

7 ODORS

7.1 INTRODUCTION

While offensive odors rarely cause physical harm, they can be unpleasant, leading to considerable annoyance and distress among the public and can generate citizen complaints to local governments and air districts. Any project with the potential to create objectionable odors affecting a substantial number of people would be considered to have a significant impact under CEQA Guidelines [Appendix G](#). In addition, the District's [Rule 402](#) (Nuisance) also prohibits any person or source from emitting air contaminants that cause detriment, nuisance, or annoyance to a considerable number of persons or the public. The adverse effects of odors on residential areas and other sensitive receptors, such as hospitals, day-care centers, and schools warrant the closest scrutiny; but consideration should also be given to other land use types where people congregate, such as recreational facilities, worksites, and commercial areas. Although the receptor(s) in question ultimately determine if a project has significant odor impacts, a number of operational and environmental factors influence the extent to which those receptors are affected by odors.

The nature of operational activities and the types of odiferous compounds they produce (e.g., odor emissions from a wastewater treatment process, rendering plant, or coffee roaster) can affect the number of complaints differently depending on the type of odor produced. For example, odiferous compounds generated by a wastewater treatment plant or landfill are more likely to be perceived more offensive to receptors than those generated by a coffee roaster or bakery.

Meteorological conditions affect the dispersion of odor emissions, which determines the exposure concentration of odiferous compounds at receptors. The predominant wind direction in an area influences which receptors are exposed to the odiferous compounds generated by a nearby source. Receptors located upwind from a large odor source may not be affected due the produced odiferous compounds being dispersed away from the receptors. Wind speed also influences the degree to which odor emissions are dispersed away from any area.

In the context of land use planning, one of the most important factors influencing the potential for an odor impact to occur is the distance between the odor source and receptors, also referred to as a buffer zone or setback. The District considers prudent land-use planning as the key mechanism that lead agencies can employ to avoid creating odor impacts. The greater the distance between an odor source and receptor, the less concentrated the odor emission would be when it reaches the receptor.

Odiferous compounds can be generated from a variety of source types including both construction and operational activities. Although less common, construction activities that include the operation of a substantial number of diesel-fueled

construction equipment and heavy-duty trucks can generate odorous diesel particulate matter (diesel PM) exhaust emissions that adversely affect nearby receptors. (The health risk associated with diesel PM is discussed in Chapter 5, Toxic Air Contaminants.) A project's operations, depending on the project type, can generate a large range of odiferous compounds that can be considered offensive to receptors. It should be noted that odor impacts associated with operational activities can be prevented with proper land use planning.

Examples of common land use types that typically generate significant odor impacts include, but are not limited to:

- Wastewater treatment plants,
- Sanitary landfills,
- Composting/green waste facilities
- Recycling facilities,
- Petroleum refineries,
- Chemical manufacturing plants,
- Painting/Coating operations,
- Rendering plants, and
- Food packaging plants.

This chapter discusses the District's recommendations for analyzing potential odor impacts associated with land use development.

7.2 ANALYSIS EXPECTATIONS

Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact, and the variety of odor sources there are no quantitative or formulaic methodologies to determine the presence of a significant odor impact. Rather, the District recommends that odor analyses strive to fully disclose all pertinent information. The District suggests that lead agencies disclose the information discussed in Section 7.3 Methodologies to provide transparency to an odor analyses. Lead agencies that anticipate potential odor impacts should provide further details about the odor sources, including but not limited to information about the specific operational processes and any project design odor control features.

7.3 METHODOLOGIES

The evaluation of potential odor impacts pertains directly to the following questions regarding air quality from the Environmental Checklist Form ([Appendix G](#)) of the State CEQA Guidelines:

III.e. Would the project create objectionable odors affecting a substantial number of people?

Lead Agencies should consider all available pertinent information to qualitatively determine if a significant odor impact could potentially occur. A potential odor impact can occur from two different situations: 1) the proposed project would locate receptors in a location where they would be affected by an existing odor source, or 2) the proposed project would generate odors that could adversely affect a substantial number of persons. In either situation, lead agencies should present all the odor parameters described below. The District considers this to be the minimum level of information necessary for Lead Agencies to make an informed and accurate odor significance determination.

7.3.1 ODOR EXPOSURE PARAMETERS

The potential for an odor impact is dependent on a number of variables including the nature of the odor source, distance between the receptor and odor source, and local meteorological conditions. Generally, the District recommends that lead agencies consider all of these parameters when making a significance determination regarding the potential for odor impacts. Each of these parameters is discussed separately below.

NATURE OF THE ODOR SOURCE

The nature of an odor relates to the type of facility producing the odor (e.g., wastewater treatment plant, landfill, or bakery), intensity of the odor source, and the frequency at which odors are generated. Individuals are typically more sensitive to certain types of odors such as those from wastewater treatment plants, landfills, or rendering plants. Odors generated by these types of sources are considered objectionable and offensive to most individuals.

The intensity of an odor source's operations or the level of odor emissions it produces also influences its potential to adversely affect area receptors. Sources that release high levels of odor emissions are more likely to adversely affect off-site receptors. The time of day when odors are generated by a source can also influence its potential to adversely affect receptors. Sources that only generate odor emissions during the nighttime, when most people are indoors, would have a decreased probability of affecting the surrounding community. While odor sources that generate odors during daytime hours would have an increased probability of adversely affecting receptors. For some sources, such as a manufacturing facility, the time of day when odors are generated is a function of when production activity occurs. For other sources, such as settling pond at a wastewater treatment

plant, odor emissions may peak during the warmest summer afternoons with anaerobic activity.

BUFFER ZONE

The District considers the inclusion of a sufficient buffer zone, which results from appropriate land use planning, to be one of the most effective methods to ensure land use compatibility with respect to odors. Distance alone can allow odor emissions to disperse to lower, undetectable concentrations before reaching receptors.

The District's [Recommended Odor Screening Distances table](#) lists suggested buffer distances for a variety of odor-generating facilities. A project that would site receptors at a location closer than the applicable odor screening distance would be considered to have a greater potential to adversely affect nearby receptors. Conversely, if a project would site a new odor source, the screening distances should be used to evaluate whether the odor source would be too close to existing or future planned receptors. Without consideration of other odor parameters a project that complies with the applicable odor screening distance would not be considered to adversely affect off-site receptors. However, as discussed above, the potential for a significant odor impact is dependent on a variety of factors. Therefore, the recommended screening distances should not be used as absolute thresholds to determine the significance of an odor impact.

A buffer zone that includes dense vegetative cover from trees or shrubs could further reduce the potential for a significant odor impact by acting as a filter and enabling more vertical or mechanical mixing to occur.

All odor impact discussions should provide the buffer distance and a description of the land features and topography in the buffer zone that separates nearby receptors and the odor source.

METEOROLOGY

The meteorological conditions in an area affect the dispersion of odor emissions. The analysis should determine the predominant wind direction and the frequency of temperature inversions in the project area and evaluate whether receptors would be located upwind or downwind of the subject odor source. Receptors located downwind of odor sources are more likely to experience an adverse effect. The average wind speed and the frequency of inversions in an area can also influence the potential for an odor impact. Generally, odor emissions are highly dispersive, especially in areas with higher average wind speeds. However, odors disperse less quickly during inversions or during calm conditions, which hamper vertical mixing and dispersion.

ODOR COMPLAINT HISTORY

The odor complaint history documented for an area can be useful in the analysis of projects that would locate new receptors near an existing odor source as well as projects that would locate new odor sources near existing or future planned receptors. The use of odor complaint records for these two types of situations is discussed separately below.

Siting Receptors near a Potential Odor Source

When locating new sensitive receptors near an existing odor source the District recommends that lead agencies survey the number of confirmed and unconfirmed complaints that have been received by the District for that particular odor source. Lead agencies should [contact the District](#) to obtain a 3-year history of odor complaints for the subject odor source. The analysis should then calculate the annual average number of confirmed and unconfirmed odor complaints filed during the past 3 years. The District generally considers odor sources to have a substantial number of odor complaints if they have had one confirmed complaint per year averaged over a 3-year period or three unconfirmed complaints per year averaged over a 3-year period. In reviewing the complaint history lead agencies should also consider the distance at which receptors were affected by the existing odor source. The analysis should describe the buffer distance there would be between the new receptors and the odor source and compare it to the distances between the source and the receptors documented in the odor complaint history. Lead agencies can also describe the existing odor conditions by contacting institutions in the area (e.g., schools, hospitals) to see if they have been adversely affected by nearby odor sources. In general, if a substantial number of odor complaints for an existing odor source is documented then locating additional receptors near that source would be considered to be a potentially significant odor impact. However, consideration of other odor parameters such as timing, and the nature of the odor source may alter this determination.

Siting an Odor Source near Receptors

When locating a new odor source in an area, lead agencies should attempt to identify comparable odor-generating facilities in the region and examine whether they have generated confirmed or unconfirmed odor complaints by nearby receptors. Similar to the guidance described above, the analysis should provide a calculation of the number of annual average confirmed and unconfirmed odor complaints for any existing comparable odor sources in the past 3 years. The annual average odor complaints may serve as a baseline for odor conditions in the project area.

7.4 SIGNIFICANCE DETERMINATION

The District recommends that significance determinations be made on a case-by-case basis and consider all the parameters discussed in Section 7.3.1 above. Typically, it is necessary for lead agencies to consider more than one parameter when making a significance determination. For instance, if a project would result

in a receptor and odor source being located closer than the District's [Recommended Odor Screening Distances](#) but the receptor would be upwind from the source, the likelihood of the receptor being exposed to objectionable odors would be lower than if it was downwind from the odor source. Also, an odor complaint history may support the determination that receptors would be exposed to objectionable odors from a specific source even if the buffer distance exceeds the applicable value in the District's [Recommended Odor Screening Distances table](#). This might be the case because the source generates more intense levels of odor emissions than similar sources, or because of meteorological conditions unique to the area or season. Therefore, a lead agency should clearly present the reasoning used to support the significance determination.

7.5 MITIGATION MEASURES

If a lead agency determines that a project would result in a significant impact by exposing a substantial number of people to objectionable odors then it shall require the implementation of all feasible mitigation measures to reduce impacts. Mitigation measures to reduce or prevent potential odor impacts should be developed on a project-by-project basis, as there is no formulaic approach to implementing odor mitigation measures to reduce odor impacts. The District offers separate discussion of planning-based measures and technology- and design-based measures below.

7.5.1 PLANNING-BASED MEASURES

The District considers appropriate land use planning as the most effective method to avoid and minimize odor impacts. Planning-based measures typically relate to those parameters that influence the potential for odor exposure and are discussed in Section 7.3.1 above. For instance, the potential for odor impacts is often minimized by ensuring a sufficient buffer distance between the odor source and nearby receptors, or by locating receptors upwind of odor sources (or odor sources downwind of receptors). In some cases, it might be feasible to require facilities to cease odor-generating activities during atypical times when the predominant wind direction shifts such that receptors are located downwind. In other cases, such as locating an office building near an odor source, it may be practical and effective to require the building's air intake to be located on the side of the building that is more distant from the odor source and/or require a level of air filtration that exceeds Title 24 standards or the local building code.

Implementing planning-based measures often avoids the need to implement more costly odor control technologies, which are discussed in Section 7.5.2 below.

DISCLOSURES

In some instances it may be appropriate for lead agencies to require the execution and recordation of deed notices on properties to provide initial and subsequent prospective buyers, lessees, and renters of those properties, particularly residential buyers, with information that their respective properties would

potentially be subject to objectionable odors from a known nearby odor source. While deed notices would notify people with above-average sensitivity to particular odor sources that they are choosing to locate where such odors may be considered objectionable, recorded deed notices would not reduce the odors or reduce the impact to a less-than-significant level. This strategy simply involves making prospective buyers, lessees, and tenants more aware of the above-average likelihood that they would experience objectionable odors before they decide to locate in the subject area. This also applies to projects that would locate receptors near agricultural land uses, which are often considered an odor source but are protected by the “right-to-farm” ordinance, Section 14.05.050, in the [Sacramento County Code](#).

7.5.2 TECHNOLOGY- AND DESIGN-BASED MEASURES

Odors impacts can also be minimized, contained, or prevented by implementing engineering technologies and design measures at the source. Mitigation that is both effective and feasible shall be selected on a case-by-case basis.

Implementing engineering- and design-based measures is generally appropriate for proposed projects that would locate a new odor source near existing receptors and funding for these measures should be provided by the applicant introducing the new odor source. However, in some cases, when a project proposes to locate new sensitive receptors in close proximity to existing odor sources the mitigation measure should require that funding be provided by the applicant and/or lead agency even if they involve implementing odor control technologies at the source. This is particularly the case when the lead agency is making a change to the land use designation on the proposed project site to allow for the introduction of the new receptors near a pre-existing odor source.

The District’s list of [Technology- and Design-Based Odor Control Measures](#) provides a variety of applicable odor reduction measures that can be implemented at a range of odor source types. It also provides sources of additional detailed information. The District recognizes that there is a vast range of both odor source types and applicable odor reduction technologies and, therefore, does not consider this list to be comprehensive and encourages lead agencies to develop other engineering and design measures.