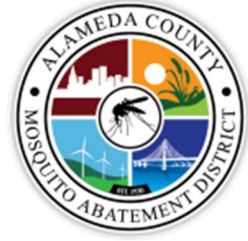


Alameda County

Mosquito Abatement District

Mosquito and Disease Control Assessment



Fiscal Year 2026-27

Engineer's Report

Pursuant to the Health and Safety Code, Government Code and
Article XIID of the California Constitution

Engineer of Work:



4745 Mangels Boulevard
Fairfield, California 94534
707.430.4300
www.sci-cg.com

(This Page Intentionally Left Blank)

Alameda County Mosquito Abatement District

Board of Trustees

Kashef Qaadri, President, City of Dublin

John Bauters, Vice President, City of Emeryville

John Zlatnik, Secretary, City of Fremont

Victor Aguilar, City of San Leandro

P. Robert Beatty, City of Berkeley

Subru Bhat, City of Union City

Eric Hentschke, City of Newark

Preston Jordan, City of Albany

Ted Kinch, City of Piedmont

Nick Ksiazek, City of Alameda

Maya Manoharan, City of Livermore

Jeff Nibert, City of Pleasanton

Lisa Rasler, City of Oakland

George Syrop, City of Hayward

Don McCoon, County-at-Large

General Manager

Ryan Clausnitzer

Table of Contents

Introduction	1
Overview	1
Legislative Analysis	4
Assessment Process	7
General Description of the District and Services.....	8
About the Mosquito Abatement District	8
Description of Mosquito Abatement Program.....	8
Estimate of Cost	20
Method of Assessment.....	21
Discussion of Benefit	21
Mosquito and Disease Control Is a Special Benefit to Properties	24
Benefit Factors	24
Benefit Finding	32
General Versus Special Benefit	32
Calculating General Benefit.....	35
Zones of Benefit	39
Method of Assessment.....	40
Assessment Apportionment.....	42
Residential Properties	43
Commercial/Industrial Properties	44
Agricultural, Rangeland, and Cemetery Properties.....	46
Other Properties.....	47
Duration of Assessment	48
Appeals and Interpretation	48
Assessment	49
Assessment Diagram	52
Assessment Roll	54

List of Figures

Figure 1 – Cost Estimate – FY 2026-27..... 20

Figure 2– Residential Assessment Factors..... 44

Figure 3 – Commercial/Industrial Benefit Assessment Factors 45

Figure 4 – Other Land Benefit Assessment Factors 47

Figure 5– Summary Cost Estimate – FY 2026-27 49

Introduction

Overview

In 1930, the Alameda County Mosquito Abatement District was officially formed in accordance with local authority provided by the Mosquito Abatement Act of 1915. The District's services are further supported by the California Health and Safety Codes. The District is overseen by a Board of Trustees (the "Board") comprised of fifteen members. Each City Council within the District and the Board of Supervisors of Alameda County appoint one Trustee. A Trustee serves a two-year term and can be reappointed.

The Alameda County Mosquito Abatement District ("District") is an independent special District in Alameda County ("County"). The District's services encompass more than 800 square miles and are provided to properties accommodating approximately 1.65 million residents.

The District provides control for both disease carrying mosquitoes and non-disease carrying mosquitoes within its boundaries (the "Assessment Area" or "Assessment District"). The purpose of the Alameda County Mosquito Abatement District is to reduce the risk of mosquito-borne disease and mosquito nuisance to property and the inhabitants of property within the District. The District services are available to all properties within the established boundary of the District.

The District's core services are summarized as follows:

- Early detection of public health threats through comprehensive mosquito and disease surveillance.
- Elimination and control of mosquitoes to protect public health and to diminish the nuisance and harm caused by mosquitoes.
- Protection of public health by reducing mosquitoes or exposure to mosquitoes that transmit diseases on property
- Appropriate, timely response to customer requests to prevent/control mosquitoes and the diseases they can transmit.

The District currently provides a "baseline" level of mosquito and disease control services in the County. Over the past few years, costs of providing services have exceeded revenue, and without the additional assessment, services would have deteriorated. The services provided to the Assessment Area consist of maintaining the current level of services and in some cases expanded services, as listed below, above the existing baseline level of services.

The Assessment Area is narrowly drawn to include only properties that may request and/or receive direct and more frequent service, that are located within the scope of the mosquito surveillance area, that are located within flying or traveling distance of potential mosquito sources monitored by the District, and that will benefit from a reduction in the amount of mosquitoes reaching and impacting the property as a result of the enhanced mosquito surveillance and control. The Assessment Diagram included in this report shows the boundaries of the Assessment Area.

The following is an outline of the primary services, programs and related costs that are funded by the mosquito and disease control assessment:¹

- Public education and outreach
- Mosquito surveillance and disease testing
- Mosquito inspections and response to service requests
- Mosquito control and abatement
- Mosquitofish for appropriate water sources
- Equipment, data systems, applied research, and program support

This Engineer's Report ("Report") defines the benefit assessment, which provides funding for these improved mosquito and disease control services for property throughout the District, as well as related costs for equipment, capital improvements and services, facilities necessary and incidental to mosquito and disease control programs.

As used within this Report and the benefit assessment ballot proceeding, the following terms are defined:

"Vector" means any animal capable of transmitting the causative agent of human disease or capable of producing human discomfort or injury, including, but not limited to, mosquitoes, flies, mites, ticks, other arthropods, and rodents and other vertebrates (Health and Safety Code Section 2002(k)).

"Vector Control" means any system of public improvements or services that is intended to provide for the surveillance, prevention, abatement, and control of vectors as defined in subdivision (k) of Section 2002 of the Health and Safety Code and a pest as defined in Section 5006 of the Food and Agricultural Code (Government Code Section 53750(m)).

¹ The improved mosquito and disease prevention services materially increase the usefulness, utility, livability and desirability of properties in the Assessment Area.

The District is the only dedicated agency controlling mosquitoes in Alameda County. There are however, other agencies dedicated to the control of other types of vectors. In any case, the California Code sections and other applicable citations within this report pertain specifically to mosquito and disease control even when the term vector is used.

The District is controlled by Mosquito Abatement and Vector Control Districts Law of the State of California. Following are excerpts from the Mosquito Abatement and Vector Control Districts Law of 2002, codified in the Health and Safety Code, Section 2000, et. seq. which serve to summarize the State Legislature's findings and intent with regard to mosquito abatement and other vector control services:

2001. (a) The Legislature finds and declares all of the following:

(1) California's climate and topography support a wide diversity of biological organisms.

(2) Most of these organisms are beneficial, but some are vectors of human disease pathogens or directly cause other human diseases such as hypersensitivity, envenomization, and secondary infections.

(3) Some of these diseases, such as mosquitoborne viral encephalitis, can be fatal, especially in children and older individuals.

(4) California's connections to the wider national and international economies increase the transport of vectors and pathogens.

(5) Invasions of the United States by vectors such as the Asian tiger mosquito and by pathogens such as the West Nile virus underscore the vulnerability of humans to uncontrolled vectors and pathogens.

(b) The Legislature further finds and declares:

(1) Individual protection against the vectorborne diseases is only partially effective.

(2) Adequate protection of human health against vectorborne diseases is best achieved by organized public programs.

(3) The protection of Californians and their communities against the discomforts and economic effects of vectorborne diseases is an essential public service that is vital to public health, safety, and welfare.

(4) Since 1915, mosquito abatement and vector control districts have protected Californians and their communities against the threats of vectorborne diseases.

(c) In enacting this chapter, it is the intent of the Legislature to create and continue a broad statutory authority for a class of special districts with the power to conduct effective programs for the surveillance, prevention, abatement, and control of mosquitoes and other vectors.

(d) It is also the intent of the Legislature that mosquito abatement and vector control districts cooperate with other public agencies to protect the public health, safety, and welfare. Further, the Legislature encourages local communities and local officials to adapt the powers and procedures provided by this chapter to meet the diversity of their own local circumstances and responsibilities.

Further the Health and Safety Code, Section 2082 specifically authorizes the creation of benefit assessments for vector control, as follows:

(a) A district may levy special benefit assessments consistent with the requirements of Article XIII D of the California Constitution to finance vector control projects and programs.

This Engineer's Report (Report") was prepared by SCI Consulting Group (SCI) to describe the mosquito, disease surveillance and control services and related costs that are funded by the assessments, to establish the estimated costs for those services, to determine the special benefits and general benefits received by property from the services and to apportion the assessments to lots and parcels within the District based on the estimated special benefit each parcel receives from the services funded by the benefit assessment.

Legislative Analysis

Proposition 218

This assessment was formed consistent with Proposition 218, The Right to Vote on Taxes Act, which was approved by the voters of California on November 6, 1996, and is now Article XIII C and XIII D of the California Constitution. Proposition 218 provides for benefit assessments to be levied to fund the cost of providing services, improvements, as well as maintenance and operation expenses to a public improvement which benefits the assessed property.

Proposition 218 imposes a number of important requirements, including property-owner balloting, for the formation and continuation of assessments, and these requirements are satisfied by the process used to establish this assessment. When Proposition 218 was initially approved in 1996, it allowed for certain types of assessments to be "grandfathered" in, and these were exempted from the property-owner balloting requirement.

Beginning July 1, 1997, all existing, new, or increased assessments shall comply with this article. Notwithstanding the foregoing, the following assessments existing on the effective date of this article shall be exempt from the procedures and approval process set forth in Section 4:

(a) Any assessment imposed exclusively to finance the capital costs or maintenance and operation expenses for sidewalks, streets, sewers, water, flood control, drainage systems or vector control (Article XIII D, Section 5).

Mosquito and vector control was specifically “grandfathered in,” underscoring the fact that the drafters of Proposition 218 and the voters who approved it were satisfied that funding for mosquito and vector control is an appropriate use of benefit assessments, and therefore confers special benefit to property.

Silicon Valley Taxpayers Association, Inc. v Santa Clara County Open Space District (2008) 44 Cal.4th 431

On July 14, 2008, the California Supreme Court issued its ruling in *Silicon Valley Taxpayers Association, Inc. v. Santa Clara County Open Space District* (“*Silicon Valley*”). Several of the most important elements of the ruling are:

- Benefit assessments are for special, not general benefit
- The services and/or improvements funded by assessments must be clearly defined
- Special benefits are directly received by and provide a direct advantage to property in the Assessment District

This Engineer’s Report, and the process used to establish this assessment is consistent with the *Silicon Valley* decision.

Dahms v. Downtown Pomona Property (2009) 174 Cal.App.4th 708

On June 8, 2009, the Court of Appeal amended its original opinion upholding a benefit assessment for property in the downtown area of the City of Pomona. On July 22, 2009, the California Supreme Court granted review and transferred the case back to the Court of Appeal for reconsideration in light of the Supreme Court’s discussion in the *Silicon Valley* case. In *Dahms*, the Appellate Court then upheld the assessment that was 100% special benefit (i.e. 0% general benefit) holding that the services and improvements funded by the assessments were directly provided to property in the assessment District. The Court also upheld discounts and exemptions from the assessment for certain properties.

Bonander v. Town of Tiburon (2009) 46 Cal.4th 646

On December 31, 2009, the Court of Appeal overturned a benefit assessment approved by property owners to pay for placing overhead utility lines underground in an area of the Town of Tiburon. The Court invalidated the assessments on the grounds that the assessments had been apportioned to assessed property based in part on relative costs within sub-areas of the assessment district, instead of each individual property’s proportional special benefits.

Beutz v. County of Riverside (2010) 184 Cal.App.4th 1516

On May 26, 2010, the California Court of Appeal issued its decision in *Steven Beutz v. County of Riverside* (“*Beutz*”). This decision overturned an assessment for park maintenance in Wildomar, California, primarily because the general benefits associated with improvements and services were not explicitly calculated, quantified, and separated from the special benefits.

Golden Hill Neighborhood Association v. City of San Diego (2011)199 Cal.App.4th 416

On September 22, 2011, California Court of Appeal issued its decision in *Golden Hill Neighborhood Association v. City of San Diego*. This decision overturned an assessment for street and landscaping maintenance in the Greater Golden Hill neighborhood of San Diego, California. The court described two primary reasons for its decision. First, as in *Beutz*, the court found the general benefits associated with services were not explicitly calculated, quantified and separated from the special benefits. Second, the court found that the City had failed to document the basis for the assessment on city-owned parcels.

Compliance with Current Law

This Engineer’s Report is consistent with the requirements of Article XIII C and XIII D of the California Constitution and with the *Silicon Valley* decision because the Services to be funded are clearly defined; the Services are available to and will be directly provided to all benefited property in the Assessment District; the Services provide a direct advantage to property in the Assessment District that would not be received in the absence of the Assessment.

This Report is consistent with *Dahms* because, similar to the *Downtown Pomona* assessment validated in *Dahms*, the Services will be directly provided to property in the Assessment District. While *Dahms* could be used as the basis for a finding of 0% general benefits, this Engineer’s Report establishes a more generous separation and quantification of general benefits.

This Report is also consistent with *Bonander* because the Assessment has been apportioned based on the overall cost of the services and proportional special benefit to each property. Furthermore, the Assessment is consistent with *Beutz* and *Golden Hill* because the general benefits have been explicitly calculated, quantified, and excluded from the Assessment.

Assessment Process

In order to allow property owners to ultimately decide whether additional funding should be provided for the District's mosquito and disease control services, the Board authorized by Resolution the Initiation of proceedings for a benefit assessment on February 13, 2008. In March and April of 2008, the District conducted an assessment ballot proceeding pursuant to the requirements of Article XIII D of the California Constitution ("The Taxpayer's Right to Vote on Taxes Act") and the Government Code. During this ballot proceeding, property owners in the District were provided with a notice and ballot for the proposed special assessment. A 45-day period was provided for balloting and a public hearing was conducted on April 30, 2008.

It was determined after the conclusion of the public input portion of the public hearing that 70.19% of the weighted ballots returned were in support of the assessment. Since the assessment ballots submitted in opposition to the proposed assessments did not exceed the assessment ballots submitted in favor of the assessments (with each ballot weighted by the proportional financial obligation of the property for which ballot was submitted), the District gained the authority to approve the levy of the assessments for fiscal year 2008-09 and to continue to levy them in future years. The authority granted by the ballot proceeding includes an annual increase in the maximum authorized assessment rate equal to the annual change in the Consumer Price Index for the San Francisco Bay Area, not to exceed 3%. In the event that the annual change in the CPI exceeds 3%, any percentage change in excess of 3% can be cumulatively reserved and can be added to the annual change in the CPI for years in which the CPI change is less than 3%. The Board took action, by Resolution No.937-1 passed on May 14, 2008, to approve the levy of the assessments.

In each subsequent year for which the assessments will be levied, the Board must preliminarily approve an updated Engineer's Report for the upcoming fiscal year at a noticed public hearing. The Engineer's Report should include a budget for the upcoming fiscal year's costs and services and an updated assessment roll listing all parcels and their proposed assessments for the upcoming fiscal year.

Upon approval of the Engineer's Report and the assessments for fiscal year 2026-27, the assessments would be submitted to the County Auditor for inclusion on the property tax roll.

General Description of the District and Services

About the Mosquito Abatement District

The Alameda County Mosquito Abatement District (the “District”) is an independently funded public agency that controls and monitors mosquitoes and the diseases they carry in Alameda County. The District protects the usefulness, desirability and livability of property and the inhabitants of property within its jurisdictional area by controlling and monitoring disease-carrying and public nuisance mosquitoes. In addition, the District regularly tests for diseases carried by mosquitoes and educates property owners and the occupants of property in the District about how to protect themselves from mosquito-borne diseases.

The District consists of 20 employees including a General Manager, Operations Director, Laboratory Director, Mechanical Specialist, Regulatory & Public Affairs Director, Information Technology Director, Finance & Administration Director, Public Education Officer, Community Liaison, six Vector Biologist, two Mosquito Control Technicians, two Vector Scientist, one Associate Vector Scientist, and seasonal staff.

The District is governed by the Alameda County Mosquito Abatement District Board of Trustees. The Board meetings are held at 5:00 p.m. on the second Wednesday of every month, and residents are welcome to attend.

Description of Mosquito Abatement Program

As mentioned earlier, the District currently provides a “baseline” level of services in the County as permitted with the limited funding available. The Assessment provides the additional funding to operate the program and expand the services provided in the Assessment Area to an optimum level necessary to protect the usefulness, utility, desirability and livability of property within its jurisdictional area.

Introduction

Following are the services and resulting level of service for the Assessment Area. As previously noted, the District provides a baseline level of service in the County. These services are over and above the current baseline level of service. The formula below describes the relationship between the final level of service, the existing baseline level of service, and the enhanced level of service to be funded by the assessment.

<i>Final Level of Service</i>	=	<i>Current Baseline Level of Service</i>	+	<i>Proposed Enhanced Level of Service</i>
-------------------------------	---	--	---	---

The assessment provides funding for the continuation and enhancement of the service, surveillance, disease prevention, abatement and control of mosquitoes within the District boundaries. Such mosquito abatement and disease prevention projects and programs include, but are not limited to, source reduction, biological control, larvicide applications, adulticide applications, disease monitoring, public education, reporting, accountability, research and interagency cooperative activities, as well as capital costs, maintenance and operation expenses (collectively “Services”). The cost of these Services also includes capital costs comprised of equipment, capital improvements and facilities and other expenses necessary and incidental to the mosquito control program.

Vectors and Vector-Borne Diseases in the District Service Area

Mosquitoes

Mosquitoes generally occur where there is adequate vegetation for harborage and where water is standing or stagnant. Although mosquitoes have seasonal cycles, some species reproduce continuously while conditions are suitable. The mosquito species listed in the table below can be generally described as floodwater, standing-water, and container-breeding mosquitoes that are important in the District:

MOSQUITO SPECIES	LARVAL HABITAT	SEASONAL ACTIVITY	HOSTS	PUBLIC HEALTH CONCERN
<i>Aedes aegypti</i> (Yellow fever mosquito)	Artificial containers	All year	Humans	Zika, dengue, chikungunya, yellow fever
<i>Aedes dorsalis</i> (Salt marsh mosquito)	Salt marshes	All year	Humans and other mammals	Serious pest
<i>Aedes sierrensis</i> (Tree hole mosquito)	Tree holes & containers	Spring, Summer	Humans and other mammals	Serious pest; canine heartworm
<i>Aedes squamiger</i> (Winter salt marsh mosquito)	Salt marshes	Spring	Humans and other mammals	Serious pest
<i>Aedes washinoi</i> (Woodland pool mosquito)	Woodland ponds	Spring, Summer	Humans and other mammals	Serious pest
<i>Anopheles freeborni</i> (Western malaria mosquito)	Seepages, streams, lakes, pits	Summer	Humans and other mammals	Malaria

MOSQUITO SPECIES	LARVAL HABITAT	SEASONAL ACTIVITY	HOSTS	PUBLIC HEALTH CONCERN
<i>Anopheles punctipennis</i>	Grassy pools in creeks and lake seepages	Summer	Humans and other mammals	Malaria
<i>Culex erythrothorax</i> (Tule mosquito)	Ponds, ditches, and marshes with tules or cattails	Spring, Summer	Humans, other mammals, and birds	West Nile virus; serious pest
<i>Culex pipiens</i> (House mosquito)	Catch basins, pools, utility vaults	All year	Humans, other mammals, and birds	West Nile virus; serious pest
<i>Culex stigmatosoma</i> (Foul water mosquito)	Foul water, sewage, pools	All year	Birds	West Nile virus
<i>Culex tarsalis</i> (Encephalitis mosquito)	Creeks, marshes, pools, ditches	All year	Humans, other mammals, and birds	West Nile virus; moderate pest
<i>Culiseta incidens</i> (Fish pond mosquito)	Fish ponds, containers, pools, catch basins	All year	Humans and other mammals	Serious pest; canine heartworm
<i>Culiseta inornata</i> (Winter salt marsh mosquito)	Marshes, pools, ditches	Fall, Winter, Spring	Humans and other mammals	Serious pest

Floodwater mosquitoes lay their eggs on damp soil or vegetation in areas that later flood from high tides, rainfall or managed water flows. Their eggs can remain dormant for more than a year, then hatch in large numbers after flooding. This can produce many adult mosquitoes over a relatively short period.

Floodwater species of concern in Alameda County include *Aedes dorsalis*, *Aedes squamiger* and *Aedes washinoi*. These mosquitoes are often most active during the day, but they can also bite at dawn and dusk. *Aedes dorsalis* and *Aedes squamiger* can produce multiple generations when habitats are repeatedly inundated, which can lead to very high abundance. Floodwater mosquitoes are aggressive biters and may travel several miles from their larval sources.

Standing-water mosquitoes use natural and artificial sources that hold water long enough for larvae to develop. These sources include ponds, marshes, catch basins, unmaintained swimming pools, containers, tree holes and other places where water collects. Some species lay eggs directly on the water surface, while others lay eggs just above the water line, where they hatch after the water level rises. Eggs usually hatch within a few days after they are covered by water, although timing varies with environmental conditions

and mosquito species. When water remains long enough, many standing-water mosquitoes can produce several generations in a year.

Several *Anopheles*, *Culex* and *Culiseta* species found in Alameda County use these types of sources. Most species bite near dawn, dusk or at night. *Culex erythrothorax* can also bite during the day, especially in shaded or densely vegetated wetland areas.

Tree holes and outdoor containers are common mosquito sources in Alameda County. *Aedes sierrensis*, the western tree hole mosquito, breeds in water-filled tree holes, especially in oaks and other mature trees. This species usually produces one generation per year. It is an aggressive biter, can become abundant in localized areas, and typically does not fly far from its larval source.

The invasive yellow fever mosquito, *Aedes aegypti*, was detected in Pleasanton in 2024. This species mainly breeds in small artificial containers around homes and businesses, including buckets, plant saucers, fountains and other items that hold water. Some of these sources can also support *Aedes sierrensis*, especially containers with water and leaf litter. Unlike *Aedes sierrensis*, *Aedes aegypti* is closely associated with human-made containers and can produce multiple generations when conditions are favorable. It is an aggressive daytime biter but may also bite in the evening or at night in well-lit areas.

Since West Nile virus (WNV) was first detected in Alameda County in 2004, the California Department of Public Health (CDPH) has attributed 11 human cases to the county. Across California, more than 8,000 human WNV cases have been reported since the virus arrived in 2003.² The highest case numbers have occurred in regions with greater *Culex* mosquito abundance and stronger summer virus activity, particularly the Central Valley, which borders eastern Alameda County. Most infected people have no symptoms, but some develop fever, headache, rash or fatigue. In rare cases, WNV can cause encephalitis, paralysis or death.

St. Louis encephalitis virus (SLE) and western equine encephalitis virus (WEE) are historically important mosquito-borne viruses in California. SLE has re-emerged in California since 2015, with activity reported mainly in warmer inland regions.³ WEE was once an important disease in California, with no human cases since 1986, but has been detected in mosquitoes as recently as 2007.

² California Department of Public Health, Vector-Borne Disease Section. "California West Nile Virus Website." Accessed May 27, 2026. Available at: <https://westnile.ca.gov>

³Snyder RE, Feiszli T, Foss L, Messenger S, Fang Y, Barker CM, Reisen WK, Vugia DJ, Padgett KA, Kramer VL. "Epidemiologic and Environmental Characterization of the Re-Emergence of St. Louis Encephalitis Virus in California, 2015–2020." *PLOS Neglected Tropical Diseases* 16, no. 8 (2022)

Malaria was historically a mosquito-borne disease concern in California, including parts of the Bay Area, during the early 1900s. Local transmission was greatly reduced through mosquito control, improved housing and effective treatments. The last locally transmitted malaria cases in California were reported in 1989. However, travel-associated malaria cases continue to occur in California, and *Anopheles* mosquitoes capable of transmitting malaria are present in Alameda County. If a local *Anopheles* mosquito bites an infected traveler and later bites another person, local transmission can occur. Warmer temperatures and longer mosquito seasons may also increase the suitability of some areas for malaria vectors.

Canine heartworm is caused by the nematode parasite *Dirofilaria immitis*. It primarily affects dogs, and less commonly cats and wild canids. In Alameda County, *Aedes sierrensis*, the western tree hole mosquito, is an important vector. Heartworm disease can be serious, but it is preventable with veterinary-prescribed medications.

Aedes aegypti can transmit dengue, Zika, chikungunya, and yellow fever viruses. Alameda County routinely receives travel-associated cases of dengue, chikungunya, Zika, and malaria and is among the California counties with high numbers of imported mosquito-borne disease cases. In 2024, Alameda County ranked third statewide for reported dengue cases and was among the highest counties for malaria cases. Dengue and chikungunya commonly cause fever, joint or muscle pain, headache and rash; chikungunya is especially associated with severe joint pain. Zika often causes mild illness, including fever, rash, joint pain and red eyes, but infection during pregnancy can cause serious birth defects.

These disease risks support the continued need to reduce mosquito production, limit human exposure to mosquito bites and respond to changes in mosquito species and pathogen introductions.

Integrated Pest Management

As noted, the District's services address several types of mosquitoes and share general principles and policies. These include the identification of mosquito problems; responsive actions to control existing populations of mosquitoes, prevention of new sources of mosquitoes from developing, and the management of habitat in order to minimize mosquito production; education of land-owners and others on measures to minimize interaction with mosquitoes; and provision and administration of funding and institutional support necessary to accomplish these goals.

In order to accomplish effective and environmentally sound mosquito management, control of mosquitoes must be based on careful surveillance of their abundance, habitat (potential abundance), pathogen load, and potential contact with people and animals; the establishment of treatment criteria (thresholds); and appropriate selection from a wide range of control methods. This dynamic combination of surveillance, treatment criteria, and use of multiple control activities in a coordinated program is generally known as Integrated Pest Management (IPM).

The Alameda County Mosquito Abatement District's Mosquito Management Program, like any other IPM program, involves procedures for minimizing potential environmental impacts. The District employs IPM principles by first determining the species and abundance of mosquitoes through evaluation of public service requests and field surveys, trapping of immature and adult pest populations, and, if the populations exceed predetermined criteria, using the most efficient, effective and environmentally sensitive means of control. For all mosquito species, public education is an important control strategy. In appropriate situations, water management or other physical control activities (historically known as "source reduction" or "physical control") can be instituted to reduce mosquito-breeding sites. The District also uses biological control such as the stocking of mosquitofish in ornamental ponds, unused swimming pools and other artificial water bodies. When these approaches are not effective or are otherwise inappropriate, materials that have been approved and labeled by the U.S. Environmental Protection Agency and the California Department of Pesticide Regulation are used to treat specific pest-producing or pest-harboring areas. The District chooses materials that are highly specific, have the lowest impact on nontargets, selectively applied to places where mosquitoes occur. These materials are considerably more expensive than less specific pesticides and are labor intensive to apply.

The District's approach is organized into two principle sections to accomplish IPM. First, the administrative element provides leadership, expertise, public relations/education and interface with other governmental authorities. Second, the operational and laboratory sections include technicians that perform IPM in the field. The technicians perform control and surveillance functions by responding to complaints from individual residents and by extensive examination of aquatic sites for mosquito larvae. The technicians and lab staff also monitor the treated areas to be sure that their control efforts have been successful.

The District has the capability of applying liquid or solid forms of larvicides to treat sources of immature mosquitoes and aerosolized adulticides for area treatment of adult mosquitoes. Adulticiding is used to reduce significant populations of adult mosquitoes and to prevent or to reduce the spread of mosquito-borne disease in the environment.

Applications are made by personnel licensed by the California Department of Public Health (or under the direct supervision of certified personnel) who are trained in the proper use of the products and specialized equipment used for this type of public health pest control. All insecticide products employed by the District are used with consideration of existing environmental conditions in order to minimize the impact on non-target organisms.

Mosquito Surveillance Control and Monitoring

Surveillance: Surveillance is foundational for the District's mosquito and mosquito-borne disease program. The District conducts surveillance year-round, weather permitting, to identify mosquito sources, track mosquito abundance, determine species composition, detect mosquito-borne virus activity, identify invasive mosquitoes and provide data to guide mosquito control operations.

Mosquito sources occur throughout the District, and all properties within the District are within mosquito-flying range of one or more mosquito sources. Surveillance is therefore conducted across Alameda County using a balanced, risk-based approach that considers known mosquito sources, habitat type, historical mosquito abundance, disease activity, invasive mosquito detections, public reports and operational needs.

Surveillance methods differ for native and invasive mosquito species. Many native mosquito species occur in known or predictable sources, such as marshes, ponds, ditches, creeks, tree holes, catch basins and other standing-water habitats. District staff prioritize inspections of these sites based on historical surveillance records, expected seasonal activity, weather conditions and availability of water that can support mosquito growth. Field inspections include visual assessment of habitat conditions, collection of larvae and pupae, and identification of immature mosquitoes.

Adult mosquito surveillance is conducted using a variety of traps placed throughout Alameda County. Traps may use carbon dioxide, light, scent lures, gravid-water attractants or other methods to collect different mosquito species and life stages. All adult mosquitoes collected through surveillance are counted and identified to species in the District laboratory.

Invasive mosquito surveillance requires a broader approach because species such as *Aedes aegypti* can develop in small artificial containers around homes, businesses and public spaces. Unlike many native species, invasive *Aedes* mosquitoes are not limited to known recurring sources. The District uses countywide and targeted surveillance methods to detect container-breeding invasive mosquitoes, including adult traps, oviposition traps, property inspections, and public reports. Invasive mosquito surveillance can also reveal previously unknown sources that support native mosquitoes because native and invasive species may use some of the same sites.

Mosquito-borne virus surveillance focuses primarily on West Nile virus and other arboviruses of public health concern. Mosquito species that can transmit WNV, SLE, and WEE are tested using molecular methods in the District laboratory. The District also participates in statewide dead bird surveillance for WNV because dead birds, especially crows and ravens, are important indicators of virus activity in the bird-mosquito transmission cycle. Testing in the District laboratory allows results to be available within two hours after samples arrive, so staff can quickly evaluate disease activity and make timely operational decisions. Mosquito abundance and disease testing results are reported to CDPH to support a statewide understanding of mosquito-borne disease risk.

These surveillance results are analyzed with historical records, seasonal patterns and prior disease activity to evaluate current risk in context. This analysis helps the District compare current mosquito abundance with prior years, identify emerging trends, anticipate periods of increased mosquito activity and plan mosquito control operations. The District continues to evaluate additional data sources that may improve future surveillance and forecasting.

Reports from residents, property owners and public agencies are an important part of surveillance. Public reports help identify mosquito problems, unmaintained swimming pools, standing water, unusual biting activity, dead birds and potential invasive mosquito detections that may not be found through routine field surveillance alone.

The District evaluates and develops improved surveillance and testing methods. This includes refining trap designs, improving detection of container-breeding mosquitoes and developing laboratory tools that more accurately distinguish among mosquito species. Continued improvement is important because mosquito species, mosquito-borne pathogens, land use, travel patterns and environmental conditions change over time.

Control. The District's objective is to provide a District-wide level of consistent mosquito control so that all properties throughout the District benefit from reduced mosquito abundance and reduced mosquito-borne disease risk. Surveillance and monitoring are conducted throughout the District. The District cannot predict in advance where all control measures will be applied because the type and location of control depend on surveillance results, mosquito species, habitat conditions, disease activity, public reports and operational needs. However, control decisions are guided by consistent District-wide objectives and are based on surveillance findings, mosquito species, disease risk, habitat conditions and operational need.

The District uses several techniques to control immature mosquitoes (larvae and pupae), including biological, chemical and physical control. Biological control includes the use of mosquitofish, *Gambusia affinis*, which can provide effective mosquito control year-round in many permanent or semi-permanent water sources. When stocked in appropriate artificial ponds, unmaintained swimming pools or similar sources, mosquitofish can provide consistent long-term control for many years because established populations reproduce and feed on mosquito larvae. The District stocks mosquitofish in appropriate artificial water sources at the request of property residents or when biological control is judged to be the best control method. To support the long-term sustainability of this program, the District maintains a dedicated mosquitofish rearing facility, reducing reliance on field collection or outside vendors.

Chemical control of immature mosquitoes includes bacterial larvicides, insect growth regulators, surface-active agents, and other products approved for mosquito control. Bacterial larvicides include *Bacillus thuringiensis israelensis* (Bti) and *Bacillus sphaericus* (Bs), which are applied as liquids, briquets, or granules and are most effective when consumed by feeding mosquito larvae. Bti is highly specific to mosquitoes and closely related flies, while Bs is especially useful in polluted water and may provide extended control in some habitats. Spinosad, derived from the naturally occurring soil bacterium *Saccharopolyspora spinosa*, acts by ingestion or contact and can be applied in liquid or granular formulations.

The insect growth regulators used by the District include methoprene and pyriproxyfen. These products interfere with mosquito development and prevent immature mosquitoes from successfully emerging as adults that may bite people and transmit pathogens. Methoprene mimics a natural insect hormone that disrupts larval development and is available in short-acting liquid formulations and longer-lasting granules, pellets, and briquets. Pyriproxyfen similarly disrupts normal mosquito growth and metamorphosis and is effective at very low concentrations in a variety of aquatic habitats. Surface-active agents may also be used when other materials are not appropriate. These products control larvae and pupae at the water surface.

The District uses multiple application methods to match control work to mosquito species, habitat, access and public health need. Larvicides may be applied by hand, truck-mounted equipment, drone or other specialized equipment. The District operates a drone larvicide program supported by an electric Ford F-150 Lightning truck. The vehicle provides field access, secure transport, cargo capacity and electrical power to charge batteries for drone operations. The District's facility also generates solar energy, supporting greener, lower-emission use of electric equipment such as the F-150 Lightning. The drone program allows larvicide applications in areas where aerial treatment is safer, more efficient or more effective than ground access alone.

The District also uses wide-area larvicide spray (WALS) applications as part of its invasive *Aedes aegypti* response. WALS is a larval control method used to reduce mosquito production in small container habitats that may be numerous, hidden or difficult to access individually. Following detections of *Aedes aegypti*, District staff conduct site inspections and may apply WALS treatments in response zones around detections. The A1 Super Duty Mister, originally purchased to support WALS applications, is also used for *Aedes dorsalis* control in marsh habitats where appropriate. This dual use allows the District to apply larvicide efficiently in both invasive mosquito response areas and floodwater mosquito habitats.

Chemical control of adult mosquitoes may be used when surveillance indicates elevated mosquito abundance, mosquito-borne disease risk or invasive mosquito activity that cannot be adequately addressed by larval control alone. Adult mosquito control products used by the District contain pyrethrin, a natural plant-derived insecticide, or pyrethroids, synthetic analogues of pyrethrin. These products are applied using ultra-low volume application methods, which disperse very small droplets designed to contact adult mosquitoes with a small amount of product. Adult mosquito control provides rapid knockdown and control of adult mosquitoes and is conducted by trained personnel using specialized equipment and label-directed methods.

The District uses physical control when appropriate to temporarily or permanently reduce mosquito production. Examples include removing water from containers, clearing access for inspection or treatment, maintaining channels and waterways and improving water circulation in existing marsh ditches to reduce pooling after high tides. The District was originally formed to control marsh mosquitoes, which can reach very high abundance and aggressively bite people when marsh habitats are not managed to limit mosquito production. Physical control and source reduction activities are conducted in a manner that avoids impacts to mature trees, threatened or endangered species and sensitive habitat areas.

The District records control work using internet-connected field tablets. These systems allow staff to document inspections, treatments, product use, site conditions, service requests and follow-up results while in the field. Electronic field records improve accuracy, reduce delays, support coordination among staff and provide more complete documentation of mosquito control activities.

Monitoring. Monitoring is the continuation of surveillance after control work has been completed. District personnel check treatment sites to evaluate whether applications or source-reduction work were successful. Follow-up may include additional field inspections, larval sampling, adult mosquito trapping, review of service requests and comparison with prior surveillance results. Monitoring results help determine whether additional work is needed and provide feedback for improving future control decisions.

Public Relations, Outreach, and Education

The public health risks of mosquito-borne diseases create a need for regular and extensive community outreach and education. The District's outreach program teaches the public how to recognize, prevent and suppress mosquito breeding on their property. This is accomplished through media outreach, quarterly newsletters, participation in local events and fairs, presentations to community organizations, paid advertisement campaigns, social media, and contact with District staff in response to service requests. Public education also includes school presentations that teach future adults to be responsible by preventing and/or eliminating mosquito breeding sources.

The District maintains a website and several social media accounts to provide mosquito control and related information on the internet. The District website address is www.mosquitoes.org. The District has most of its publications on the site, Board of Trustee documents (agendas, minutes, meeting packets, and financial reports), specialized technical information (mosquito biology, mosquito-borne diseases, and technical reports), press releases, upcoming events, and additional general information about District services and links to other related websites.

The District interacts professionally at many levels with other agencies. The District is a member of the Mosquito and Vector Control Association of California (MVCAC); employees attend meetings at both the regional and state level. District employees also attend and receive periodic continuing education programs designed to reinforce surveillance and control protocols and learn about new and emerging technologies. The District is a member of the American Mosquito Control Association; District staff participates in national programs relating to mosquito and disease control. The District is also an active member in the California Special Districts Association (CSDA) and the Entomological Society of America (ESA).

Research and Development

The District conducts research and development to improve mosquito surveillance, control operations, disease testing, public education, data systems, equipment deployment and service delivery. This work occurs across District departments, with staff identifying operational challenges, testing new approaches, evaluating tools and procedures and adapting methods to improve effectiveness, efficiency, safety and public benefit.

Mosquito sources, species and service needs vary across Alameda County, so the District uses an adaptive approach to improve its tools and procedures based on surveillance results, service patterns, field observations and operational performance. The District also collaborates with universities, mosquito and vector control districts, private companies and other partners when outside expertise or shared development can improve outcomes.

Results and lessons learned are incorporated into District procedures, shared with other agencies, presented at professional meetings or scientific conferences or published in peer-reviewed journals or technical reports. This ongoing work helps the District respond to changing mosquito species, disease risks, technology, regulations and community needs.

Service Requests

The District responds to mosquito-related service requests from property owners, residents, businesses, public agencies and other members of the public within its boundaries. Service requests may include reports of biting mosquitoes, standing water, unmaintained swimming pools, unusual mosquito activity, dead birds or potential invasive mosquito detections.

When a request is received, District staff evaluate the reported concern and, when appropriate, inspect the property or nearby area, identify mosquito sources, collect mosquito samples, provide education and perform control work. Service requests are integrated with the District's surveillance and control program so that information from the public can be evaluated alongside field observations, laboratory results and operational records.

The District responds to service requests in a timely manner, typically within 24 hours, regardless of location within District boundaries. Service request inspections, treatments, site conditions and follow-up actions are documented using field data systems to improve accuracy, coordination and continuity of service.

Estimate of Cost

Figure 1 – Cost Estimate – FY 2026-27

Alameda County Mosquito Abatement District	
Mosquito and Disease Control Assessment	
Mosquito Control Services and Related Expenditures	
Mosquito Control and Disease Prevention Operations	\$4,933,311
Materials, Utilities and Supplies ¹	\$1,403,081
Capital Expenditures	\$463,000
Contingency	\$0
Total Mosquito Control Services and Related Expenditures	\$6,799,392
Total Benefits of Mosquito and Disease Control	\$6,799,392
Single Family Equivalent Units (SFEs)	475,477
Benefit Received per SFE Unit	\$14.30
Less Contributions from Other Sources²	
Revenue from property taxes/ other sources	(\$5,420,508)
Total Mosquito & Disease Control Services and Incidentals	\$1,378,884
Budget Allocation to Property	
Total Assessment Budget³	\$1,378,884
	Total SFE Units ⁴ 475,477
	Assessment Rate per SFE⁵ \$2.90

Consolidated ER Notes:

1. Includes assessment administration costs including county collection charges for placement on the annual property tax bills.
2. Contributions from other sources to cover the costs of any general benefits and special benefits not funded by the assessments.
3. The assessment amounts are rounded down to the even penny for purposes of complying with the collection requirements from the County Auditor. Therefore, the total assessment amount for all parcels subject to the assessments may vary slightly from the net amount to be assessed.
4. SFE Units means Single Family Equivalent Benefit Units. See method of assessment in the following Section for further definition.
5. The assessment rate per SFE is the total amount of assessment per Single Family Equivalent benefit unit.

Method of Assessment

This section of the Report explains the benefits to be derived from the Services provided for property in the District, and the methodology used to apportion the total assessment to properties within the Mosquito and Disease Control Assessment area.

The Mosquito and Disease Control Assessment area consists of the Assessor Parcels within the Alameda County Mosquito Abatement District.

The method used for apportioning the assessment is based upon the proportional special benefits to be derived by the properties in the District over and above general benefits conferred on real property in the Assessment District. Special benefit is calculated for each parcel in the Assessment District using the following process:

1. Identification of total benefit to the properties derived from the Services
2. Calculation of the proportion of these benefits that are special vs. general
3. Determination of the relative special benefit within different areas within the Assessment District
4. Determination of the relative special benefit per property type and property characteristic
5. Calculation of the specific assessment for each individual parcel based upon special vs. general benefit; location, property type and property characteristics

Discussion of Benefit

In summary, the assessments can only be levied based on the special benefit to property. This benefit is received by property over and above any general benefits. This special benefit is received by property over and above any general benefits from the additional Services. With reference to the engineering requirements for property related assessments, under Proposition 218 an Engineer must determine and prepare a report evaluating the amount of special and general benefit received by property within the Assessment District as a result of the improvements or services provided by a local agency. That special benefit is to be determined in relation to the total cost to that local entity of providing the service and/or improvements.

Proposition 218 as described in Article XIII D of the California Constitution has confirmed that assessments must be based on the special benefit to property:

"No assessment shall be imposed on any parcel which exceeds the reasonable cost of the proportional special benefit conferred on that parcel."

The below benefit factors, when applied to property in the Assessment Area, confer special benefits to property and ultimately improve the safety, utility, functionality and usability of property in the Assessment Area. These are special benefits to property in the Assessment Area in much the same way that storm drainage, sewer service, water service, lighting, sidewalks and paved streets enhance the safety, utility and functionality of each parcel of property served by these improvements, providing them with more utility of use and making them safer and more usable for occupants.

It should also be noted that Proposition 218 included a requirement that existing assessments in effect upon its effective date were required to be confirmed by either a majority vote of registered voters in the Assessment Area, or by weighted majority property owner approval using the new ballot proceeding requirements. However, certain assessments were excluded from these voter approval requirements. Of note is that in California Constitution Article XIII D Section 5(a) this special exemption was granted to assessments for sidewalks, streets, sewers, water, flood control, drainage systems and vector control. The Howard Jarvis Taxpayers Association explained this exemption in their Statement of Drafter's Intent:

"This is the "traditional purposes" exception. These existing assessments do not need property owner approval to continue. However, future assessments for these traditional purposes are covered."⁴

Therefore, the drafters of Proposition 218 acknowledged that mosquito control assessments were a "traditional" and therefore acknowledged and accepted use.

⁴ Howard Jarvis Taxpayers Association, "Statement of Drafter's Intent", January 1997.

Since all assessments, existing before or after Proposition 218 must be based on special benefit to property, the drafters of Proposition 218 inherently found that mosquito and disease control services confer special benefit on property. Moreover, the statement of drafter's intent also acknowledges that any new or increased mosquito control assessments after the effective date of Proposition 218 would need to comply with the voter approval requirements it established. This is as an acknowledgement that additional assessments for such "traditional" purposes would be established after Proposition 218 was in effect. Therefore, the drafters of Proposition 218 clearly recognized mosquito and disease control assessments as a "traditional" use of assessments, acknowledged that new mosquito and disease assessments may be formed after Proposition 218 and inherently were satisfied that mosquito control services confer special benefit to properties.

The Legislature also made a specific determination after Proposition 218 was enacted that mosquito control services constitute a proper subject for special assessment. Health and Safety Code Section 2082, which was signed into law in 2002, provides that a district may levy special assessments consistent with the requirements of Article XIII D of the California Constitution to finance mosquito and disease control projects and programs. The intent of the Legislature to allow and authorize benefit assessments for mosquito and disease control services after Proposition 218 is shown in the Assembly and Senate analysis the Mosquito Abatement and Vector Control Districts Law where it states that the law:

Allows special benefit assessments to finance vector control projects and programs, consistent with Proposition 218.⁵

Therefore, the State Legislature unanimously found that mosquito and disease control services are a valuable and important public service that can be funded by benefit assessments. To be funded by assessments, mosquito and disease control services must confer special benefit to property.

⁵ Senate Bill 1588, Mosquito Abatement and Vector Control District Law, Legislative bill analysis

Mosquito and Disease Control Is a Special Benefit to Properties

As described below, this Engineer's Report concludes that mosquito and disease control is a special benefit that provides direct advantages to property in the Assessment District. For example, the assessment provides reduced levels of mosquitoes on property throughout the Assessment District. Moreover, the assessment will reduce the risk of the presence of diseases on property throughout the Assessment District, which is another direct advantage received by property in the Assessment District. Moreover, the assessment funds Services that improve the use of property and reduce the nuisance and harm created by mosquitoes on property throughout the Assessment District. These are tangible and direct special benefits that are received by property throughout the specific area covered by the Assessment.

The following section, Benefit Factors, describes how and why mosquito control services specially benefit properties in the Assessment Area. These benefits are particular and distinct from its effect on property in general or the public at large.

Benefit Factors

In order to allocate the assessments, the Engineer identified the types of special benefit arising from the aforementioned mosquito and disease control Services and that would be provided to property within the District. The following benefit factors have been established that represent the types of special benefit to parcels resulting from the Services financed with the assessment proceeds. These types of special benefit are as follows:

Reduced mosquito populations on property and as a result, enhanced desirability, utility, usability and functionality of property in the Assessment District.

The assessments provide enhanced services for the control and abatement of nuisance and disease-carrying mosquitoes. These Services will materially reduce the number of mosquitoes on properties throughout the Assessment District. The lower mosquito populations on property in the Assessment District is a direct advantage to property that will serve to increase the desirability and "usability" of property. Clearly, properties are more desirable and usable in areas with lower mosquito populations and with a reduced risk of mosquito-borne disease. This is a special benefit to residential, commercial, agricultural, industrial and other types of properties because all such properties will directly benefit from reduced mosquito populations and properties with lower mosquito populations are more usable, functional and desirable.

Excessive mosquitoes in the area can materially diminish the utility and usability of property. For example, prior to the commencement of mosquito control and abatement services, properties in many areas in the State were considered to be nearly uninhabitable during the times of year when the mosquito populations were high.⁶ The prevention or reduction of such diminished utility and usability of property caused by mosquitoes is a clear and direct advantage and special benefit to property in the Assessment District.

The State Legislature made the following finding on this issue:

“Excess numbers of mosquitoes and other vectors spread diseases of humans, livestock, and wildlife, reduce enjoyment of outdoor living spaces, both public and private, reduce property values, hinder outdoor work, reduce livestock productivity; and mosquitoes and other vectors can disperse or be transported long distances from their sources and are, therefore, a health risk and a public nuisance; and professional mosquito and vector control based on scientific research has made great advances in reducing mosquito and vector populations and the diseases they transmit.”⁷

Mosquitoes emerge from sources throughout the Assessment District, and with an average flight range of two miles, mosquitoes from known sources can reach all properties in the Assessment District. These sources include standing water in rural areas, such as marshes, pools, wetlands, ponds, drainage ditches, drainage systems, tree holes and other removable sources such as old tires and containers. The sources of mosquitoes also include numerous locations throughout the urban areas in the Assessment District. These sources include underground drainage systems, containers, unmaintained swimming pools, leaks in water pipes, tree holes, flower cups in cemeteries, over-watered landscaping and lawns and many other sources. By controlling mosquitoes at known and new sources, the Services will materially reduce mosquito populations on property throughout the Assessment District.

⁶ Prior to the commencement of modern mosquito control services, areas in the State of California such as the Alameda County, San Mateo Peninsula, Napa County, Lake County and areas in Marin and Sonoma Counties had such high mosquito populations that they were considered to be nearly unlivable during certain times of the year and were largely used for part-time vacation cottages that were occupied primarily during the months when the natural mosquito populations were lower.

⁷ Assembly Concurrent Resolution 52, chaptered April 1, 2003

Unmaintained swimming pools and spas remain important mosquito sources. They can produce large numbers of *Culex* mosquitoes near homes and other properties, creating a mosquito and WNV risk to nearby parcels.⁸ Since 2006, the District has used annual aerial photography to identify unmaintained swimming pools throughout Alameda County. Each year, this program identifies more than 500 unmaintained pools that could otherwise produce large numbers of mosquitoes. District staff proactively inspect these pools to determine whether the water is being maintained. When needed, the District reduces mosquito production by applying mosquitofish or long-lasting mosquito control products. This proactive program helps identify and control WNV vector sources that may not be reported by residents or visible during routine inspections from the front of the property.

Increased safety of property in the Assessment District.

The Assessments result in improved year-round proactive Services to control and abate mosquitoes that otherwise would occupy properties throughout the Assessment District. Mosquitoes are transmitters of diseases, so the reduction of mosquito populations makes property safer for use and enjoyment. In the absence of the assessments, these Services would not be provided, so the Services funded by the assessments make properties in the Assessment District safer, which is a distinct special benefit to property in the Assessment District.⁹ This is not a general benefit to property in the Assessment District or the public at large because the Services are tangible mosquito and disease control services that are provided directly to the properties in the Assessment District and the Services are over and above what otherwise would be provided by the District or any other agency.

This finding was confirmed in 2003 by the State Legislature:

“Mosquitoes and other vectors, including but not limited to, ticks, Africanized honey bees, rats, fleas, and flies, continue to be a source of human suffering, illness, death, and a public nuisance in California and around the world. Adequately funded mosquito and vector control, monitoring and public awareness programs are the best way to prevent outbreaks of West Nile Virus and other diseases borne by mosquitoes and other vectors.”¹⁰

⁸ California Department of Public Health, Vector-Borne Disease Section. *Best Management Practices for Mosquito Control in California: A Manual for Landowners and Land Managers*. May 2023. Available at: <https://westnile.ca.gov>

⁹ By reducing the risk of disease and increasing the safety of property, the Services will materially increase the usefulness and desirability of certain properties in the Assessment Area.

¹⁰ Assembly Concurrent Resolution 52, chaptered April 1, 2003

Also, the Legislature, in Health and Safety Code Section 2001, finds that:

“The protection of Californians and their communities against the discomforts and economic effects of vectorborne diseases is an essential public service that is vital to public health, safety, and welfare.”

Reductions in the risk of new diseases and infections on property in the Assessment District.

Mosquitoes have proven to be a major contributor to the spread of new diseases such as West Nile virus, among others. A highly mobile population combined with migratory bird patterns can introduce new mosquito-borne diseases into previously unexposed areas.

West Nile virus remains the leading domestic arboviral disease in the United States. The Centers for Disease Control and Prevention (CDC) reported that in 2023, “West Nile virus (WNV) was the most commonly reported domestic arboviral disease,” accounting for 95% of reported domestic arboviral disease cases. CDC identified 2,628 WNV disease cases in 692 counties across 46 states. Of those, 194 patients died, representing approximately 7% of reported WNV cases.¹¹

A study using 12 years of surveillance and control data from the Sacramento-Yolo Mosquito and Vector Control District found that aerial adulticide applications reduced abundance of the primary WNV vectors, *Culex tarsalis* and *Culex pipiens*. The authors concluded that “aerial adulticides are effective for achieving a rapid short-term reduction of the abundance of the primary West Nile virus vectors, *Cx. tarsalis* and *Cx. pipiens*.”¹²

A recent study of travel-associated mosquito-borne infections described malaria, dengue, chikungunya, and Zika as diseases of concern for travelers and noted that:

“These four mosquito-borne infections are known to have epidemic potential and constitute a growing public health concern due to globalization, increased human mobility and climate change, particularly dengue with markedly increasing trends in incidence, mortality and burden over the past three decades. International travelers acquire these diseases while travelling in endemic areas and upon return infected

¹¹ Padda H, Jacobs D, Gould CV, Sutter R, Lehman J, Staples JE, Lyons S. “West Nile Virus and Other Nationally Notifiable Arboviral Diseases, United States, 2023.” *Morbidity and Mortality Weekly Report (MMWR)* 74, no. 21 (2025): 358–364. Centers for Disease Control and Prevention.

¹² Holcomb, K. M., Reiner, R. C., and Barker, C. M. “Spatio-temporal impacts of aerial adulticide applications on populations of West Nile virus vector mosquitoes.” *Parasites & Vectors* 14, 104 (2021)

travelers can lead to autochthonous transmission in areas with high density of Aedes mosquitoes resulting in local outbreaks and contributing to the spread of these diseases into non-endemic areas.”¹³

The Services funded by the assessments help prevent on a year-round basis the presence of mosquito-borne diseases on property in the Assessment District. This is another tangible and direct special benefit to property in the Assessment District that would not be received in the absence of the assessments.

Protection of economic activity on property in the Assessment District.

Mosquitoes hinder, annoy and harm residents, guests, visitors, farm workers and employees. A mosquito-borne disease outbreak would have a drastic negative effect on agricultural, business and residential activities in the Assessment District.

¹³ Boggild, A. K., et al. “Impact, healthcare utilization and costs of travel-associated mosquito-borne infections.” *Journal of Travel Medicine* 30, no. 7 (2023)

Recent infectious disease outbreaks have demonstrated that public health threats disrupt economic activity. For example, a 2024 economic analysis of the COVID-19 pandemic found sharp reductions in consumer spending, business revenue and employment.¹⁴ Mosquito-borne disease outbreaks result in increased medical costs, public agency response costs and broader economic losses from worker illness, and impacts to businesses and tourism.¹⁵ The economic and public-health impact of mosquito-borne disease in the U.S. is well documented. In 2021, Maricopa County, Arizona experienced the largest recorded WNV outbreak in a single U.S. county, with 1,487 cases, 1,014 hospitalizations (68%), and 101 deaths. CDC reported that the outbreak “tax[ed] a stressed health care system,”¹⁶ illustrating how mosquito-borne disease outbreaks can create substantial medical costs, public agency response costs and disruption to community activity. This risk is not limited to WNV. In 2024, CDC reported 3,798 dengue cases among residents of U.S. states, including locally acquired cases in Florida, California and Texas.¹⁷ These recent WNV and dengue events show that mosquito-borne diseases can create substantial public-health and economic impacts where the mosquito vectors are present.¹⁸

The Services funded by the assessment help prevent the likelihood of such outbreaks on property in the Assessment District and will reduce the harm to economic activity on property caused by existing mosquito populations. This is another direct advantage received by property in the Assessment District that would not be received in the absence of the assessments.

¹⁴ Chetty, R., Friedman, J. N., Stepner, M., and the Opportunity Insights Team. “The Economic Impacts of COVID-19: Evidence from a New Public Database Built Using Private Sector Data.” *The Quarterly Journal of Economics* 139, no. 2 (2024): 829–889

¹⁵ Lee, B. Y., et al. “The macroeconomic impact of a dengue outbreak: Case studies from Thailand and Brazil.” *PLOS Neglected Tropical Diseases* 18, no. 6 (2024)

¹⁶ Dale, K., et al. “Unprecedented Outbreak of West Nile Virus, Maricopa County, Arizona, 2021.” *MMWR* 72, no. 17 (2023): 452–457. Centers for Disease Control and Prevention

¹⁷ Kiplagat SJ, et al. “Increase in Travel-Associated and Locally Acquired Dengue Cases — United States, 2024.” *MMWR* 75, no. 18 (2026): 227–233. Centers for Disease Control and Prevention

¹⁸ Jones, F. K., et al. “Introduction and Spread of Dengue Virus 3, Florida, USA, May 2022–April 2023.” *Emerging Infectious Diseases* 30, no. 2 (2024): 376–379

Protection of Assessment District's agriculture, tourism, and business industries.

The agriculture, tourism and business industries will benefit from reduced levels of nuisance or disease-vector mosquitoes. High mosquito abundance can limit outdoor work and customer use of outdoor spaces, while mosquito-borne disease activity can create public-health, veterinary and economic impacts. West Nile virus remains relevant to animal health as well as human health. The California Department of Food and Agriculture reports that more than 27,000 horses in the United States had been infected with WNV as of 2015, and the agency continues to monitor equine neurologic cases for WNV in California.¹⁹ Invasive mosquitoes and the diseases they can transmit create economic concerns. A 2024 global analysis estimated that invasive *Aedes* mosquitoes and *Aedes*-borne diseases caused at least \$94.7 billion in economic impacts through 2020, while noting that these costs are likely underestimated and expected to increase.²⁰

By reducing mosquito abundance and mosquito-borne disease risk, the Services help protect property use, outdoor economic activity, animal health and the employees, residents, customers and visitors who use properties in the Assessment District. This is a direct advantage and special benefit to property in the Assessment District.

Reduced risk of nuisance and liability on property in the Assessment District.

In addition to mosquito-borne disease risks, uncontrolled mosquito populations create a nuisance and health risk (e.g. allergic reactions, secondary infections from mosquito bites) for the occupants of property in the Assessment District. Properties in the Assessment District, therefore, benefit from the reduced nuisance factor that is created by the Services. Agricultural and rangeland properties also benefit from the reduced nuisance factor and harm to livestock and employees from lower mosquito populations.

¹⁹ California Department of Food and Agriculture, Animal Health Branch. "Equine West Nile Virus." Accessed May 27, 2026. https://www.cdffa.ca.gov/ahfss/Animal_Health/wnv_info.html

²⁰ Bradshaw, C. J. A., et al. "The rising global economic costs of invasive *Aedes* mosquitoes and *Aedes*-borne diseases." *Science of the Total Environment* 947 (2024)

Agricultural, range, golf course, cemetery, open space and other such lands in the Assessment District contain large areas of mosquito habitat and are therefore a significant source of mosquito populations. In addition, residential and business properties in the Assessment District can also contain significant sources.²¹ It is conceivable that sources of mosquitoes could be held liable for the transmission of diseases or other harm. According to California Health and Safety Code 2061:

2061 (a) Whenever a public nuisance exists on any property within a district or on any property that is located outside the district from which vectors may enter the district, the board of trustees may notify the owner of the property of the existence of the public nuisance.

(b) The notice required by subdivision (a) shall do all of the following:

(1) State that a public nuisance exists on the property, describe the public nuisance, and describe the location of the public nuisance on the property.

(2) Direct the owner of the property to abate the nuisance within a specified time.

(3) Direct the owner of the property to take any necessary action within a specified time to prevent the recurrence of the public nuisance.

(4) Inform the owner of the property that the failure to comply with the requirements of the notice within the specified times may result in the district taking the necessary actions, and that the owner shall be liable for paying the costs of the district's actions.

(5) Inform the owner of the property that the failure to comply with the requirements of the notice within the specified times may result in the imposition of civil penalties of up to one thousand dollars (\$1,000) per day for each day that the public nuisance continues after the specified times.

(6) Inform the owner of the property that before complying with the requirements of the notice, the owner may appear at a hearing of the board of trustees at a time and place stated in the notice.

The Services serve to protect the businesses and industries in the Assessment District. This is a direct advantage and a special benefit to property in the Assessment District.

²¹ Sources of mosquitoes on residential, business, agricultural, range and other types of properties include removable sources such as containers that hold standing water.

Improved marketability of property.

As described previously, the Services specially benefit properties in the Assessment District by making them more useable, livable, functional and desirable. Reduced mosquito abundance and reduced mosquito-borne disease risk improve the ability of residents, employees, customers and visitors to use outdoor areas of property. Economic valuation studies have found that residents are willing to pay for mosquito control services that reduce nuisance mosquitoes and mosquito-borne disease risk.²² These benefits support the marketability and desirability of property in the Assessment District and represent another tangible and direct special benefit that would not be received in the absence of the Services.

Benefit Finding

In summary, the special benefits described in this Report and the expansion of Services in the Assessment District directly benefit and protect the real properties in the Abatement District in excess of the assessments for these properties. Therefore, the assessment engineer finds that the cumulative special benefits to property from the Services are reasonably equal to or greater than the annual assessment amount per benefit unit.

General Versus Special Benefit

Article XIII C of the California Constitution requires any local agency proposing to increase or impose a benefit assessment to “separate the general benefits from the special benefits conferred on a parcel.” The rationale for separating special and general benefits is to ensure that property owners subject to the benefit assessment are not paying for general benefits. The assessment can fund the special benefits to property in the Assessment Area but cannot fund any general benefits. Accordingly, a separate estimate of the special and general benefit is given in this section.

In other words:

<i>Total Benefit</i>	=	<i>General Benefit</i>	+	<i>Special Benefit</i>
----------------------	---	------------------------	---	------------------------

²² Dickinson, K. L., et al. “Public Acceptance of and Willingness to Pay for Mosquito Control, Texas, USA.” *Emerging Infectious Diseases* 28, no. 2 (2022): 449–458.

There is no widely-accepted or statutory formula for general benefit from mosquito and disease control services. General benefits are benefits from improvements or services that are not special in nature, are not “particular and distinct” and are not “over and above” benefits received by other properties. General benefits are conferred to properties located “in the district,”²³ but outside the narrowly-drawn Assessment District and to “the public at large.” *Silicon Valley* provides some clarification by indicating that general benefits provide “an indirect, derivative advantage” and are not necessarily proximate to the improvements and services funded by the assessments.

A formula to estimate the general benefit is listed below:

	<i>1.) Benefit to Real Property Outside the Assessment District</i>
+	<i>2.) Benefit to Real Property Inside the Assessment District that is Indirect and Derivative</i>
+	<i>3.) Benefit to the Public at Large</i>
=	<i>General Benefit</i>

²³ *Silicon Valley* explains as follows:

OSA observes that Proposition 218’s definition of “special benefit” presents a paradox when considered with its definition of “district.” Section 2, subdivision (i) defines a “special benefit” as “a particular and distinct benefit over and above general benefits conferred on real property located in the district or to the public at large.” (Art. XIII D, § 2, subd. (i), italics added.) Section 2, subdivision (d) defines “district” as “an area determined by an agency to contains all parcels which will receive a special benefit from a proposed public improvement or property-related service.” (Art. XIII D, § 2, subd. (d), italics added.) In a well-drawn district — limited to only parcels receiving special benefits from the improvement — every parcel within that district receives a shared special benefit. Under section 2, subdivision (i), these benefits can be construed as being general benefits since they are not “particular and distinct” and are not “over and above” the benefits received by other properties “located in the district.”

Special benefit, on the other hand, is defined in the state constitution as “a particular and distinct benefit over and above general benefits conferred on real property located in the district or to the public at large.” The *Silicon Valley* decision indicates that a special benefit is conferred to a property if it “receives a direct advantage from the improvement (e.g., proximity to a park).” In this assessment, the overwhelming proportion of the benefits conferred to property is special, since the advantages from the mosquito and disease control/protection funded by the Assessments are directly received by the properties in the Assessment District and are only minimally received by property outside the Assessment District or the public at large.

Proposition 218 twice uses the phrase “over and above” general benefits in describing special benefit. (Art. XIII D, sections 2(i) & 4(f).) There currently are some mosquito and disease control related services being provided to the Assessment District area. Consequently, there currently are some mosquito control related benefits being provided to the Assessment District and any new and extended service provided by the District would be over and above this baseline. Arguably, all of the Services funded by the assessment therefore are a special benefit because the additional Services would particularly and distinctly benefit and protect the Assessment District over and above the previous baseline benefits and service.

Nevertheless, arguably some of the Services would benefit the public at large and properties outside the Assessment District. In this report, the general benefit is conservatively estimated and described, and then budgeted so that it is funded by sources other than the assessment.

In the 2009 *Dahms* case, the court upheld an assessment that was 100% special benefit on the rationale that the services funded by the assessments were directly provided to property in the assessment district. Similar to the assessments in Pomona that were validated by *Dahms*, the Assessments described in this Engineer’s Report fund mosquito and disease control services directly provided to property in the assessment area. Moreover, as noted in this Report, the Services directly reduce mosquito and vector populations on all property in the assessment area. Therefore, *Dahms* establishes a basis for minimal or zero general benefits from the Assessments. However, in this report, the general benefit is more conservatively estimated and described, and then budgeted so that it is funded by sources other than the assessment.

Calculating General Benefit

Without this assessment the District would lack the funds to extend the additional Services to the Assessment District. The only additional service that is being provided is the vector control program assessment-funded Services. Consistent with footnote 8 of *Silicon Valley*, and for the reasons described above, the District has determined that all parcels in the Assessment District receive a shared direct advantage and special benefit from the Services. The Services directly and particularly serve and benefit each parcel, and are not a mere indirect, derivative advantage. As explained above, Proposition 218 relies on the concept of “over and above” in distinguishing special benefits from general benefits. As applied to an assessment proceeding concurrent with the annexation this concept means that all mosquito and disease control services, which provide direct advantage to property in the Assessment District, are over and above the baseline and therefore are special.

Nevertheless, the Services provide a degree of general benefit, in addition to the predominant special benefit. This section provides a conservative measure of the general benefits from the assessments.

Benefit to Property Outside the District

Properties within the Assessment District receive almost all of the special benefits from the Services because the Services funded by the Assessments are provided directly to protect property within the Assessment District from mosquitoes and mosquito-borne diseases. However, properties adjacent to, but just outside of, the District boundaries may receive some benefit from the Services in the form of reduced mosquito populations on property outside the Assessment District. Since this benefit, is conferred to properties outside the district boundaries, it contributes to the overall general benefit calculation and will not be funded by the assessment.

A measure of this general benefit is the proportion of Services that would affect properties outside of the Assessment District. Each year, the District will provide some of its Services in areas near the boundaries of the Assessment District. By abating mosquito populations near the borders of the Assessment District, the Services could provide benefits in the form of reduced mosquito populations and reduced risk of disease transmission to properties outside the Assessment District. If mosquitoes were not controlled inside the Assessment District, more of them would fly from the Assessment District. Therefore, control of mosquitoes within the Assessment District provides some benefit to properties outside the Assessment District but within the normal flight range of mosquitoes, in the form of reduced mosquito populations and reduced mosquito-borne disease transmission. This is a measure of the general benefits to property outside the Assessment District because this is a benefit from the Services that is not specially conferred upon property in the assessment area.

The mosquito potential outside the Assessment District is based on studies of mosquito dispersion concentrations. Mosquitoes can travel up to two miles, on average, so this destination range is used. Based on studies of mosquito destinations, relative to parcels in the Assessment District average concentration of mosquitoes from the Assessment District on properties within two miles of the Assessment District is calculated to be 6%.²⁴ This relative mosquito population reduction factor within the destination range is combined with the number of parcels outside the Assessment District and within the destination range to measure this general benefit and is calculated as follows:

Mosquitoes may fly up to 2 miles from their breeding source.

38,786 parcels within 2 miles of, but outside of the District, MAY receive some mosquito and disease protection benefit

6% portion of relative benefit that is received of the

436,350 Parcels in the District

Calculation:

Total Benefit = 38,786 parcels * 6% = 2,327 parcels equivalents

²⁴ Tietze, Noor S., Stephenson, Mike F., Sidhom, Nader T. and Binding, Paul L., "Mark-Recapture of *Culex Erythrothorax* in Santa Cruz County, California", Journal of the American Mosquito Control Association, 19(2):134-138, 2003.

Therefore, for the overall benefits provided by the Services to the Assessment District, it is determined that 0.53% of the benefits would be received by the parcels within two miles of the Assessment District boundaries. Recognizing that this calculation is an approximation, this benefit will be rounded up to 1.0%.

Benefit to Property *Inside* the District that is *Indirect and Derivative*

The “indirect and derivative” benefit to property within the Assessment District is particularly difficult to calculate. As explained above, all benefit within the Assessment District is special because the mosquito and disease control services in the Assessment District would provide direct service and protection that is clearly “over and above” and “particular and distinct” when compared with the level of such protection under current conditions. Further the properties are within the Assessment District boundaries and this Engineer’s Report demonstrates the direct benefits received by individual properties from mosquito and disease control services.

In determining the Assessment District area, the District was careful to limit it to an area of parcels that will directly receive the Services. All parcels directly benefit from the surveillance, monitoring and treatment provided on an equivalent basis throughout the Assessment District in order to maintain the same improved level of protection against mosquitoes and reduced mosquito populations throughout the area. The surveillance and monitoring sites are spread on a balanced basis throughout the area. Mosquito control and treatment is provided as needed throughout the area based on the surveillance and monitoring results. The shared special benefit - reduced mosquito levels and reduced presence of mosquito-borne diseases - is received on an equivalent basis by all parcels in the Assessment District. Furthermore, all parcels in the Assessment District directly benefit from the ability to request service from the District and to have a District field technician promptly respond directly to the parcel and address the owner’s or resident’s service need.

The *Silicon Valley* decision indicates that the fact that a benefit is conferred throughout the Assessment District area does not make the benefit general rather than special, so long as the Assessment district is narrowly drawn and limited to the parcels directly receiving shared special benefits from the service. This concept is particularly applicable in situations involving a landowner-approved assessment-funded extension of a local government service to benefit lands previously not receiving that particular service. The District therefore concludes that, other than the small general benefit to properties outside the Assessment District (discussed above) and to the public at large (discussed below), all of the benefits of the Services to the parcels within the Assessment District are special benefits and it is not possible or appropriate to separate any general benefits from the benefits conferred on parcels in the Assessment District.

Benefit To The Public At Large

With the type and scope of Services provided to the Assessment District, it is very difficult to calculate and quantify the scope of the general benefit conferred on the public at large. Because the Services directly serve and benefit all of the property in the Assessment Area, any general benefit conferred on the public at large is small. Nevertheless, there is some indirect general benefit to the public at large.

The public at large uses the public highways, streets and sidewalks, and when traveling in and through the Assessment Area they will benefit from the Services. A fair and appropriate measure of the general benefit to the public at large therefore is the amount of highway, street and sidewalk area within the Assessment Area relative to the overall land area. An analysis of maps of the Assessment Area shows that approximately 6% of the land area in the Assessment Area is covered by highways, streets and sidewalks. This 6% therefore is a fair and appropriate measure of the general benefit to the public at large within the Assessment Area

Summary of General Benefits

Using a sum of the measures of general benefit for the public at large and land outside the Assessment Area, we find that approximately 7.0% of the benefits conferred by the Mosquito and Disease Control Assessment may be general in nature and should be funded by sources other than the Assessment.

General Benefit Calculation

$$\begin{aligned}
 &1.0\% \quad (\text{Outside the Assessment District}) \\
 &+ 0.0\% \quad (\text{Property within the Assessment District}) \\
 &+ \underline{6.0\%} \quad (\text{Public at Large}) \\
 &= 7.0\% \quad (\text{Total General Benefit})
 \end{aligned}$$

Although this analysis supports the findings that 7.0% of the assessment may provide general benefit only, this number is increased by the Assessment Engineer to 10% to conservatively ensure that no assessment revenue is used to support general benefit. This additional amount allocated to general benefit also covers general benefit to parcels in the Assessment Area if it is later determined that there is some general benefit conferred on those parcels.

The District's estimated budget is \$6,799,392 of which \$1,378,884 is funded by the Mosquito and Disease Control Assessment. The District will contribute more than 79.72% of the total budget from other funding sources, effectively offsetting any general benefits associated with the Assessment.

Zones of Benefit

The District's mosquito and disease control programs, projects and Services that are funded by the Mosquito and Disease Control Assessment are provided in all areas within the District. Parcels of similar type in the District would receive similar mosquito abatement benefits on a per parcel and land area basis. Therefore, zones of benefit are not justified.

The *Silicon Valley* decision indicates:

In a well-drawn district — limited to only parcels receiving special benefits from the improvement — every parcel within that district receives a shared special benefit. Under section 2, subdivision (i), these benefits can be construed as being general benefits since they are not "particular and distinct" and are not "over and above" the benefits received by other properties "located in the district."

We do not believe that the voters intended to invalidate an assessment district that is narrowly drawn to include only properties directly benefiting from an improvement. Indeed, the ballot materials reflect

otherwise. Thus, if an assessment district is narrowly drawn, the fact that a benefit is conferred throughout the district does not make it general rather than special. In that circumstance, the characterization of a benefit may depend on whether the parcel receives a direct advantage from the improvement (e.g., proximity to park) or receives an indirect, derivative advantage resulting from the overall public benefits of the improvement (e.g., general enhancement of the district's property values).

In the Assessment Area, the advantage that each parcel receives from the Services is direct and the boundary for the Service Area is narrowly drawn so the Service Area includes parcels that receive similar levels of benefit from the Services. Therefore, the even spread of assessment for similar properties in the narrowly drawn Service Area within the Program is indeed consistent with the *Silicon Valley* decision.

Method of Assessment

As previously discussed, the Assessments fund enhanced, comprehensive, year-round mosquito control, disease surveillance and control Services that will reduce mosquito populations on property and will clearly confer special benefits to properties in the Assessment Area. These benefits can also partially be measured by the occupants on property in the Improvement District because such parcel population density is a measure of the relative benefit a parcel receives from the Improvements. Therefore, the apportionment of benefit is partially based the population density of parcels. It should be noted that many other types of “traditional” assessments also use parcel population densities to apportion the assessments. For example, the assessments for sewer systems, roads and water systems are typically allocated based on the population density of the parcels assessed.

Moreover, assessments have a long history of use in California and are in large part based on the principle that any benefits from a service or improvement funded by assessments that is enjoyed by tenants and other non-property owners ultimately is conferred directly to the underlying property.²⁵

²⁵ For example, in *Federal Construction Co. v. Ensign* (1922) 59 Cal.App. 200 at 211, the appellate court determined that a sewer system specially benefited property even though the direct benefit was to the people who used the sewers: “Practically every inhabitant of a city either is the owner of the land on which he resides or on which he pursues his vocation, or he is the tenant of the owner, or is the agent or servant of such owner or of such tenant. And since it is the inhabitants who make by far the greater use of a city’s sewer system, it is to them, as lot owners or as tenants, or as the servants or agents of such lot owners or tenants, that the

With regard to benefits and source locations, the assessment engineer determined that since mosquitoes readily fly from their breeding locations to all properties in their flight range and since mosquitoes are actually attracted to properties occupied by people or animals, the benefits from mosquito control extend beyond the source locations to all properties that would be a “destination” for mosquitoes. In other words, the control and abatement of mosquito populations ultimately confers benefits to all properties that are a destination of mosquitoes, rather than just those that are sources of mosquitoes.

Although some primary mosquito sources may be located outside of residential areas, residential properties can and do generate their own, often significant, populations of mosquitoes and other organisms. For example, storm water basins in residential areas are a common source of mosquitoes. Since the typical flight range for a female mosquito, on average is 2 miles, most homes in the Assessment Area are within the flight zone of many mosquito sources. Moreover, there are many other common residential sources of mosquitoes, such as miscellaneous backyard containers, unmaintained swimming pools, leaking water pipes and tree holes. Clearly, there is a potential for mosquito sources on virtually all types of property. More importantly, all properties in the Assessment Area are within the destination range of mosquitoes and most properties are actually within the destination range of multiple mosquito source locations.

Because the Services are provided throughout the Assessment District with the same level of control objective in each zone, mosquitoes can rapidly and readily fly from their breeding locations to other properties over a large area, and because there are current or potential breeding sources literally everywhere in the Assessment District, the Assessment Engineer determined that all similar properties in the Assessment District have generally equivalent mosquito “destination” potential and, therefore, receive equivalent levels of benefit throughout the Assessment District.

In the process of determining the appropriate method of assessment, the Engineer considered various alternatives. For example, a fixed assessment amount per parcel for all residential improved property was considered but was determined to be inappropriate because agricultural lands, commercial property and other property also receive benefits from the assessments. Likewise, an assessment exclusively for agricultural land was considered but deemed inappropriate because other types of property, such as residential and commercial, also receive the special benefit factors described previously.

advantages of actual use will redound. But this advantage of use means that, in the final analysis, it is the lot owners themselves who will be especially benefited in a financial sense.”

A fixed or flat assessment was deemed to be inappropriate because larger residential, commercial and industrial properties receive a higher degree of benefit than other similarly used properties that are significantly smaller. (For two properties used for commercial purposes, there is clearly a higher benefit provided to a property that covers several acres in comparison to a smaller commercial property that is on a 0.25 acre site. The larger property generally has a larger coverage area and higher usage by employees, customers, tourists and guests that would benefit from reduced mosquito populations, as well as the reduced threat from diseases carried by mosquitoes. This benefit ultimately flows to the property.) Larger commercial, industrial and apartment parcels, therefore, receive an increased benefit from the assessments.

In conclusion, the assessment engineer determined that the appropriate method of assessment apportionment should be based on the type and use of property, the relative size of the property its relative population and usage potential, and its destination potential for mosquitoes. This method is further described below.

Assessment Apportionment

The special benefits derived from the Mosquito and Disease Control Assessment are conferred on property and are not based on a specific property owner's occupancy of property or the property owner's demographic status, such as age or number of dependents. However, it is ultimately people who do or could use the property and who enjoy the special benefits described above. The opportunity to use and enjoy property within the Assessment District without the excessive nuisance, diminished "livability" or the potential health hazards brought by mosquitoes and the diseases they carry is a special benefit to properties in the Assessment District. This benefit can be in part measured by the number of people who potentially live on, work at, visit or otherwise use the property, because people ultimately determine the value of the benefits by choosing to live, work and/or recreate in the area, and by choosing to purchase property in the area.²⁶

²⁶ It should be noted that the benefits conferred upon property are related to the average number of people who could potentially live on, work at or otherwise could use a property, not how the property is currently used by the present owner.

In order to apportion the cost of the Services to property, each property in the Assessment District is assigned a relative special benefit factor. This process involves determining the relative benefit received by each property in relation to a single-family home, or, in other words, on the basis of Single-Family Equivalents (SFE). This SFE methodology is commonly used to distribute assessments in proportion to estimated special benefit. For the purposes of this Engineer's Report, all properties are designated a SFE value, which is each property's relative benefit in relation to a "benchmark" parcel in the Assessment District. The "benchmark" property is the single-family detached dwelling on a parcel of less than one acre. This benchmark parcel is assigned one Single Family Equivalent benefit unit or one SFE.

The special benefit conferred upon a specific parcel is derived as a sum function of the applicable special benefit type (such as improved safety (i.e. disease risk reduction) on a parcel for a mosquito assessment) and a parcel-specific attributes (such as the number of residents living on the parcel for a mosquito assessment) which supports that special benefit. Calculated special benefit increases accordingly with an increase in the product of special benefit type and supportive parcel-specific attribute.

The calculation of the special benefit per parcel is summarized in the following equation:

$$\text{Special Benefit}_{(\text{per parcel})} = \sum f(\text{Special Benefits, Property Specific Attributes}^1)_{(\text{per parcel})}$$

¹. Such as use, property type, and size.

Residential Properties

Certain residential properties in the Abatement District that contain a single residential dwelling unit and are on a lot of less than or equal to one acre are assigned one Single Family Equivalent or 1.0 SFE. Traditional houses, zero-lot line houses, and town homes are included in this category of single-family residential property.

Single family residential properties in excess of one acre receive additional benefit relative to a single-family home on up to one acre, because the larger parcels provide more area for mosquito sources and the mosquito and disease control Services. Therefore, such larger parcels receive additional benefits relative to a single-family home on less than one acre and are assigned 1.0 SFE for the residential unit and an additional rate equal to the agricultural rate described below of 0.0021 SFE per one-fourth acre of land area in excess of one acre. Mobile home parcels on a separate parcel and in excess of one acre also receive this additional acreage rate.

Other types of properties with residential units, such as agricultural properties, are assigned the residential SFE rates for the dwelling units on the property and are assigned additional SFE benefit units for the agricultural-use land area on the property.

Properties with more than one residential unit are designated as multi-family residential properties. These properties, along with condominiums, benefit from the Services in proportion to the number of dwelling units that occupy each property, the average number of people who reside in each property and the average size of each property in relation to a single-family home in the District. This Report analyzed Alameda County population density factors from the 2000 U.S. Census as well as average dwelling unit size for each property type. After determining the Population Density Factor and Square Footage Factor for each property type, an SFE rate is generated for each residential property structure, as indicated in Figure 2 below.

The SFE factor of 0.46 per dwelling unit for multifamily residential properties applies to such properties with two to four units (duplex, triplex, fourplex). Properties in excess of 5 units typically offer on-site management, monitoring and other control services that tend to offset some of the benefits provided by the Mosquito Abatement District. Therefore, the benefit for properties in excess of 5 units is determined to be .32 SFE per unit for the first 20 units and 0.10 SFE per each additional unit in excess of 20 dwelling units.

Figure 2– Residential Assessment Factors

Type of Residential Property	Total Population	Occupied Households	Persons per Household	Pop. Density Equivalent	SqFt Factor	Proposed Rate
Single Family Residential	866,596	284,662	3.04	1.00	1.00	1.00
Condominium	103,373	37,417	2.76	0.91	0.66	0.60
Duplex, Triplex, Fourplex	144,626	57,815	2.50	0.82	0.56	0.46
Multi-Family Residential (5+ Units)	286,957	136,173	2.11	0.69	0.47	0.32
Mobile Home on Separate Lot	13,464	6,660	2.02	0.66	0.41	0.27

Source: 2000 Census, Alameda County, and property dwelling size information from the Alameda County Assessor data and other sources.

Commercial/Industrial Properties

Commercial and industrial properties receive relatively lower levels of benefit in comparison to a single-family home because they are generally open and operated for more limited times and employees of indoor businesses tend to spend less time outdoors. Since the hours of operation and the potential exposure to mosquitoes are measures of relative benefit, commercial and industrial properties receive lower relative levels of benefit. Therefore, commercial and industrial properties are determined to receive 0.50 SFE of benefit per one-quarter acre (10,890 square feet) of land area.

The SFE values for various commercial and industrial land uses are further defined by using average employee densities because the special benefit factors described previously are also related to the average number of people who work at commercial/industrial properties.

To determine employee density factors, this Report utilizes the findings from the San Diego County Association of Governments Traffic Generators Study (the "SANDAG Study") because these findings were approved by the State Legislature which determined the SANDAG Study to be a good representation of the average number of employees per acre of land area for commercial and industrial properties. As determined by the SANDAG Study, the average number of employees per acre for commercial and industrial property is 24. As presented in Figure 3, the SFE factors for other types of businesses are determined relative to their typical employee density in relation to the average of 24 employees per acre of commercial property.

Self-storage and golf course property benefit factors are similarly based on average usage densities. Figure 3 below lists the benefit assessment factors for such business properties.

Figure 3 – Commercial/Industrial Benefit Assessment Factors

<i>Type of Commercial/ Industrial Land Use</i>	<i>Average Employees Per Acre ¹</i>	<i>SFE Units per Fraction Acre ²</i>	<i>SFE Units per Acre After 5</i>
Commercial	24	0.500	0.500
Office	68	1.420	1.420
Shopping Center	24	0.500	0.500
Industrial	24	0.500	0.500

¹. Source: San Diego Association of Governments Traffic Generators Study, University of California, Davis and other studies and sources.

². The SFE factors for commercial and industrial parcels indicated above are applied to each fourth acre of building area or portion thereof. (Therefore, the SFE rate for any assessable parcel with 10,890 square feet or less in these categories is the SFE Units listed above.)

Agricultural, Rangeland, and Cemetery Properties

Utilizing research and agricultural employment reports from UC Davis and the California Employment Development Department and other sources, this Report calculated an average usage density of 0.05 people per acre for agriculture property, 0.01 for rangelands and timber and .10 for cemeteries. Since these properties typically are a source of mosquitoes and/or are typically closest to other sources of mosquitoes, it is reasonable to determine that the benefit to these properties is twice the usage density ratio of commercial and industrial properties. The SFE factors per 0.25 acres of land area are shown in the following Figure 4 below.

Figure 4 – Other Land Benefit Assessment Factors

<i>Other Types of Land Use</i>	<i>Average Employees Per Acre ¹</i>	<i>SFE Units per 1/4 Acre ²</i>
Self-Storage or Parking Lot	1.00	0.021
Wineries	12.00	0.250
Golf Course	3.00	0.063
Cemeteries	0.10	0.050
Agriculture / Vineyards	0.05	0.0021
Timberland / Dry Rangeland	0.01	0.00042

¹. Source: San Diego Association of Governments Traffic Generators Study, University of California, Davis and other studies and sources.

². The SFE factors for commercial and industrial parcels indicated above are applied to each fourth acre of land area or portion thereof. (Therefore, the minimum assessment for any assessable parcel in these categories is the SFE Units listed herein.)

Other Properties

Article XIII D stipulates that publicly owned properties must be assessed unless those properties are reasonably determined to receive no special benefit from the assessment. All properties that are specially benefited are assessed. Publicly owned property that is used for purposes similar to private residential, commercial, industrial or institutional uses is benefited and assessed at the same rate as such privately owned property.

Other public properties such as watershed parcels, parks, open space parcels are determined to, on average, receive similar benefits as a single-family home. Therefore, such parcels are assessed an SFE benefit factor of 1. Miscellaneous, small and other parcels such as roads, right-of-way parcels, and common areas typically do not generate significant numbers of employees, residents, customers or guests and have limited economic value. These miscellaneous parcels receive minimal benefit from the services and are assessed an SFE benefit factor of 0.

Church parcels, institutional properties, and property used for educational purposes typically generate employees on a less consistent basis than other non-residential parcels. Many of these properties with higher population factors provide on-site management, monitoring and other control services that tend to offset some of the benefits provided by the District. Therefore, these parcels are determined to, on average, receive similar benefits as a single-family home. Therefore, such parcels are assessed an SFE benefit factor of 1.

Miscellaneous, small and other parcels such as roads, right-of-way parcels, and common areas typically do not generate significant numbers of employees, residents, customers or guests and have limited economic value. These miscellaneous parcels receive minimal benefit from the Services and are assessed an SFE benefit factor of 0.

Duration of Assessment

It is proposed that the Assessment be levied for fiscal year 2026-27 and continued every year thereafter, so long as mosquitoes remain in existence and the Alameda County Mosquito Abatement District requires funding from the Assessment for its Services in the District. As noted previously, if the Assessment and the duration of the Assessment are approved by property owners in an assessment ballot proceeding, the Assessment can continue to be levied annually after the Alameda County Mosquito Abatement District Board of Trustees approves an annually updated Engineer's Report, budget for the Assessment, Services to be provided, and other specifics of the Assessment. In addition, the District Board of Trustees must hold an annual public hearing to continue the Assessment.

Appeals and Interpretation

Any property owner who feels that the assessment levied on the subject property is in error as a result of incorrect information being used to apply the foregoing method of assessment, may file a written appeal with the General Manager of the Alameda County Mosquito Abatement District or his or her designee. Any such appeal is limited to correction of an assessment during the then current fiscal year or, if before July 1, the upcoming fiscal year. Upon the filing of any such appeal, the General Manager or his or her designee will promptly review the appeal and any information provided by the property owner. If the General Manager or his or her designee finds that the assessment should be modified, the appropriate changes shall be made to the assessment roll. If any such changes are approved after the assessment roll has been filed with Alameda County for collection, the General Manager or his or her designee is authorized to refund to the property owner the amount of any approved reduction. Any dispute over the decision of the General Manager, or his or her designee, shall be referred to the District Board of Trustees. The decision of the District Board of Trustees shall be final.

Assessment

WHEREAS, the Alameda County Mosquito Abatement District Board of Trustees contracted with the undersigned Engineer of Work to prepare and file a report presenting an estimate of costs of Services, a diagram for the benefit assessment area, an assessment of the estimated costs of Services, and the special and general benefits conferred thereby upon all assessable parcels within the Alameda County Mosquito Abatement District - Mosquito and Disease Control Assessment;

NOW, THEREFORE, the undersigned, by virtue of the power vested in me under Article XIII D of the California Constitution, the Government Code and the Health and Safety Code and the order of the Alameda County Mosquito Abatement District Board of Trustees, hereby make the following determination of an assessment to cover the portion of the estimated cost of the Services, and the costs and expenses incidental thereto to be paid by the Mosquito and Disease Control Assessment.

The District has evaluated and estimated the costs of extending and providing the Services to the Assessment District. The estimated costs are summarized in Figure 1 and detailed in Figure 5, below.

The amount to be paid for the Services and the expenses incidental thereto, to be paid by the Alameda County Mosquito Abatement District for fiscal year 2026-27 is generally as follows:

Figure 5– Summary Cost Estimate – FY 2026-27

Mosquito Abatement & Disease Control Services	\$4,933,311
Materials, Utilities and Supplies	\$1,403,081
Capital Equipment and Fixed Assets	\$463,000
Contingency	\$0
Total Mosquito Control Services & Expenditures	\$6,799,392
Less Contributions from Other Sources:	(\$5,420,508)
Net Amount To Assessments	\$1,378,884
General Contribution to Total Mosquito Control Services & Expenditures	79.72%

An Assessment Diagram is hereto attached and made a part hereof showing the exterior boundaries of the assessment area. The distinctive number of each parcel or lot of land in the Mosquito and Disease Control Assessment is its Assessor Parcel Number appearing on the Assessment Roll.

I do hereby determine and apportion the net amount of the cost and expenses of the Services, including the costs and expenses incidental thereto, upon the parcels and lots of land within the Mosquito and Disease Control Assessment, in accordance with the special benefits to be received by each parcel or lot, from the Services, and more particularly set forth in this Engineer's Report.

The assessment determination is made upon the parcels or lots of land within the assessment area in proportion to the special benefits to be received by the parcels or lots of land, from the Services.

The assessment is subject to an annual increase tied to the Consumer Price Index-U for the San Francisco Bay Area as of December of each succeeding year (the "CPI"), with a maximum annual increase not to exceed 3%. Any change in the CPI in excess of 3% shall be cumulatively reserved as the "Unused CPI" and shall be used to increase the maximum authorized assessment rate in years in which the CPI is less than 3%. The maximum authorized assessment rate is equal to the maximum assessment rate in the first fiscal year the assessment was levied adjusted annually by the minimum of 1) 3% or 2) the change in the CPI plus any Unused CPI as described above.

The change in the Consumer Price Index (CPI) from December 2024 to December 2025 was 3.0365%. Therefore, the maximum assessment rate for fiscal year 2026-27 is calculated as the maximum rate for fiscal year 2025-26 (\$7.75) plus 3% CPI increase. As a result, the maximum authorized assessment rate for fiscal year 2026-27 is \$7.98 per single-family equivalent benefit unit. The estimate of cost and budget in this Engineer's Report proposes assessments for fiscal year 2026-27 at the rate of \$2.90, which is below the maximum authorized rate.

Each parcel or lot of land is described in the Assessment Roll by reference to its parcel number as shown on the Assessor's Maps of the County of Alameda for the fiscal year 2026-27. For a more particular description of the property, reference is hereby made to the deeds and maps on file and of record in the office of the County Assessor of the County of Alameda.

I hereby place opposite the Assessor Parcel Number for each parcel or lot within the Assessment Roll, the proposed amount of the assessment for the fiscal year 2026-27 for each parcel or lot of land within the Alameda County Mosquito Abatement District- Mosquito and Disease Control Assessment.²⁷

Dated: May 29, 2026



Engineer of Work

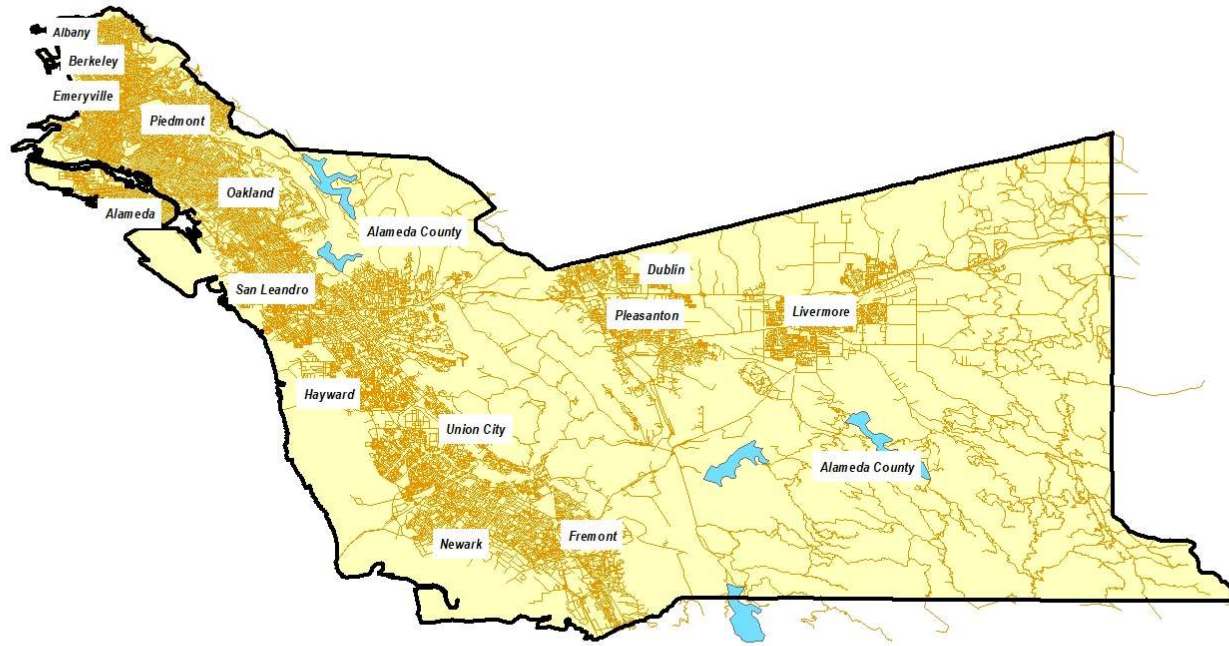
By  _____
John Bliss, License No. C52091

²⁷ Each parcel has a uniquely calculated assessment based on the estimated level of special benefit to the property as determined in accordance with this Engineer's Report.

Assessment Diagram

The Alameda County Mosquito Abatement District, Mosquito and Disease Control Assessment area includes all properties within the boundaries of the Alameda County Mosquito Abatement District.

The boundaries of the Mosquito and Disease Control Assessment Area are displayed on the following Assessment Diagram.



Note:
 REFERENCE IS HEREBY MADE TO THE MAPS AND DEEDS
 OF RECORD IN THE OFFICE OF THE ASSESSOR OF THE
 COUNTY OF ALAMEDA FOR A DETAILED DESCRIPTION OF
 THE LINES AND DIMENSIONS OF ANY PARCELS SHOWN
 HEREIN. THOSE MAPS SHALL GOVERN FOR ALL DETAILS
 CONCERNING THE LINES AND DIMENSIONS OF SUCH PARCELS.
 EACH PARCEL IS IDENTIFIED IN SAID MAPS BY ITS
 DISTINCTIVE ASSESSOR'S PARCEL NUMBER.

SCI Consulting Group
 4745 Mangels Blvd.
 Fairfield, CA 94534

**ALAMEDA COUNTY MOSQUITO ABATEMENT DISTRICT
 MOSQUITO AND DISEASE CONTROL ASSESSMENT DIAGRAM**

Assessment Roll

Reference is hereby made to the Assessment Roll in and for the assessment proceedings on file in the office of the Alameda County Mosquito Abatement District, as the Assessment Roll is too voluminous to be bound with this Report.