Appendix A-2

Bird Strike Risk Assessment

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Bird Strike Risk Assessment
Berkeley Biotech Building Expansion Project
City of Berkeley, Alameda County, California

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SECTION 1: INTRODUCTION

At the request of Bayer HealthCare LLC, FirstCarbon Solutions (FCS) conducted the following Bird Strike Risk Assessment (BSRA) to evaluate the potential to which the Bayer Development Agreement Extension Project (proposed project or 'proposed DA' hereafter) could result in an increased risk of bird injury and mortality caused by collisions with transparent and/or reflective surfaces (summarily termed 'glazed surfaces' hereafter).

Exhibit 1 shows the proposed project's regional location. Exhibit 2 identifies the baseline conditions of the buildings on the project site. Buildings that would be in place under the proposed DA are shown in Exhibit 3. The west-facing façades of these structures may include glazed surfaces on façade that would face the adjacent City of Berkeley's Aquatic Park. The Aquatic Park includes foraging, roosting, and nesting habitat for a wide range of avian species, including potential special-status bird species (Photographs of current conditions and avian habitats are included in Appendix A).

Therefore, the Impact Analysis in Section 5 of this BSRA includes two main elements:

1. A quantitative comparison between the baseline conditions already entitled under the current proposed DA (Exhibit 2) and the extent of additional proposed glazed surfaces associated with the proposed DA (Exhibit 3);
2. A qualitative analysis of potential significant impacts to birds caused by glazed surfaces associated with the proposed DA in the form of a CEQA-specific risk analysis and findings of significance.

Additionally, this assessment recommends measures to avoid and minimize the potential for bird injury and fatalities related to collision with glazed surfaces.

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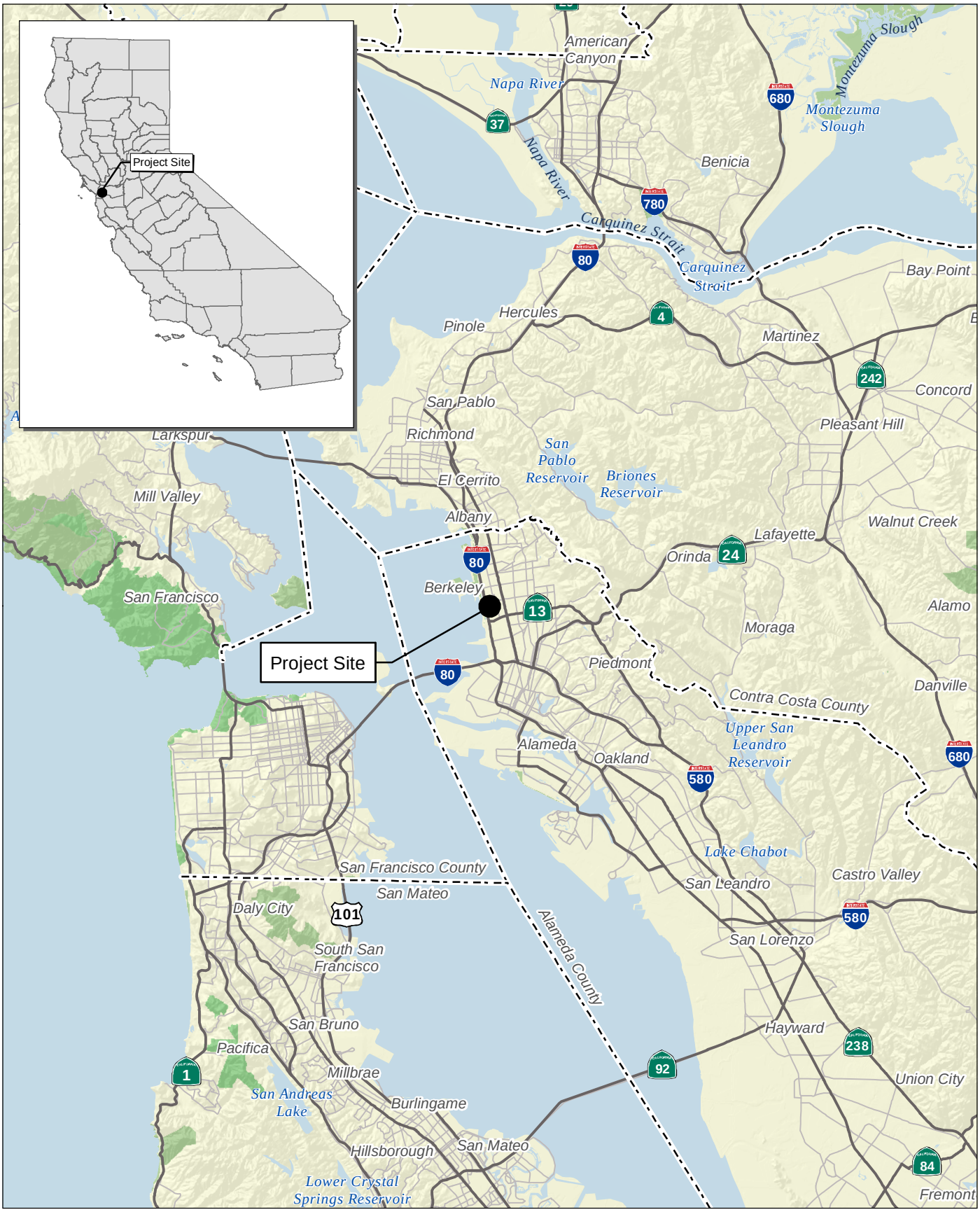

Source: Census 2000 Data, The CaSIL

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Exhibit 1
Regional Location Map

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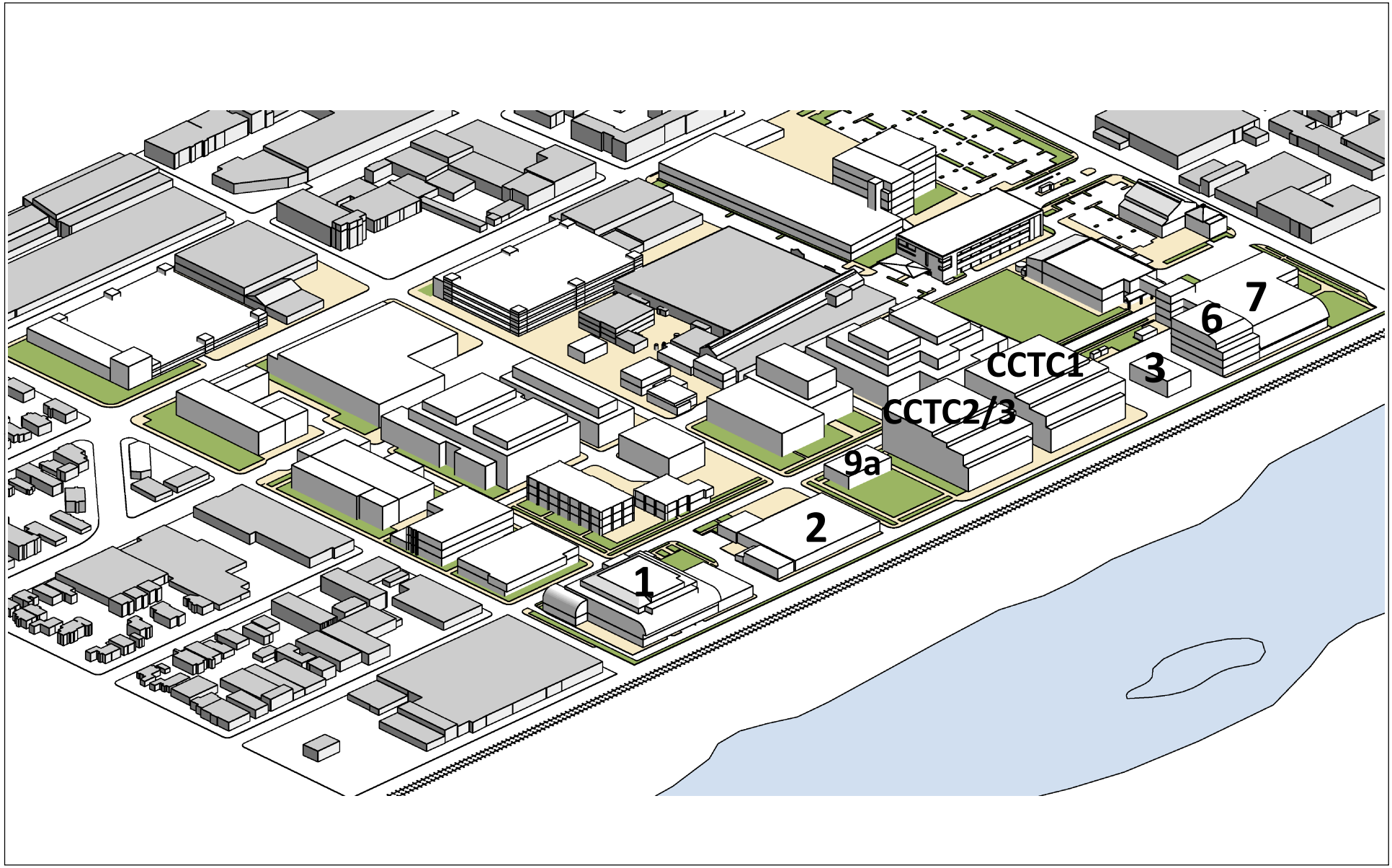

Source: Bayer HealthCare LLC

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Exhibit 2
Baseline (Entitled Development Agreement)

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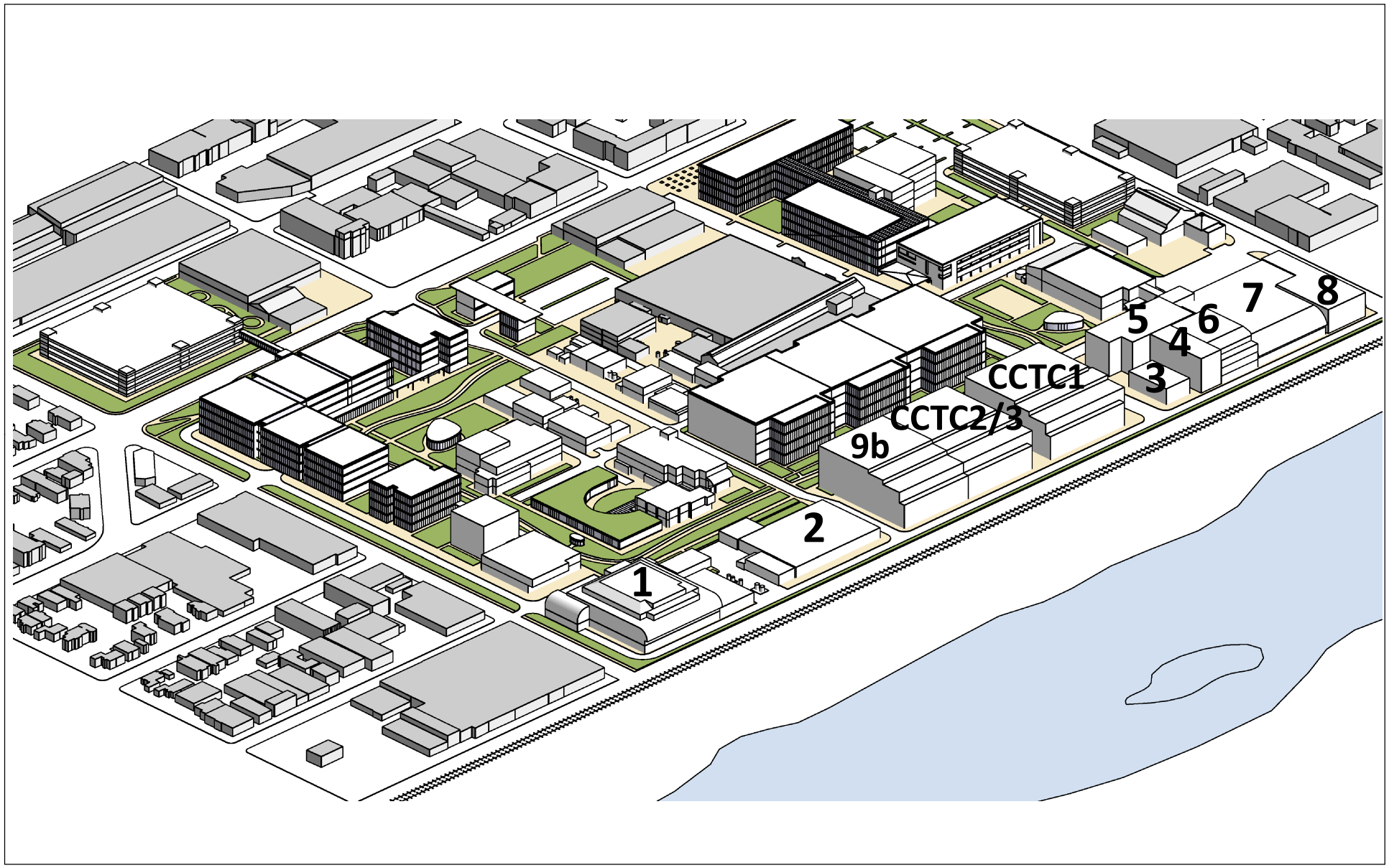

Source: Bayer HealthCare LLC

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Exhibit 3
Proposed Development Agreement

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SECTION 2: REGULATORY CONTEXT

2.1 - Federal

2.1.1 - Endangered Species Act

The United States Fish and Wildlife Service (USFWS) has jurisdiction over species, including bird species, listed as threatened or endangered under the Federal Endangered Species Act (FESA). Section 9 of FESA protects listed species from "take," which is broadly defined as actions taken to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." FESA protects threatened and endangered plants and animals and their critical habitat. Candidate species are those proposed for listing; these species are usually treated by resource agencies as if they were actually listed during the environmental review process.

2.1.2 - Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements international treaties between the United States and other nations devised to protect migratory birds, their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized in the regulations or by permit. All migratory birds and their nests are protected from take and other impacts as defined in Section 703 of the MBTA (16 United States Code [USC] § 703, *et seq*.).

2.1.3 - Eagle Protection Act

The golden eagle (*Aquila chrysaetos*) and bald eagle (*Haliaeetus leucocephalus*) are afforded additional protection under the Eagle Protection Act, amended in 1973 (16 USC § 669, *et seq*.) and the Bald and Golden Eagle Protection Act (16 USC § 668–668d).

2.2 - State

2.2.1 - California Fish and Game Code (including the California Migratory Bird Protection Act)

Protection of avian species by the State is codified in Fish and Game Code Sections 86, 2000, 3800, 3503 and 3503.5. Under Fish and Game Code Sections. Specifically, Fish and Game Section 3503 makes it unlawful "to take, possess, or needlessly destroy the nest or eggs of any bird . . ."

Under Section 3503.5 of the Fish and Game Code, it is unlawful to take, possess, or destroy any birds in the orders of *Falconiformes* or *Strigiformes* (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto. To comply with the requirements of the California Endangered Species Act (CESA), an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project study area and determine whether the proposed project will have a potentially significant impact on such species. In addition, CDFW encourages informal consultation on any proposed project that may impact a candidate species.

"Take" of protected species incidental to otherwise lawful management activities may be authorized under Fish and Game Code Section 206.591. Authorization from CDFW would be in the form of an Incidental Take Permit.

Additionally, the State of California has incorporated the protections of the MBTA into the 2019 California Migratory Bird Protection Act (CMBPA) by amending California Fish and Game Code Section 3513. The CMBPA would, until January 20, 2025, make unlawful the taking or possession of any migratory nongame bird designated in the federal MBTA before January 1, 2017, any additional migratory nongame bird that may be designated in the federal act after that date, or any part of those migratory nongame birds, except as provided by rules and regulations adopted by the United States Secretary of the Interior under the federal act before January 1, 2017, or subsequent rules or regulations adopted pursuant to the federal act, unless those rules or regulations are inconsistent with the Fish and Game Code.

Under existing law, a violation of the Fish and Game Code is a crime. By narrowing the exception to a crime defined in existing law, the law expands the scope of a crime, thus imposing a state-mandated local program.

2.2.2 - CEQA Guidelines

CEQA guidelines identify a significant impact to a bird species where a project would have a substantial adverse effect, either directly or through habitat modification on any species identified as candidate, sensitive, or special status in local or regional plans, policies or regulations, or by the CDFW or USFWS. If an unlisted migratory or native bird species is affected by a proposed project under CEQA, the analysis is not limited to the question of whether a bird or nest will be "taken" within the meaning of the Fish and Game Code or the MBTA. CDFW guidelines recommend that a CEQA document employ the following findings of significance.[1]

- The project has a substantially adverse effect, either directly or through habitat modifications, on any species meeting the standards set forth in Section 15380 of the CEQA Guidelines
- the project has the potential to substantially reduce the habitat, restrict the range or cause a population of a native bird species to drop below self-sustaining levels
- the project is likely to have long-term adverse consequences for one or more populations of native bird species
- the project has direct or indirect environmental effects on native bird species that are individually limited but cumulatively considerable.

Additionally, project-related impacts to species listed as endangered or threatened under CESA would be considered significant.

2.2.3 - California Endangered Species Act

The State of California enacted CESA in 1984. CESA is similar to FESA but pertains to State-listed endangered and threatened species, including bird species. CESA requires State agencies to consult

[1] Natural Resource Regulation in California. 2019. Morrison C. and S. B. Birke. Solano Press Books. Point Arena. California.

with the CDFW, when preparing CEQA documents. The purpose is to ensure that the State lead agency actions do not jeopardize the continued existence of a listed species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available (FGC § 2080).

CESA directs agencies to consult with CDFW on projects or actions that could affect listed species, directs the CDFW to determine whether jeopardy would occur, and allows the CDFW to identify "reasonable and prudent alternatives" to the project consistent with conserving the species. CESA allows CDFW to authorize exceptions to the State's prohibition against take of a listed species if the "take" of a listed species is incidental to carrying out an otherwise lawful project that has been approved under CEQA (FGC § 2081).

2.2.4 - Regional and Local

Proposed Berkeley Municipal Code Chapter 23C.27 BIRD SAFETY and 23C.28 DARK SKIES

The City of Berkeley Planning Commission and the City Attorney proposed in 2019-2020 to amend Berkeley Municipal Code Title 23C, adding a new Chapter 23C.27 that would established bird safety requirements for new construction and significant renovations, for review and approval.[2] This ordinance is not adopted at this time, but may be adopted before building permits for the proposed project can be issued. Please note that Bayer's Development Agreement, adopted by the City in 1992 and last modified in 1999, generally vests Bayer into ordinances existing at the time of the agreement's option. As a conservative measure, the provisions in the draft bird safety regulations are utilized in this analysis.

When adopted, the proposed ordinance includes regulations to reduce bird mortality from windows or other specific building features known to increase the risk of bird collisions. The proposed requirements would be applicable to "New buildings with two (2) or more stories, and one or more façades in which glass constitutes fifty percent (50%) or more of the area of the individual façade. The bird-safe glazing requirement must be met on any window with dimensions of at least two (2) feet by four (4) feet, or an area of eight (8) square feet or more, located on such façade"; and "Any structure that has transparent glass walls twenty-four (24) square feet or more in size, including but not limited to freestanding glass walls, wind barriers, skywalks, balconies, greenhouses, and rooftop appurtenances."

Where applicable, Subsection "23C.27.040 Standards" would then include a requirement that at least 90 percent of the glazing on any building façade or freestanding glass structure shall include features that enable birds to perceive the glass as a solid object, as determined by the Planning Director.

Additionally, the City of Berkeley Planning Commission and the City Attorney proposed adding a new Chapter 23C.28 establishing a dark skies ordinance. The Dark Skies ordinance would that ensure exterior light fixtures are pointed downwards and would turn off whenever possible, thereby

[2] Bird Safe Berkeley Requirements. 2020. Community Environmental Advisory Committee.

minimizing light pollution, sky glow, and hazardous risks to birds, while ensuring adequate illumination for safety, security, and the enjoyment of outdoor areas, including travel on public roads.

Reference Legislation: City of Emeryville and City of San Francisco Bird-Safe Building Requirements

Both the City of Emeryville and City of San Francisco passed regulations through their respective municipal codes that require bird safety standards for new developments (City of Emeryville Municipal Code Article 8 "Bird Safe Buildings"; City of San Francisco Municipal Code Section 139 "Standards for Bird-Safe Buildings"). While not legally binding for this specific project in the City of Berkeley, these codes serve as reference and guiding principles for the mitigation measures stated in this document. Following the implementation of the bird-safe measures as described in Section 6 of this Assessment, the proposed project would follow or exceed the Cities of Emeryville and City of San Francisco's bird-safe glazing treatment requirements.

SECTION 3: METHODS

3.1 - Literature and Database Review

The following analysis was informed by review of relevant publications related to avian impacts caused by building designs, including window strike mortality and impacts of lighting of buildings, and measures to reduce impacts. Sources are referenced in footnotes throughout this document. Additionally, FCS completed a review of databases documenting occurrences of special-status and non-special status migratory and domestic bird species and their habitats in the project vicinity, along with federal register listings, protocols, and species data provided by the USFWS and CDFW. Database entries reviewed included the CNDDB,[3] and observations from the local public documented through eBird.[4] Table 1 in Appendix B lists the special-status bird species that could potentially occur at Aquatic Park based on data provided by CNDDB and review of all other available resources, and the results of the site surveys; Table 2 in Appendix B lists the non-special status species that could occur in Aquatic Park.

For the purpose of this assessment, special-status bird species are defined as all species that meet at least one of the following criteria:

- listing under the Federal or State Endangered Species Acts as rare, threatened or endangered;
- all federal and state candidates for listing;
- listing as CDFW Species of Special Concern;
- bird species that are "fully protected" in California Fish and Game Code
- migratory nongame birds identified by the U.S. Fish and Wildlife Service as bird species of conservation concern (BCC);
- all other species that would be considered endangered, rare or threatened as defined in CEQA Guidelines Section 15380.

3.2 - Field Survey

FCS Biologist, Bernhard Warzecha, conducted a reconnaissance-level avian and avian habitat survey on July 23, 2020 on the project site, surrounding areas, and specifically Berkeley's Aquatic Park. The objective of the survey was to evaluate baseline site conditions, including existing building and reflective/transparent surface extent and conditions, the extent of anthropogenic disturbance, potential suitable habitats for different avian functional groups including group-specific roosting and nesting habitat, movement corridors, and functional group-specific flight patterns. Avian use of existing habitats was evaluated and the supporting conditions such as the potential for a sufficient prey base (e.g., insect, small mammal, etc.) was evaluated. Photographs of the project area are included in Appendix A.

[3] California Department of Fish and Wildlife (CDFW). 2020. California Natural Diversity Database. July 2020.
[4] eBird Field Checklist for the Berkeley Marina Bayside. Alameda, California, US. Ebird.org/hotspot/L1239780. July 2020.

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SECTION 4: RESEARCH AND SURVEY RESULTS

The following section summarizes the results from literature and database review and the reconnaissance-level field survey.

4.1 - Environmental Setting and Avian Habitats

The proposed project and adjacent Berkeley Aquatic Park are located on the east shore of San Francisco Bay, which is part of the Northern California ecoregion. The region is recognized as an Important Bird Area with global importance by the California Audubon Society, which is due in part to the diverse habitats of the Bay Area and its position on the coastal migration path, the Pacific Flyway, which is one of the four flyways used by migratory birds in North America. Some migratory species pass through the region, flying southward in autumn en route to their winter feeding grounds, then returning northward in spring to establish territories in summer breeding grounds. Additionally, resident bird species are well-adapted to urban life, and may remain in the region year-round.

Specifically, the project site and surrounding areas include a variety of avian habitats that although disturbed to varying degrees, nevertheless provide important habitat functions to support avian life cycles, including foraging, roosting, and nesting. The project-relevant generalized habitat types are shown on Exhibit 4 and are described in more detail below.

4.1.1 - Avian Habitats and Use of Developed Areas

The project site includes a developed pharmaceutical campus, production site, and active construction sites, and is surrounded to the north, east and south by additional campus development, as well as residential, commercial, and industrial development.

Parameters relevant to assessing avian use and risk within the developed areas of the project site include the level of direct anthropogenic disturbance and the limitations associated with highly managed habitat features (i.e., vegetation is currently limited to managed ornamental plantings and small lawn areas, providing only limited forage opportunities that are further diminished by rodent control and other management activities). These conditions generally limit the use of the developed areas to opportunistic and common bird species of robust population size throughout the region, which are already adapted to urban conditions including the potential to learn how to recognize and avoid clear glass.[5]

Typical avian species observed in these conditions include American crow (*Corvus brachyrhynchos*), California gull (*Larus californicus*), mourning dove (*Zenaida macroura*), house finch (*Haemorhous mexicanus*), common sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), and Canada goose (*Branta canadensis*). Use of developed areas such as the existing campus by rare, sensitive, or special-status bird species requiring specific habitat conditions (see Table 1) is not considered typical. The project site itself is entirely located on developed land, with Aquatic Park located approximately 100 feet from project buildings.

[5] San Francisco Planning Department, 2011. Standards for Bird-Safe Buildings, Adopted July 14, 2011.

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Source: FCS | City of Berkeley | Bayer HealthCare LLC

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Feet

Exhibit 4
Generalized Avian Habitat Boundaries

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4.1.2 - Avian Habitats and Use of Aquatic Park

Aquatic Park has a combination of lagoon, wetland and woodland habitats, subject to recreational use. Based on City of Berkeley's Aquatic Park Natural Resource Management Plan,[6] and confirmed through FCS Biologists' reconnaissance-level survey and research, Aquatic Park is used by waterfowl and other birds due to its proximity to San Francisco Bay (Bay). During the late summer through winter, waterfowl, shorebirds, gulls and other birds move through the Bay region in their annual migration from their northern breeding grounds to milder southern climates. Many birds pass through en route to wintering grounds in Central and South America, but a large number of migratory birds will winter in the Bay region. In addition, the adjacent San Francisco Bay supports resident populations of water-associated birds, including species of geese, waterfowl, wading birds, shorebirds and gulls. Birds that are documented at Aquatic Park include waterfowl such as mallards, Canada geese and American coots; shorebirds such as willets, black-necked stilts, as well as brown pelicans and several species of gulls and terns, double-crested cormorants, snowy egrets, great egrets, black-crowned night herons, great blue herons, northern harriers and belted kingfishers. For a full list of potentially visiting bird species and bird species scientific names see Appendix B, Tables 1 and 2. Additional information on specific abundance of specific water birds of the lagoon can be found in the City of Berkeley's Waterbird Population and Disturbance Response Study.[7]

The lagoons and surrounding areas at Aquatic Park provide different habitat functions for birds. Birds such as pelicans, gulls, terns, ducks, geese and cormorants use the open-water areas of the lagoons for feeding. Herons and egrets feed along the water's edge. Some of the trees around the lagoons provide roosting areas for birds such as the great egret, snowy egret and black-crowned night heron. Shorebirds such as willets and black-necked stilts forage on the one somewhat isolated mudflat along the western shore of the Main Lagoon at low tide. These remote areas with lower levels of Park activity attract shorebirds.

Terrestrial habitats of Aquatic Park include managed non-native annual grassland, small patches of seasonal wetlands, riparian thickets (dominated by willows [*Salix* sp.] and English ivy [*Hedera helix*], and Himalayan blackberry [*Rubus armeniacus*]), and disturbed woodland. Woodland consists predominantly of blue gum (*Eucalyptus globulus*), Monterey cypress (*Cupressus macrocarpa*), and Monterey pine (*Pinus radiata*). A row of blue gum with individual trees up to approximately 90 feet in height are located along the railroad corridor opposite of the project site. A single stick nest was observed in one of the blue gums at an elevation of approximately 50 feet (no bird activity was observed at the nest during the survey).

The upland thickets and tall trees at this location may attract terrestrial birds, including songbirds, corvids and birds-of-prey (listed in Appendix B, Tables 1 and 2). Bird species primarily associated with terrestrial habitats observed during the FCS reconnaissance-level survey of the terrestrial habitats of Aquatic Park included American crow, black phoebe (*Sayornis nigricans*), Canada goose, mourning dove, house finch, common sparrow, Anna's humming bird (*Calypte anna*), California towhee (*Melozone crissalis*), and turkey vulture (*Cathartes aura*).

[6] City of Berkeley. Aquatic Park Natural Resource Management Plan. July 2003.
[7] City of Berkeley. Aquatic Park, Berkeley, California: Waterbird Population and Disturbance Response Study. 2005. Prepared by Avocet Research Associates.

4.2 - Connectivity between Aquatic Park and the Project Site

The terrestrial habitats of Aquatic Park start at approximately 100 feet from the proposed buildings, and the aquatic habitats start at approximately 250 feet from the proposed buildings (Exhibit 4). The major habitat feature relevant in this context is the row of tall blue gum along the railroad tracks at the eastern edge of Aquatic Park, directly opposite the west-facing facades of the proposed buildings (Appendix A, Photo 1). This row consists of approximately two dozen blue gum with individual trees up to approximately 90 feet tall, with a dense understory of willows, English ivy, and Himalayan blackberry.

During the field survey, several California gulls and a skein of Canada geese were repeatedly observed choosing flight elevations well above the tops of the blue gums and consequently above the tops of the existing buildings, which are similar in height. Therefore, it is reasonable to assume that this row of trees may shield a substantial part of the proposed building from the flight path for birds coming from the lagoon, substantially reducing the risk of window collision for water and shorebirds.

However, along some portions of the project site, existing shrubs and trees would be in direct line of sight of the proposed west-facing facades of the proposed buildings. These shrubs and trees provide well utilized bird habitat for land-based birds, including passerines, corvids, and potentially birds of prey that nest, forage or perch in trees and shrubs. The eastern boundary of these trees and shrubs may reflect in the windows of the west-facing facades of the proposed buildings, and may therefore result in the potential for window collision for birds in these functional groups, as described in more detail in the Impact Analysis section below.

SECTION 5: IMPACT ANALYSIS

The following section analyzes potential impacts to birds resulting from westerly-facing glazed surfaces of structures directly fronting Aquatic Park associated with new structures to be covered under the proposed DA. Therefore, the impact analysis first calculates the difference between the extent of already entitled glazed surfaces under the existing DA (i.e., baseline conditions or 'Baseline' hereafter) and the extent of glazed surfaces under the proposed DA (see Section 5.1). The second step (see Section 5.2) includes an evaluation of potential significant impacts to birds caused by the extent of westerly-facing glazed surfaces associated with new buildings under the proposed DA that would be directly fronting the bird habitats of Aquatic Park in the form of a CEQA-specific risk analysis and findings of significance.

5.1 - Quantitative Comparison of Extent of Glazed Surfaces Between Baseline Conditions and Proposed DA

There are 11 structures along the western boundary of the campus with west-facing facades that currently do or could contain glazed surfaces with potential for bird strikes. These structures are identified on Exhibit 2 and Exhibit 3 as buildings 1, 2, CCTC2/3, CCTC1, 3, 4, 5, 6, 7, 8, and 9a/b (north to south).

Buildings 1, 2, CCTC2/3, CCTC1, 3, 6, 7, and 9a are already constructed and entitled under the existing DA Baseline conditions. Therefore, these buildings are inconsequential for the quantitative analysis of new glazed surfaces that could occur under the proposed DA conditions, and therefore are excluded from the analysis.

Changes to the entitled extent of glazed surfaces are calculated for buildings 4, 5, 8, and 9b as shown in Table 1, below. As part of an entitled building at Site 9a, the existing DA permits a structure to be built that would contain at least 2,250 square feet glazed surface area on facades facing the avian habitats of Aquatic Park. Under the proposed DA, this total glaze surface area will be reduced to 2,212 square feet, for all four of the buildings 4,5, 8, and 9b. The preliminary glazing plan from which glazing square foot total estimates were calculated for the west-facing façade of 9b is shown in Exhibit 5.

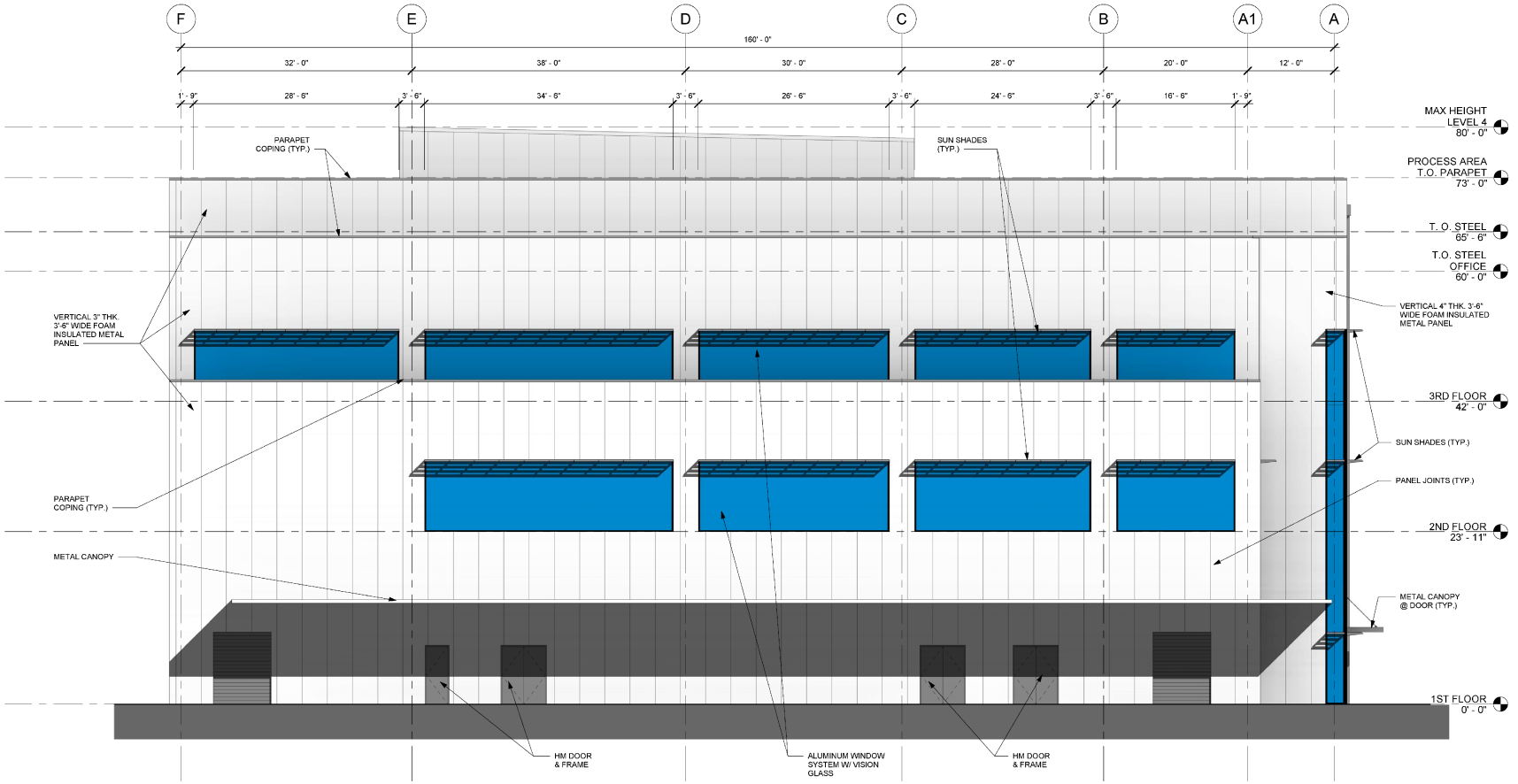
Table 1: Quantitative Comparison of Extent of Glazed Surfaces Between Baseline Conditions and Proposed DA

Buildings	Baseline				Proposed DA				Difference (Proposed - Baseline)			
	Maximum Building Height (ft)	West-facing Façade Area (sqft)	Glazed Surface Area (sqft)	Percent Glazed Surfaces of Façade	Maximum Building Height (ft)	West-facing Façade Area (sqft)	Glazed Surface Area (sqft)	Percent Glazed Surfaces of Facade (sqft)	Maximum Building Height (ft)	West-facing Façade Area (sqft)	Glazed Surface Area (sqft)	Percent Glazed Surfaces of Facade (sqft)
9*	25	2,500	2,250	90%	80	12,000	1,744	15%	55	9,500	-506	-75%
4	0	0	0	0%	65	3,100	124	4%	65	3,100	124	4%
5	0	0	0	0%	65	4,600	184	4%	65	4,600	184	4%
8	0	0	0	0%	45	4,000	160	4%	45	4,000	160	4%
TOTALS:		2,500	2,250			23,700	2,212			**21,200**	**-38**	

*Building 9a (Figure 2) is associated with the baseline scenario, where an administration building was approved and would be the reasonably foreseeable structure, whereas 9b (Figure 3) represents a larger production building proposed under the project. Please note that, under the proposed City bird safety ordinance, the baseline build 9a would not be subject to any such ordinance given its height under the existing DA is limited to one story.

In summary, the extent of glazed surface area of facades facing the avian habitats of Aquatic Park under the proposed DA will result in a net decrease of 38 square feet when compared to baseline conditions. The reason for this slight decrease is that the proposed DA contemplates a different configuration of buildings and land uses along the project sites westerly boundary, with more warehouse and production space contemplated and less administration space proposed (where window demand is much greater based on workspace conventions). Therefore, it is reasonable to assume that the proposed DA would not result in a net increase in potential impacts to birds through window collision when compared to already entitled or existing conditions.

These facts, associated potential impacts, and measures to avoid and minimize these impacts, are analyzed below.



Source: Bayer HealthCare LLC

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Exhibit 5
Preliminary Plan of West-Facing Facades of Proposed Building 9b

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5.2 - CEQA-Specific Risk Analysis and Findings of Significance

The following findings of significance are based on CDFW recommendations for evaluating avian-specific impacts based on CEQA Section 15065 (mandatory findings of significance) and Appendix G of the CEQA Guidelines (see Section 2 Regulatory Background for more information).

Finding of Significance 1: Would the project have a substantially adverse effect, either directly or through habitat modifications, on any species meeting the standards set forth in Section 15380 of the CEQA Guidelines.

The presence of special-status bird species within the habitats of Aquatic Park adjacent to the project site or within the project site cannot be ruled out due to the fact that Aquatic Park contains terrestrial and aquatic habitat that is likely to be used by migrating birds as stop-over habitat, as well as by domestic birds for foraging and nesting (species-specific information is provided in Tables 1 and 2; Appendix B).

The reflection of trees in windows may attract birds utilizing the vegetation corridor of Aquatic Park, and such reflections are known to have the potential to result in fatal window collisions.[8] Lethal casualties result from head trauma after birds leave a perch in an attempt to reach habitat seen through or reflected in clear and tinted panes.[9] The extent of bird fatality through window collision is correlated to surface area of untreated transparent or reflective glass.[10] Additionally, transparent glass under certain conditions (including in combination with nighttime indoor lighting) may be perceived by birds as clear flight path, potentially resulting in injury or death.[11] However, bird safe treatment of transparent or reflective surfaces (as is proposed for building 9b), and the additionally proposed exterior window shade structures (shown in Figure 5) have the potential to reduce window collision risk significantly[12,13] (See also Mitigation Measure BIO-1, below).

Project-related substantial impacts to special-status birds could potentially be considered a significant impact under CEQA, and in particular if the square footage of project-related glass were to be greater than under baseline conditions. Therefore, the currently proposed new extent of reflective or transparent glass surfaces facing Aquatic Park may constitute a significant impact under CEQA unless mitigated.

Bird safe treatment of transparent or reflective surfaces and/or shading have the potential to reduce window collision risk significantly, because birds will be able to recognize glazed surfaces with bird-

[8] Gelb, Yigal; Nicole Delacretaz. 2009. *Windows and Vegetation: Primary Factors in Manhattan Bird Collisions*. Northeastern Naturalist. 16(3):455-470.

[9] Klem, D. Jr., Christopher Farmer, Nicole Delacretaz, Yigal Gelb, Peter Saenger. 2009. A*rchitectural and Landscape Risk Factors Associated with Bird-Glass Collisions in an Urban Environment*. The Wilson Journal of Ornithology. 121(1):126-134.; and citations within.

[10] Ibid.

[11] San Francisco Planning Department, 2011. Standards for Bird-Safe Buildings, Adopted July 14, 2011.

[12] Ibid.

[13] Kahle, L.Q, M.E. Flannery, and J.P. Dumbacher, 2016. Bird-Window Collisions at a West-Coast Urban Park Museum: Analyses of Bird Biology and Window Attributes from Golden Gate Park, San Francisco. PLoS ONE. January 5.

safe treatment as solid obstacles from far enough to avoid collision.[14,15] Mitigation Measures BIO-1 through BIO-3 articulate the specific treatments that can be applied to the project design to reduce potential risks associated with collisions. With implementation of Mitigation Measure BIO-1 to BIO-4, the probability of window collisions would be reduced to a less-than-significant level.

Finding of Significance 2: Would the project have the potential to substantially reduce the habitat, restrict the range or cause a population of a native bird species to drop below self-sustaining levels".

The proposed project consists of construction of buildings on already developed land and not within natural or semi-natural avian habitats of any kind, and would therefore not result in substantial reduction of natural or semi-natural avian habitats. The construction of the proposed buildings on developed land would not substantially restrict the range of a native bird species, and it should be noted that, across the project site, the square footage of proposed buildings are less than those entitled under the existing Development Agreement. While it is not expected that the proposed project could cause a native bird species to drop below self-sustaining levels due to window collisions, the implementation of Mitigation Measure BIO-1 to BIO-4 would ensure that the risk of a native bird population to drop at all due to project implementation will be reduced to a less-than-significant level.

Finding of Significance 3: Would the project be likely to have long-term adverse consequences for one or more populations of native bird species.

No long-term predictive studies are currently available for this specific Project, however, as reported by researchers from other projects, bird fatality rates range up to 0.04[16] bird fatalities per square foot glazed surface area per year.

Implementation of Mitigation Measure BIO-1 through BIO-4 would ensure that untreated glazed surfaces of the proposed project would reflect a net decrease of 38 square feet compared to baseline conditions, and that 100 percent of glass facing Aquatic Park would be bird-safe. Implementation of the proposed project would therefore reduce bird strike impacts over the short and long-term compared to baseline conditions, and even in comparison to existing conditions. Impacts of the proposed project with the inclusion of Mitigation Measures BIO-1 through BIO-4 would therefore be less than significant.

Finding of Significance 4: Would the project have direct or indirect environmental effects on native bird species that are individually limited but cumulatively considerable."
No specific studies on the cumulative direct or indirect effects of this project on native bird species are currently available. Nevertheless, it is acknowledged that this project in its unmitigated form would contribute to the cumulative impact when combined with other existing and future development along Aquatic Park. However, with implementation of Mitigation Measure BIO-1 to BIO-4, untreated glazed surfaces facing avian habitats will be reduced by about 38 square feet

[14] San Francisco Planning Department, 2011. Standards for Bird-Safe Buildings, Adopted July 14, 2011.
[15] Kahle, L.Q, M.E. Flannery, and J.P. Dumbacher, 2016. Bird-Window Collisions at a West-Coast Urban Park Museum: Analyses of Bird Biology and Window Attributes from Golden Gate Park, San Francisco. PLoS ONE. January 5.
[16] Ibid.

compared to baseline conditions. Please note that implementation of Mitigation Measures BIO-1 to BIO-4 would also ensure that the project's 2,212 square feet of westerly facing glass would incorporate bird-safe features, which would reduce bird strike impacts to a less than significant level under any comparative scenario. As such, in light of other existing and reasonably foreseeable projects, the proposed project's contribution to any significant cumulative impact would not be considerable. Therefore it is reasonable to assume that the proposed project's contribution to any cumulative impacts will be reduced to a less-than-significant level.

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SECTION 6: MITIGATION MEASURES

The following section defines measures to avoid and minimize potential significant adverse project-related effects to migrating or residential native birds (including special-status birds) resulting from window collisions.

BIO-1 100 percent of the window area of the west-facing façade of proposed buildings 4, 5, 8, and 9b shall consist of verified bird-safe glazing products, e.g., American Bird Conservancy-endorsed products such as Arnold Glass Ornilux Mikado, Acopian Birdsavers, Bendheim Channel Glass, GlasPro Bird Safe Glass, Guardian Glass SunGuard SN68, Viracon, or others.

Alternatively, reflective or transparent surface area of facades of buildings 4, 5, 8, and 9b that would be facing Aquatic Park shall employ bird safe glazing treatments, including fritting, netting, permanent stencils, frosted glass, exterior screens, physical grids placed on the exterior of glazing or UV patterns visible to birds. To qualify as bird-safe glazing treatment, vertical elements of the window patterns should be at least 1/4 inch wide at a maximum spacing of 4 inches, or have horizontal elements at least 1/8 inch wide at a maximum spacing of 2 inches.

BIO-2 For rooms with reflective or transparent surfaces facing Aquatic Park, occupancy sensors or other switch control devices shall be installed on non-emergency lights and shall be programmed to shut off during non-work hours and between 10:00 p.m. and sunrise. Alternatively, non-emergency lighting shall be shielded to minimize light from buildings that are visible to birds.

BIO-3 Transparent glass shall not be allowed at the rooflines of buildings, including in conjunction with green roofs.

BIO-4 The cumulative area of glass facades facing the project sites westerly boundary shall not exceed 2,250 square feet.

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SECTION 7: CONCLUSION

The proposed DA will result in a net decrease of glazed surface area facing the avian habitats of Aquatic Park when compared to glazed surface areas entitled under the current DA. Additionally, newly proposed glazed surfaces will include measures accepted as bird-safe treatment, as defined in Section 6, Mitigation Measures. Please note, the bird safe treatment under Mitigation Measures BIO-1, BIO-2, and BIO-3 will enable birds to perceive glazed surfaces as solid objects, therefore avoiding collision, injury and death and, in and of themselves, reduce impacts associated with any new glass to a less-than-significant level. Mitigation BIO-4 ensures the square footage of project-related glass would be less than glass entitled under baseline conditions, further ensuring impacts are less-than-significant. Please also note this portfolio of mitigations is very conservative, and ensures impacts are less-than-significant under any analytical scenario.

In conclusion, the net decrease in glazed surface area in combination with implementation of all mitigation measures, including bird-safe treatment of glazed surfaces, will result in no significant project-related impacts to birds.

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Appendix A:
Site Photographs

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Photograph 1: South-facing view of westerly property line south of Carleton Way and the row of blue gum trees and shrub habitat of Aquatic Park to the right.

Photograph 2: Aquatic Park as seen from the western boundary of the Project site.

Photograph 3: Tree corridor opposite of the Project site.

Photograph 4: The main lagoon and shore habitat of Aquatic Park

Photograph 5: Tree and shrub habitat on the eastern edge of Aquatic Park, opposite the Project site.

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Appendix B: Species Tables

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Table 1: Special-status Bird Species Potentially Occurring at Aquatic Park Habitats

Scientific Name Common Name	Status		Habitat Description[3]	Potential to Occur and Rationale
	USFWS[1]	CDFW[2]		
Falco peregrinus anatum American peregrine falcon	FD MBTA	CD FP FGC	Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures Nest consists of a scrape or a depression or ledge in an open site.	**Low:** When adapted to urban environments, tall buildings are preferred (e.g., UC California Campanile). No such tall buildings are present at the project site. Presence of visiting individuals cannot be ruled out.
Melospiza melodia pusillula Alameda song sparrow	MBTA	SSC FGC	Resident of salt marshes bordering south arm of San Francisco Bay.	**Low:** Aquatic Park is not in the year-round range, however site is within migrating distance from known locations north and south along SF Bay shore. Marginal suitable nesting and foraging habitat is present.
Charadrius alexandrinus nivosus western snowy plover	FT MBTA	SSC FGC	Found in sandy beaches, salt pond levees, and shores of large alkali lakes. Requires sandy, gravelly, or friable soils for nesting.	**None.** No typical suitable habitat present at Project Site or Aquatic Park.
Laterallus jamaicensis coturniculus California black rail	MBTA	CT FP FGC	Inhabits freshwater marshes, wet meadows, and shallow margins of saltwater marshes bordering larger bays. Requires water depth of about 1 inch that does not fluctuate during the year, and dense vegetation for nesting.	**None.** No typical suitable habitat present at Project Site or Aquatic Park.
Melospiza melodia samuelis San Pablo song sparrow	MBTA	SSC FGC	Tidal, brackish or salt marshes, San Pablo Bay.	**Low.** Site location is outside the range for this species.
Coturnicops noveboracensis yellow rail	MBTA	SSC FGC	Found in moderately wet marshes meadows and seeps, where it finds cover among dense grasses	**Low:** Suitable marsh habitat is present however, this species hasn't been recorded in the local area since the year 1905. Species has likely been extirpated.
Branta hutchinsii leucopareia cackling (=Aleutian Canada) goose	FD MBTA	WL FGC	Artificial standing waters Sacramento/San Joaquin standing waters Valley & foothill grassland. Forages on natural pasture or that cultivated to grain; loafs on lakes, reservoirs, ponds.	**Low:** No suitable nesting habitat is present in the vicinity of the project site. Though this species may pass through during migration.

Scientific Name Common Name	Status		Habitat Description[3]	Potential to Occur and Rationale
	USFWS[1]	CDFW[2]		
Rallus obsoletus obsoletus California Ridgway's rail	FE MBTA	CE FP FGC	Found in saltwater marshes traversed by tidal sloughs in the vicinity of San Francisco Bay; associated with abundant growths of pickleweed; feeds on mollusks obtained from mud bottomed sloughs	**None:** No typical nesting or foraging habitat present.
Asio flammeus short-eared owl	MBTA	SSC FGC	Found in marshes, both freshwater and salt; lowland meadows; irrigated alfalfa fields. Tule patches/full grass needed for nesting and daytime seclusion. Nests on dry ground in a depression concealed in vegetation.	**Low:** No typical suitable habitat is present in the vicinity of the project site.
Circus hudsonius northern harrier	MBTA	SSC FGC	Coastal salt marsh and freshwater marsh; nests and forages in grasslands; nests on ground in shrubby vegetation, usually at marsh edge.	**Low:** No typical suitable and undisturbed habitat is present on the project site.
Athene cunicularia burrowing owl	MBTA	SSC FGC	Found in open dry annual or perennial grasslands, deserts and scrublands characterized by low growing vegetation. This species is a subterranean nester, dependent upon burrowing mammals, most notably the California ground squirrel.	**Low:** No typical suitable and undisturbed habitat is present on the project site. Overwintering individuals known in the past from Berkeley marina.
Phalacrocorax auratus double-crested cormorant	MBTA	WL FGC	Colonial nester on coastal cliffs and offshore islands and along lake margins in the interior of the state. Nests along coast on sequestered islets, usually on ground with sloping surface, or in tall trees along lake margins.	**High:** Observed during FCS survey and presence documented in 2004 Berkeley Waterbird Population and Disturbance Response Study.
Sternula antillarum browni California least tern	FE MBTA	CE FP FGC	Nests along the coast from San Francisco Bay south to northern Baja California. A colonial breeder on bare or sparsely vegetated, flat substrates, sand beaches, alkali flats, landfills, or paved areas.	**Moderate:** Least Terns occur along the Alameda shoreline in spring summer and fall, although they were not detected at Aquatic Park during the 2004 surveys. Least Terns occur regularly in summer at North Basin, Ceasar Chavez Park in Berkeley**.**

Scientific Name Common Name	Status USFWS[1]	 CDFW[2]	Habitat Description[3]	Potential to Occur and Rationale
Geothlypis trichas sinuosa saltmarsh common yellowthroat	MBTA	SSC FGC	Requires thick continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	**Low:** Aquatic Park is not in the breeding range, however site is between known locations north and south along SF Bay shore. Marginal suitable nesting and foraging habitat is present.
Ardea herodias great blue heron	MBTA	FGC	A colonial nester in tall trees, cliffsides, and sequestered spots in marshes. Rookery sites are often in close proximity to foraging areas—marshes, lake margins, tide-flats, rivers, streams, and wet meadows.	**High:** Commonly recorded occurrences at Aquatic Park.
Accipiter cooperii Cooper's hawk	MBTA	WL FGC	Found in woodlands, chiefly of the open, interrupted, or marginal types. Nest sites are mainly in riparian growths of deciduous trees, such as in canyon bottoms on river plains; also, in live oaks.	**Moderate:** Marginally suitable and undisturbed habitat is present on the project site.
Hydroprogne caspia Caspian tern	MBTA	FGC	Nests on sandy or gravely beaches and shell banks in small colonies inland and along the Coast. Found in inland freshwater lakes and marshes, and also brackish or salt waters of estuaries and bays.	**High:** Occurrence documented in Berkeley Waterbird Population and Disturbance Response Study.
Haliaeetus leucocephalus bald eagle	FD MBTA	CE FP FGC	Occurs along ocean shoreline, lake margins, and rivers for nesting and wintering. Most nests are within one mile of water. Nest in large, old-growth or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter.	**Low:** There is little suitable nesting habitat for this birds species present in the vicinity of the project site in form of large, old-growth trees. However, species has been recorded nearby as recently as 2006.
Elanus leucurus white-tailed kite	MBTA	FP FGC	Found in rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Requires open grasslands, meadows, or marshes for foraging close to the isolated, dense-topped trees for nesting and perching.	**Moderate:** Suitable but small and marginal foraging and nesting habitat is present.

Scientific Name Common Name	Status USFWS[1]	Status CDFW[2]	Habitat Description[3]	Potential to Occur and Rationale
Egretta thula snowy egret	MBTA	FGC	Colonial nester with nest sites situated in protected beds of dense tules. Rookery sites are situated close to foraging areas. Found in marshes, tidal-flats, streams, wet meadows, and borders of lakes.	**High:** Presence documented in Berkeley Waterbird Population and Disturbance Response Study.
Aquila chrysaetos golden eagle	MBTA	FP WL FGC	Found in rolling foothills, mountain areas, sage-juniper flats, and desert. Prefers cliff-walled canyons to provide nesting habitat as well as large trees in open areas.	**Unlikely to Occur:** No suitable habitat is present for this species within the vicinity of the project due extensive urban development
Nycticorax nycticorax black-crowned night heron	MBTA	FGC	Colonial nester, usually in trees but occasionally in tule patches. Rookery sites are located adjacent to foraging areas including lake margins, mud-bordered bays and marshy spots.	**High:** Roosting colony documented in the cypress trees on western shore by Berkeley Waterbird Population and Disturbance Response Study.

[1] Federal Status: 2020 USFWS Listing

ESU = Evolutionary Significant Unit is a distinctive population.
FE = Listed as endangered under the FESA.
FT = Listed as threatened under the FESA.
FC = Candidate for listing (threatened or endangered) under FESA.
FD = Delisted in accordance with the FESA.
FPD = Federally Proposed to be Delisted.
FGC = protected by Fish and Game Code
MBTA = protected by the Migratory Bird Treaty Act
— = Not federally listed

Table 2: Non-special-status Bird Species Potentially Present

Common Name	Scientific Name
Waterfowl	
Greater White-fronted Goose	*Anser albifrons*
Brant	*Branta bernicla*
Canada Goose	*Branta canadensis*
Cinnamon Teal	*Anas cyanoptera*
Northern Shoveler	*Spatula clypeata*
Gadwall	*Mareca strepera*
American Wigeon	*Mareca americana*
Mallard	*Anas platyrhynchos*
Northern Pintail	*Anas acuta*
Green-winged Teal	*Anas carolinensis*
Canvasback	*Aythya valisineria*
Greater Scaup	*Aythya marila*
Lesser Scaup	*Aythya affinis*
Surf Scoter	*Melanitta perspicillata*
White-winged Scoter	*Melanitta deglandi*
Black Scoter	*Melanitta americana*
Long-tailed Duck	*Clangula hyemalis*
Bufflehead	*Bucephala albeola*
Common Goldeneye	*Bucephala clangula*

Common Name	Scientific Name
Red-breasted Merganser	*Mergus serrator*
Ruddy Duck	*Oxyura jamaicensis*
Grouse, Quail, and Allies	
Wild Turkey	*Meleagris gallopavo*
Grebes	
Pied-billed Grebe	*Podilymbus podiceps*
Horned Grebe	*Podiceps auritus*
Red-necked Grebe	*Podiceps grisegena*
Eared Grebe	*Podiceps nigricollis*
Western Grebe	*Aechmophorus occidentalis*
Clark's Grebe	*Aechmophorus clarkii*
Pigeons and Doves	
Rock Pigeon	*Columba livia*
Band-tailed Pigeon	*Patagioenas fasciata*
Eurasian Collared-Dove	*Streptopelia decaocto*
Mourning Dove	*Zenaida macroura*
White-throated Swift	*Aeronautes saxatalis*
Hummingbirds	
Anna's Hummingbird	*Calypte anna*
Allen's Hummingbird	*Selasphorus sasin*
Rails, Gallinules, and Allies	
Sora	*Porzana carolina*
American Coot	*Fulica americana*

Common Name	Scientific Name
Shorebirds	
Black-necked Stilt	*Himantopus mexicanus*
American Avocet	*Recurvirostra americana*
Black Oystercatcher	*Haematopus bachmani*
Black-bellied Plover	*Pluvialis squatarola*
Semipalmated Plover	*Charadrius semipalmatus*
Killdeer	*Charadrius vociferus*
Long-billed Curlew	*Numenius americanus*
Marbled Godwit	*Limosa fedoa*
Black Turnstone	*Arenaria melanocephala*
Sanderling	*Calidris alba*
Dunlin	*Calidris alpina*
Least Sandpiper	*Calidris minutilla*
Western Sandpiper	*Calidris mauri*
Long-billed Dowitcher	*Limnodromus scolopaceus*
Spotted Sandpiper	*Actitis macularius*
Greater Yellowlegs	*Tringa melanoleuca*
Willet	*Tringa semipalmata*
Alcids	
Common Murre	*Uria aalge*
Gulls, Terns, and Skimmers	
Bonaparte's Gull	*Chroicocephalus philadelphia*
Heermann's Gull	*Larus heermanni*

Common Name	Scientific Name
Mew Gull	*Larus canus*
Ring-billed Gull	*Larus delawarensis*
Western Gull	*Larus occidentalis*
California Gull	*Larus californicus*
Herring Gull	*Larus smithsonianus*
Iceland Gull	*Larus glaucoides*
Glaucous-winged Gull	*Larus glaucescens*
Least Tern	*Sternula antillarum*
Caspian Tern	*Hydroprogne caspia*
Forster's Tern	*Sterna forsteri*
Loons	
Red-throated Loon	*Gavia stellata*
Pacific Loon	*Gavia pacifica*
Common Loon	*Gavia immer*
Yellow-billed Loon	*Gavia adamsii*
Cormorants and Anhingas	
Brandt's Cormorant	*Phalacrocorax penicillatus*
Pelagic Cormorant	*Phalacrocorax pelagicus*
Double-crested Cormorant	*Phalacrocorax auritus*
Pelicans	
American White Pelican	*Pelecanus erythrorhynchos*
Brown Pelican	*Pelecanus occidentalis*
Herons, Ibis, and Allies	

Common Name	Scientific Name
American Bittern	*Botaurus lentiginosus*
Great Blue Heron	*Ardea herodias*
Great Egret	*Ardea alba*
Snowy Egret	*Egretta thula*
Green Heron	*Butorides virescens*
Black-crowned Night-Heron	*Nycticorax nycticorax*
Vultures, Hawks, and Allies	
Turkey Vulture	*Cathartes aura*
Osprey	*Pandion haliaetus*
White-tailed Kite	*Elanus leucurus*
Northern Harrier	*Circus hudsonius*
Sharp-shinned Hawk	*Accipiter striatus*
Cooper's Hawk	*Accipiter cooperii*
Red-shouldered Hawk	*Buteo lineatus*
Red-tailed Hawk	*Buteo jamaicensis*
Owls	
Burrowing Owl	*Athene cunicularia*
Short-eared Owl	*Asio flammeus*
Kingfishers	
Belted Kingfisher	*Megaceryle alcyon*
Woodpeckers	
Nuttall's Woodpecker	*Picoides nuttallii*
Northern Flicker	*Colaptes auratus*

Common Name	Scientific Name
Falcons and Caracaras	
American Kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Peregrine Falcon	*Falco peregrinus*
Tyrant Flycatchers: Pewees, Kingbirds, and Allies	
Olive-sided Flycatcher	*Contopus cooperi*
Willow Flycatcher	*Empidonax traillii*
Pacific-slope Flycatcher	*Empidonax difficilis*
Black Phoebe	*Sayornis nigricans*
Vireos	
Hutton's Vireo	*Vireo huttoni*
Jays, Magpies, Crows, and Ravens	
California Scrub-Jay	*Aphelocoma californica*
American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corvax*
Tits, Chickadees, and Titmice	
Chestnut-backed Chickadee	*Poecile rufescens*
Martins and Swallows	
Tree Swallow	*Tachycineta bicolor*
Violet-green Swallow	*Tachycineta thalassina*
Barn Swallow	*Hirundo rustica*
Long-tailed Tits and Bushtit	
Bushtit	*Psaltriparus minimus*

Common Name	Scientific Name
Kinglets	
Golden-crowned Kinglet	*Regulus satrapa*
Ruby-crowned Kinglet	*Regulus calendula*
Nuthatches	
Red-breasted Nuthatch	*Sitta canadensis*
Starlings and Mynas	
European Starling	*Sturnus vulgaris*
Catbirds, Mockingbirds, and Thrashers	
Northern Mockingbird	*Mimus polyglottos*
Thrushes	
Western Bluebird	*Sialia mexicana*
Hermit Thrush	*Catharus guttatus*
American Robin	*Turdus migratorius*
Old World Sparrows	
House Sparrow	*Passer domesticus*
Wagtails and Pipits	
American Pipit	*Anthus rubescens*
Finches, Euphonias, and Allies	
House Finch	*Haemorhous mexicanus*
Red Crossbill	*Loxia curvirostra*
Lesser Goldfinch	*Spinus psaltria*
New World Sparrows	
Black-throated Sparrow	*Amphispiza bilineata*

Common Name	Scientific Name
Fox Sparrow	*Passerella iliaca*
Dark-eyed Junco	*Junco hyemalis*
White-crowned Sparrow	*Zonotrichia leucophrys*
Golden-crowned Sparrow	*Zonotrichia atricapilla*
White-throated Sparrow	*Zonotrichia albicollis*
Savannah Sparrow	*Passerculus sandwichensis*
Song Sparrow	*Melospiza melodia*
Lincoln's Sparrow	*Melospiza lincolnii*
California Towhee	*Melozone crissalis*
Blackbirds	
Western Meadowlark	*Sturnella neglecta*
Red-winged Blackbird	*Agelaius phoeniceus*
Brown-headed Cowbird	*Molothrus ater*
Brewer's Blackbird	*Euphagus cyanocephalus*
Wood-Warblers	
Common Yellowthroat	*Geothlypis trichas*
Yellow-rumped Warbler	*Setophaga coronata*
Townsend's Warbler	*Setophaga townsendi*
Wilson's Warbler	*Cardellina pusilla*
Cardinals, Grosbeaks, and Allies	
Western Tanager	*Piranga ludoviciana*