SAN FRANCISCO
PLANNING DEPARTMENT

Letter of Determination

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June 16, 2016

Ms. Rachel B. Horsch
Partner
Pillsbury Winthrop Shaw Pittman LLP
Four Embarcadero Center, 22nd Floor
San Francisco, CA 94111

Site Address:	**181 Fremont Street**
Assessor's Block/Lot:	**3719/010, 011**
Zoning District:	**C-3-O(SD) (Downtown—Office (Special Development))**
Staff Contact:	**Nicholas Foster, (415) 575-6167 or nicholas.foster@sfgov.org**
Record No.:	**2016-007743ZAD**

Dear Ms. Horsch:

This letter is in response to your March 30, 2016 letter, requesting a general waiver or modification from Planning Code Section 139 (Standards for Bird-Safe Buildings) for the project known as 181 Fremont Street ("Project") located at 181 Fremont Street ("Property"). The Property is located in the C-3-O(SD) (Downtown - Office - Special Development) Zoning District and 700-S-2 Height and Bulk District. The Project is being undertaken by 181 Fremont Street, LLC ("Project Sponsor").

Planning Code Section 139(c)(3)(C) states that the Zoning Administrator may either waive the requirements contained within Sections 139(c)(1) (Location-Related Standards) and 139(c)(2) (Feature-Related Standards) or modify such requirements to allow equivalent Bird-Safe Glazing Treatments upon the recommendation of a qualified biologist.

In considering a waiver or modification from Section 139, it is necessary to determine which Bird-Safe Standards apply (Location-Related or Feature-Related Standards). While the Property is not located within 300 feet of an established Urban Bird Refuge, the Property is located immediately adjacent the site of the future Transbay Transit Center, which contains an elevated rooftop park known as City Park. This park will be approximately 5.4 acres and will be well vegetated with trees and shrubs that could provide habitat for birds. Because the park has a landscaped area greater than 2 acres, Location-Related Standards would apply because the glass façade of the Project is directly adjacent to the park and extends upwards 60 feet from the level of the Park.

Additionally, the Project contains a crown at the upper-most portion of the building comprised of glass panels arranged in an overlapping manner at heights of 700-740 feet above ground level, to conceal the rooftop penthouses and mechanical equipment. As the glass panels are larger than 24 square feet and there will be open sky behind these panels, it has been determined that Feature-Related Standards would apply at the crown.

In assessing Bird Safe Standards for the Project, the Project Sponsor retained the services of H.T. Harvey & Associates, an ecological consulting firm, to prepare an Avian Collision Risk Assessment report (dated June 2015) and a supplemental report (dated August 2015). These reports, prepared by Stephen C. Rottenborn, Ph.D., a wildlife ecologist and qualified ornithologist, challenged the overall avian collision risk posed by the Project citing a low, native resident bird population in the existing conditions surrounding the Property, and the likelihood of low bird use in City Park given that migratory birds are less likely to habituate to the conditions found in urban parks. The reports also cited the Project's unique architectural design features that would prove more conspicuous to avian populations, thereby helping to reduce avian collisions. With respect to the crown, the reports find the potential collision risk to be low, as the "saw-tooth" architectural design is continued at this level of the building, making the structure more conspicuous to passing birds. Additionally, given its height above grade, the birds flying at this altitude would primarily consist of long-distance migrants that would perceive the building as a solid structure and avoid flying into it, long before they came close to the building itself, therefore no additional treatment of the glass panels would be necessary.

In consideration of these reports, the Planning Department concurs with the findings that the Project's design features could help reduce avian collisions. The Project's façade is comprised of a glass curtain system (glass panels separated by non-glass mullions) that is arranged in a "saw-tooth" pattern. While the "saw-tooth" pattern was originally designed to minimize solar heat gain, the staggering of glazing may help to disrupt reflections compared to unbroken segments of plain glass, thereby functioning as a Bird-Safe Standard. The Department also concurs with the findings in the reports that the crown at this height poses a minimal collision risk.

Additionally, the Project Sponsor, after consultation with the Planning Department, has agreed to the installation of architectural features that are in service of reducing bird mortality from circumstances that are known to pose a high risk to birds and are considered to be "bird hazards." These features will apply within the Bird Collision Zone, which begins at the height of the building where the pedestrian bridge connects City Park to the Project (approximately 71'-4" above grade) to a height 60 feet upwards (approximately 133'-10") or floors 5-9. These features include:

1. The addition of horizontal mullions to the glass curtain wall fronting onto City Park (north façade) to limit the size of the segments of glass, such that all unbroken glazed segments are no larger than 24 square feet.

2. Prohibition of indoor vegetation placed within the building, along the norther façade (facing City Park).

Lastly, the Project Sponsor has voluntary introduced an Avian Collision Monitoring Plan ("Monitoring Plan"), prepared by H.T. Harvey & Associates, aimed at monitoring avian collisions following the construction of the Project. The Monitoring Plan, which is intended to collect data from avian collisions, calls for the evaluation of potential "hotspots" where there are higher frequencies of avian collisions occurring, and the consideration of post-construction measures to reduce avian collisions.

In response to the requirements set forth in Planning Code Section 139 for Location-Related and Feature-Related Standards, the Project Sponsor has demonstrated partial compliance with these requirements. Therefore, based upon the findings listed above and the evidence outlined in the March 30, 2016 letter, I hereby grant the modification from Planning Code Section 139.

Please note that a Letter of Determination is a determination regarding the classification of uses and interpretation and applicability of the provisions of the Planning Code. This Letter of Determination is not a permit to commence any work or change occupancy. Permits from appropriate Departments must be secured before work is started or occupancy is changed.

APPEAL: If you believe this determination represents an error in interpretation of the Planning Code or abuse in discretion by the Zoning Administrator, an appeal may be filed with the Board of Appeals within 15 days of the date of this letter. For information regarding the appeals process, please contact the Board of Appeals located at 1650 Mission Street, Room 304, San Francisco, or call (415) 575-6880.

Sincerely,

Scott F. Sanchez
Zoning Administrator

cc: Nicholas Foster, Planner
Property Owner
Neighborhood Groups
BBN Requestor (if any)

pillsbury

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March 30, 2016

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CITY & COUNTY OF S.F.
PLANNING DEPARTMENT
ZA OFFICE

Mr. Scott Sanchez
Zoning Administrator
c/o San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Re: **181 Fremont Street – Waiver or Modification request pursuant to Planning Code Section 139((c)(3)(C)** (3719/011)

Dear Mr. Sanchez,

We represent 181 Fremont Street, LLC ("Sponsor"), the owner and developer of the project known as 181 Fremont Street (the "Project"). On behalf of Sponsor, pursuant to Planning Code Section 139(c)(3)(C), we hereby request a waiver or modification from the requirements of Planning Code Section 139(c)(1) (Location-Related Standards) and, to the extent applicable, Planning Code Section 139(c)(2) (Feature-Related Standards).

Planning Code Section 139(c)(1), requires bird-safe glazing treatment on buildings located in or near an Urban Bird Refuge. Sponsor originally intended to design and build the Project incorporating glass on the southern façade between the roof of the Transbay Park and 60' above the Transbay Park meeting the City's bird safe glazing guidelines.

However, further development of the design turned up serious issues with a technical solution that would simultaneously: (a) meet the bird safe design guidelines; (b) provide the structural and water integrity required for the Project's curtain wall system; and (c) meet the design goals of the Project. See the attached letter from Project Architect, Heller Manus, dated November 11, 2015.

In addition, the Planning Department has suggested that the crown of the building, which provides visual screening from roof top mechanical equipment, might qualify as a feature-related hazard pursuant to the provisions of Section 139(c)(2).

As a result, pursuant to Planning Code Section 139(c)(3)(C), Sponsor is requesting a modification or waiver of the requirements of Planning Code Section 139(c)(1) and,

to the extent applicable, Planning Code Section 193(c)(2). In accordance with the provisions of Planning Code Section 139(c)(3)(C), Sponsor engaged H.T. Harvey & Associates, a qualified ornithologist to prepare an Avian Risk Assessment. Attached please find their report, dated June 2015 and their supplemental report, dated August 2015.

In addition Sponsor has incorporated additional architectural features (the integration of additional horizontal mullions) within the 60' section of curtain wall facing the Transbay Park. See attached diagrams showing the added features. By doing so, the areas that are currently uninterrupted glazing will be divided into three smaller areas, none of which exceed 24 square feet. Sponsor is also prepared to adopt a bird strike monitoring program to provide the City with additional quantitative data for purposes use in determining future policy and procedures. H.T. Harvey & Associates has prepared the attached initial draft monitoring program.

Based on the considerations described above and the risk assessment prepared by H.T. Harvey & Associates, Sponsor requests that the Zoning Administrator either waive the requirements of Planning Code Section 139(c)(1) and, to the extent applicable Planning Code Section 193(c)(2) or modify such requirements to be satisfied by the architectural refinements described above and/or implementation of the monitoring program described above. Based on the risk posed to birds by the building taking into account: (1) the fact that the building's design included conspicuous architectural elements which inherently deterred bird collisions; and (2) the nature of likely bird activity on research, field investigation and analysis of similar urban parks, we believe a waiver or modification from the requirements pursuant to Planning Code Section 139(c)(3)(C) is appropriate.

Sincerely,

Rachel B. Horsch

Attachments

- *Heller Manus letter, dated 11 November 2015*
- *H.T. Harvey & Associates Avian Risk Assessment, dated June 2015*
- *H.T. Harvey & Associates Supplement, dated August 2015*
- *Diagrams of Architectural Refinements*
- *H.T. Harvey & Associates Proposed Monitoring Program*

H.T. HARVEY & ASSOCIATES
Ecological Consultants

181 Fremont Street Project

Avian Collision Monitoring Plan

Prepared for:

Jay Paul Company
Four Embarcadero, Suite 3620
San Francisco, CA 94111

Prepared by:

H. T. Harvey & Associates

March 28, 2016

Project No. 3601-01

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Section 1.0 Introduction

H. T. Harvey & Associates has prepared this Avian Collision Monitoring Plan (Monitoring Plan) describing the monitoring program for avian collisions that Jay Paul Company will implement as part of its 181 Fremont Street Project in San Francisco, California, in order to monitor, and thereby potentially reduce, avian collisions following the completion of construction of a new building at this location.

The purpose of this Monitoring Plan is to provide Jay Paul Company a means by which to gauge the relative frequency of avian collisions and, possibly, to detect avian collision hotspots (areas exhibiting higher frequencies of avian collisions), following construction of the Project. This Plan describes the monitoring methodology; monitoring frequency; process by which monitoring data will be compiled and reviewed by Jay Paul Company; and potential outcomes of the monitoring, such as consideration of post-construction measures to reduce avian collisions should any collision hotspots be detected.

Section 2.0 Avian Collision Monitoring Measures

Jay Paul Company will monitor bird collisions around its 181 Fremont Street building for a period of two years following completion of construction to determine the relative frequency of avian collisions, the species involved in collisions, and whether there are any collision "hotspots" (i.e., areas where collisions occur most frequently). Specific monitoring measures are described below.

2.1 Avian Collision Monitors

Jay Paul Company will designate one or more Avian Collision Monitors who will be responsible for implementing the monitoring measures outlined below. Monitors will have some understanding of bird identification and will be provided with the following equipment to help with data collection: field guide to bird identification, flashlight, camera, and data sheet.

2.2 Weekly Survey

An Avian Collision Monitor will conduct weekly ground searches for dead or injured birds on the northwest side of the building (the side facing the future Transbay Park). The monitor will look for such birds within 100 feet of the building, including areas within 100 feet to the southwest and northeast of the corners of the building facing the park (in case birds that strike the building are blown away from the building). Monitoring will take place before 9:00 in the morning to reduce the potential for scavengers such as crows and ravens to remove dead or injured birds.

Photo 1. Imprint left behind after a bird struck a window.

In addition, the monitor will look for detectable evidence of collision (e.g., imprints, blood, or feathers on glass; Photo 1). If evidence of a bird collision, or any dead or injured bird (or parts thereof) are detected, the incident will be assigned a unique identification number and the following information will be collected:

- Date
- Bird species, if it can be determined[1]

[1] If the Avian Collision Monitor is unable to identify a dead or injured bird, the photograph of the individual will be forwarded to an expert for identification, and/or the bird will be recorded to the most specific level possible (e.g., "flycatcher", "sparrow", "unidentified", etc.).

- Location (including the building, the side of the building, the specific location on that side of the building, the height above ground of any evidence of a collision, and the physical structure where the collision occurred [e.g., glass window or opaque wall])
- Photograph (with size reference), if feasible

Collision information will be recorded on an Avian Collision Data Form (an example of which is provided below) and subsequently entered into an avian collision database to be created by Jay Paul Company.

2.3 Avian Collision Awareness Program

In addition to weekly monitoring, Jay Paul Company will develop an avian collision awareness program for building occupants. The program will ask that occupants report dead or injured birds, or evidence of avian collisions on windows (e.g., feathers, bird imprints, or observations of collisions) to the Avian Collision Monitor. This will increase awareness and the likelihood that data will be recorded.

2.4 Hotspot Analysis

At a frequency of no less than every six months, Jay Paul Company will review the avian collision data to determine whether any "hotspots" (i.e., areas of frequent avian collisions) are present. Hotspots may be relatively small (e.g., the area around a single highly reflective glass panel) or larger (e.g., an area where a particular tree is reflected in several panels). If any such hotspots are found, Jay Paul Company will review the data to determine which, if any, of the following factors may be responsible for the relatively high number of collisions at that location:

- Interior lighting
- Exterior lighting
- Landscaping (i.e., proximity to vegetation highly attractive to birds)
- Glass characteristics (e.g., reflectivity, transparency, or degree of fritting)
- Proximity to outdoor trash and recycling receptacles or eating areas

Avian Collision Data Form

Monitor Name _____

Identification Number[1]	Date	Location	Evidence Type[2]	Species	Photo Taken? (yes/no)	Observer Comments

[1] For each new casualty, create a unique ID value. Start the ID with date (month/day/year) followed by the monitor's initials and a number (e.g., "101514JD03" indicates the collision was recorded on 15 October 2014 by monitor John Doe and was the third collision recorded by the monitor that day).

[2] D = Dead bird, I = injured bird, S = secondary evidence (e.g., imprint, feathers, or blood on glass)

H.T. HARVEY & ASSOCIATES
Ecological Consultants

16 June 2015

Eric Lundquist
Heller Manus Architects
600 Montgomery Street, Suite 100
San Francisco, California 94111

Subject: Proposed 181 Fremont Street Project – Avian Collision Risk Assessment (HTH #3601-01)

Dear Mr. Lundquist:

Per your request, H. T. Harvey & Associates has performed an assessment of avian collision risk for the proposed 181 Fremont Street Project (Project) adjacent to the Transbay Transit Center in San Francisco, California. It is our understanding that an 800-foot tall building is proposed for this site. The building's façade will consist of glass panels separated by non-glass mullions. Each panel will be slightly offset from the next so that the sides of the rectangular building will have a saw-tooth design to minimize solar heat gain. Little or no vegetation would be planted at ground level around the building, but the northwestern side of the building would face the proposed Transbay Park. This park, which would sit atop the Transbay Transit Center once the Transit Center is completed, would be approximately five stories above ground level. It would be planted with numerous trees and shrubs, with walking paths and other facilities.

The crown of the building will also include glazed surfaces, at heights of 700-740 feet above ground level. The crown will include two sets of glass screens that conceal the rooftop penthouses and mechanical equipment. The outside set will align with the saw-tooth and glass type on the portion of the building below it, essentially being a continuation of the saw-tooth curtain wall. This glass will cover 70 percent of the mullion frame with a panel of open sky adjacent to it. There will be a second set of glass that is constructed as a screen that completes the adjacent corners but is located inboard of the large building frames. This glass is also adjacent to a panel of open sky which is the same size as the glass panel, but the pattern is not a saw tooth. The rendering to the right depicts the proposed appearance of the crown.

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We understand that the City of San Francisco has asked the project proponent to assess the appropriate bird safe design for this project pursuant to the City's 2011 bird safe design standards, and Heller Manus Architects has requested our assistance in addressing the City's request. This report describes my assessment of bird occurrence in the vicinity of the building under existing conditions and conditions present after construction of the Project and Transbay Park, the potential risk of avian collisions with the glass facades and recommendations on appropriate bird collision risk mitigation. In preparing this assessment, I have considered all the items in the City's "Bird-Safe Building Checklist" (attached). As a result, my assessment pertains primarily to the collision risk involving the building's façade within 60 feet of the surface of the ground on the side of the proposed building facing Transbay Park and the crown of the building (i.e., the areas subject to requirements of the City's bird-safe design guidelines).

Briefly, my qualifications are as follows (resume attached). I have a Ph.D. in biological sciences from Stanford University, where my doctoral dissertation focused on the effects of urbanization on riparian bird communities in the South San Francisco Bay area. I have been an active birder for more than 35 years and have conducted or assisted with research on birds since 1990. I have served for 6 years as an elected member of the California Bird Records Committee and for 10 years as a Regional Editor for the Northern California region of the journal *North American Birds*. I am a member of the Scientific Advisory Board for the San Francisco Bay Bird Observatory and the Technical Advisory Committee for the South Bay Salt Ponds Restoration Project. Although the subject of bird safe design is relatively new to the West Coast, I have performed avian collision risk assessments and identified measures to reduce collision risk for several projects in the Bay Area, including projects in the cities of San Francisco, Mountain View, and San Jose.

Methods

On 1 August 2014, from approximately 11:45 a.m. to 1:00 p.m., I viewed the proposed Project site from Fremont Street and walked nearby streets for several blocks in each direction looking and listening for all birds. I counted individuals of each species I encountered. This time of year, the terrestrial bird community in San Francisco is at the end of (and for most species just after) the breeding season, but southbound migration has just barely begun. Because observations during my site visit just represented a brief "snapshot" of conditions during this season, I also assessed the suitability of habitat within the survey area to support birds that might not have been present during my site visit (such as northbound or southbound migrants, which would occur in the San Francisco area in spring and fall, respectively). I assessed how birds might use resources around the project site, such as using vegetation or artificial structures as roost or nest sites or for cover from predators and the elements; obtaining food resources (such as invertebrate prey, fruit, or seeds) from vegetation; and obtaining anthropogenic food resources such as food waste. I also assessed the potential for avian collisions with the facades of the proposed building, taking into account the location of the building relative to food or structural resources (such as vegetation); the distance from the proposed glass facades to those resources; the potential for vegetation to be reflected in the glass facades; and the existing conditions of the facades of other buildings in the vicinity.

Because the Transbay Transit Center is still under construction, and Transbay Park will not be developed until the Transit Center has been completed, future habitat conditions in the Park will differ considerably from the conditions that I viewed in the field. I took this into account while I was visiting the Project site, considering the potential future use of the Park by birds based on the conceptual drawings of the Park available to me (i.e., showing vegetation plantings), the dimensions of the future park, and the surrounding land use once the Project, the Transbay Transit Center, and the proposed Transbay Tower are constructed. In addition, because the Park has not yet been constructed and I thus could not assess bird use of the Park directly, I visited three "reference parks" in the vicinity that possessed vegetation potentially similar to that in the proposed Transbay Park and that could thus provide a sense of future bird use of Transbay Park. These included Sue Bierman Park and the park bounded by Washington, Drumm, Clay, and Davis Streets (both approximately 0.5 miles north of 181 Fremont Street) and Walton Square located approximately 0.6 miles north of 181 Fremont Street. At these locations, I recorded the number of individuals of each bird species I saw within 15-minute periods and assessed habitat conditions to allow me to evaluate the potential for occurrence of birds at other times of year, and to place into context the bird records from these areas that I gleaned from other sources (described in the next paragraph).

Because my site visit only represented a snapshot of avian occurrence in the project vicinity, I also searched for bird observations on the internet to determine what birds others have seen in the vicinity of the Project site and in the reference parks. This search included a search of the archives of the "SF Birds" list (http://groups.yahoo.com/group/SFBirds/messages) for messages containing the term "Fremont Street", "Sue Bierman Park", and "Walton Square". This internet list is used by birders in San Francisco to report interesting bird observations. In addition, I searched the eBird database (http://ebird.org/content/ebird/), which has been established by the Cornell University Laboratory of Ornithology to archive records of birds seen worldwide, for records at the Project site and the reference parks.

Results – Assessment of Bird Occurrence

Assessment of Bird Occurrence under Existing Conditions. During the 1.25 hours I spent in the vicinity of 181 Fremont Street, including walking nearby streets, I observed only two bird species – four rock pigeons (*Columba livia*) foraging along Howard Street, and several western gulls (*Larus occidentalis*) flying high over the vicinity. Rock pigeons are not protected by the Federal Migratory Bird Treaty Act or California Fish and Game Code because they are not native to North America. As a result, this species is not discussed further, as this report focuses on potential collision risk of protected, native birds. The western gulls were simply flying through the City, and not using habitat near the Project site.

The scarcity of native birds in the Project vicinity was not surprising, as very little habitat for native birds is present. No vegetation is present immediately adjacent to the site, and only a few scattered street trees, including red maple (*Acer rubrum*), London planetree (*Platanus x acerifolia*), birches (*Betula* sp.), and other ornamentals, are present along nearby streets. These trees could potentially provide roost sites for migrant birds that occasionally move through the area, but without any understory vegetation, and given the

intensively urban surroundings, such trees provide few resources for native birds. The intensive disturbance associated with construction of the Transbay Transit Center immediately adjacent to 181 Fremont Street further discourages bird use, and no reference to birds found in the Project vicinity was noted either on the SF Birds internet list or the eBird database. As a result, under existing conditions, very few native birds are expected to occur in the Project vicinity, and any birds occurring in the vicinity would likely be regionally abundant, urban-adapted species that are not of conservation concern.

Assessment of Bird Occurrence under Future Conditions. Under future conditions, Transbay Park would o adjacent to the northwest side of the Project site, and based on conceptual plans for the Park, it would be well vegetated with trees and shrubs that could provide habitat for birds. During my 15-minute visits to each of the reference parks, I observed 21 individuals of seven native species in the park bounded by Washington, Drumm, Clay, and Davis Streets, seven individuals of four native species in Sue Bierman Park, and one individual of one native species in Walton Square. Although these totals are not particularly high (e.g., compared to more natural areas around San Francisco Bay), they represented just brief snapshots of bird use of these areas, and inspection of SF Bay internet bird records and eBird records revealed much higher bird use of these reference parks. At least 25 species of native birds have been recorded at Walton Square, with up to 66 individual native birds recorded at this site in a single visit. Sue Bierman Park (which, in SF Birds reports and eBird checklists, apparently includes the area bounded by Washington, Drumm, Clay, and Davis Streets), has hosted at least 63 native species, with counts of up to 73 native birds in a single visit. Both Walton Square and Sue Bierman Park are most heavily covered by birders during migration and winter, when more individuals and more native species are expected to be present than during my late-summer visit.

Because vegetation at these reference parks is likely similar to the vegetation that will be planted at Transbay Park, the bird use of these reference parks provides some insight into potential bird use at Transbay Park. However, there are several differences between these reference parks and Transbay Park that are expected to result in less bird use of Transbay Park, relative to the reference parks. First, because Transbay Park will be constructed on top of the Transit Center, soil depths will be lower at Transbay Park than in the reference parks. As a result, trees selected for Transbay Park are unlikely to be species that can reach the heights of trees in the reference parks. Because bird diversity tends to increase with the number of layers of vegetation, having shorter trees at Transbay Park is likely to result in lower bird use than the reference parks. Second, Transbay Park will be narrower than the reference parks (less than 200 feet wide, vs. 300 feet or more wide in the reference parks). Transbay Park will thus accommodate less vegetation and will be less attractive to birds in the context of the very tall buildings surrounding the Park. The height of the existing and proposed buildings adjacent to Transbay Park, coupled with the narrow nature of the Park, will likely make the birds seemed "hemmed in", increasing the urban context of the park and making the habitat seem less natural to birds. In addition, Transbay Park will be separated from the shoreline of San Francisco Bay by several blocks of very tall buildings, whereas Sue Bierman Park and Walton Square are closer to the Bay and not separated from the Bay by tall buildings. Migrants flying over or along the edge of the Bay drop into suitable habitat nearby, and thus easily detect Sue Bierman Park and Walton Square, whereas they would be less likely to see or use Transbay Park due to intervening tall buildings.

In summary, Transbay Park is expected to attract a number of native bird species, as the reference parks currently do, after the vegetation is planted and it begins to mature. Native bird use of Transbay Park will be highest during migration, when birds are moving over the City and can detect Transbay Park nestled among the tall surrounding buildings. Bird use will be lower in winter, and particularly low in summer, when relatively few native birds are expected to nest in the Park due to its narrow nature, anticipated high human use, and intensively urban surroundings. Bird use of the Park is expected to be lower than at the reference parks, both in terms of the number of native species and the abundance of these birds. Nevertheless, some native birds will be present in the Park year-round, and native bird abundance in the vicinity of the 181 Fremont Street Project will be higher after Transbay Park is vegetated than under existing conditions.

Results – Assessment of Collision Risk

It has been well documented that glass windows and building facades can result in injury or mortality of birds due to birds' collisions with these surfaces.[1] Because birds do not perceive glass as an obstruction the way humans do, they may collide with glass when the sky or vegetation is reflected in glass (e.g., they see the glass as sky or vegetated areas); when transparent windows allow birds to perceive an unobstructed flight route through the glass (such as at corners); and when the combination of transparent glass and interior vegetation (such as in planted atria) results in attempts by birds to fly through glass to reach that vegetation. The greatest risk of avian collisions with buildings occurs in the area within 60 feet of the ground, because this is the area in which most bird activity occurs. [2]

As noted above, very few native, resident birds are present in the Project vicinity under existing conditions, and even during migration, the number of native birds expected to occur in the Project vicinity under existing conditions will be low. As a result, under existing conditions, the glass facades of the 181 Fremont Street Project are expected to result in collisions by very few native birds in the primary collision zone within 60 feet of the ground.

After Transbay Park is constructed, the risk of collisions with the portion of the building within 60 feet of the Park surface on the area facing the Park will be higher because more native birds will be present in the Park. The glass panels comprising a building's facades would be expected to reflect the sky, and along the northwest side of a building at this location, these panels would reflect vegetation within the Park. Birds flying into or leaving the Park could thus mistake the glass panels for vegetation or the sky and collide with the building.

Several factors will limit the number of birds that may collide with the portions of the building within 60 feet of the Park's ground level (the building's fifth level). First, as described above, bird use of the Park is

[1] Klem, D. Jr. February, 2009. Avian Mortality at Windows: The Second Largest Human Source of Bird Mortality on Earth. Proceedings of the Fourth International Partners in Flight Conference: Tundra to Tropics. 244-251.
[2] San Francisco Planning Department. 2011. Standards for Bird-Safe Buildings.

expected to be lower than in reference parks, which limits the number of birds present in the vicinity of the building. Second, human use of the Park is expected to be very high owing to the number of office and residence spaces in the immediate vicinity of the Park and the Park's proximity to the Transit Center. Although many birds habituate to high human use and the disturbance (e.g., from dogs being walked, noise, and human activity) associated with it, particularly common, urban-adapted resident birds, migrants are less likely to be habituated to such disturbance and thus are less likely to remain in the Park if they do descend from migration to use the Park.

In addition, various features of the building as designed could reduce the extent to which this project actually causes bird confusion that could result in collisions. The non-glass mullions separating glass panels on the building will break up the glass façade, so that the building will be more conspicuous (and thus less likely to be mistaken for the sky or vegetation) than buildings with more uniform glass. The "saw-tooth" nature of the glass panels, with each panel slightly offset from the next, will make these panels even more conspicuous to birds than traditional, flat-sided facades, as each panel will reflect more of the adjacent mullions than would otherwise be the case. Due to the dimensions of the building, birds will not be able to see through windows to the other side of the building. In addition, six-foot wide columns and braces at the corners would provide opaque corners that would prevent birds from being able to "see through" the corners and thus attempt to fly through.

According to the City's bird-safe design guidelines, the glass in the crown may be considered a "feature-related hazard" because of the open sky behind the glass. As a result, I considered the potential for avian collisions resulting from the presence of glass in the building's crown. I concluded that the potential for, and frequency of, such collisions will be low, for several reasons:

(1) The saw-tooth nature of the glass panels will continue to make the majority of glass in the crown more conspicuous to birds than traditional, flat-sided facades, as discussed previously.
(2) The interspersion of glass panels, 4-inch-wide aluminum mullions, shadows cast by the saw-tooth patterns and mullions, and sky will create a heterogeneous appearance that will be viewed by birds as a solid structure to be avoided.
(3) Birds flying at an altitude of 700-740 feet in the project vicinity would consist primarily of migrants or dispersing birds making long-distance movements through the City, rather than birds making local foraging or nesting movements. As a result, these birds would be moving long distances and would see features before them, such as buildings, long before they got very close to those buildings. Such birds approaching from afar would see the Project building as a solid feature to be avoided; whether it contains glass in certain areas, or whether that glass has been treated (e.g., with bird-safe patterns), is inconsequential to a bird that views the building as a whole as something to be avoided. Long-distance migrants or dispersants flying high above the ground will perceive and avoid this building before they get close enough that they might be confused by reflections of the sky in untreated glass panes.

(4) There is some potential for bird strikes to occur with any part of the building (including the crown) at night, when birds may be less able to perceive the presence of the building (especially in bad weather). However, large-scale collision events involving nocturnal migrants such as those that have been documented at high-rise buildings in the East and Midwest have not been documented in the West, and thus I do not expect large collision events to occur with this building. The Project does not propose any very bright spotlights or other lighting that would be pointed upward or outward and that may serve to attract or confuse birds. Furthermore, it is worth noting that the composition of the building's surface (e.g., presence or absence of glass, or whether the glass includes bird-safe treatments) would have no influence on whether nocturnal migrants collide with the building if they are unable to perceive the building due to darkness in the first place.

Applicability of San Francisco Standards for Bird-Safe Buildings

I have reviewed the design of the proposed building with respect to the City's "Bird-Safe Building Checklist"; a copy of the checklist completed for this Project is attached. Per the instructions for completing this checklist, there are only two potential issues of concern (i.e., issues that would typically require treatment of glazing). These are item #5 ("Is the structure inside of, or within a distance of 300 feet from an open space 2 acres or larger dominated by vegetation?") and item #13 ("Is the building's glass treated with bird-safe treatments such that the 'collision zone' contains no more than 10% untreated glazing for identified 'location-related hazards' (lines 4-7) and such that 100% of the glazing on 'feature-related hazards' (lines 19-22) is treated?").

According to the City of San Francisco's bird-safe design guidelines, a "location-related hazard" is a building located inside of, or within a clear flight path of less than 300 feet from, an Urban Bird Refuge, which is defined as an open space 2 acres or larger dominated by vegetation.[3] Transbay Park will exceed 2 acres, and the Project will be located well within 300 feet of the vegetated areas of the Park. Therefore, the City's bird-safe design guidelines state that bird-safe glazing treatment is necessary so that there is no more than 10% untreated glazing in the bird collision zone (i.e., the area within 60 feet of the surface of the Park).

Based on my review of the Project's plans and the City's comments on the Project, it appears that the only potential "feature-related hazard" proposed involves the glass in the crown that is open to the sky behind it. As discussed above, I do not expect the glass in the building's crown to result in substantial collision risk because birds approaching from a distance during the daytime will be able to perceive and avoid the building as a whole and the crown in particular. Treatment of the glass in the crown would be unnecessary, as birds flying at the altitude of the crown in daylight would avoid the building and thus would not get close enough to the building for glazing treatments to have any influence on collision risk. Although there is some potential for collision risk at night (with the crown or any part of the building), treatment of glazing in the crown would have no effect on whether such collisions occur, as any nocturnal migrant birds that are unable to

[3] San Francisco Planning Department. 2011. Standards for Bird-Safe Buildings.

perceive the presence of an entire building (e.g., due to bad weather) would not be expected to see the glazing on individual panes.

Despite the potential location-related and feature-related hazards discussed above, the City's bird-safe design guidelines state that the City may waive these requirements or allow alternative treatments based upon the recommendations of a qualified biologist. As a biologist qualified to provide a professional opinion regarding the issue of bird-safe design, I offer the conclusions and recommendations in the following section to indicate why in lieu of bird-safe glazing treatment the building's overall architectural design is sufficient to avoid substantial avian impacts from collisions within the area within 60 feet of the ground's surface or at the building's crown.

Conclusions and Recommendations

I expect that occasional collisions between native birds and the glass facades of the new project may occur after Transbay Park is constructed, and that occasional collisions by nocturnal migrants with the building's crown may occur. However, the frequency of bird collisions that will occur with any portion of the building will be low. I base this conclusion primarily on (1) the relatively low numbers of birds expected to use Transbay Park (e.g., relative to the reference parks), (2) the mullions that separate the glass panels on the proposed building's façade, the offset angles of the glass and the pronounced columns and braces at the corners, thus making the façade more conspicuous and less likely to be mistaken for the sky or vegetation, (3) the heterogeneous combination of mullions, glass panes, and sky that will make the crown conspicuous to any birds moving at the altitude of the crown, and (4) the expectation that birds moving at the altitude of the crown during the daytime will be making longer-distance movements and thus will be able to perceive the building as a structure to be avoided long before coming into close contact with the building. Because the frequency of bird collisions will be low, these collisions will not result in the loss of a substantial proportion of any species' Bay-area populations or any Bay-area bird community. In addition, any collisions by nocturnal migrants with the crown will not be avoided by the use of bird-safe glazing treatments, which would not be visible at night. Therefore, in my opinion, the overall architectural design of the building in lieu of bird-safe glazing treatment should sufficient to avoid any substantial impacts on birds from collisions.

Please feel free to contact me at (408) 458-3205 or srottenborn@harveyecology.com if you have any questions regarding this assessment. Thank you very much for contacting us about this project.

Sincerely,

Stephen C. Rottenborn

Stephen C. Rottenborn, Ph.D.
Principal – Wildlife Ecologist

Print Form

BIRD-SAFE BUILDING CHECKLIST

Using the key on the prior page, complete this checklist as a guide to help evaluate potential bird-hazards or eligibility for Bird-Safe Building Certification.

		QUESTION		YES	NO
MACRO-SETTING (PAGE 12, 16)	1	**Is the structure located within a major migratory route?** (All of San Francisco is on the Pacific Flyway)		☒	☐
	2	**Is the location proximate to a migratory stopover destination?** (Within 1/4 mile from Golden Gate Park, Lake Merced or the Presidio)		☐	☒
	3	**Is the structure location in a fog-prone area?** (Within 1/2 mile from the ocean or bay)		☒	☐
MICRO-SETTING (LOCATION-RELATED HAZARD) (PAGES 13, 16, 28-29)	4	**Is the structure located such that large windows greater than 24 square feet will be opposite of, or will reflect interlocking tree canopies?**		☒	☐
	5	**Is the structure inside of, or within a distance of 300 feet from an open space 2 acres or larger dominated by vegetation?** (Requires treatment of glazing, see page 28)		☒	☐
	6	**Is the structure located on, or within 300 feet from water, water features, or wetlands?** (Requires treatment of glazing, see page 28)		☐	☒
	7	**Does the structure feature an above ground or rooftop vegetated area two acres or greater in size?** (Requires treatment of glazing, see page 29)		☐	☒
GLAZING QUANTITY (PAGE 8)	8	**Is the overall quantity of glazing as a percentage of façade:** (Risk increases with amount of glazing)	**Less than 10%?**	☐	☒
			More than 50%? (Residential Buildings in R-Districts must treat 95% of unbroken glazed segments 24 square feet or greater in size if within 300 feet of an Urban Bird Refuge.)	☒	☐
	9	Will the glazing be replaced?	**More than 50% glazing to be replaced on an existing bird hazard (including both feature-related hazards as described in lines 19-22 and location-related hazard as described in lines 4-7)?** (Requires treatment see pages 29 and 31.)	☐	☒
GLAZING QUALITY (PAGE 6, 7)	10	Is the quality of the glass best described as:	**Transparent** (If so, remove indoor bird-attractions visible from outside the windows.)	☒	☐
	11		**Reflective** (If so, keep visible light reflectance low (between 10-20%) and consider what will reflect in the windows. Note: Some bird-safe glazing such as fritting and UV spectrum glass may have higher reflectivity that is visible to birds.)	☐	☒
	12		**Mirrored or visible light reflectance exceeding 30%.** (Prohibited by Planning Code.)	☐	☒
GLAZING TREATMENTS (PAGE 16-21)	13	**Is the building's glass treated with bird-safe treatments such that the "collision zone" contains no more than 10% untreated glazing for identified "location-related hazards" (lines 4-7) and such that 100% of the glazing on "feature-related hazards" (lines 19-22) is treated?**		☐	☒
	14	**Is the building's glass treated for required "bird hazards" (as described in line 13) *and* such that no more than 5% of the collision zone (lower 60') glazing is untreated but not for the entire building?**		☐	☒
	15	**Is the building glazing treated (as described above in lines 14 and 15) *and* such that no more than 5% of the glazing on the exposed façade is left untreated?**		☐	☒
BUILDING FAÇADE GENERAL (PAGE 8, 13)	16	**Is the building façade well-articulated (as opposed to flat in appearance)?**		☒	☐
	17	**Is the building's fenestration broken with mullions or other treatments?**		☒	☐
	18	**Does the building use unbroken glass at lower levels?**		☒	☐
BUILDING FEATURE-RELATED HAZARDS AND BIRD TRAPS (PAGE 8, 30-31)	19	**Does the structure contain a "feature-related" hazard or potential "bird trap" such as:**	**Free standing clear-glass walls, greenhouse or other clear barriers on rooftops or balconies?** (Prohibited unless the glazing is treated with bird-safe applications.)	☐	☒
	20		**Free standing clear-glass landscape feature or bus shelters?** (Prohibited unless the glazing is treated with bird-safe applications.)	☐	☒
	21		**Glazed passageways or lobbies with clear sight lines through the building broken only by glazing?**	☐	☒
	22		**Transparent building corners?**	☐	☒
LIGHTING DESIGN (PAGE 10, 25)	23	**Does the structure, signage or landscaping feature uplighting?** (Prohibited within 300 feet of an Urban Bird Refuge)		☐	☒
	24	**Does the structure minimize light spillage and maximize light shielding?**		☒	☐
	25	**Does the structure use interior "lights-out" motion sensors?**		☒	☐
	26	**Is night lighting minimized to levels needed for security?**		☒	☐
	27	**Does the structure use decorative red-colored lighting?**		☐	☒
LIGHTING OPERATIONS (PAGE 12, 24-25)	28	**Will the building participate in San Francisco Lights Out during the migration seasons?** (February 15-May 31 and August 15- November 30th) To achieve "sterling" certification the building must participate in year-round best management practices for lighting.		☒	☐
OTHER BUILDING ELEMENTS (PAGE 23)	29	**Does the structure feature rooftop antennae or guy wires?**		☐	☒
	30	**Does the structure feature horizontal access wind generators or non-solid blades?**		☐	☒
CONSENT (PAGE 34)	31	**Does the building owner agree to distribute San Francisco's Bird-Safe Building Standards to future tenants?**		☐	☒

Authorized Signature x Stephen C. Rotterdam **Date:** Jun 16, 2015

Stephen C. Rottenborn, Ph.D.

Principal, Wildlife Ecology

srottenborn@harveyecology.com
408.458.3205

Areas of Expertise

- Avian ecology
- Wetlands and riparian systems ecology
- Endangered Species Act consultations/ compliance
- Environmental impact assessment

Education

- Ph.D. Biological Sciences, Stanford University, 1997
- B.S. Biology, College of William and Mary, 1992

Other Professional Experience

- Ecology Section Chief/Environmental Scientist, Wetland Studies and Solutions, Inc., 2000-2004
- Sr. Wildlife Ecologist, H. T. Harvey & Associates, 1997-2000
- Independent Consultant, 1989-1997
- Scientific Associate/Scientific Advisory Board, San Francisco Bay Bird Observatory, 1999-2004, 2009-present
- Member, Board of Directors, Virginia Society of Ornithology, 2000-2004
- Member, Board of Directors, Western Field Ornithologists, 2014-present

Key Projects

- Candlestick Point/Hunters Point Shipyard
- Concord Community Reuse Project EIR
- Santa Clara Valley Water District Stream Maintenance Program
- Envision San Jose 2040 General Plan Update
- South Bay Salt Ponds Restoration Project

Key Publications

Rottenborn, S. C. 2000. Nest-site selection and reproductive success of red-shouldered hawks in central California. Journal of Raptor Research 34:18-25.

Rottenborn, S. C. 1999. Predicting the impacts of urbanization on riparian bird communities. Biological Conservation 88:289-299.

Rottenborn, S. C. and E. S. Brinkley. 2007. Virginia's Birdlife. Virginia Society of Ornithology, Virginia Avifauna No. 7

Professional Profile

As a principal in our wildlife group, Steve's primary role is addressing wildlife-related CEQA/NEPA and special-status species issues. While much of his work focuses on wildlife issues, Steve's broad training enables him to expertly manage multi-disciplinary projects involving a broad array of biological issues.

In his past research, Steve conducted studies detailing the effects of urbanization, land use, and habitat degradation on riparian bird communities in the South San Francisco Bay. In addition, he identified habitat features important to individual bird species, predicted how urbanization would impact these communities, and conducted a study of nest-site selection and reproductive success of urban-nesting red-shouldered hawks. He has also conducted studies of shorebird use of agricultural fields, an assessment of habitat associations and population dynamics of colonially nesting birds, and a study of resource partitioning among members of an oak woodland foraging guild.

Combining his research and training as a wildlife biologist and avian ecologist, Steve has built an impressive professional career that is highlighted by a particular interest in wetland and riparian communities, as well as the effects of human activities on bird populations and communities. He has contributed to more than 600 projects involving wildlife impact assessment, NEPA/CEQA documentation, biological constraints analysis, endangered species issues (including California and Federal Endangered Species Act consultations), permitting, and restoration. Steve has conducted surveys for a variety of wildlife taxa, including threatened and endangered species, and contributes to the design of habitat restoration and monitoring plans. In his role as project manager and principal-in-charge for numerous projects, he has supervised data collection and analysis, report preparation, and agency and client coordination.

Steve has managed a number of large and complex projects involving wildlife issues, including CEQA assessment and/or Endangered Species Act consultation for the Santa Clara Valley Water District's Stream Maintenance Program, Concord Community Reuse Project, Braddock & Logan's Fallon Village project, Newark Areas 3 & 4 Specific Plan, Las Positas College Master Plan, and Hecker Pass Specific Plan. He served as the senior wildlife ecologist for our work on the South Bay Salt Pond Restoration Project. He managed the preparation of a resource management plan for the Santa Clara Valley Transit Authority's Coyote Ridge conservation area, and is currently assisting Lennar and the City of San Francisco with biological planning and permitting for the Candlestick Point – Hunters Point redevelopment project.

Steve also has considerable experience managing biological resources issues for large on-call projects. He has served as project manager or principal-in-charge for more than 35 task orders for Caltrans on-call projects, more than 30 task orders for the Santa Clara Valley Water District, and numerous task orders for PG&E's Hydrotest project.

Although much of Steve's work has been performed in the San Francisco Bay area, he has been heavily involved in projects throughout California. He provided considerable input on biological resources reports and permit applications for the California Valley Solar Ranch project in San Luis Obispo County and has managed a number of projects in the Central Valley, from the southern San Joaquin Valley north to the Sacramento Valley.

H.T. HARVEY & ASSOCIATES
Ecological Consultants

31 August 2015

Eric Lundquist
Heller Manus Architects
600 Montgomery Street, Suite 100
San Francisco, California 94111

Subject: Proposed 181 Fremont Street Project – Response to City's Comments Regarding Avian Collision Risk Assessment (HTH #3601-01)

Dear Mr. Lundquist:

Per your request, H. T. Harvey & Associates has reviewed comments provided by the City of San Francisco regarding our assessment of avian collision risk for the proposed 181 Fremont Street Project (Project) adjacent to the Transbay Transit Center in San Francisco, California. Specifically, Kevin Guy of the City's Planning Department provided comments by email on 16 July 2015 indicating why the City did not think there was enough evidence in our assessment to indicate that the building would not present a significant bird-collision hazard. The City requested that further analysis be provided. Below, we have provided responses to these comments; the City's comments are provided first in italics, followed by our response.

Comment #1: *The methodology used, comparing the proposed Transbay Park to Sue Bierman and Walton Square, is appropriate; however, the conclusion that the new Transbay Park will experience less bird activity than either of the comparison parks is tenuous. Although the new park will be narrower, the overall acreage is similar to (if not larger than) the comparison parks. The landscaping plan has not been finalized, however the current renderings appear to show a significant amount of vegetation in the park particularly on the end where the proposed project is located, vegetation comparable to that in the comparison parks and that could accommodate both a diversity of species and a large number of individual birds. The report documented that Sue Bierman Park has recorded at least 63 native species in a single visit; it is not unreasonable to expect a similar level of use for the new park.*

Response: Although the City's 16 July 2015 email asked that further analysis focus on the building's design and inherent bird-safety aspects rather than on an anticipated lack of birds or suitable habitat, we think it is important to clarify several issues in response to this comment, as bird use of the future Transbay Park is fundamental to the issue of the magnitude (and therefore significance) of bird collision issues.

First, with respect to the statement regarding 63 native bird species at Sue Bierman Park – our original (16 June 2015) assessment stated that a total of 63 native species had been reported to eBird from this location. That was the total cumulative number that had been reported, not the total seen in a single day (which would be much lower). We disagree with the City's statement that Transbay Park may have similar bird use to Sue Bierman Park, for several reasons:

(1) There is a well-known relationship between native bird diversity and foliage height diversity, or the layering of vegetation[1]. Based on 16 December 2014 planting plans prepared by PWP Landscape Architecture for the Transbay Joint Powers Authority, trees will be scattered throughout much of Transbay Park, but the majority of them (by area) would be within a "meadow sod" area. Understory shrubs would be planted only in narrow, linear areas on the east and west sides of the park. As a result, foliage height diversity, with multiple layers of vegetation (ground cover, understory, and tree canopy) would be high only in very limited parts of the park. The limited foliage height diversity at Transbay Park will limit the diversity of birds that would be able to regularly use vegetation in the Park.

(2) Native vegetation tends to support more of the resources required by native birds than non-native vegetation.[2,3] Based on the planting plans for Transbay Park, very few native plant species are proposed. Although coast live oak (*Quercus agrifolia*), California buckeye (*Aesculus californica*), and coast redwood (*Sequoia sempervirens*) are proposed, the vast majority of trees (and most of the shrubs as well) to be planted are not native to San Francisco. As a result, the overall plant palette is not conducive to attracting and supporting high diversity and abundance of native birds.

(3) At Sue Bierman Park, migrant songbirds and other birds are known to make particularly heavy use of the planted poplars/cottonwoods (*Populus* sp.), which support many insects in summer and fall. Such trees are not proposed at Transbay Park.

(4) Transbay Park will be smaller than many of the other parks in the City that support higher numbers of birds (see Figure 1 below). The numbers of birds using a given park in an urban setting is expected to be correlated with park size due to potential for habitat/microhabitat diversity; availability of areas that may be less affected by intensive human use; conspicuousness from the air to migrant songbirds; and sizes of the populations of a given bird species, which would influence persistence of that species in the park (particularly for more sedentary species).

(5) The height of the existing and proposed buildings adjacent to Transbay Park, coupled with the narrow nature of the Park, will likely make the birds seemed "hemmed in", increasing the urban context of the park and making the habitat seem less natural (and thus less attractive) to birds.

(6) Most of the parks with high bird use in San Francisco are either larger than Transbay Park (as indicated above) or are located in closer proximity to San Francisco Bay or the Pacific Ocean. Figure 1 below indicates the locations of eBird "hotspots" within the City and depicts (using the legend in the lower

[1] MacArthur, R. H. and J. W. MacArthur. 1961. On bird species diversity. Ecology 42:594-598.
[2] Anderson, B. W., A. E. Higgins, and R. D. Ohmart. 1977. Avian use of saltcedar communities in the lower Colorado River valley. Pages 128-136 in R. R. Johnson and D. A. Jones (eds.), Importance, preservation, and management of riparian habitats. USDA For. Serv. Gen. Tech. Rep. RM-43.
[3] Mills, G. S., J. B. Dunning, Jr., and J. M. Bates. 1989. Effects of urbanization on breeding bird community structure in southwestern desert habitats. Condor 91:416-429.

right) the approximate numbers of bird species that have been recorded at each location. Transbay Park will be separated from the shoreline of San Francisco Bay by several blocks of very tall buildings, whereas Sue Bierman Park is much closer to the bay and is not separated from the Bay by tall buildings. Migrants flying over or along the edge of the bay or Pacific Ocean drop into suitable habitat nearby, and thus easily detect Sue Bierman Park and other bayside or coastside parks, as well as large parks that are not surrounded by such tall buildings. Such migrants would be far less likely to see (and thus descend into) Transbay Park due to intervening tall buildings.

Figure 1. eBird hotspots in San Francisco.

(7) It would be difficult for bird species with relatively low vagility (i.e., more sedentary resident species), particularly species associated with low, dense vegetative cover, to disperse to Transbay Park because of the absence of suitable habitat in areas between the park and areas where these species currently occur. In the event that individuals of such species wandering through the City were able to find Transbay Park, the likelihood of finding a mate and breeding, or sustaining a population through immigration, would be very low.

For all these reasons, the diversity and abundance of native birds using Transbay Park is expected to be substantially lower than in parks that are larger, are not surrounded by tall buildings, are closer to the bay or ocean, have more native vegetation (including cottonwoods), have greater foliage height diversity, and/or are not so isolated from other habitat areas.

Comment #2: *While the overall design of the building, with thick mullions and saw-tooth staggering of glazing, will help to disrupt reflections compared to a sheet of plain glass, it is still unclear what exactly the surface area will measure for the largest,*

unbroken segments of glazing. The report does not address this specifically with regard to dimensions and glazing area. There is a concern that, even with the mullions and saw-tooth design, the areas of unbroken glazing will still be quite large, and at a close distance (such as that between a nearby tree in the park and the building façade) there will be only minimal disruption of any reflections.

Response: From park level to a height of 60 feet and above, the largest glass panel within each window will be 42 square feet (5 x 8.4 feet) in size (Figure 2). Adjacent windows will be offset by a 13.75-inch distance, producing a saw-tooth pattern. The 4-inch-wide aluminum mullions, the saw-tooth pattern of the curtain wall, and the shadows cast by the saw-tooth patterns and mullions will create a heterogeneous appearance that will be viewed by birds as a solid structure to be avoided even at relatively close distances. Figure 3 indicates how the proposed façade facing Transbay Park would appear from "treetop" level not far from the building face.

Figure 2. Proposed curtain wall window dimensions.

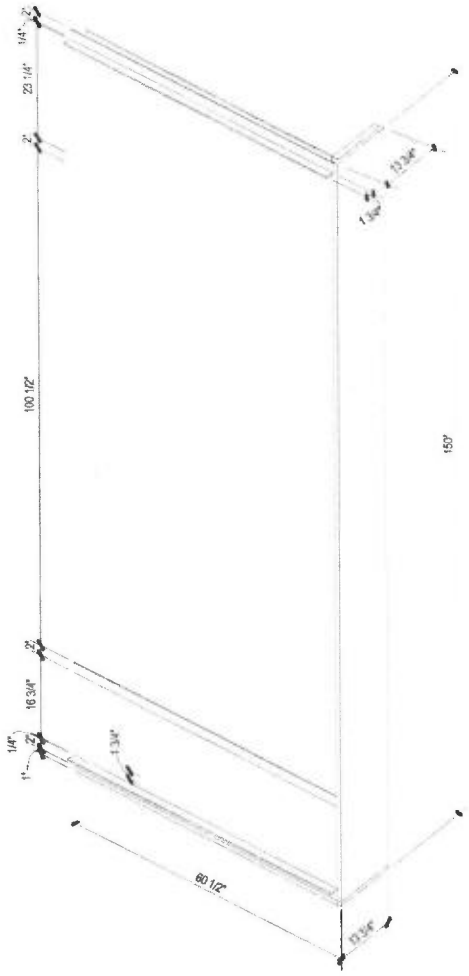


Figure 3. Rendering of proposed façade that would face Transbay Park.

Birds that are closer to the building, such as in one of the shrubs shown in Figure 3 as being immediately adjacent to the building, will see more glass than mullion in front of them, but the mullions, shadows, saw-tooth pattern, and the internal features of the building (furniture and human activity) will reduce the potential for birds to fly into the windows as though they represented sky or vegetation.

Comment #3: *The report does not consider the transparent nature of glazing at all, and the potential that indoor vegetation at these floors of the building may have in drawing birds into the structure.*

Response: The glass of the windows will be highly transparent. This will reduce reflections of vegetation and sky, which would reduce the frequency of collisions due to birds' misconception that they are flying toward sky or vegetation reflected in the windows. Because of the transparent nature of the glass, birds would be able to see all the interior features of the buildings, which would help to indicate the presence of a solid object (i.e., the building) rather than habitat that would be appropriate for bird use. Within 60 feet above the level of the park, the applicant will prohibit any vegetation from being placed inside the buildings along the northern façade. The human activity within the buildings, coupled with the artificial nature of structures inside the building, will minimize any attraction birds might have for flying toward the building.

Comment #4: *We would generally concur with the conclusions made in regard to the crown and feature-related hazard at this level, specifically that this feature will not pose a significant threat.*

Response: We are in agreement on this point.

Comment #5: *Please provide additional elevation details of the glazing and saw-tooth design pattern at the level of the park and for 60' above so that we may verify what the largest segments of unbroken glazing will measure.*

Response: Please see Figure 2 above for details on the dimensions of individual windows. Additional details regarding the proposed glazing and the saw-tooth design are attached.

Please feel free to contact me at (408) 458-3205 or srottenborn@harveyecology.com if you have any questions regarding these responses.

Sincerely,

Stephen C. Rottenborn

Stephen C. Rottenborn, Ph.D.
Principal – Wildlife Ecologist

Attachment: Details of glazing and saw-tooth design

181 Fremont is targeting a LEED Gold Certification under the US Green Building Council's LEED CS rating system.

181 Fremont will include sustainable design measures in the following LEED credit categories:

Sustainable Sites: By focusing office and residential development on a site in the heart of downtown and in close proximity to all major regional transit systems, the project will promote community connectivity and alternative transportation such as transit use, car share, bicycle use and walking. This will result in a decrease of carbon emissions from its residents and workers. Additionally, the site will manage stormwater quality and quantity to reduce water pollution and disruption of natural hydrology.

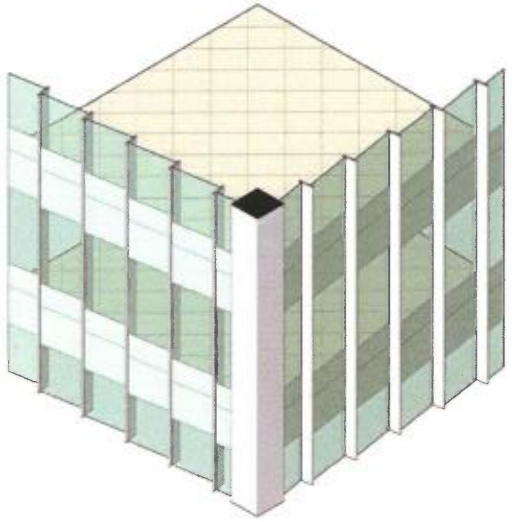
Water Efficiency: Through utilization of water efficient landscaping, low flow fixtures and toilets, and other water efficiency measures, 181 Fremont will result in smarter use of water, inside and out, which will reduce potable water consumption by more than 30%.

Energy & Atmosphere: Through optimized energy performance, ultra-efficient mechanical and curtain wall systems, and enhanced commissioning and refrigerant management, 181 Fremont will minimize the use of energy and impact on the atmosphere. One unique approach to the building's energy performance is the sawtooth curtainwall design (see diagram).

Materials & Resources: 181 Fremont will utilize sustainable building materials and reduce waste by diverting more that 75% of construction waste from disposal and utilizing recycled content as well as regionally sourced and sustainably produced materials.

Indoor Environmental Quality: By utilizing low emitting materials, paints, carpets and adhesives, providing increased natural ventilation, providing natural daylight and views to its tenants, and offering increased controllability of thermal comfort, 181 Fremont will create a better and healthier indoor environment which will result in lower absenteeism and greater enjoyment of the interior space.

Innovative Design and Regional Priority: Beyond the standard LEED credits, the design of 181 Fremont will include unique innovative approaches to sustainability and will be optimized with strategies specific to the Bay Area's climate and geography.

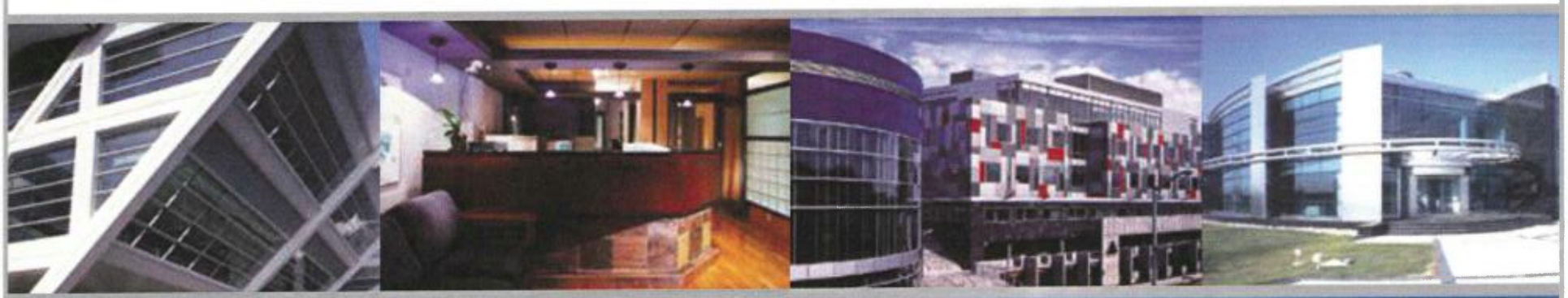


Innovative Curtain Wall System:

181 Fremont's curtain wall utilizes an innovative 'saw-tooth' design that minimize solar heat gain on the building. By specifically 'tuning' each façade so that more solid mullion area faces the directions with the most direct afternoon sun (west and south) and more glass area faces the north and east, the curtain wall inherently reduces the building's energy demand for cooling by more than 6%.

PPG IdeaScapes™

Glass • Coatings • Paint



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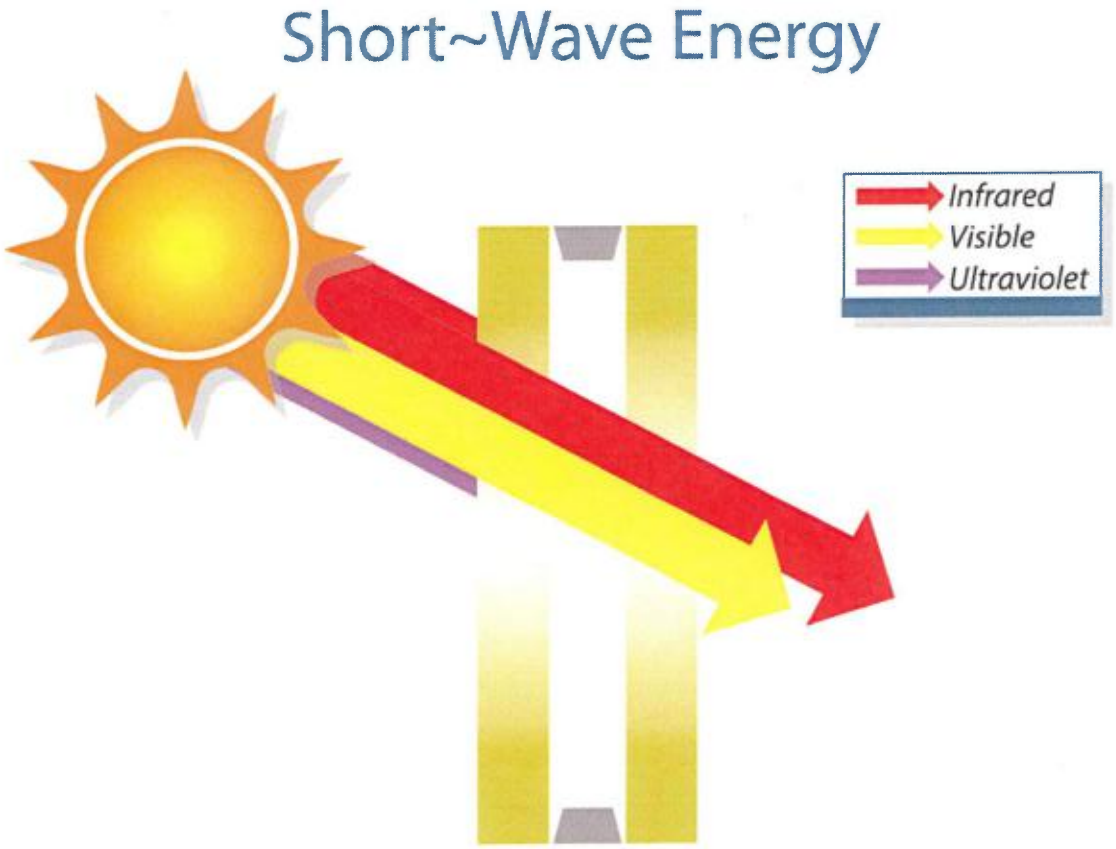
CONTINUING EDUCATION AIA

Energy Efficient Glazing



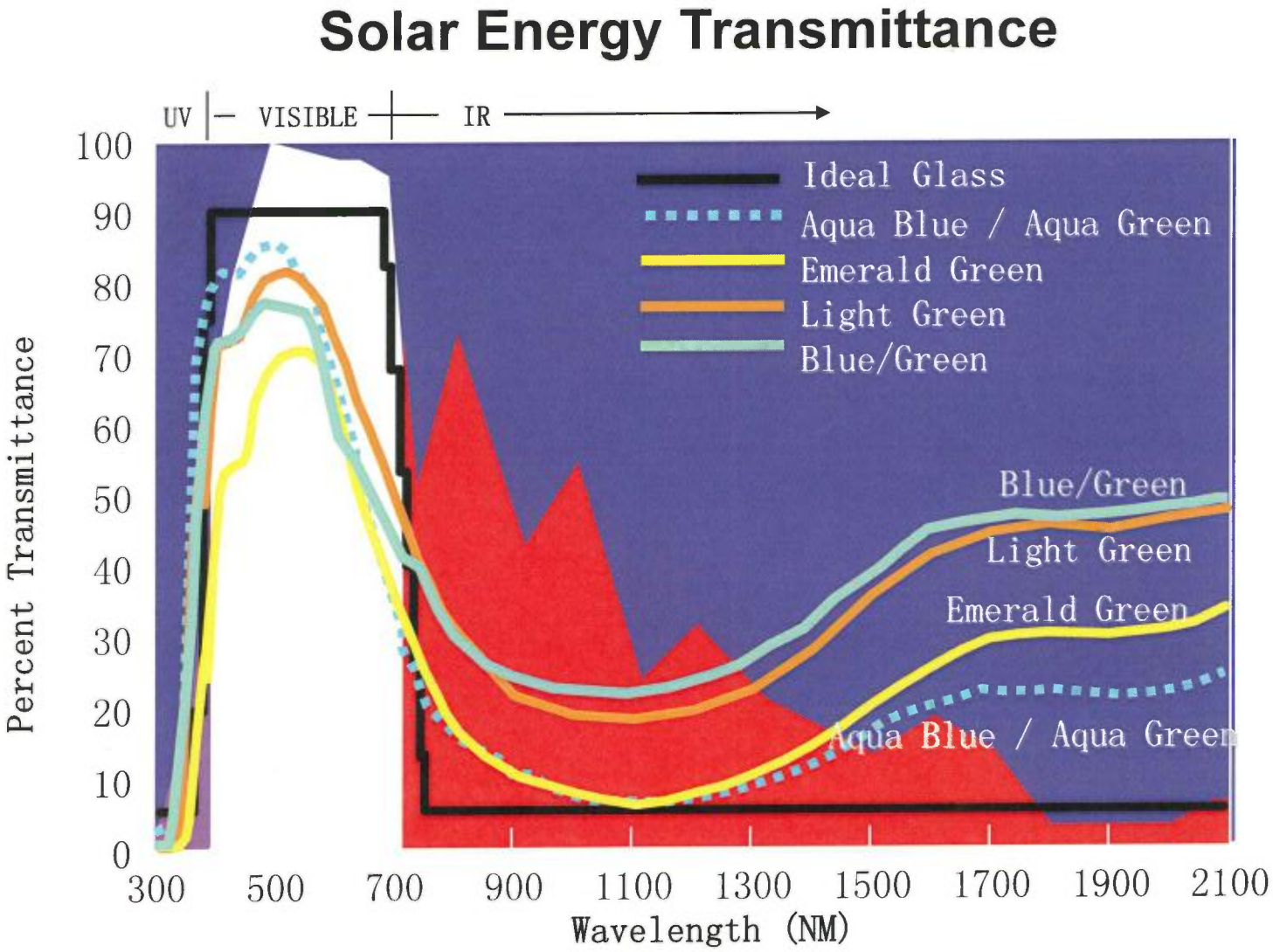
Benefits:

- Low infrared heat gain
- High visible natural light transmittance
- Less artificial lighting
- Reduction of long wave heat gain/loss
- Increased comfort/productivity

Results:

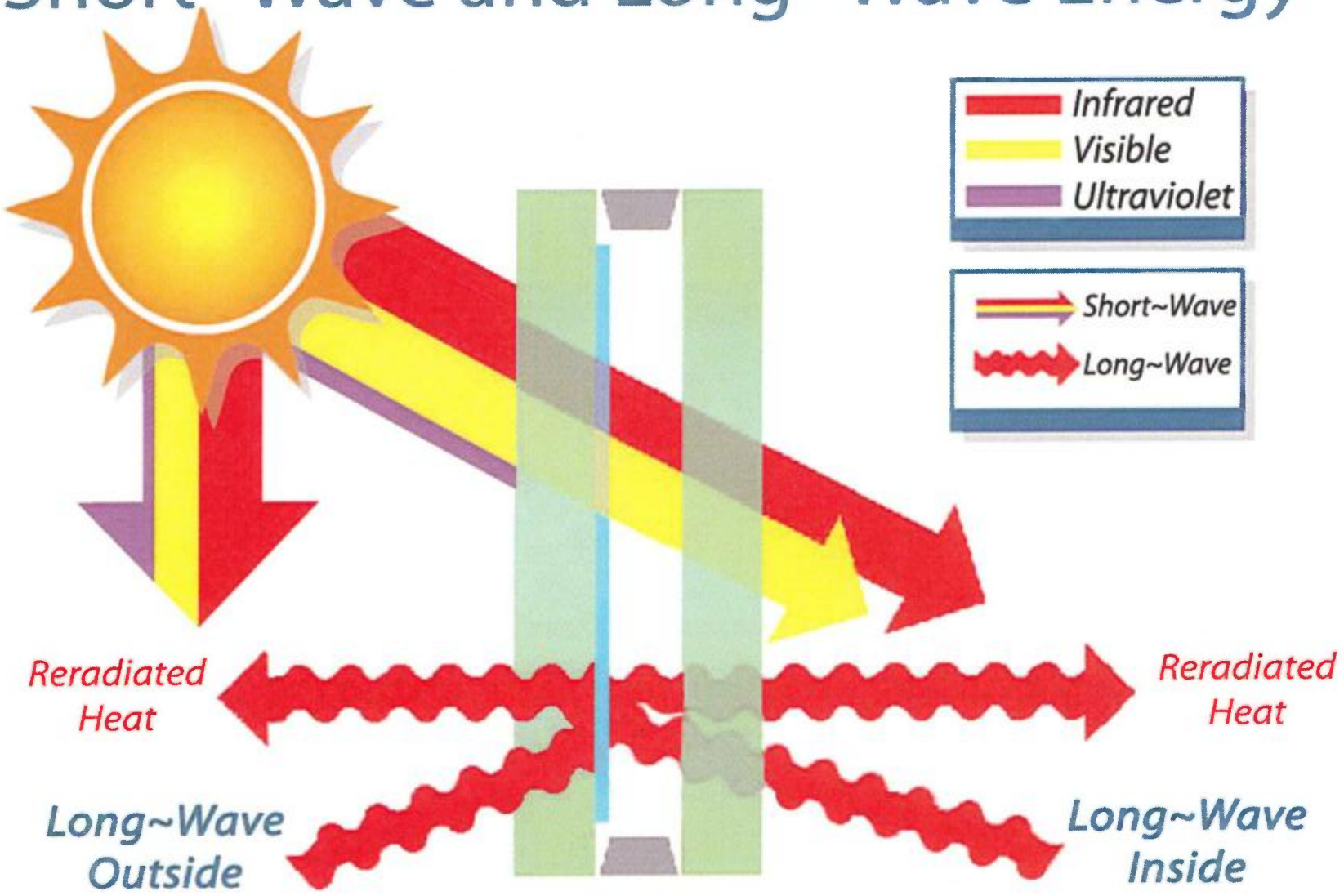
- Overall reduction in energy usage

“Spectrally Selective” Tinted Glazing



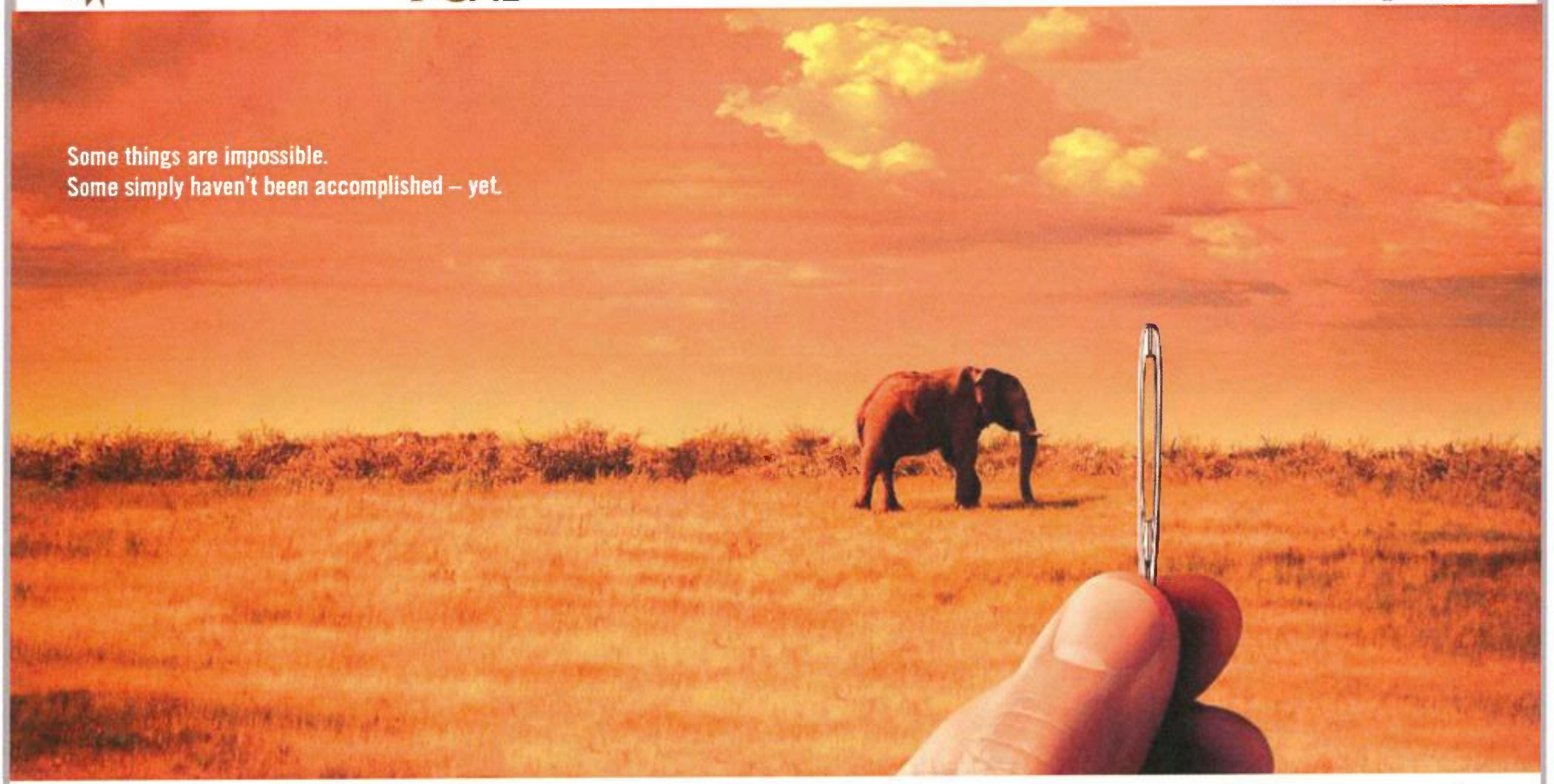
How Low-E Coatings Work

Short~Wave and Long~Wave Energy



SOLARBAN®
SOLAR CONTROL LOW-E GLASS 70XL

PPG IdeaScapes.
Glass • Coatings • Paint



Coming soon: the impossibly impressive *Solarban® 70XL* Solar Control low-E glass.

Architects have always demanded more from energy-saving flat glass. More solar control. More visible light. More of a clear glass appearance. The scientists at PPG have finally created a product that's up to their standards.

New *Solarban 70XL* is the first vision glass that gives architects exactly what they want by delivering a previously impossible set of features. It blocks over 75% of total solar energy while delivering 63% visible light transmittance – and does it with the look of clear glass. After all, looks are still everything. For a *Solarban 70XL* sample and a white paper detailing the unbelievable energy savings it can bring to your next project, call 1-888-PPG-IDEA or visit www.ppgideascapes.com.

SOLARBAN 70XL

PPG IdeaScapes.
Glass • Coatings • Paint

PPG Industries, Inc., Glass Technology Center, Guys Run Road, Pittsburgh, PA 15238-1305 www.ppgideascapes.com

SOLARBAN®
SOLAR CONTROL LOW-E GLASS 70XL

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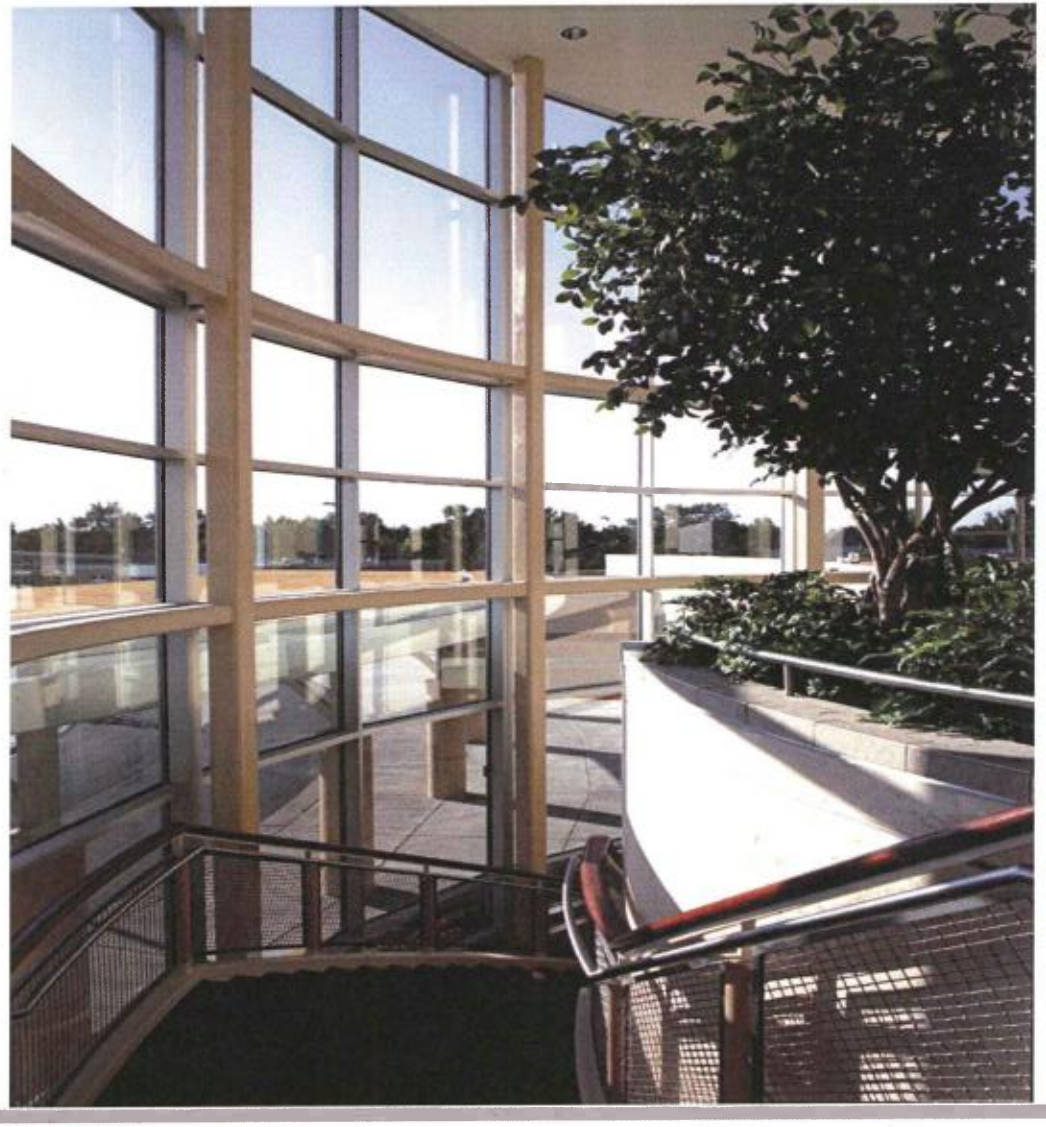
Unprecedented Performance Characteristics*

- SHGC: 0.27
- VLT: 64%
- LSG: 2.37

***When coupled with clear glass in a one-inch IGU**



SOLARBAN®
SOLAR CONTROL LOW-E GLASS 70XL

PPG IdeaScapes
Glass • Coatings • Paint

Benefits

- Large areas of transparent vision glass without requisite increase in cooling equipment costs
- Color neutral aesthetic with exceptional solar control and visible light transmission
- Significant energy saving potential
- Payback on investment in less than one year
- Proven Magnetic Sputter Vacuum Deposition (MSVD) technological platform

SOLARBAN®
SOLAR CONTROL LOW-E GLASS 70XL

PPG IdeaScapes
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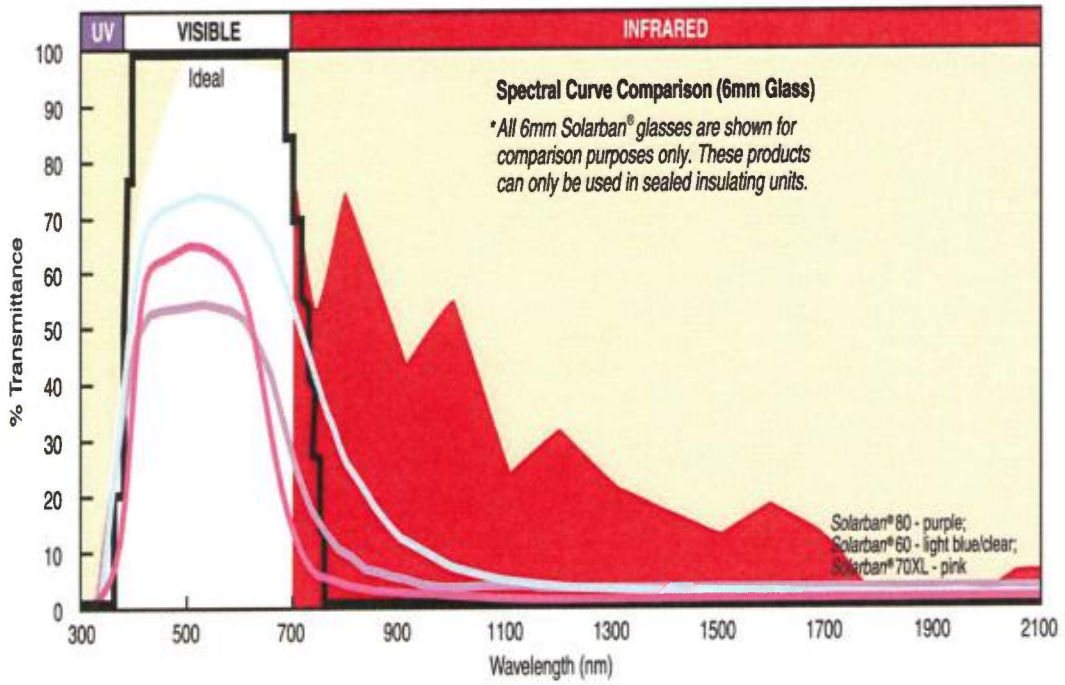
Spectral Curve



LEGEND

- Ideal Glass
- Solarban® 80/Clear
- Solarban® 70XL/Clear
- Solarban® 60/Clear

LSG Competitive Comparison

Company	Product	LSG
PPG	**Solarban 70XL**	**2.37**
PPG	Solarban 60	1.84
Viracon	VE1-2M	1.85
Viracon	VE2-2M	1.94
Viracon	VRE1-54	1.54
Guardian	SN-68	1.83
Guardian	AG-43	1.46
AFGD	TiAC 40	1.45

HELLER MANUS ARCHITECTS HM

November 11, 2015

RE: 181 Fremont

Subject: Ornilux

VIA EMAIL

Jake Albini
Jay Paul Company
Four Embarcadero Center, Suite 3620
San FranciscoCA,94111
Tel: (415) 263-2919
Fax: (415) 362-0698
jalbini@jaypaul.com

Dear Jake:

When the 181 Fremont Street Project was in conceptual design phases, the project team worked with the Planning Department to determine the applicability of the requirements of Planning Code Section 139 regarding Bird Safe Glass. In conjunction with Kevin Guy and other staff planners at the Planning Department, the project team proposed that there would be a portion of the curtain wall along the southern side of the building starting at the height of the future TransBay Transit Center roof-top park and reaching 60 feet above such height that would utilize a product known as Ornilux to provide a surface that is visible to birds but not to humans (either from inside looking out or from the outside looking in). The transparency of this glass sections to humans was an essential feature of the building design.

As the project moved forward in the approvals we found out that Ornilux is a proprietary product provided by ARNOLD GLAS (http://ornilux.com/index.html). Upon further investigation we determined that ARNOLD GLAS is not a curtain wall vendor and does not make any Ornilux or similar products that work as a curtain wall system but rather a manufacturer of glass and glass treatments for small projects and single family residential uses. Specifically, we could not solve the following problems through an ARNOLD GLAS only project: (i) acoustical rating, (ii) energy efficiency, (iii) color match to the other class on the project, (iv) sufficient quantity, and (v) structural needs.

None of the curtain wall system manufacturers currently have any products available that perform the way Ornilux performs. We therefore subsequently considered using the Ornilux glass in concert with a curtain wall system – installing a single sheet of Ornilux in an insulating glazing panel behind the high performance PPG glass. This solution could have neatly solved our dilemma – causing only a slight, probably acceptable color shift in the glass panel. However, the combination of a curtain wall system from an independent vendor and the Ornilux product as an insulating glazing proved infeasible due to issues with the warranties. The combination of the products would have voided the warranty given by both manufacturers.

We therefore examined alternative products and proceeded with constructing a full mock-up of the glazing system to select glass options and evaluate fritting designs. After reviewing the mock-up from both the interior and exterior point of view, Jay Paul Company and Heller Manus Architects determined that none of these products succeeded in satisfying the primary objective (originally envisioned to be satisfied by Ornilux or a similar competitor product) – lack of impact on the esthetic of the design (from the interior as well as the exterior). Since it appears that the technology exists to make a product that is bird safe, visibly unobtrusive to humans and works in a curtain wall system we sincerely hope that such a product will be available in the future. Unfortunately it does not exist in time for this project.

Regards,

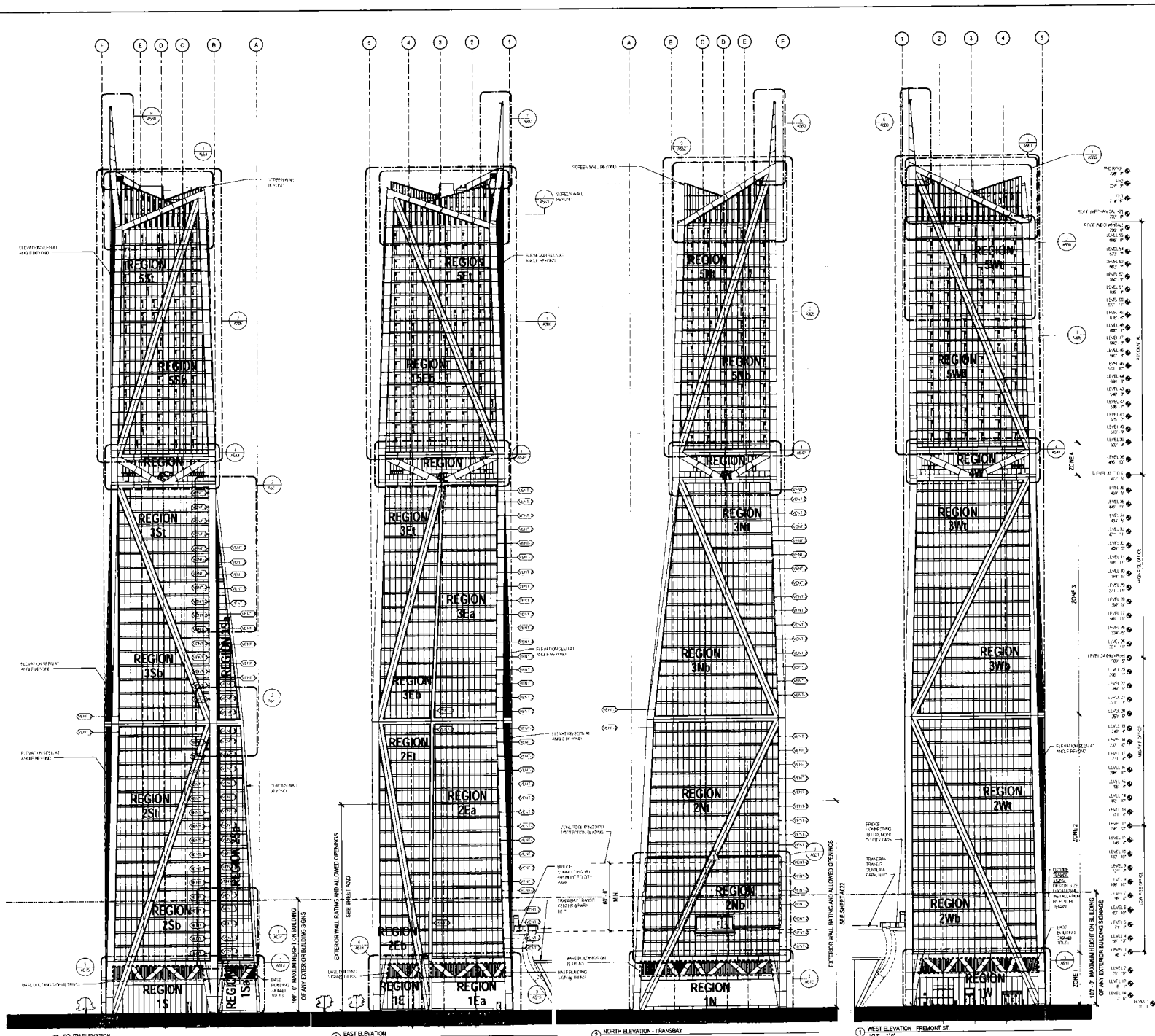
Eric Lundquist

Eric Lundquist
Managing Director

E:\181 Fremont\300 Owner\Rejected Bird Glass System rev 1.docx

181 FREMONT - BIRD GLASS STUDY 01.13.16 - OPTION 1 - HORIZONTAL MULLION

181 FREMONT - BIRD GLASS STUDY 01.13.16 - OPTION 1 - HORIZONTAL MULLION



GENERAL NOTES - EXTERIOR
1 SEE A-5 SERIES FOR GEOMETRY DIAGRAMS & ENLARGED EXTERIOR INFORMATION
2 3-DIMENSIONAL VIEWS PROVIDED TO ASSIST IN GENERAL COMPREHENSION OF BUILDING DESIGN ONLY.

EXTERIOR WALL ASSEMBLIES (EWA):

EWA-1 (TYPICAL AT OFFICE LEVELS, U.O.N.)
UNITIZED CURTAIN WALL (THERMALLY BROKEN AND PRESSURE EQUALIZED SYSTEM):
- ALUMINUM MULLIONS
- ALUMINUM MULLION CAPS, HORIZONTAL
- IGU-1 [USE IGU-2 FOR BIRD PROTECTION]
- IGU-1 W SHADOW BOX ASSEMBLY: AIR GAP, MP-1, RIGID INSULATION & CLOSURE PANEL (MP-1 WHERE VISIBLE AT OFFICE LEVELS)
- SEALANT & STRUCTURAL SEALANT
- FIRE STOP ASSEMBLY

EWA-1A (TYPICAL AT RESIDENTIAL LEVELS, U.O.N.)
UNITIZED CURTAIN WALL (THERMALLY BROKEN AND PRESSURE EQUALIZED SYSTEM):
- ALUMINUM MULLIONS
- ALUMINUM MULLION CAPS, HORIZONTAL
- IGU-1
- IGU-1 W SHADOW BOX ASSEMBLY: AIR GAP, MP-1, RIGID INSULATION & CLOSURE PANEL(MP-1 WHERE VISIBLE AT RESIDENTIAL LEVELS)
- SEALANT & STRUCTURAL SEALANT
- FIRE STOP ASSEMBLY
- MANUAL OPERABLE WINDOWS, WHERE INDICATED

EWA-1B (TYPICAL ABOVE ROOF LEVEL)
UNITIZED CURTAIN WALL
- ALUMINUM MULLIONS
- IGU-1A W GL 1A OUTBOARD AND LAM-5 INBOARD
- STRUCTURAL SCREEN WALL SUPPORT, PAINTED

EWA-1C (TYPICAL AT REGIONS 2Sa & 1Sa)
SIMILAR TO EWA-1 WITHOUT SAWTOOTH

MSW-1 (SECONDARY MECHANICAL SCREEN WALL)
SIMILAR TO EWA-1B WITHOUT SAWTOOTH AND IGU
- LAM-5
- STRUCTURAL SCREEN WALL SUPPORT, PAINTED

EWA-2: GLASS MULLION GLAZING SYSTEM
- GL-3B, WITH CERAMIC FRIT PATTERN ON SURFACE (2), WHERE OCCURS, TYPE AS INDICATED
- GLASS MULLIONS (LAM-3)
- STRUCTURAL SEALANT

EWA-3: HIGH SPAN STICK CURTAIN WALL
- ALUMINUM MULLIONS
- IGU-3
- IGU-3 W SHADOW BOX ASSEMBLY: AIR GAP, MP-1, RIGID INSULATION & CLOSURE PANEL
- STRUCTURAL SEALANT
- AIR SPACE
- FIRE STOP ASSEMBLY

EWA-4: CONCRETE EXTERIOR WALL ASSEMBLY:
- GRAFFITI RESISTANT COATING, U.O.N.
- ARCHITECTURAL CAST-IN PLACE CONCRETE, ARC-1 FINISH, U.O.N.
- FIRE STOP ASSEMBLY
- INTERIOR FINISH AS SCHEDULED

EWA-5: (NOT USED)

EWA-6: STUD SUPPORTED EXTERIOR WALL ASSEMBLY:
- PROFILED METAL SIDING, METAL PANEL (MP-X) TYPE & COLOR AS INDICATED
- FURRING, CLIPS & SUPPORTS
- MOISTURE VAPOR BARRIER, MVB-1
- 5/8" GYPSUM SHEATHING
- METAL STUDS
- THERMAL BATT INSULATION
- 5/8" TYPE X GYPSUM BOARD
- INTERIOR FINISH AS SCHEDULED

EWA-6A: STUD SUPPORTED EXTERIOR WALL ASSEMBLY:
- TPO ROOFING WALL SIDING
- 5/8" GYPSUM SHEATHING BOARD
- METAL STUDS
- THERMAL BATT INSULATION
- 5/8" TYPE X GYPSUM BOARD
- INTERIOR FINISH AS SCHEDULED

EWA-7: EXTERIOR SOFFIT ASSEMBLY:
- METAL PANEL, MP-1, U.O.N.
- FURRING, CLIPS & SUPPORTS
- MOISTURE VAPOR BARRIER, MVB-1
- 5/8" GYPSUM SHEATHING
- METAL STUDS, CLIPS & SUPPORTS
- THERMAL BOARD INSULATION

EWA-7A: MEGA-CLADDING ASSEMBLY
- METAL PANEL, MP-1, U.O.N.
- FURRING, CLIPS & SUPPORTS
- MOISTURE VAPOR BARRIER, MVB-1
- 5/8" GYPSUM SHEATHING
- METAL STUDS, CLIPS & SUPPORTS
- THERMAL BOARD INSULATION
- SOUND DAMPENING INSULATION (TO +10'-0" ABOVE ANY PUBLICLY ACCESSIBLE WALKING SURFACE)
- INTERIOR FINISH AS SCHEDULED

GRAPHIC LEGEND - EXTERIOR
(SEE ENLARGED ELEVATIONS FOR MATERIALS INDICATIONS)

LEGEND
(EVNT) = RELIEF VENT
(EVNT) = VERTICAL RELIEF LOUVERS

JAY PAUL COMPANY
FOUR EMBARCADERO CENTER SUITE 3600 SAN FRANCISCO, CA 94111

HELLER MANUS ARCHITECTS
SAN FRANCISCO
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(415) 247-1100

181 FREMONT

SAN FRANCISCO, CA 94105

KEY PLAN

100 % CONSTRUCTION DOCUMENTS

2015.06.05

REVISIONS

REVISION	DESCRIPTION	DATE
	ADDENDUM S4	10/1/14
1	ADDENDUM S4-R8	01/28/15

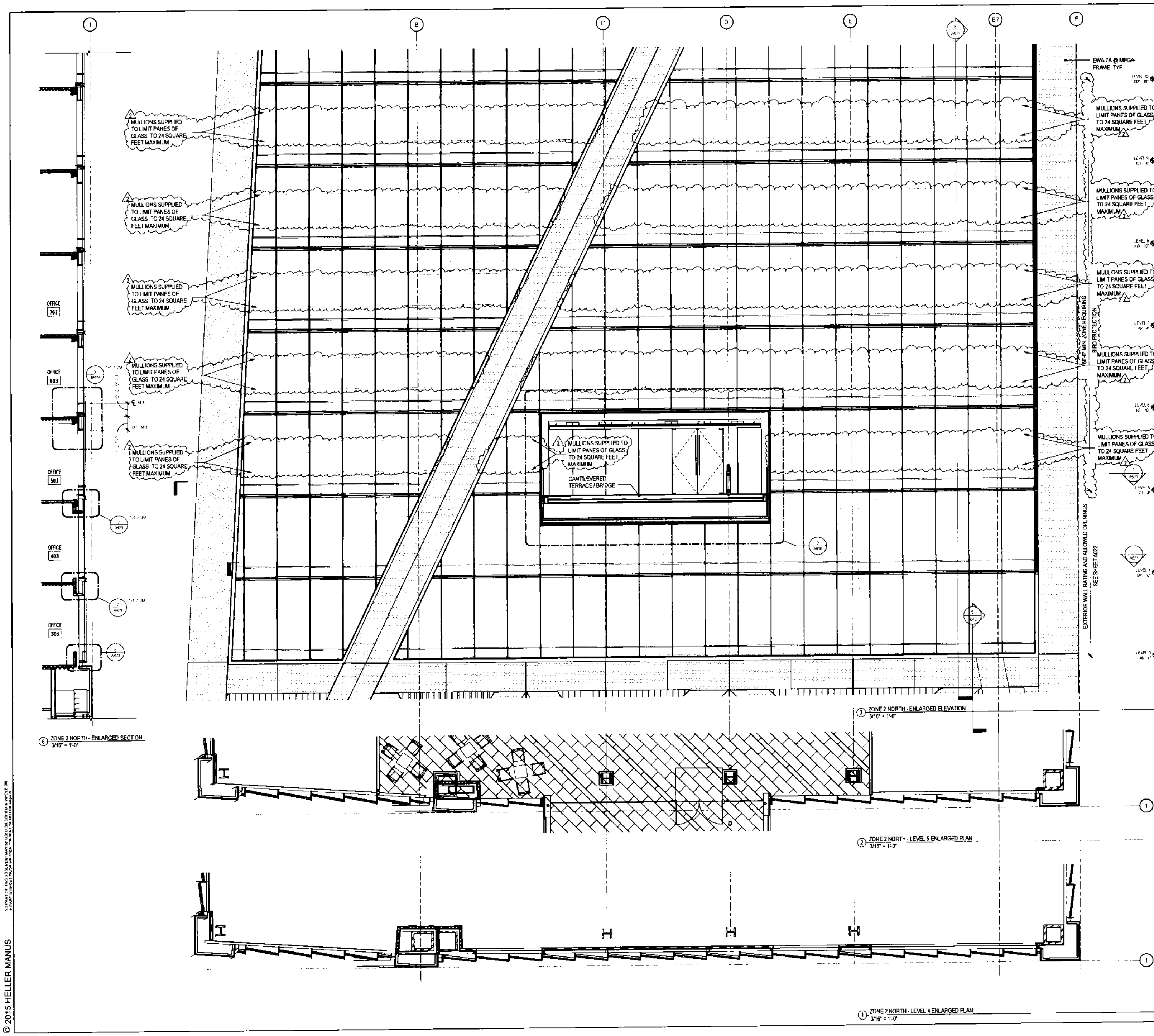
LICENSED ARCHITECT JEFFREY O. HELLER C-23318 STATE OF CALIFORNIA

SHEET ISSUE DATE
10/01/2014

SHEET TITLE
BUILDING ELEVATIONS

SCALE
As Indicated

SHEET NO
A300



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UNITIZED CURTAIN WALL (THERMALLY BROKEN AND PRESSURE EQUALIZED SYSTEM):
- ALUMINUM MULLIONS
- ALUMINUM MULLION CAPS, HORIZONTAL
- IGU-1 (USE IGU-2 FOR BIRD PROTECTION)
- IGU-1 W/ SHADOW BOX ASSEMBLY: AIR GAP, MP-1, RIDGID INSULATION & CLOSURE PANEL (MP-1 WHERE VISIBLE AT OFFICE LEVELS)
- SEALANT & STRUCTURAL SEALANT
- FIRE STOP ASSEMBLY

EWA-1A (TYPICAL AT RESIDENTIAL LEVELS, U.O.N.)
UNITIZED CURTAIN WALL (THERMALLY BROKEN AND PRESSURE EQUALIZED SYSTEM):
- ALUMINUM MULLIONS
- ALUMINUM MULLION CAPS, HORIZONTAL
- IGU-1
- IGU-1 W/ SHADOW BOX ASSEMBLY: AIR GAP, MP-1, RIDGID INSULATION & CLOSURE PANEL(MP-1 WHERE VISIBLE AT RESIDENTIAL LEVELS)
- SEALANT & STRUCTURAL SEALANT
- FIRE STOP ASSEMBLY
- MANUAL OPERABLE WINDOWS, WHERE INDICATED

EWA-1B (TYPICAL ABOVE ROOF LEVEL)
UNITIZED CURTAIN WALL:
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- IGU-1A W/ GL-1A OUTBOARD AND LAM-5 INBOARD
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SIMILAR TO EWA-1 WITHOUT SAWTOOTH

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- GL-3B, WITH CERAMIC FRIT PATTERN ON SURFACE (2), WHERE OCCURS, TYPE AS INDICATED
- GLASS MULLIONS (LAM-3)
- STRUCTURAL SEALANT

EWA-3: HIGH SPAN STICK CURTAIN WALL
- ALUMINUM MULLIONS
- IGU-3
- IGU-3 W/ SHADOW BOX ASSEMBLY: AIR GAP, MP-1, RIGID INSULATION & CLOSURE PANEL
- STRUCTURAL SEALANT
- AIR SPACE
- FIRE STOP ASSEMBLY

EWA-4: CONCRETE EXTERIOR WALL ASSEMBLY
- GRAFFITI RESISTANT COATING, U.O.N.
- ARCHITECTURAL CAST-IN PLACE CONCRETE, ARC-1 FINISH, U.O.N.
- FIRE STOP ASSEMBLY
- INTERIOR FINISH AS SCHEDULED

EWA-5: (NOT USED)

EWA-6: STUD SUPPORTED EXTERIOR WALL ASSEMBLY:
- PROFILED METAL SIDING, METAL PANEL (MP-X) TYPE & COLOR AS INDICATED.
- FURRING, CLIPS & SUPPORTS
- MOISTURE VAPOR BARRIER, MVB-1
- 5/8" GYPSUM SHEATHING
- METAL STUDS
- THERMAL BATT INSULATION
- 5/8" TYPE X GYPSUM BOARD
- INTERIOR FINISH AS SCHEDULED

EWA-6A: STUD SUPPORTED EXTERIOR WALL ASSEMBLY:
- TPO ROOFING WALL SIDING
- 5/8" GYPSUM SHEATHING BOARD
- METAL STUDS
- THERMAL BATT INSULATION
- 5/8" TYPE X GYPSUM BOARD
- INTERIOR FINISH AS SCHEDULED

EWA-7: EXTERIOR SOFFIT ASSEMBLY
- METAL PANEL, MP-1, U.O.N.
- FURRING, CLIPS & SUPPORTS
- MOISTURE VAPOR BARRIER, MVB-1
- 5/8" GYPSUM SHEATHING
- METAL STUDS, CLIPS & SUPPORTS
- THERMAL BOARD INSULATION

EWA-7A: MEGA-CLADDING ASSEMBLY:
- METAL PANEL, MP-1, U.O.N.
- FURRING, CLIPS & SUPPORTS
- MOISTURE VAPOR BARRIER, MVB-1
- 5/8" GYPSUM SHEATHING
- METAL STUDS, CLIPS & SUPPORTS
- THERMAL BOARD INSULATION
- SOUND DAMPENING INSULATION (TO +10'-0" ABOVE ANY PUBLICLY ACCESSIBLE WALKING SURFACE)
- INTERIOR FINISH AS SCHEDULED

GRAPHIC LEGEND - EXTERIOR

- CAST-IN-PLACE CONCRETE, ARC-1
- CAST-IN-PLACE CONCRETE, ARC-2
- IGU WITH MP-1 SHADOW BOX
- MP-1, METAL SPANDREL PANEL AT MEGA FRAME
- EWA-6 W/ METAL PANEL MP-X AS INDICATED & LVR-2 WHERE SHOWN
- BIRD PROTECTION, SEE EXTERIOR WALL ASSEMBLIES
- OPERABLE WINDOWS
- LAM-5
- BASE BUILDING SIGN: ILLUMINATED FINS BY SIGN MANUFACTURER
- JT-01, HORIZONTAL STACK JOINT
- JT-02, EXPRESSED JOINT
- JT-03, CONCEALED JOINT
- JT-03, CONCEALED JOINT WHERE REQUIRED

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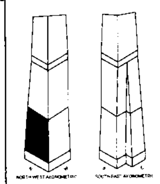

KEY PLAN

100 % CONSTRUCTION DOCUMENTS

2015.06.05

REVISIONS		
REVISION	DESCRIPTION	DATE
	ADDENDUM S4	10/1/14
1	RFI-1175.00	07/23/15
2	ADDENDUM S4-R8	01/28/16

LICENSED ARCHITECT JEFFREY D. HELLER C4831 STATE OF CALIFORNIA

SHEET ISSUE DATE
10/01/2014

SHEET TITLE
EXTERIOR - ZONE 2 NORTH

SCALE
3/16" = 1'-0"

SHEET NO
A521