significant environmental impacts should be analyzed in accordance with CEQA and mitigation measures should be imposed to reduce the risk of formaldehyde exposure. (*Id.* at 6.) Mr. Offermann identifies mitigation measures that are available to reduce these significant health risks, including the installation of air filters and a requirement that the applicant use only composite wood materials (e.g. hardwood plywood, medium density fiberboard, particleboard) for all interior finish systems that are made with CARB approved no-added formaldehyde (NAF) resins or ultra-low emitting formaldehyde (ULEF) resins in the buildings’ interiors. (*Id.* at 12-14.)

Formaldehyde exposure in indoor air has been recognized as a public health risk by the California Air Resources Board. (<https://ww2.arb.ca.gov/resources/fact-sheets/formaldehyde>). (Ex. C.) CARB recommends use of “no-added formaldehyde” building materials. (Ex. B, p. 12-14.) Because the Project’s formaldehyde emissions constitute a “public health exposure at a level that would exceed” SCAQMD’s significance threshold for increased cancer risk, the Project does not qualify for the SCPE. (*See* PRC § 21155.1(a)(6)(C).) Therefore, the City must prepare an initial study for the Project and either an MND or EIR to disclose and mitigate the potential environmental impacts to future users of the building.

b. The SCPE Fails to Adequately Analyze the Health Risks from Diesel Exhaust During Construction.

DKA maintains that a health risk assessment (“HRA”) is not needed for diesel particulate matter (“DPM”) exposure for multiple reasons. Such explanations carry little merit and do not resolve the issues SAFER raised in its previous letter. For example, DKA alleges that no HRA is required since the construction DPM emissions would not be sufficient to result in substantial

concentrations at off-site locations. However, as Baseline underlines, “the CE failed to define a threshold concentration of DPM that would be considered a substantial pollutant concentration at off-site locations or provide scientific evidence to justify such a threshold; and therefore, the CE’s conclusion that less than one pound per day of DPM emissions would not result in substantial pollutant concentrations at off-site locations is not substantiated.” (Ex. A, p. 4.)

Additionally, DKA relies on guidelines in the South Coast Air Quality Management District’s (“SCAQMD”) 1993 Handbook to justify its decision not to prepare an HRA. Apart from the obvious fact that DKA is relying on a severely outdated reference guide as opposed to a more recent guidance from the Office of Environmental Health Hazards Assessment (“OEHHA”), “the SCAQMD’s CEQA guidance does not provide any evidence or justification for not evaluating short-term health risks from construction projects. (Ex. A, p. 4.) And as a practical matter, Baseline notes that “construction projects that generate DPM emissions adjacent to sensitive receptors (e.g., the residences located five feet to the east) often results in a significant increase in cancer risk if exhaust controls such as diesel particulate filters or Tier 4 engines are not implemented.” (*Id.*)

For these foregoing reasons, SAFER finds that the City relies on wholly unreliable information to reach its determinations about the health risks associated with the Project. Baseline recommends the City to prepare an HRA “estimate the incremental increase in cancer risk at nearby sensitive receptors that would be exposed to DPM Emissions during project construction.” (Ex. A, p. 4.) Before it does so, the City must not proceed with the SCPE exemption. As such, the Project cannot proceed unless and until it prepares an HRA that better captures the health risks associated with the Project as well as implement and incorporate feasible mitigation measures as appropriate to reducing the impacts to a level below significance.

CONCLUSION

In light of the above comments, the Project does not meet the requirements of the SCPE due to its potential noise impacts and public health risk impacts. SAFER’s findings clearly violate multiple requirements under CEQA, and the City is precluded on relying the SCPE for this Project. The City must instead prepare an initial study followed by an EIR for the Project, or at least an MND, and the draft CEQA document should be circulated for public review and comment in accordance with CEQA. Thank you for considering these comments.

Sincerely,

A handwritten signature in black ink, appearing to read 'Marjan R. Abubo', with a horizontal line extending to the right.

Marjan R. Abubo
Lozeau Drury LLP

Exhibit A



16 October 2023

23207-00

Marjan Kris Abubo
Lozeau Drury LLP
1939 Harrison St., Suite 150
Oakland, CA 94612

Subject: Opposition to Response to Comments for the 1200 Vine Street Project, City of Los Angeles

Dear Mr. Abubo:

Baseline Environmental Consulting (Baseline) has reviewed the Response to Comments prepared by DouglasKim+Associates, LLC (DKA), dated May 8, 2023, regarding the proposed 1200 Vine Project (project) in the City of Los Angeles (City), California, in which DKA provided responses to the comment letter from Lozeau Drury LLP (LD Letter), dated May 3, 2023. Based on our review, the responses provided by DKA do not adequately address the issues raised by the LD Letter. Detailed discussions of these issues are provided in the sections below.

Comment 1: Unsubstantiated Analysis of Noise Reductions During Construction

The first comment DKA addresses from the LD Letter (Comment 1) is about the noise analysis for the Categorical Exemption (CE)¹ not providing information to support the specific noise reduction amounts that could be achieved by implementation of “best practices techniques” during project construction. The DKA response to Comment 1 indicates that up to a 15 dBA reduction in noise levels can be achieved by noise barriers according to the Federal Transit Administration (FTA). In addition, the DKA response to Comment 1 states that “the analysis also considered use of mufflers, shields, and other noise reduction devices were assumed in order to achieve prescribed noise limits.”

Unfortunately, neither the CE nor DKA’s response to Comment 1 states what level of noise reductions were assumed in the noise analysis. Based on DKA’s response, it appears that a 15 dBA reduction from using a temporary noise barrier during construction was applied to all construction equipment, but this has not been explicitly stated or disclosed in the CE or supporting documentation.

¹ City of Los Angeles, 2023. 1200 Vine Project Categorical Exemption (ENV-2022-7048-CE), January. The project is currently being considered under a Sustainable Communities Project Exemption (ENV-2023-4989-SCPE).

Mr. Marjan Kris Abubo
16 October 2023
Page 2

According to the FTA's *Transit Noise and Vibration Impact Assessment Manual*, noise barrier systems along highways can reduce noise levels by 5 to 15 dB, depending upon the barrier height, length, and distance from both source and receiver.² There are two key problems with applying this assumption to the noise analysis in the CE: 1) FTA is describing the range of noise reduction that could be achieved by large permanent noise barrier systems built along highways and not small temporary noise barriers used during construction; and 2) the CE analysis and supporting documentation does not describe what type of temporary barrier material (e.g., plywood, metal, fabric) and design (e.g., wall, curtain, enclosure, shield) would be implemented to achieve a 15 dBA reduction during construction.

According to Appendix A of the Federal Highway Administration (FHWA) *Construction Noise Handbook*,³ a noise barrier that just barely breaks the line-of-sight between the construction equipment and the receptor can reduce noise levels by about 3 dBA. This would be the most common type of noise barrier implemented at a construction site. A barrier that completely encloses the construction equipment can reduce noise levels by about 5 to 10 dBA depending on the design; however, it's typically not feasible to completely enclose construction equipment such as cranes and backhoes.

DKA's response to Comment 1 fails to address the concerns identified in the LD Letter and summarized above. We request that the City provide supporting evidence in the construction noise impact analysis of the CE to demonstrate how noise reduction measures will be implemented during project construction to ensure the project will achieve a less-than-significant impact related to noise.

Comment 2: Inadequate Analysis of Noise Levels at the Nearest Sensitive Receptors during Construction

The second comment DKA addresses from the LD Letter (Comment 2) is about the CE noise analysis failing to properly evaluate the noise levels at the nearest sensitive receptors during project construction, which includes two residential receptors located five feet east of the project site. The DKA response to Comment 2 indicates that the more distant residential receptor noise impact locations used in the CE were determined based on the actual noise measurement locations, representing the building facade exposure to construction noise at the project site. However, the receptors modeled in the CE do not need to be co-located at the actual noise measurement locations, because the ambient noise level measurements are representative of noise levels in the general vicinity. As stated in the LD letter, these locations do not represent the worst-case scenario because the receptors are not located along the west building facades nearest to the project site (**Figure 1**). Based on the construction noise sound contour map provided on page 2-41 of the CE, the modeled construction-generated noise levels

² Federal Transit Administration (FTA), 2018. *Transit Noise and Vibration Impact Assessment Manual*. September.

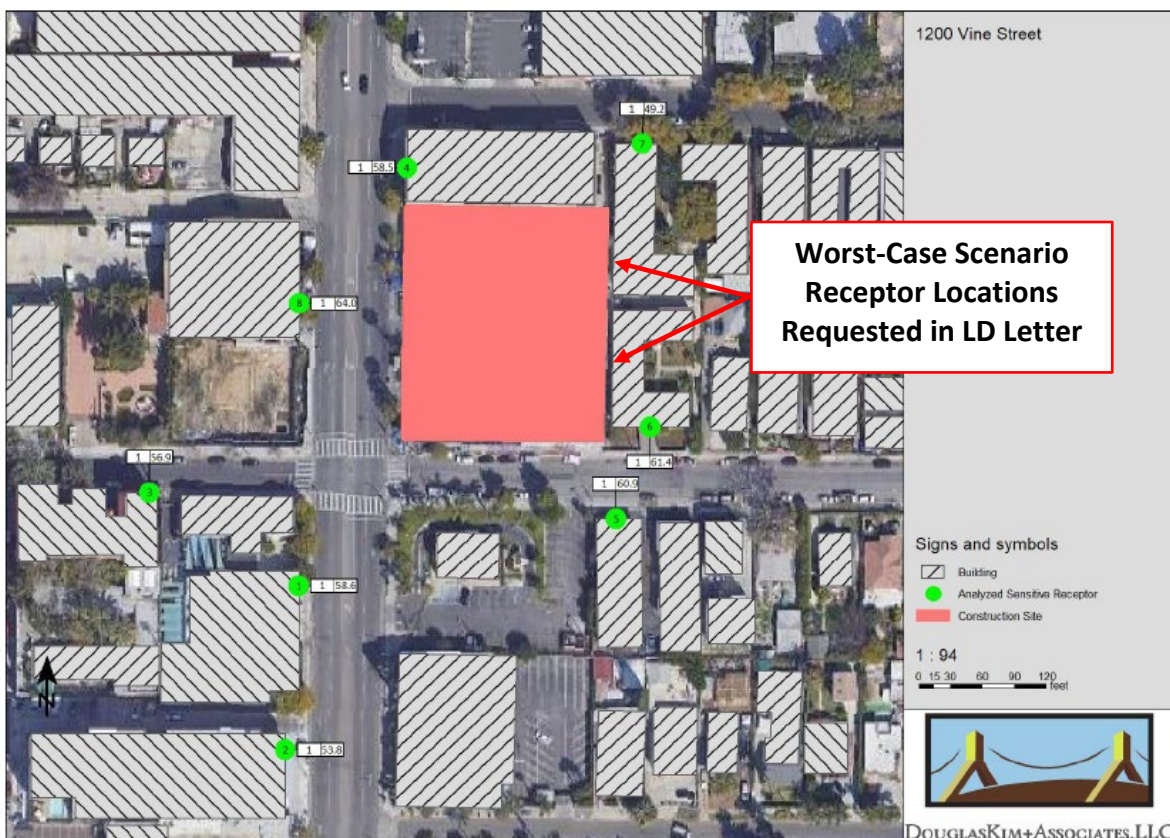
³ Federal Highway Administration (FHWA), 2006. *FHWA Highway Construction Noise Handbook*. August.

Mr. Marjan Kris Abubo
16 October 2023
Page 3

at the west building facades facing the project site would be around 70 to 75 dBA, which are more than 10 dBA higher than the existing ambient noise levels and would exceed the City's significance threshold of a 5 dBA increase over existing ambient conditions. Therefore, the project's construction noise impact would be significant.

DKA's response to Comment 2 fails to address the concerns identified in the LD Letter and summarized above. We request that the City provide an updated analysis in the CE to evaluate and mitigate the construction noise impacts to the adjacent residential receptors to ensure the project will achieve a less-than-significant impact related to noise.

Figure 1. Sensitive Receptors Analyzed in the CE



Source: 1200 Vine Project Categorical Exemption, Appendix D

Comment 3: Inadequate Analysis of Health Risks from Diesel Exhaust during Construction

The final comment DKA addresses from the LD Letter (Comment 3) is about the CE air quality analysis failing to evaluate health risks to nearby nearest sensitive receptors exposed to diesel particulate matter (DPM) during construction. The DKA response to Comment 3 indicates that a health risk assessment (HRA) for exposure to DPM is not needed for the project because the

Mr. Marjan Kris Abubo
16 October 2023
Page 4

project's construction DPM emissions have already been analyzed in the CE. The CE indicates that the project's DPM emissions during construction would not be sufficient to result in substantial pollutant concentrations at off-site locations nearby because the daily DPM emissions would be less than one pound. As stated in the LD letter, the CE failed to define a threshold concentration of DPM that would be considered a substantial pollutant concentration at off-site locations or provide scientific evidence to justify such a threshold; and therefore, the CE's conclusion that less than one pound per day of DPM emissions would not result in substantial pollutant concentrations at off-site locations is not substantiated.

DKA also states that Comment 3 is not supported by any evidence or technical analysis showing significant DPM-related impacts, and "the comment instead merely asserts that an HRA was required. A demand for additional testing is not substantial evidence of a significant impact." As explained in the LD Letter, the CE failed to properly evaluate the significance criterion and disclose the potential health risks to nearby sensitive receptors. To evaluate the impact adequately, an HRA should be performed to estimate the incremental increase in cancer risk at nearby sensitive receptors that would be exposed to DPM emissions during project construction.

DKA also claims that an HRA for project construction is not required because the South Coast Air Quality Management District's (SCAQMD's) CEQA Air Quality Handbook does not explicitly recommend it. The SCAQMD CEQA Air Quality Handbook was published in November 1993, and HRA guidelines have improved substantially in the past 30 years; therefore, the absence of a discussion in the SCAQMD's CEQA guidance about health risks from project construction is not surprising. More importantly, the SCAQMD's CEQA guidance does not provide any evidence or justification for not evaluating short-term health risks from construction projects. That is why the LD Letter referenced the more recent guidance from the Office of Environmental Health Hazards Assessment (OEHHA)⁴ that was published in 2015.

In response, DKA states that the OEHHA requirements under AB 2588 only apply to industrial facilities requiring operational air permits and does not address "short term" projects. There are several misunderstandings or misrepresentations presented here regarding the OEHHA guidance. Baseline agrees that the OEHHA guidance "does not mandate analysis for 'short-term' projects," but as explained on page 8-17 of the OEHHA guidance, the methods for evaluating cancer risk are presented to assist local air pollution control districts in evaluating health risks from "short-term projects such as construction." In other words, OEHHA provides guidance for evaluating health risks from short-term construction projects that is supported by substantial evidence. Therefore, DKA's claim that the OEHHA guidance would not apply to the project construction DPM emissions is false.

⁴ Office of Environmental Health Hazard Assessment (OEHHA). 2015. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. February.

Mr. Marjan Kris Abubo
16 October 2023
Page 5

Furthermore, in our professional experience, construction projects that generate DPM emissions adjacent to sensitive receptors (e.g., the residences located five feet to the east) often results in a significant increase in cancer risk if exhaust controls such as diesel particulate filters or Tier 4 engines are not implemented. We request that the City prepare an HRA to evaluate and mitigate (if needed) the potential increase in cancer risk to nearby sensitive receptors exposed to DPM emissions during project construction in accordance with the OEHHA guidance.

CONCLUSIONS

Based on our review of the Response to Comments prepared by DKA, the issues raised by the LD Letter regarding the inadequate analysis of noise and air quality impacts have not been adequately addressed. Therefore, Baseline recommends that the City of Los Angeles prepare an updated analysis to address the environmental concerns described above.

Sincerely,



Patrick Sutton
Principal Environmental Engineer



Yilin Tian, PhD
Environmental Engineer

Exhibit B



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Date: May 17, 2023

To: Marjan R. Abubo
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1939 Harrison Street, Suite 150
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From: Francis J. Offermann PE CIH

Subject: Indoor Air Quality Rebuttal Comment: 1200 – 1218 N. Vine Street, 6245 - 6247 W. Lexington Avenue Project, Los Angeles, CA
(IEE File Reference: P-4681)

Pages: 26

The following are my rebuttal comments regarding the responses contained in the CAJA Environmental Services, April 13, 2023 response to my February 5, 2023 Indoor Air Quality letter for the 1200 – 1218 N. Vine Street, 6245 - 6247 W. Lexington Avenue Project, Los Angeles, CA (attached in Appendix A).¹

CAJA Environmental Services, Response to SAFER Comment 1 – Part 1

Further, the SAFER Letter analysis of alleged formaldehyde impacts is not based on any factual data concerning the Project, but relies entirely on speculation. The analysis is based on speculation regarding the type of furniture to be used by future residents and the construction materials that would be utilized to build the Project. The analysis is based on the speculation that the Project would utilize unspecified “composite wood products”

¹ City of Los Angeles, 2023. 1200 Vine Project Categorical Exemption (ENV-2022-7048-CE). While the air quality review performed in February 5, 2023 was with regard to the Project when it was submitted for consideration for a Class 32 Categorical Exemption, the project is now being considered under a Sustainable Communities Project Exemption (ENV-2023-4989-SCPE). This change in status does not change any analysis.

indoors with no evidentiary support specific to the Project. Moreover, the SAFER Letter purported indoor air quality analysis relies on an unsubstantiated indoor air quality “threshold” not adopted by the City, SCAQMD, or any other responsible agency for this Project. The speculation, which forms the basis of the SAFER analysis includes inappropriate factors, including the impact of existing outdoor air quality on future Project residents (which is not a recognizable CEQA impact of the Project on the environment) and assumptions such as construction workers on the Project being exposed to formaldehyde for 45 years. There is no analysis specific to the Project, but rather generalized conclusions of formaldehyde exposure in the existing environment.

IEE Rebuttal Comments to Comment 6 - Part 1.

In my February 5, 2023 Indoor Air Quality letter for the 1200 – 1218 N. Vine Street, 6245 - 6247 W. Lexington Avenue Project, Los Angeles, CA (attached in Appendix A) I explained that “Further, we are not asking that the builder “speculate” on what and how much composite materials be used, but rather at the design stage to select composite wood materials based on the formaldehyde emission rates that manufacturers routinely conduct using the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers,” (CDPH, 2017), and use the procedure described earlier above (i.e., Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.”

With respect to the statement that “construction workers on the Project being exposed to formaldehyde for 45 years”, my commercial space employee cancer risk analyses was not for “construction workers on the Project being exposed to formaldehyde for 45 years”, but rather the employees who will be working in the commercial spaces designated for this mixed use project.

With respect to the statement that my “indoor air quality analysis relies on an unsubstantiated indoor air quality ‘threshold’ not adopted by the City, SCAQMD, or any

other responsible agency for this Project”, my analyses for cancer risk from indoor formaldehyde exposure created from composite wood emissions did not use an “unsubstantiated indoor air quality ‘threshold’, but used the CEQA cancer risk of 10 per million, and my indoor exposure analyses is based upon mass balance theory, as referenced in Section 3.10.2 “Calculation of Estimated Building Concentrations” of the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers”, (CDPH, 2017).

Assuming that the residential occupants inhale 20 m³ of air per day, the average 70-year lifetime formaldehyde daily dose is 482 µg/day for continuous exposure in the residences. This exposure represents a cancer risk of 120 per million, which is more than 12 times the CEQA cancer risk of 10 per million.

Assuming that the employees of the commercial spaces work 8 hours per day and inhale 20 m³ of air per day, the formaldehyde dose per work-day at the offices is 161 µg/day. Assuming that these employees work 5 days per week and 50 weeks per year for 45 years (start at age 20 and retire at age 65) the average 70-year lifetime formaldehyde daily dose is 70.9 µg/day. This is 1.77 times the NSRL (OEHHA, 2017a) of 40 µg/day and represents a cancer risk of 17.7 per million, which exceeds the CEQA cancer risk of 10 per million.

CAJA Environmental Services, Response to SAFER Comment 1 – Part 2

Indoor air quality is also not regulated by the applicable air quality plan, the SCAQMD’s 2016 Air Quality Management Plan (AQMP). The USEPA, the California Air Resources Board (CARB) and SCAQMD have also not promulgated ambient air quality standards for indoor air quality.

IEE Rebuttal Comments to SAFER Comment 1 - Part 2

OEHHA Proposition 65 NSRL does regulate exposures to carcinogens and reproductive toxicants, including formaldehyde, for exposures that occur in both outdoor and indoor

environments.

CAJA Environmental Services, Response to SAFER Comment 1 – Part 3

Furthermore, to address indoor air quality, the Project would comply with applicable regulations that address this issue. These include the California Green Building Standards Code (CALGreen Code), applicable to new commercial and industrial buildings, which is designed to promote “environmentally responsible, cost-effective, healthier places to live and work.” “CALGreen includes both required measures and voluntary measures, a number of which help assure healthful indoor air quality, such as those addressing chemical emissions from composite wood products, carpets, resilient flooring materials, paints, adhesives, sealants, and insulation, and also ventilation.”

More specifically, Section 4.5, Environmental Quality, of the CALGreen Code provides mandatory residential measures to reduce the quantity of air contaminants that are odorous, irritating and/or harmful to the comfort and wellbeing of a building’s installers, occupants and neighbors. It includes VOC limits for paints, coatings, adhesives, adhesive bonding primers, sealants, sealant primers, and caulk. Section 4.504.3, Carpet Systems, of the CALGreen Code establishes product requirements to meet one of the following: (1) Carpet and Rug Institute’s Green Label Plus Program; (2) California Department of Public Health, “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers,” Version 1.1; (3) NSF/ANSI 140 at the Gold Level; or (4) Scientific Certifications Systems Indoor Advantage Gold. Furthermore, Section 4.504.5, Composite Wood Products, of the CALGreen Code establishes limits for formaldehyde as specified in ARBS’s Air Toxics Control Measure for Composite Wood (e.g., particle board). These measures have been established through the CALGreen Code and are designed to reduce the quantity of air contaminants to acceptable levels.

CARB’s ATCM (Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products) is a regulation that has a purpose of “reducing formaldehyde emissions from composite wood products, and finished goods that contain composite wood products, that are sold, offered for sale, supplied, used, or manufactured

for sale in California. The composite wood products covered by this regulation are hardwood plywood, particleboard, and medium density fiberboard.” The measure applies to manufacturers, distributors, importers, fabricators (that use such materials to make other goods), retailers, third party certifiers who manufacture, offer for sale or supply these goods in California. The control measure assures that all building materials and furnishings manufactured, distributed, imported and used in new construction in California meet the maximum allowable concentrations that assure healthful indoor air quality.

IEE Rebuttal Comments to SAFER Comment 1 - Part 3

In my February 5, 2023 Indoor Air Quality letter for the 1200 – 1218 N. Vine Street, 6245 - 6247 W. Lexington Avenue Project, Los Angeles, CA (attached in Appendix A), I showed that using standard engineering mass balance calculations, the even if the Project uses composite wood products that meet CARB ATCM regulation for formaldehyde emissions from composite wood products, and as required in the CALGreen Code, the ensuing indoor concentrations of formaldehyde will result in cancer risks that exceed 10 per million.

Even composite wood products manufactured with CARB certified ultra-low emitting formaldehyde (ULEF) resins do not insure that the indoor air will have concentrations of formaldehyde the meet the OEHHA cancer risks that substantially exceed 10 per million. The permissible emission rates for ULEF composite wood products are only 11-15% lower than the CARB Phase 2 emission rates. Only use of composite wood products made with no-added formaldehyde resins (NAF), such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHA cancer risk of 10 per million is met.

CAJA Environmental Services, Response to SAFER Comment 1 – Part 4

According to CARB, from a public health standpoint, the Composite Wood Products (CWP) Regulation’s emission standards are set at low levels intended to protect public health. The CWP Regulation, adopted in 2007, established two phases of emissions standards: an initial Phase I, and later, a more stringent Phase 2 that requires all finished goods, such as flooring,

destined for sale or use in California to be made using complying composite wood products. As of January 2014, only Phase 2 products are legal for sale in California. Thus, all new wood products installed in the Project would comply with the more stringent Phase 2 requirements.

IEE Rebuttal Comments to SAFER Comment 1 - Part 4

With respect to the CAJA Environmental Services statement, that the “Composite Wood Products (CWP) Regulation’s emission standards are set at low levels intended to protect public health.”, the following is my rebuttal comment.

Yes, the CARB Composite Wood Product (CWP) Regulation’s emission standards are set at low levels intended to protect public health, however this does not mean that these regulations result in indoor formaldehyde concentrations which meet the CEQA cancer risk of 10 per million.

In my December 12, 2022 Indoor Air Quality letter for the 956 S. Vermont Avenue Project, Los Angeles, CA (attached in Appendix A), I explained in Appendix A of that letter that the CARB ATCM regulations do not “assure healthful indoor air quality”, but rather “reduce formaldehyde emissions from composite wood products”. Appendix A, Indoor Formaldehyde Concentrations and the CARB Formaldehyde ATCM, provides analyses that show utilization of CARB Phase 2 Formaldehyde ATCM materials will not ensure acceptable cancer risks with respect to formaldehyde emissions from composite wood products.

Even composite wood products manufactured with CARB certified ultra low emitting formaldehyde (ULEF) resins do not insure that the indoor air will have concentrations of formaldehyde that meet the OEHHA cancer risks that substantially exceed 10 per million. The permissible emission rates for ULEF composite wood products are only 11-15% lower than the CARB Phase 2 emission rates. Only use of composite wood products made with no-added formaldehyde resins (NAF), such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHA cancer risk of 10 per million is met.

APPENDIX A



INDOOR ENVIRONMENTAL ENGINEERING



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Date: February 5, 2023

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From: Francis J. Offermann PE CIH

Subject: Indoor Air Quality: 1200 – 1218 N. Vine Street, 6245 - 6247 W. Lexington
Avenue Project, Los Angeles, CA
(IEE File Reference: P-4681)

Pages: 19

Indoor Air Quality Impacts

Indoor air quality (IAQ) directly impacts the comfort and health of building occupants, and the achievement of acceptable IAQ in newly constructed and renovated buildings is a well-recognized design objective. For example, IAQ is addressed by major high-performance building rating systems and building codes (California Building Standards Commission, 2014; USGBC, 2014). Indoor air quality in homes is particularly important because occupants, on average, spend approximately ninety percent of their time indoors with the majority of this time spent at home (EPA, 2011). Some segments of the population that are most susceptible to the effects of poor IAQ, such as the very young and the elderly, occupy their homes almost continuously. Additionally, an increasing number of adults are working from home at least some of the time during the workweek. Indoor air quality also is a serious concern for workers in hotels, offices and other business establishments.

The concentrations of many air pollutants often are elevated in homes and other buildings relative to outdoor air because many of the materials and products used indoors contain and release a variety of pollutants to air (Hodgson et al., 2002; Offermann and Hodgson, 2011). With respect to indoor air contaminants for which inhalation is the primary route of exposure, the critical design and construction parameters are the provision of adequate ventilation and the reduction of indoor sources of the contaminants.

Indoor Formaldehyde Concentrations Impact. In the California New Home Study (CNHS) of 108 new homes in California (Offermann, 2009), 25 air contaminants were measured, and formaldehyde was identified as the indoor air contaminant with the highest cancer risk as determined by the California Proposition 65 Safe Harbor Levels (OEHHA, 2017a), No Significant Risk Levels (NSRL) for carcinogens. The NSRL is the daily intake level calculated to result in one excess case of cancer in an exposed population of 100,000 (i.e., ten in one million cancer risk) and for formaldehyde is 40 µg/day. The NSRL concentration of formaldehyde that represents a daily dose of 40 µg is 2 µg/m³, assuming a continuous 24-hour exposure, a total daily inhaled air volume of 20 m³, and 100% absorption by the respiratory system. All of the CNHS homes exceeded this NSRL concentration of 2 µg/m³. The median indoor formaldehyde concentration was 36 µg/m³, and ranged from 4.8 to 136 µg/m³, which corresponds to a median exceedance of the 2 µg/m³ NSRL concentration of 18 and a range of 2.3 to 68.

Therefore, the cancer risk of a resident living in a California home with the median indoor formaldehyde concentration of 36 µg/m³, is 180 per million as a result of formaldehyde alone. The CEQA significance threshold for airborne cancer risk is 10 per million, as established by the South Coast Air Quality Management District (SCAQMD, 2015).

Besides being a human carcinogen, formaldehyde is also a potent eye and respiratory irritant. In the CNHS, many homes exceeded the non-cancer reference exposure levels (RELs) prescribed by California Office of Environmental Health Hazard Assessment (OEHHA, 2017b). The percentage of homes exceeding the RELs ranged from 98% for the Chronic REL of 9 µg/m³ to 28% for the Acute REL of 55 µg/m³.

The primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and particleboard. These materials are commonly used in building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims.

In January 2009, the California Air Resources Board (CARB) adopted an airborne toxics control measure (ATCM) to reduce formaldehyde emissions from composite wood products, including hardwood plywood, particleboard, medium density fiberboard, and also furniture and other finished products made with these wood products (California Air Resources Board 2009). While this formaldehyde ATCM has resulted in reduced emissions from composite wood products sold in California, they do not preclude that homes built with composite wood products meeting the CARB ATCM will have indoor formaldehyde concentrations below cancer and non-cancer exposure guidelines.

A follow up study to the California New Home Study (CNHS) was conducted in 2016-2018 (Singer et. al., 2019), and found that the median indoor formaldehyde in new homes built after 2009 with CARB Phase 2 Formaldehyde ATCM materials had lower indoor formaldehyde concentrations, with a median indoor concentrations of $22.4 \mu\text{g}/\text{m}^3$ (18.2 ppb) as compared to a median of $36 \mu\text{g}/\text{m}^3$ found in the 2007 CNHS. Unlike in the CNHS study where formaldehyde concentrations were measured with pumped DNPH samplers, the formaldehyde concentrations in the HENGH study were measured with passive samplers, which were estimated to under-measure the true indoor formaldehyde concentrations by approximately 7.5%. Applying this correction to the HENGH indoor formaldehyde concentrations results in a median indoor concentration of $24.1 \mu\text{g}/\text{m}^3$, which is 33% lower than the $36 \mu\text{g}/\text{m}^3$ found in the 2007 CNHS.

Thus, while new homes built after the 2009 CARB formaldehyde ATCM have a 33% lower median indoor formaldehyde concentration and cancer risk, the median lifetime cancer risk is still 120 per million for homes built with CARB compliant composite wood products. This median lifetime cancer risk is more than 12 times the OEHHA 10 in a million cancer risk threshold (OEHHA, 2017a).

With respect to the 1200 – 1218 N. Vine Street, 6245 - 6247 W. Lexington Avenue Project, Los Angeles, CA, the buildings consist of residential and commercial spaces.

The residential occupants will potentially have continuous exposure (e.g. 24 hours per day, 52 weeks per year). These exposures are anticipated to result in significant cancer risks resulting from exposures to formaldehyde released by the building materials and furnishing commonly found in residential construction.

Because these residences will be constructed with CARB Phase 2 Formaldehyde ATCM materials, and be ventilated with the minimum code required amount of outdoor air, the indoor residential formaldehyde concentrations are likely similar to those concentrations observed in residences built with CARB Phase 2 Formaldehyde ATCM materials, which is a median of $24.1 \mu\text{g}/\text{m}^3$ (Singer et. al., 2020).

Assuming that the residential occupants inhale 20 m^3 of air per day, the average 70-year lifetime formaldehyde daily dose is $482 \mu\text{g}/\text{day}$ for continuous exposure in the residences. This exposure represents a cancer risk of 120 per million, which is more than 12 times the CEQA cancer risk of 10 per million. For occupants that do not have continuous exposure, the cancer risk will be proportionally less but still substantially over the CEQA cancer risk of 10 per million (e.g. for 12/hour/day occupancy, more than 6 times the CEQA cancer risk of 10 per million).

The employees of the commercial spaces are expected to experience significant indoor exposures (e.g., 40 hours per week, 50 weeks per year). These exposures for employees are anticipated to result in significant cancer risks resulting from exposures to formaldehyde released by the building materials and furnishing commonly found in offices, warehouses, residences and hotels.

Because the commercial spaces will be constructed with CARB Phase 2 Formaldehyde ATCM materials, and be ventilated with the minimum code required amount of outdoor air, the indoor formaldehyde concentrations are likely similar to those concentrations observed in residences built with CARB Phase 2 Formaldehyde ATCM materials, which is a median of $24.1 \mu\text{g}/\text{m}^3$ (Singer et. al., 2020)

Assuming that the employees of commercial spaces work 8 hours per day and inhale 20 m³ of air per day, the formaldehyde dose per work-day at the offices is 161 µg/day.

Assuming that these employees work 5 days per week and 50 weeks per year for 45 years (start at age 20 and retire at age 65) the average 70-year lifetime formaldehyde daily dose is 70.9 µg/day.

This is 1.77 times the NSRL (OEHHA, 2017a) of 40 µg/day and represents a cancer risk of 17.7 per million, which exceeds the CEQA cancer risk of 10 per million. This impact should be analyzed in an environmental impact report (“EIR”), and the agency should impose all feasible mitigation measures to reduce this impact. Several feasible mitigation measures are discussed below and these and other measures should be analyzed in an EIR.

In addition, we note that the average outdoor air concentration of formaldehyde in California is 3 ppb, or 3.7 µg/m³, (California Air Resources Board, 2004), and thus represents an average pre-existing background airborne cancer risk of 1.85 per million. Thus, the indoor air formaldehyde exposures describe above exacerbate this pre-existing risk resulting from outdoor air formaldehyde exposures.

Additionally, the SCAQMD’s Multiple Air Toxics Exposure Study (“MATES V”) identifies an existing cancer risk at the Project site of 541 per million due to the site’s elevated ambient air contaminant concentrations, which are due to the area’s high levels of vehicle traffic. These impacts would further exacerbate the pre-existing cancer risk to the building occupants, which result from exposure to formaldehyde in both indoor and outdoor air.

Appendix A, Indoor Formaldehyde Concentrations and the CARB Formaldehyde ATCM, provides analyses that show utilization of CARB Phase 2 Formaldehyde ATCM materials will not ensure acceptable cancer risks with respect to formaldehyde emissions from composite wood products.

Even composite wood products manufactured with CARB certified ultra low emitting formaldehyde (ULEF) resins do not insure that the indoor air will have concentrations of formaldehyde that meet the OEHHA cancer risks that substantially exceed 10 per million. The permissible emission rates for ULEF composite wood products are only 11-15% lower than the CARB Phase 2 emission rates. Only use of composite wood products made with no-added formaldehyde resins (NAF), such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHA cancer risk of 10 per million is met.

The following describes a method that should be used, prior to construction in the environmental review under CEQA, for determining whether the indoor concentrations resulting from the formaldehyde emissions of specific building materials/furnishings selected exceed cancer and non-cancer guidelines. Such a design analyses can be used to identify those materials/furnishings prior to the completion of the City's CEQA review and project approval, that have formaldehyde emission rates that contribute to indoor concentrations that exceed cancer and non-cancer guidelines, so that alternative lower emitting materials/furnishings may be selected and/or higher minimum outdoor air ventilation rates can be increased to achieve acceptable indoor concentrations and incorporated as mitigation measures for this project.

Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment

This formaldehyde emissions assessment should be used in the environmental review under CEQA to assess the indoor formaldehyde concentrations from the proposed loading of building materials/furnishings, the area-specific formaldehyde emission rate data for building materials/furnishings, and the design minimum outdoor air ventilation rates. This assessment allows the applicant (and the City) to determine, before the conclusion of the environmental review process and the building materials/furnishings are specified, purchased, and installed, if the total chemical emissions will exceed cancer and non-cancer guidelines, and if so, allow for changes in the selection of specific material/furnishings and/or the design minimum outdoor air ventilations rates such that cancer and non-cancer guidelines are not exceeded.

1.) Define Indoor Air Quality Zones. Divide the building into separate indoor air quality zones, (IAQ Zones). IAQ Zones are defined as areas of well-mixed air. Thus, each ventilation system with recirculating air is considered a single zone, and each room or group of rooms where air is not recirculated (e.g. 100% outdoor air) is considered a separate zone. For IAQ Zones with the same construction material/furnishings and design minimum outdoor air ventilation rates. (e.g. hotel rooms, apartments, condominiums, etc.) the formaldehyde emission rates need only be assessed for a single IAQ Zone of that type.

2.) Calculate Material/Furnishing Loading. For each IAQ Zone, determine the building material and furnishing loadings (e.g., m^2 of material/ m^2 floor area, units of furnishings/ m^2 floor area) from an inventory of all potential indoor formaldehyde sources, including flooring, ceiling tiles, furnishings, finishes, insulation, sealants, adhesives, and any products constructed with composite wood products containing urea-formaldehyde resins (e.g., plywood, medium density fiberboard, particleboard).

3.) Calculate the Formaldehyde Emission Rate. For each building material, calculate the formaldehyde emission rate ($\mu\text{g}/\text{h}$) from the product of the area-specific formaldehyde emission rate ($\mu\text{g}/\text{m}^2\text{-h}$) and the area (m^2) of material in the IAQ Zone, and from each furnishing (e.g. chairs, desks, etc.) from the unit-specific formaldehyde emission rate ($\mu\text{g}/\text{unit-h}$) and the number of units in the IAQ Zone.

NOTE: As a result of the high-performance building rating systems and building codes (California Building Standards Commission, 2014; USGBC, 2014), most manufacturers of building materials furnishings sold in the United States conduct chemical emission rate tests using the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers,” (CDPH, 2017), or other equivalent chemical emission rate testing methods. Most manufacturers of building furnishings sold in the United States conduct chemical emission rate tests using ANSI/BIFMA M7.1 Standard Test Method for Determining VOC Emissions (BIFMA, 2018), or other equivalent chemical emission rate testing methods.

CDPH, BIFMA, and other chemical emission rate testing programs, typically certify that a material or furnishing does not create indoor chemical concentrations in excess of the maximum concentrations permitted by their certification. For instance, the CDPH emission rate testing requires that the measured emission rates when input into an office, school, or residential model do not exceed one-half of the OEHHA Chronic Exposure Guidelines (OEHHA, 2017b) for the 35 specific VOCs, including formaldehyde, listed in Table 4-1 of the CDPH test method (CDPH, 2017). These certifications themselves do not provide the actual area-specific formaldehyde emission rate (i.e., $\mu\text{g}/\text{m}^2\text{-h}$) of the product, but rather provide data that the formaldehyde emission rates do not exceed the maximum rate allowed for the certification. Thus, for example, the data for a certification of a specific type of flooring may be used to calculate that the area-specific emission rate of formaldehyde is less than $31 \mu\text{g}/\text{m}^2\text{-h}$, but not the actual measured specific emission rate, which may be 3, 18, or $30 \mu\text{g}/\text{m}^2\text{-h}$. These area-specific emission rates determined from the product certifications of CDPH, BIFA, and other certification programs can be used as an initial estimate of the formaldehyde emission rate.

If the actual area-specific emission rates of a building material or furnishing is needed (i.e. the initial emission rates estimates from the product certifications are higher than desired), then that data can be acquired by requesting from the manufacturer the complete chemical emission rate test report. For instance if the complete CDPH emission test report is requested for a CDHP certified product, that report will provide the actual area-specific emission rates for not only the 35 specific VOCs, including formaldehyde, listed in Table 4-1 of the CDPH test method (CDPH, 2017), but also all of the cancer and reproductive/developmental chemicals listed in the California Proposition 65 Safe Harbor Levels (OEHHA, 2017a), all of the toxic air contaminants (TACs) in the California Air Resources Board Toxic Air Contamination List (CARB, 2011), and the 10 chemicals with the greatest emission rates.

Alternatively, a sample of the building material or furnishing can be submitted to a chemical emission rate testing laboratory, such as Berkeley Analytical Laboratory (<https://berkeleyanalytical.com>), to measure the formaldehyde emission rate.

4.) Calculate the Total Formaldehyde Emission Rate. For each IAQ Zone, calculate the total formaldehyde emission rate (i.e. µg/h) from the individual formaldehyde emission rates from each of the building material/furnishings as determined in Step 3.

5.) Calculate the Indoor Formaldehyde Concentration. For each IAQ Zone, calculate the indoor formaldehyde concentration (µg/m³) from Equation 1 by dividing the total formaldehyde emission rates (i.e. µg/h) as determined in Step 4, by the design minimum outdoor air ventilation rate (m³/h) for the IAQ Zone.

$$C_{in} = \frac{E_{total}}{Q_{oa}} \text{ (Equation 1)}$$

where:

C_{in} = indoor formaldehyde concentration (µg/m³)

E_{total} = total formaldehyde emission rate (µg/h) into the IAQ Zone.

Q_{oa} = design minimum outdoor air ventilation rate to the IAQ Zone (m³/h)

The above Equation 1 is based upon mass balance theory, and is referenced in Section 3.10.2 “Calculation of Estimated Building Concentrations” of the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers”, (CDPH, 2017).

6.) Calculate the Indoor Exposure Cancer and Non-Cancer Health Risks. For each IAQ Zone, calculate the cancer and non-cancer health risks from the indoor formaldehyde concentrations determined in Step 5 and as described in the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines; Guidance Manual for Preparation of Health Risk Assessments (OEHHA, 2015).

7.) Mitigate Indoor Formaldehyde Exposures of exceeding the CEQA Cancer and/or Non-Cancer Health Risks. In each IAQ Zone, provide mitigation for any formaldehyde exposure risk as determined in Step 6, that exceeds the CEQA cancer risk of 10 per million or the CEQA non-cancer Hazard Quotient of 1.0.

Provide the source and/or ventilation mitigation required in all IAQ Zones to reduce the

health risks of the chemical exposures below the CEQA cancer and non-cancer health risks.

Source mitigation for formaldehyde may include:

- 1.) reducing the amount materials and/or furnishings that emit formaldehyde
- 2.) substituting a different material with a lower area-specific emission rate of formaldehyde

Ventilation mitigation for formaldehyde emitted from building materials and/or furnishings may include:

- 1.) increasing the design minimum outdoor air ventilation rate to the IAQ Zone.

NOTE: Mitigating the formaldehyde emissions through use of less material/furnishings, or use of lower emitting materials/furnishings, is the preferred mitigation option, as mitigation with increased outdoor air ventilation increases initial and operating costs associated with the heating/cooling systems.

Further, we are not asking that the builder “speculate” on what and how much composite materials be used, but rather at the design stage to select composite wood materials based on the formaldehyde emission rates that manufacturers routinely conduct using the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers,” (CDPH, 2017), and use the procedure described earlier above (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

Outdoor Air Ventilation Impact. Another important finding of the CNHS, was that the outdoor air ventilation rates in the homes were very low. Outdoor air ventilation is a very important factor influencing the indoor concentrations of air contaminants, as it is the primary removal mechanism of all indoor air generated contaminants. Lower outdoor air exchange rates cause indoor generated air contaminants to accumulate to higher indoor air concentrations. Many homeowners rarely open their windows or doors for ventilation as a

result of their concerns for security/safety, noise, dust, and odor concerns (Price, 2007). In the CNHS field study, 32% of the homes did not use their windows during the 24-hour Test Day, and 15% of the homes did not use their windows during the entire preceding week. Most of the homes with no window usage were homes in the winter field session. Thus, a substantial percentage of homeowners never open their windows, especially in the winter season. The median 24-hour measurement was 0.26 air changes per hour (ach), with a range of 0.09 ach to 5.3 ach. A total of 67% of the homes had outdoor air exchange rates below the minimum California Building Code (2001) requirement of 0.35 ach. Thus, the relatively tight envelope construction, combined with the fact that many people never open their windows for ventilation, results in homes with low outdoor air exchange rates and higher indoor air contaminant concentrations.

According to the Environmental Assessment Form Application, 1200 – 1218 N. Vine Street, 6245 - 6247 W. Lexington Avenue Project (City of Los Angeles, 2022) the Project is close to roads with moderate to high traffic (e.g., Santa Monica Blvd - 66, Vine Street, Lexington Avenue, Fountain Avenue, N. El Canto Avenue, N. Cahuenga Blvd, etc.). As a result the Project site is a sound impacted site.

In order to design the building for this Project such that interior noise levels are acceptable, an acoustic study of the existing and future ambient noise levels needs to be conducted.

As a result of the high outdoor noise levels, the current project will require a mechanical supply of outdoor air ventilation to allow for a habitable interior environment with closed windows and doors. Such a ventilation system would allow windows and doors to be kept closed at the occupant's discretion to control exterior noise within building interiors.

PM_{2.5} Outdoor Concentrations Impact. An additional impact of the nearby motor vehicle traffic associated with this project, are the outdoor concentrations of PM_{2.5}. According to the Environmental Assessment Form Application, 1200 – 1218 N. Vine Street, 6245 - 6247 W. Lexington Avenue Project (City of Los Angeles, 2022), the Project is located in the South Coast Air Basin, which is a State and Federal non-attainment area for PM_{2.5}.

Additionally, the SCAQMD's MATES V study cites an existing cancer risk of 541 per million at the Project site due to the site's high concentration of ambient air contaminants resulting from the area's high levels of motor vehicle traffic.

An air quality analyses should be conducted to determine the concentrations of PM_{2.5} in the outdoor and indoor air that people inhale each day. This air quality analyses needs to consider the cumulative impacts of the project related emissions, existing and projected future emissions from local PM_{2.5} sources (e.g. stationary sources, motor vehicles, and airport traffic) upon the outdoor air concentrations at the Project site. If the outdoor concentrations are determined to exceed the California and National annual average PM_{2.5} exceedence concentration of 12 µg/m³, or the National 24-hour average exceedence concentration of 35 µg/m³, then the buildings need to have a mechanical supply of outdoor air that has air filtration with sufficient removal efficiency, such that the indoor concentrations of outdoor PM_{2.5} particles is less than the California and National PM_{2.5} annual and 24-hour standards.

It is my experience that based on the projected high traffic noise levels, the annual average concentration of PM_{2.5} will exceed the California and National PM_{2.5} annual and 24-hour standards and warrant installation of high efficiency air filters (i.e. MERV 13 or higher) in all mechanically supplied outdoor air ventilation systems.

Indoor Air Quality Impact Mitigation Measures

The following are recommended mitigation measures to minimize the impacts upon indoor quality:

Indoor Formaldehyde Concentrations Mitigation. Use only composite wood materials (e.g. hardwood plywood, medium density fiberboard, particleboard) for all interior finish systems that are made with CARB approved no-added formaldehyde (NAF) resins (CARB, 2009). CARB Phase 2 certified composite wood products, or ultra-low emitting formaldehyde (ULEF) resins, do not insure indoor formaldehyde concentrations that are below the CEQA cancer risk of 10 per million. Only composite wood products

manufactured with CARB approved no-added formaldehyde (NAF) resins, such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHHA cancer risk of 10 per million is met.

Alternatively, conduct the previously described Pre-Construction Building Material/Furnishing Chemical Emissions Assessment, to determine that the combination of formaldehyde emissions from building materials and furnishings do not create indoor formaldehyde concentrations that exceed the CEQA cancer and non-cancer health risks.

It is important to note that we are not asking that the builder “speculate” on what and how much composite materials be used, but rather at the design stage to select composite wood materials based on the formaldehyde emission rates that manufacturers routinely conduct using the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers”, (CDPH, 2017), and use the procedure described above (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

Outdoor Air Ventilation Mitigation. Provide each habitable room with a continuous mechanical supply of outdoor air that meets or exceeds the California 2016 Building Energy Efficiency Standards (California Energy Commission, 2015) requirements of the greater of 15 cfm/occupant or 0.15 cfm/ft² of floor area. Following installation of the system conduct testing and balancing to insure that required amount of outdoor air is entering each habitable room and provide a written report documenting the outdoor airflow rates. Do not use exhaust only mechanical outdoor air systems, use only balanced outdoor air supply and exhaust systems or outdoor air supply only systems. Provide a manual for the occupants or maintenance personnel, that describes the purpose of the mechanical outdoor air system and the operation and maintenance requirements of the system.

PM_{2.5} Outdoor Air Concentration Mitigation. Install air filtration with sufficient PM_{2.5} removal efficiency (e.g. MERV 13 or higher) to filter the outdoor air entering the

mechanical outdoor air supply systems, such that the indoor concentrations of outdoor PM_{2.5} particles are less than the California and National PM_{2.5} annual and 24-hour standards. Install the air filters in the system such that they are accessible for replacement by the occupants or maintenance personnel. Include in the mechanical outdoor air ventilation system manual instructions on how to replace the air filters and the estimated frequency of replacement.

References

BIFA. 2018. BIFMA Product Safety and Performance Standards and Guidelines.
www.bifma.org/page/standardsoverview

California Air Resources Board. 2009. Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products. California Environmental Protection Agency, Sacramento, CA.
<https://www.arb.ca.gov/regact/2007/compwood07/fro-final.pdf>

California Air Resources Board. 2011. Toxic Air Contaminant Identification List. California Environmental Protection Agency, Sacramento, CA.
<https://www.arb.ca.gov/toxics/id/taclist.htm>

California Building Code. 2001. California Code of Regulations, Title 24, Part 2 Volume 1, Appendix Chapter 12, Interior Environment, Division 1, Ventilation, Section 1207: 2001 California Building Code, California Building Standards Commission. Sacramento, CA.

California Building Standards Commission (2014). 2013 California Green Building Standards Code. California Code of Regulations, Title 24, Part 11. California Building Standards Commission, Sacramento, CA <http://www.bsc.ca.gov/Home/CALGreen.aspx>.

California Energy Commission, PIER Program. CEC-500-2007-033. Final Report, ARB Contract 03-326. Available at: www.arb.ca.gov/research/apr/past/03-326.pdf.

California Energy Commission, 2015. 2016 Building Energy Efficiency Standards for Residential and Nonresidential Buildings, California Code of Regulations, Title 24, Part 6. <http://www.energy.ca.gov/2015publications/CEC-400-2015-037/CEC-400-2015-037-CMF.pdf>

CDPH. 2017. Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers, Version 1.1. California Department of Public Health, Richmond, CA. <https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx>.

City of Los Angeles 2022. Environmental Assessment Form Application, 1200 – 1218 N. Vine Street, 6245 - 6247 W. Lexington Avenue Project.

EPA. 2011. Exposure Factors Handbook: 2011 Edition, Chapter 16 – Activity Factors. Report EPA/600/R-09/052F, September 2011. U.S. Environmental Protection Agency, Washington, D.C.

Hodgson, A. T., D. Beal, J.E.R. McIlvaine. 2002. Sources of formaldehyde, other aldehydes and terpenes in a new manufactured house. Indoor Air 12: 235–242.

OEHHA (Office of Environmental Health Hazard Assessment). 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines; Guidance Manual for Preparation of Health Risk Assessments.

OEHHA (Office of Environmental Health Hazard Assessment). 2017a. Proposition 65 Safe Harbor Levels. No Significant Risk Levels for Carcinogens and Maximum Allowable Dose Levels for Chemicals Causing Reproductive Toxicity. Available at: <http://www.oehha.ca.gov/prop65/pdf/safeharbor081513.pdf>

OEHHA - Office of Environmental Health Hazard Assessment. 2017b. All OEHHA Acute, 8-hour and Chronic Reference Exposure Levels. Available at: <http://oehha.ca.gov/air/allrels.html>

Offermann, F. J. 2009. Ventilation and Indoor Air Quality in New Homes. California Air Resources Board and California Energy Commission, PIER Energy-Related Environmental Research Program. Collaborative Report. CEC-500-2009-085. <https://www.arb.ca.gov/research/apr/past/04-310.pdf>

Offermann, F. J. and A. T. Hodgson. 2011. Emission Rates of Volatile Organic Compounds in New Homes. Proceedings Indoor Air 2011 (12th International Conference on Indoor Air Quality and Climate 2011), June 5-10, 2011, Austin, TX.

Singer, B.C, Chan, W.R, Kim, Y., Offermann, F.J., and Walker I.S. 2020. Indoor Air Quality in California Homes with Code-Required Mechanical Ventilation. Indoor Air, Vol 30, Issue 5, 885-899.

South Coast Air Quality Management District (SCAQMD). 2015. California Environmental Quality Act Air Quality Handbook. South Coast Air Quality Management District, Diamond Bar, CA, <http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook>

USGBC. 2014. LEED BD+C Homes v4. U.S. Green Building Council, Washington, D.C. <http://www.usgbc.org/credits/homes/v4>

APPENDIX A

INDOOR FORMALDEHYDE CONCENTRATIONS AND THE CARB FORMALDEHYDE ATCM

With respect to formaldehyde emissions from composite wood products, the CARB ATCM regulations of formaldehyde emissions from composite wood products, do not assure healthful indoor air quality. The following is the stated purpose of the CARB ATCM regulation - *The purpose of this airborne toxic control measure is to “reduce formaldehyde emissions from composite wood products, and finished goods that contain composite wood products, that are sold, offered for sale, supplied, used, or manufactured for sale in California”*. In other words, the CARB ATCM regulations do not “assure healthful indoor air quality”, but rather “reduce formaldehyde emissions from composite wood products”.

Just how much protection do the CARB ATCM regulations provide building occupants from the formaldehyde emissions generated by composite wood products? Definitely some, but certainly the regulations do not “*assure healthful indoor air quality*” when CARB Phase 2 products are utilized. As shown in the Chan 2019 study of new California homes, the median indoor formaldehyde concentration was of $22.4 \mu\text{g}/\text{m}^3$ (18.2 ppb), which corresponds to a cancer risk of 112 per million for occupants with continuous exposure, which is more than 11 times the CEQA cancer risk of 10 per million.

Another way of looking at how much protection the CARB ATCM regulations provide building occupants from the formaldehyde emissions generated by composite wood products is to calculate the maximum number of square feet of composite wood product that can be in a residence without exceeding the CEQA cancer risk of 10 per million for occupants with continuous occupancy.

For this calculation I utilized the floor area ($2,272 \text{ ft}^2$), the ceiling height (8.5 ft), and the number of bedrooms (4) as defined in Appendix B (New Single-Family Residence Scenario) of the Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers, Version 1.1, 2017, California Department of Public Health,

For the outdoor air ventilation rate I used the 2019 Title 24 code required mechanical ventilation rate (ASHRAE 62.2) of 106 cfm (180 m³/h) calculated for this model residence. For the composite wood formaldehyde emission rates I used the CARB ATCM Phase 2 rates.

The calculated maximum number of square feet of composite wood product that can be in a residence, without exceeding the CEQA cancer risk of 10 per million for occupants with continuous occupancy are as follows for the different types of regulated composite wood products.

Medium Density Fiberboard (MDF) – 15 ft² (0.7% of the floor area), or
Particle Board – 30 ft² (1.3% of the floor area), or
Hardwood Plywood – 54 ft² (2.4% of the floor area), or
Thin MDF – 46 ft² (2.0 % of the floor area).

For offices and hotels the calculated maximum amount of composite wood product (% of floor area) that can be used without exceeding the CEQA cancer risk of 10 per million for occupants, assuming 8 hours/day occupancy, and the California Mechanical Code minimum outdoor air ventilation rates are as follows for the different types of regulated composite wood products.

Medium Density Fiberboard (MDF) – 3.6 % (offices) and 4.6% (hotel rooms), or
Particle Board – 7.2 % (offices) and 9.4% (hotel rooms), or
Hardwood Plywood – 13 % (offices) and 17% (hotel rooms), or
Thin MDF – 11 % (offices) and 14 % (hotel rooms)

Clearly the CARB ATCM does not regulate the formaldehyde emissions from composite wood products such that the potentially large areas of these products, such as for flooring, baseboards, interior doors, window and door trims, and kitchen and bathroom cabinetry, could be used without causing indoor formaldehyde concentrations that result in CEQA

cancer risks that substantially exceed 10 per million for occupants with continuous occupancy.

Even composite wood products manufactured with CARB certified ultra low emitting formaldehyde (ULEF) resins do not insure that the indoor air will have concentrations of formaldehyde that meet the OEHHA cancer risks that substantially exceed 10 per million. The permissible emission rates for ULEF composite wood products are only 11-15% lower than the CARB Phase 2 emission rates. Only use of composite wood products made with no-added formaldehyde resins (NAF), such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHA cancer risk of 10 per million is met.

If CARB Phase 2 compliant or ULEF composite wood products are utilized in construction, then the resulting indoor formaldehyde concentrations should be determined in the design phase using the specific amounts of each type of composite wood product, the specific formaldehyde emission rates, and the volume and outdoor air ventilation rates of the indoor spaces, and all feasible mitigation measures employed to reduce this impact (e.g. use less formaldehyde containing composite wood products and/or incorporate mechanical systems capable of higher outdoor air ventilation rates). See the procedure described earlier (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

Alternatively, and perhaps a simpler approach, is to use only composite wood products (e.g. hardwood plywood, medium density fiberboard, particleboard) for all interior finish systems that are made with CARB approved no-added formaldehyde (NAF) resins.

Exhibit C



Formaldehyde

Many consumer products emit formaldehyde, which can cause cancer.

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CATEGORIES

Topics Indoor Air Quality & Exposure, Simple Solutions to Improve Air Quality

Programs Air Cleaners & Ozone Generating Products, Air Toxics Program, Exposure, Indoor Air, Composite Wood Products Airborne Toxic Control Measure, Consumer Products Program

Formaldehyde is a common indoor air pollutant. It is a gas that can irritate a person's eyes, nose, throat, and lungs, or trigger an asthma attack, even at low concentrations. Prolonged exposure to formaldehyde can cause cancer.

About Formaldehyde

Formaldehyde is commonly found in the environment due to natural processes, like forest fires, and is released into the air via industrial emissions, incineration, and fuel combustion. It is also formed in the atmosphere from photo-oxidation of reactive organic gases. Formaldehyde is widely used in composite wood products that have resins containing formaldehyde, and is in building materials and insulation, glues, permanent press fabrics, paints, lacquers, and other coatings. Formaldehyde is also released into the air from formaldehyde-containing personal care products including some shampoos, soaps, hair care products, body washes, and nail polish. Moreover, many other consumer products also emit volatile organic

chemicals (VOCs) that react with ozone in the air to produce formaldehyde. Some indoor air purifiers actually create ozone, which can lead to increased concentrations of formaldehyde and other indoor air pollutants.

Formaldehyde and Health

The risk formaldehyde poses to a person's health depends on the concentration of formaldehyde in the air, the length of time the person is exposed, and the person's individual sensitivity to formaldehyde. Children and the elderly may be more sensitive.

Formaldehyde has been identified as a toxic air contaminant, based on public exposure and its potential to cause cancer. The International Agency for Research on Cancer (IARC) has published a monograph on the carcinogenic risk from exposure to formaldehyde. The Agency for Toxic Substances & Disease Registry (ATSDR) at the CDC has also extensively profiled health effects from formaldehyde exposure.

What You Can Do

There are many steps you can take to reduce your exposure to formaldehyde indoors:

- Buy building materials and furniture that have little or no added formaldehyde.
 - Consider products made from solid wood, stainless steel, adobe, bricks, and tile.
 - Consider buying used or antique furniture, as formaldehyde emissions decrease as products age.
 - When purchasing consumer goods such as furniture, flooring, and cabinets that may contain composite wood products, buy items that are labeled as CARB Phase II compliant or TSCA Title VI compliant for formaldehyde emissions.
 - Consider flooring options such as natural linoleum, pre-finished solid and engineered wood, and U.S. made ceramic tile.
 - Consider installing "floating" flooring that doesn't use adhesives.
 - Only use wood stains and finishes that are Green Seal-11 certified.
 - Use formaldehyde-free insulation in the walls and ceiling of your home.
 - For central heating and air conditioning systems, use only synthetic filters made from materials such as polyester, polyolefin and other organic polymers.
 - If interested in carpet, look at those with Green Label Plus or GreenGuard low-VOC certification.
 - Choose no-VOC latex paints that are GreenGuard Gold Certified or Green Seal Certified.
- Be cautious about using products and sources of combustion pollutants (including cooking) that can release formaldehyde.
 - Gas or wood-burning stoves and kerosene heaters can emit formaldehyde; exhaust these directly to the outdoors and have them checked annually by a licensed HVAC professional to assure they are not leaking into indoor air.
 - Permanent press clothing, linens, and other textiles ("iron-free", "durable press", or "easy care finish") may be treated with a chemical that includes formaldehyde. Washing these before use removes most of the formaldehyde.
 - Do not smoke tobacco, marijuana or e-cigarettes indoors.
 - Common brands of glue products, caulks, adhesives, window glazing, latex paints and sealants contain formaldehyde. Ensure good ventilation when using these products indoors.

- Beware of personal care products, including cosmetics, soaps, shampoos, and body washes, that contain preservatives which release formaldehyde into the air. Check product labels for these compounds which can release formaldehyde:
 - DMDM hydantoin
 - Imidazolidinyl urea
 - Diazolidinyl urea
 - Quaternium-15
 - Bronopol (*2-bromo-2-nitropropane-1,3-diol*)
 - 5-Bromo-5-nitro-1,3-dioxane
 - Hydroxymethylglycinate
 - Formaldehyde

For additional information about sources of formaldehyde in the home and ways to protect your family, visit U.S. EPA's website or read the Update on Formaldehyde by the U.S. Consumer Product Safety Commission (2016). For information about CARB's regulatory efforts regarding formaldehyde, see CARB's Composite Wood Products Airborne Toxic Control Measure.

Home tests are available for measuring formaldehyde in indoor air, but will not identify the source of the formaldehyde. Environmental consulting firms can also test indoor air for a range of contaminants and provide information on likely sources of formaldehyde.

Source URL: <https://ww2.arb.ca.gov/resources/fact-sheets/formaldehyde>