



CITY OF
**PALO
ALTO**

Planning & Transportation Commission Staff Report

From: Jonathan Lait, Planning and Development Services Director
Lead Department: Planning and Development Services

Meeting Date: August 9, 2023
Report #: 2307-1781

TITLE

LEGISLATIVE: Recommendation to City Council Regarding Proposed Amendments to Palo Alto Municipal Code (PAMC) Title 18 (Zoning) and Title 9 (Public Peace, Morals and Safety), Chapter 9.10 (Noise) to Facilitate the Installation of Electrification Equipment for Residential Development

RECOMMENDATION

Staff recommends that the Planning and Transportation Commission review and recommend that the City Council adopt the attached draft ordinance (Attachment A) which contains changes to the PAMC to further facilitate the installation of electrification equipment in residential neighborhoods.

These code changes are added to the draft ordinance modifying six Title 18 chapters that the PTC recommended on December 14, 2022, which has not yet been presented to City Council in 2023. Modifications from the December 14, 2022 ordinance are shown as double-underline/double-strikethrough text. Links to the staff report and meeting minutes from the PTC meeting of December 14, 2022 are provided in the footnote below¹.

BACKGROUND

The City's barrier reduction strategy for sustainability and climate action includes updating the City's ordinances to ensure the success of electrification programs, such as the new Heat Pump Water Heater (HPWH) Pilot Program that is now underway. Staff's proposal to facilitate the

¹ Links to PTC December 14, 2022 PTC staff report <https://www.cityofpaloalto.org/files/assets/public/agendas-minutes-reports/agendas-minutes/planning-and-transportation-commission/2022/ptc-12.14.2022-title-18-zoning.pdf>

Meeting minutes – verbatim: <https://www.cityofpaloalto.org/files/assets/public/agendas-minutes-reports/agendas-minutes/planning-and-transportation-commission/2022/ptc-12.14.2022-verbatim-minutes.pdf>

Meeting minutes – summary: <https://www.cityofpaloalto.org/files/assets/public/agendas-minutes-reports/agendas-minutes/planning-and-transportation-commission/2022/ptc-12.14.2022-summary-minutes.pdf>

placement of such equipment without requiring and reviewing individual noise reports requires modification of the noise ordinance (Title 9) as well as sections of Title 18, as described in this report.

ADU-Associated Noise-Producing Equipment

On June 5, 2023, the City Council adopted an Accessory Dwelling Unit (ADU) ordinance (Ordinance 5585), modifying the placement of noise-producing equipment for ADUs only, as follows:

(i) Noise-producing equipment such as air conditioners, water heaters, and similar service equipment that exclusively serves an ADU/JADU may be located anywhere on the site, provided they maintain the underlying front yard setback requirements of the property and, if the property is a corner lot, a 10-foot street-side setback. ~~shall be located outside of the setbacks for the ADU/JADU.~~ All such equipment shall be insulated and housed, except that the Director may permit installation without housing and insulation, provided that a combination of technical noise specifications, location of equipment, and/or other screening or buffering will assure compliance with the city's Noise Ordinance at the nearest property line. All service equipment must meet the city's Noise Ordinance in Chapter 9.10 of the Municipal Code.

Prior PTC Review of Electrification Equipment Ordinance

On December 14, 2022, staff presented the PTC with a draft ordinance that proposed to facilitate adoption of electrification equipment following adoption of the City's updated Green Building Code. The draft changes were to Chapters 18.04 (Definitions), 18.10 (Low-Density Residential), 18.12 (R-1 Zones), 18.13 (Multiple Family Residential Zones), 18.40 (General Standards and Exceptions), and 18.54 (Parking Facilities Design Standards). The PTC recommended some adjustments to the ordinance on December 14, 2022. These adjustments have been incorporated into the attached ordinance and are also noted with double-underline/double-strikethrough text.

PTC recommended the staff prepared ordinance with modifications:

- Allow a 4-foot encroachment into the front yard setback for lots with a conforming front yard setback and 2-feet into the front yard setback for lots with a non-conforming front yard setback. So, that would be 2-feet from the existing structure for those non-conforming situations.
- Amend the Home Improvement Exception Sections to include electrification equipment.
- Add the following clause at the end of 18.10.040 H (3), 18.10.040 L (3) and 18.13.040 B (1)(d) and that language is after the word insulation "due to noise generation below applicable maximums".

Discussion of Noise in Prior PTC Review

PTC report has extensive background information, including the City's policies on noise. With respect to noise, the December 14, 2022 draft ordinance simply required compliance with the City's noise ordinance. The staff report noted that staff was considering two approaches to addressing noise-producing electrification equipment within property setbacks:

- (1) The Planning Director could maintain a list of equipment types and appropriate decibel levels within a range or threshold for maximum decibel level for noise-producing equipment placed within property setbacks.
- (2) Staff could ask applicants to demonstrate that the equipment will not exceed a certain noise level and that sufficient fire access will be provided (i.e. a three-foot clearance around buildings).

The report also noted staff's concern about the placement of multiple pieces of equipment and the potential for cumulative noise and increasing the ambient noise level in a neighborhood. The report also stated the current practice for when noise reports are required:

- No noise reports are required with the electrification projects for single- and two-family residential projects.
- Housing projects of three units or more require discretionary review and therefore, environmental review is required, and noise reports may be requested.

Consultant Assistance

In early 2023, staff determined that additional study was necessary before approaching City Council with the draft ordinance the PTC recommended in December 2022. Staff was concerned that most of the electrification equipment on the market appear to operate at noise levels in excess of what is permitted under the City's existing noise ordinance.

Staff retained a noise consultant to assist staff work toward a solution with respect to the Noise Ordinance standards. Staff and the consultant studied the concept of 'presumed compliance', where setbacks would be established for the installation of electrification equipment based upon noise levels. The consultant has prepared the attached documents (Attachments B, C, and D). The consultants prepared a presentation (Attachment C) to assist staff in explaining this subject and proposal. The consultant-prepared spreadsheet (Attachment D) shows the equipment studied.

The table in Attachment B, Table 1, would establish the required setbacks for noise-producing electrification equipment.

The introduction in the consultant's document, Attachment B, states:

The City of Palo Alto Municipal Code allows for noise-producing electrification equipment, such as heat pump water heaters and heat pump HVAC equipment, to be placed in the rear and side yard setbacks. The Planning and Development Services Department has determined setback requirements for locating noise-producing electrification equipment to meet the Noise Ordinance limit of 40 dBA and 50 dBA,

where applicable, at the property line. The figures illustrate the minimum setback requirements given the manufacturers' dBA for the equipment. As the manufacturer's dBA for the equipment increases, the setback would increase as shown in Table 1.

Staff has italicized the first sentence here, to highlight that Council has not yet adopted the PTC- recommended ordinance allowing placement in setbacks.

Utility Incentives

In 2022, the City Council approved utility incentives for the installation of electrification equipment in residential neighborhoods. This prompted the City Council to request the removal of code barriers to accomplish a successful sustainability program to replace gas-powered equipment with electric equipment. The incentive program requires a change to the Noise Ordinance to facilitate these installations.

In October 2022, Council approved an Advanced Heat Pump Water Heater Pilot program, with a goal of installing 1000 heat pump water heaters within one year. This program promotes heat pump water heater installation in single family homes through a turnkey installation service by a City-provided contractor, with a low up-front cost and an option for on-bill financing; alternatively, customers may opt for the \$2300 rebate if they choose their own installation contractor. The replacement of residential gas appliances such as water heaters with electric heat pump alternatives is a key action in the City's Sustainability/Climate Action Plan to meet the City's aggressive greenhouse gas emissions reduction goal. Over the next year, Utilities anticipate rolling out additional residential electrification incentives to promote the replacement of gas furnaces with heat pump heating, ventilation and air conditioning (HVAC) equipment as well as launching a whole home electrification pilot program. A change to the Noise Ordinance will facilitate the adoption of electrification equipment in residential neighborhoods.

In addition to utility incentives, state and federal incentives are also available to accelerate the adoption of electrification equipment in order to meet climate goals. The TECH Clean California program currently offers a rebate of \$1000 per unit for new heat pump HVAC systems in single family homes. The 2022 Inflation Reduction Act offers a 30% federal tax credit for residential electrification upgrades, including an annual maximum of \$2000 each for heat pump water heater and heat pump HVAC installation.

Spreadsheet of Residential Projects

To provide relevant data for this study, the Chief Building Officials prepared a spreadsheet (Attachment E) inclusive of all residential projects that included either heat pump or air conditioning units or both. This spreadsheet included all building permit projects issued between January 1, 2022 and June 13, 2023. Staff included the manufacturers, model number, and dbA level, if these were able to be extracted from the permitting information.

Comprehensive Plan Policies on Noise

The December 14, 2022 PTC report provided a review of the Comprehensive Plan policies regarding noise, which are relevant policies² for this discussion. Noise is addressed in the Palo Alto Comprehensive Plan, and staff has used Comprehensive Plan policies as well as the municipal code to guide decisions on issuing building permits. The Comprehensive Plan addresses diverse noise sources and provides the policy foundation for much more rigorous requirements established in the City's Noise Ordinance. The policies and programs in the Comprehensive Plan regulate the placement of future "sensitive receptors"—homes, schools, medical clinics, and the like—in compatible noise environments and acknowledge the importance of quiet environments in public open spaces and conservation areas.

This section of the Comprehensive Plan also guides the analysis and design of proposed new development to avoid creating new noise impacts on existing sensitive receptors. In addition, this section supports the City's ongoing efforts to coordinate with regional, State and federal authorities on noise issues of concern to the Palo Alto community, such as overflights into and out of Bay Area airports and the proposed high speed rail project.

Noise Contours in Comp Plan v. Local Ambient Noise

The below map excerpted from the Comprehensive Plan shows CNEL (Community Noise Equivalent Level), which is a weighted average of noise level over time used to compare the noisiness of neighborhoods. This is not the same as "local ambient noise," which is more specifically defined in the Noise Ordinance.

² Policies on noise from Comp Plan, link: https://www.cityofpaloalto.org/files/assets/public/planning-amp-development-services/file-migration/historic/long-range-planning/resources/compplan_2017_04_naturalenviro_pdf_w_links.pdf

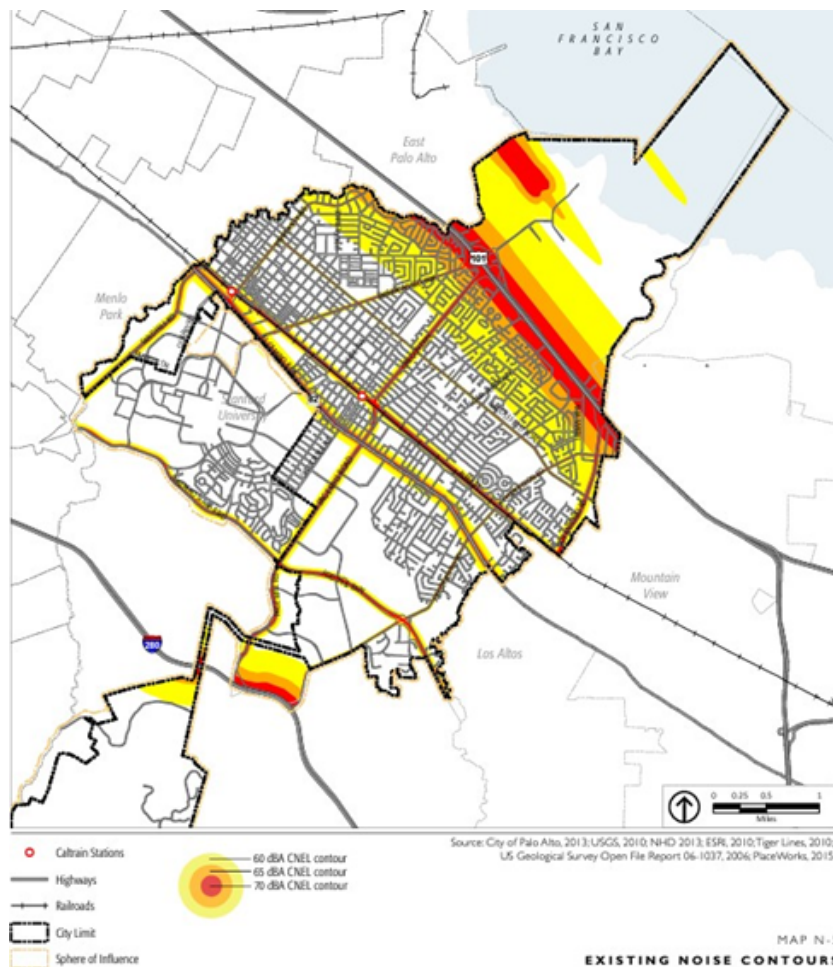


TABLE N-1 LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENT

Land Use Category	Exterior Noise Exposure L_{dn} or CNEL, dB					
	55	60	65	70	75	80
Residential, Hotel, & Motels						
Outdoor Sports & Recreation, Neighborhood Parks & Playgrounds						
Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches						
Office Buildings, Business Commercial, & Professional						
Auditoriums, Concert Halls, & Amphitheaters						
Industrial, Manufacturing, Utilities, & Agriculture						
Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal convention, construction, without any special insulation requirements.					
Conditionally Acceptable	Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.					
Unacceptable	New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.					

Source: City of Palo Alto, 2017.

Noise Ordinance

The City's noise ordinance Chapter 9.10, Section 9.10.030 sets a permissible noise limit in residential zones of 6 dBA over the local ambient noise levels, and Section 9.10.020 defines 'local ambient'. The existing noise ordinance of the City of Palo Alto limits noise levels caused by stationary noise sources. The existing noise ordinance requires that ambient noise levels first be established through noise measurements, and then, defines an exceedance if noise levels would exceed ambient noise levels by more than 6 dBA.

Selected definitions from PAMC 9.10.020 relevant to Table 1 compliance

- (a) "Sound level," expressed in decibels (dB), means a logarithmic indication of the ratio between the acoustic energy present at a given location and the lowest amount of acoustic energy audible to sensitive human ears and weighted by frequency to account for characteristics of human hearing, as given in the American National Standards Institute Standard S1.1, "Acoustic Terminology," paragraph 2.9, or successor reference. All references to dB in this chapter utilize the A-level weighting scale, abbreviated dBA, measured as set forth in this section.
- (b) "Precision sound level meter" means a device for measuring sound level in decibel units within the performance specifications in the American National Standards Institute Standard S1.4, "Specification for Sound Level Meters."
- (c) "Noise level" means the maximum continuous sound level or repetitive peak sound level, produced by a source or group of sources as measured with a precision sound level meter. In order to measure a noise level, the controls of the precision sound level meter should be arranged to the setting appropriate to the type of noise being measured.
- (d) "Local ambient" means the lowest sound level repeating itself during a six-minute period as measured with a precision sound level meter, using slow response and "A" weighting. The minimum sound level shall be determined with the noise source at issue silent, and in the same location as the measurement of the noise level of the source or sources at issue. However, for purposes of this chapter, in no case shall the local ambient be considered or determined to be less than: (1) Thirty dBA for interior noise in Section 9.10.030(b); (2) Forty dBA in all other sections. If a significant portion of the local ambient is produced by one or more individual identifiable sources which would otherwise be operating continuously during the six-minute measurement period and contributing significantly to the ambient sound level, determination of the local ambient shall be accomplished with these separate identifiable noise sources silent.

Excerpt from PAMC 9.10.030 re residential property noise limits

This code section states, in pertinent part:

(a) No person shall produce, suffer or allow to be produced by any machine, animal or device, or any combination of same, on residential property, a noise level more than six dB above the local ambient at any point outside of the property plane.

(b) No person shall produce, suffer or allow to be produced by any machine, animal, or device, or any combination of same, on multi-family residential property, a noise level more than six dB above the local ambient three feet from any wall, floor, or ceiling inside any dwelling unit on the same property, when the windows and doors of the dwelling unit are closed, except within the dwelling unit in which the noise source or sources may be located.

Additional information from Section 9.10.030 is provided in the Discussion section of this report.

Home Improvement Exceptions

PAMC sections 18.10.110 and 18.12.120 enable a discretionary review process for exceptions to the development standards of these chapters. The process is the Home Improvement Exception (HIE) process, allowing staff to approve a home improvement or minor addition to an existing single-family or two-family home, or accessory structure in the RE, R-1, RMD, or R-2 districts. There are required findings for the PDS Director to tentatively approve or deny these exceptions, and a Director's Hearing may be requested to contest the Director's action; HIE decisions following Director's Hearing actions may be appealed to Council. The exceptions are limited to a list described in subsection c of 18.12.120. The attached ordinance adds 'Electrification equipment' to the list of exceptions in subsection c, to enable further flexibility in placement of such equipment, subject to the approval findings.

In the areas of Palo Alto with local ambient noise level above 50dBA, the equipment noise level can be up to and including the level of the local ambient, for presumed compliance at a three-foot setback from rear and interior side property lines, and ten feet from the street side yard property line, but not in the front setback.

DISCUSSION

Draft Ordinance Title 9 Changes

In addition to the changes recommended by the PTC on December 14, 2022, the attached ordinance modifies Chapter 9.10. While the PTC's purview does not include recommendations on changes to other PAMC titles beyond Titles 18 and 21, the PTC's feedback is sought because these changes will affect the placement of noise-producing electrification equipment in residential zones. The draft ordinance modifies Title 9 to:

(1) Establish a table with minimum setbacks for placement of electrification equipment based on local ambient noise and the noise level of the equipment. This table would be used to determine compliance for electrification equipment in lieu of individualized noise studies.

(2) Raise the local ambient noise level noted in PAMC Chapter 9.10 to a minimum 50 dBA for the 'flats' area and 40 dBA in the foothills area. Note, as of the preparation of this report and ordinance, these terms have not yet been fully defined.

(2) Change the noise ordinance to allow for limited exceedances of the current limit of 6dBA above the ambient level - to a limit of 8dBA above.

Proposed Noise Thresholds

In addition to the consultant's Table 1 showing setbacks, the consultant prepared two graphs intended to replace the standard currently set forth in the City's noise ordinance for residential zone districts. These graphs, referenced in the proposed ordinance, show the relationship between the source levels of the equipment and the necessary setbacks to meet the noise limits. They show the setback gradient for equipment producing noise above ambient noise levels of 40 dBA (the ambient noise level encountered in the foothills area of Palo Alto) and 50 dBA (found in other areas in Palo Alto).

A two-tier noise level threshold is proposed to simplify the process for documenting ambient noise levels and defining an exceedance. The thresholds account for the ambient noise environment in various areas of Palo Alto and establish a standalone threshold to simplify the application of the ordinance.

Foothills

For the Palo Alto foothills area, the relatively low ambient noise environment requires a more conservative threshold to ensure that the installation of new equipment facilitated by these zoning code changes would not result in a substantial permanent increase ambient noise levels. After a review of ambient noise data and the regulatory criteria established by neighboring communities having a similar location and noise source characteristics (Portola Valley and Los Altos Hills), 40 dBA was selected as the noise level threshold that would be applied to equipment installed in the foothills.

Palo Alto 'Flats'

The second noise level tier would be applied in the non-foothills areas of Palo Alto, or 'flats' areas where ambient noise levels are higher because of the proximity to major transportation noise sources traversing the areas including highways and major arterial roadways. To ensure that the installation of new equipment facilitated by these zoning code changes would not result in a substantial permanent increase ambient noise levels in the Palo Alto flats, 50 dBA was selected. The 50 dBA noise limit is consistent with other nearby communities including East Palo Alto, Los Altos, Mountain View, Menlo Park, and Sunnyvale.

Increased Exceedance of Local Ambient – Good Neighbor Placement

The consultant's document notes that good neighbor placement of equipment and sound baffling may not work to allow the installation to meet the existing standard of 6 dbA above

ambient. The handout (Attachment B) notes that owners seeking to install electrification equipment are advised to:

- Select the quietest equipment possible and utilize the manufacturer's noise control packages where applicable
- Place equipment as far as possible from adjacent property lines or in areas shielded by structures or noise barriers. Note that acoustical enclosures may not be feasible noise control options as air-flow requirements, building setbacks, or other constraints may limit their effectiveness.
- Orient the equipment take advantage of the directionality of the noise source (i.e., point the noise source away from receptors).

ATTACHMENTS

Attachment A: Draft Ordinance

Attachment B: Electric Noise Equipment Handout

Attachment C: Noise Ordinance Update

Attachment D: Equipment Noise Level for Palo Alto

Attachment E: Spreadsheet of installations

AUTHOR/TITLE:

Amy French, Chief Planning Official