# APPENDIX E: 706 MISSION STREET TRANSPORTATION STUDY (WITHOUT APPENDICES)

# 706 MISSION STREET
## Transportation Study
### 2008.1084E

## Final Report

*Prepared for*:
**City and County of San Francisco**
**Redevelopment Agency**

**City and County of San Francisco**
**Planning Department**

*Prepared by:*
**LCW Consulting**

**January 24, 2012**

# 706 Mission Street Transportation Study
## 2008.1084E

## Final Report

Prepared for:

**City and County of San Francisco**
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# Chapter 1
# INTRODUCTION

This report presents the existing transportation conditions and assesses the transportation impacts associated with the development of the proposed 706 Mission Street project (herein referred to as the "Proposed Project") in San Francisco. The transportation study was conducted consistent with the scope of work included in Appendix A. The following transportation elements are addressed in this study:

- Traffic conditions
- Transit operations
- Pedestrian circulation
- Bicycle circulation
- Loading circulation
- Emergency vehicle access
- Construction activities
- Parking conditions

## 1.1 PROJECT DESCRIPTION

The Proposed Project site is located within San Francisco's Financial District neighborhood, on the northwest corner of the intersection of Mission and Third Streets, on the block bounded by Market, Third, Mission, and Fourth streets (see Figure 1). The project site is at the southeastern portion of Central Block 1 of the former Yerba Buena Center ("YBC") Redevelopment Project Area, and has frontages on both Third Street and Mission Street. The site includes the entirety of Assessor's Block 3706, Lot 093 and 275, plus a portion of Assessor's Block 3706, Lot 277. Figure 2 presents the lots comprising the Proposed Project site. The project site is in the Downtown Retail (C-3-R) District.[1]

The project site is relatively flat and slopes gently to the southeast. The project would include the use of the existing Jessie Square Garage. The garage is below grade and directly west and northwest of the project site. Figure 3A presents the Proposed Project ground floor plan, and Figures 3B through 3E present the below-grade plans. Figure 3F presents an enlargement of the loading dock within basement level B1. Additional plans are included in Appendix B.

[1] The *Yerba Buena Center Redevelopment Plan* expired on December 31, 2010. As of January 1, 2011, the project site is subject to the zoning controls established by the *San Francisco Planning Code (Planning Code).*

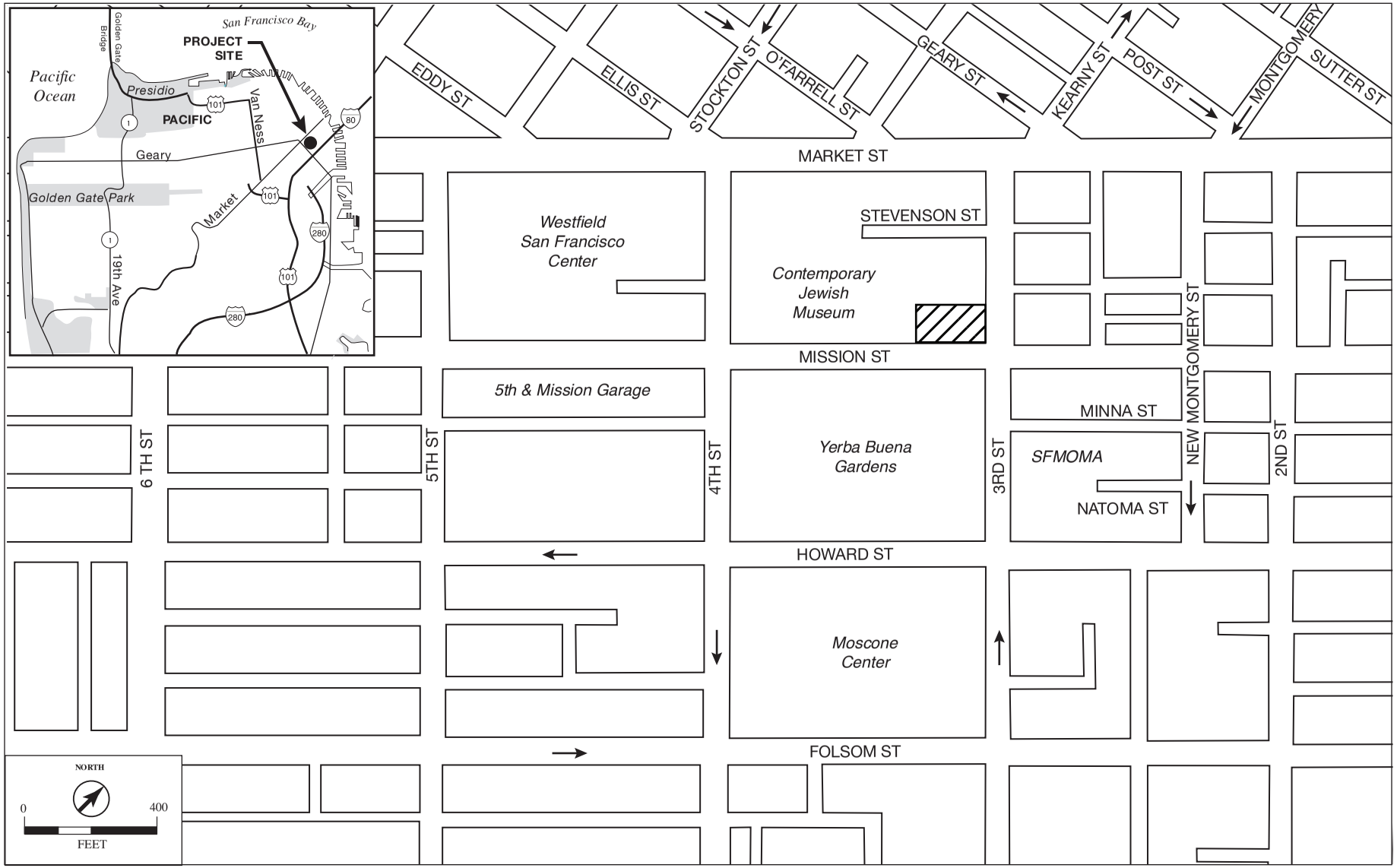
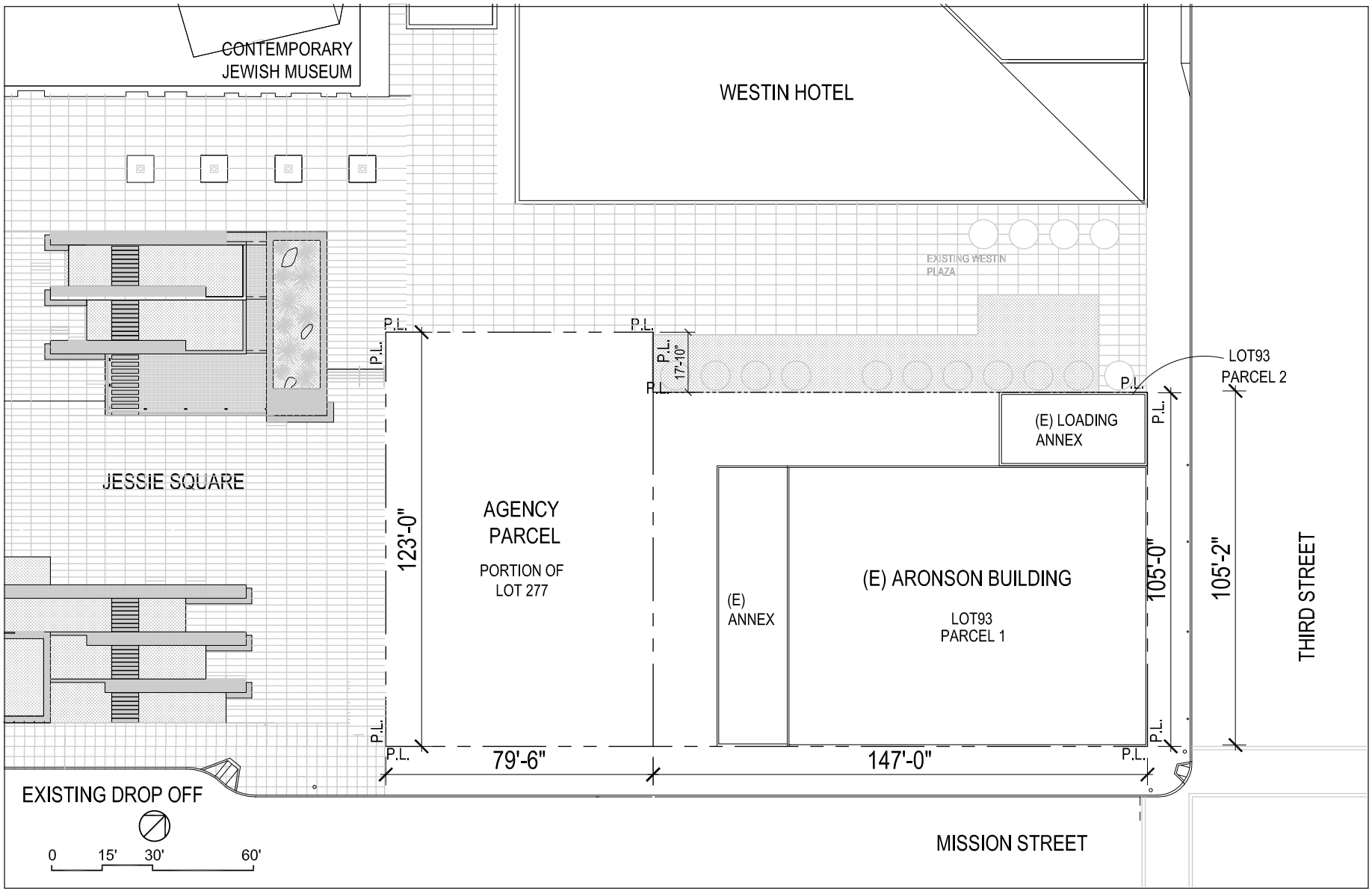




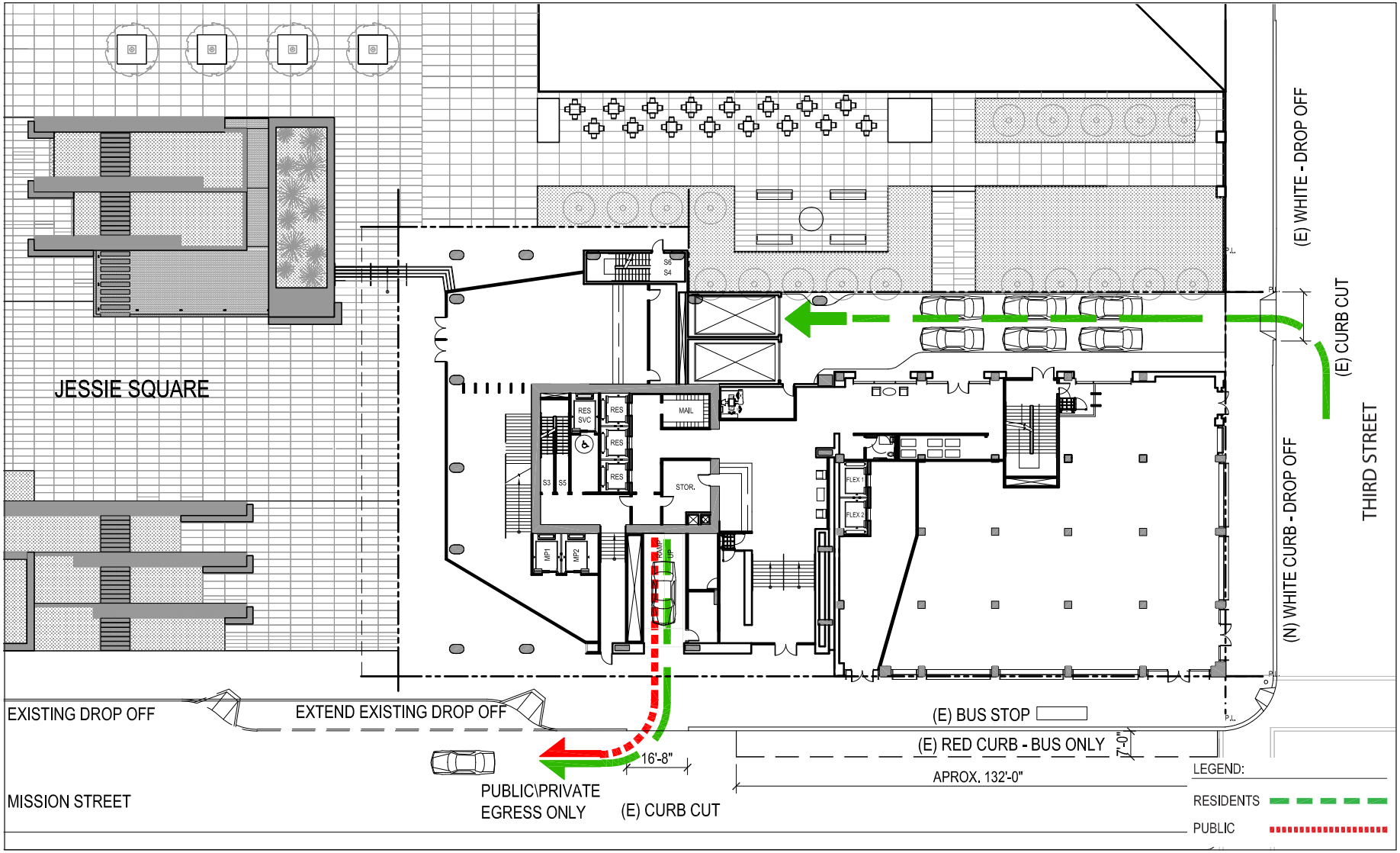

**FIGURE 1: PROJECT LOCATION**




SOURCE: Handel Architects



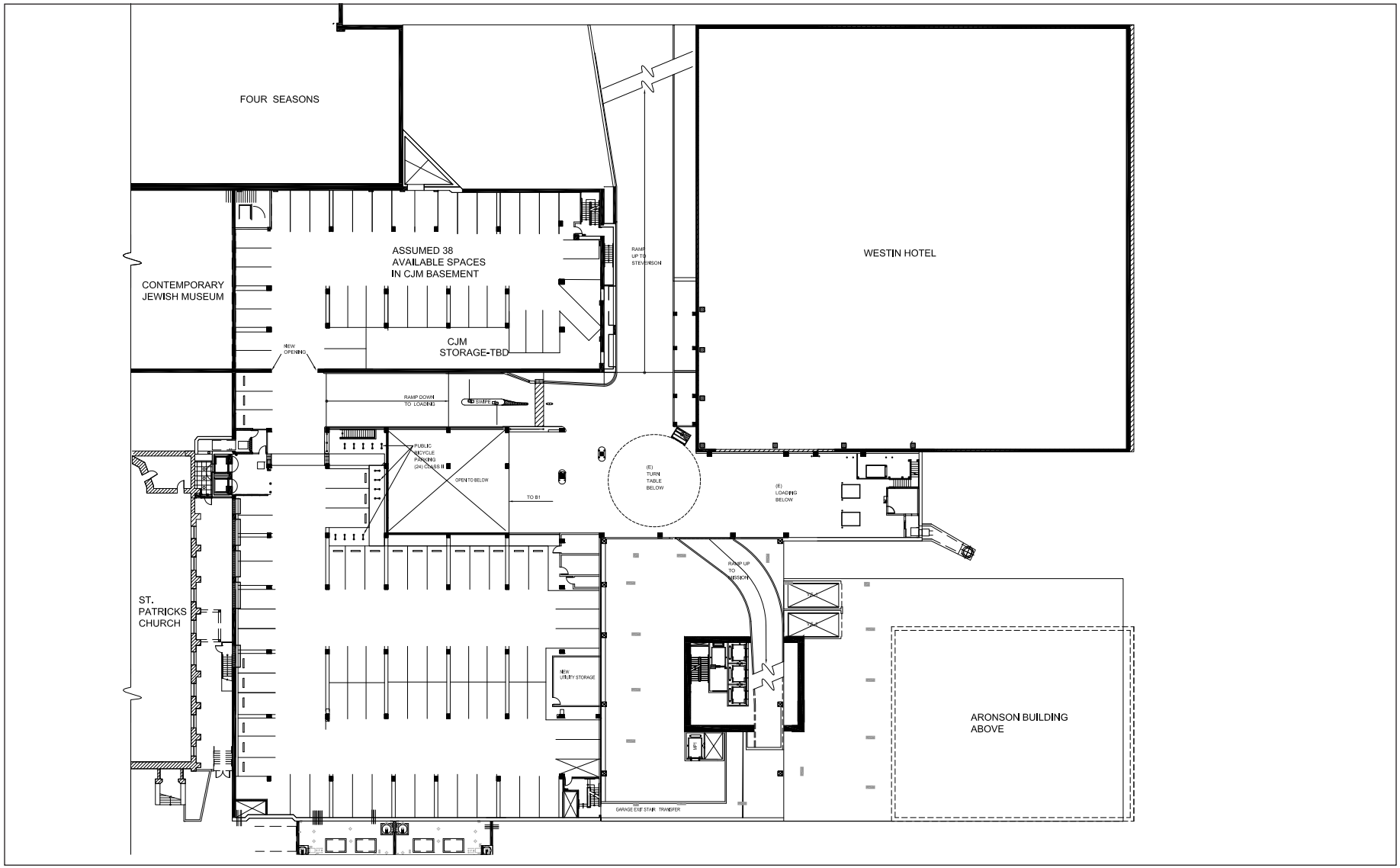
**FIGURE 2: EXISITNG SITE PLAN**




SOURCE: Handel Architects



**FIGURE 3A: PROPOSED PROJECT GROUND FLOOR PLAN**




SOURCE: Handel Architects

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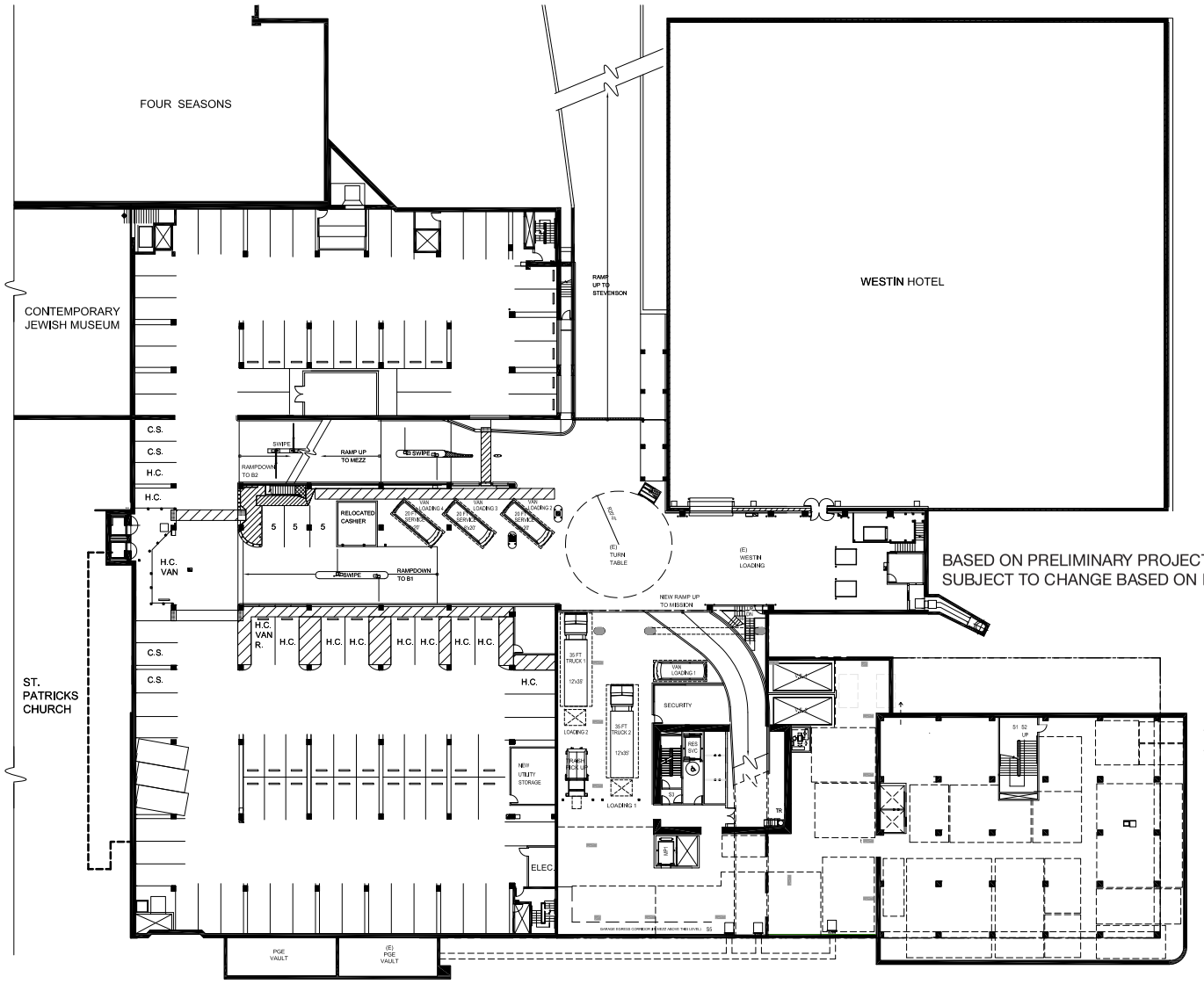
**FIGURE 3B: PROPOSED PROJECT BASEMENT LEVEL-MEZZANINE**




BASED ON PRELIMINARY PROJECT DESIGN AND USE AS OF JANUARY 2012.
SUBJECT TO CHANGE BASED ON FUTURE DESIGN DEVELOPMENT.

SOURCE: Handel Architects

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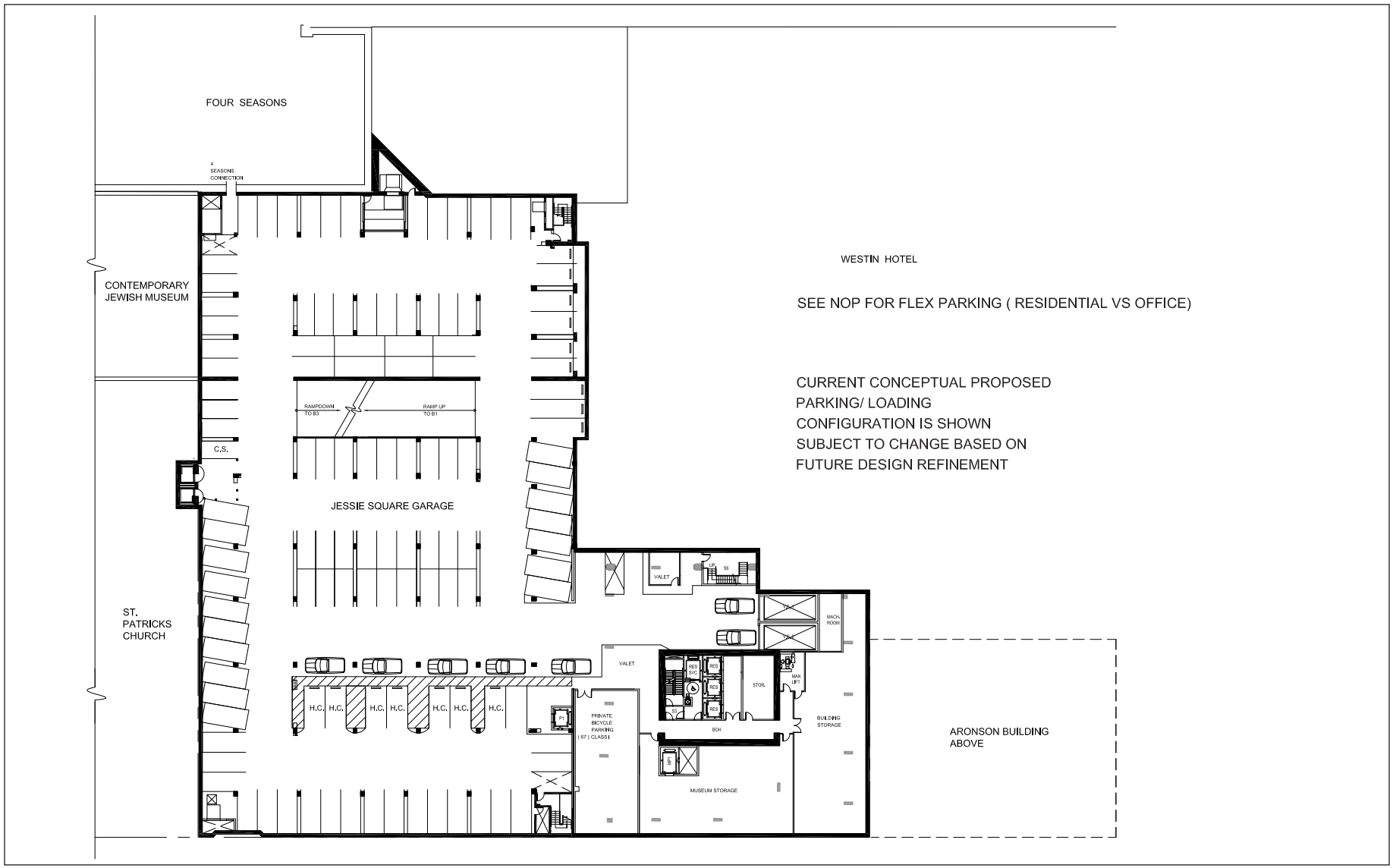
**FIGURE 3C: PROPOSED PROJECT BASEMENT LEVEL-B1**




SOURCE: Handel Architects

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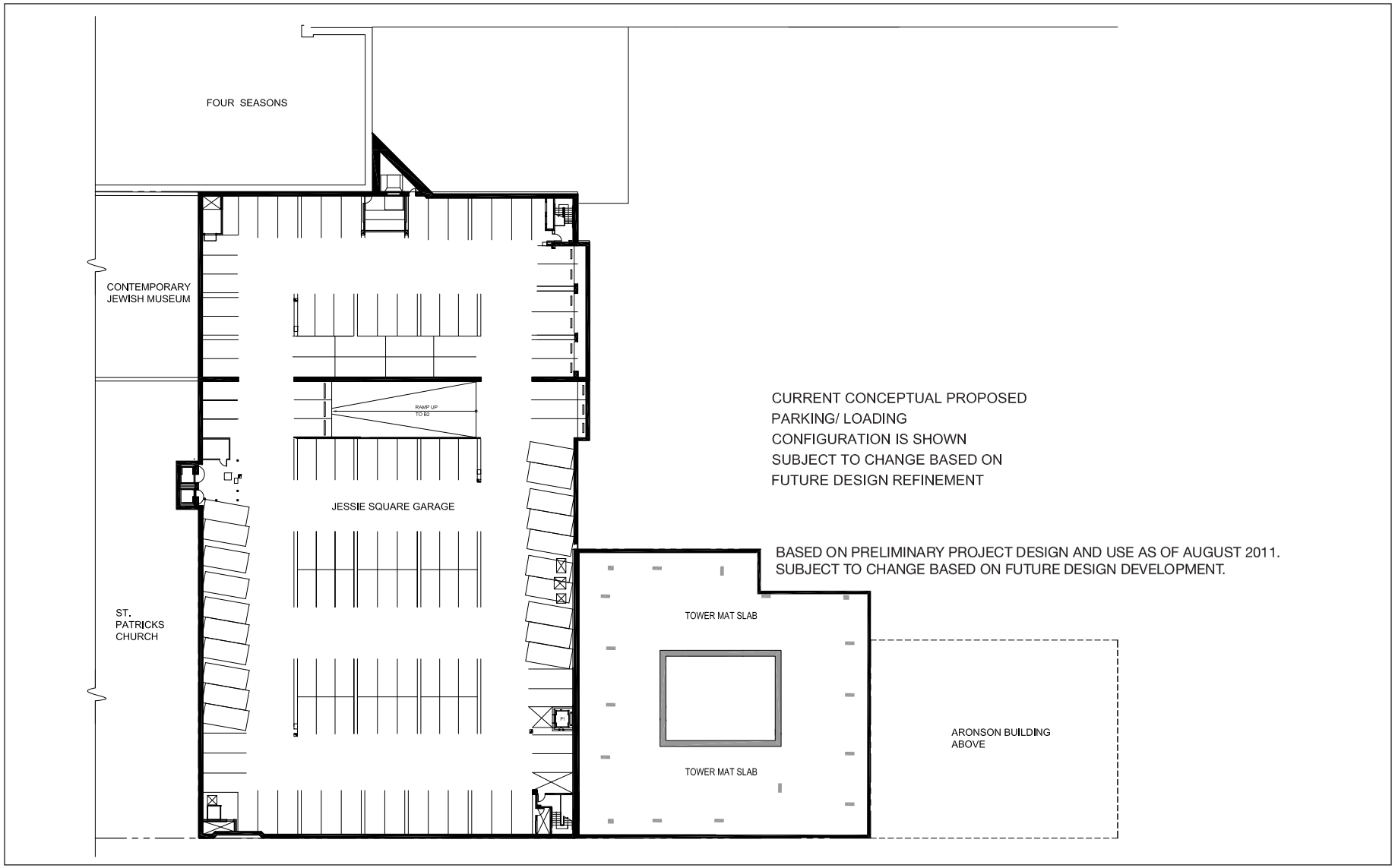
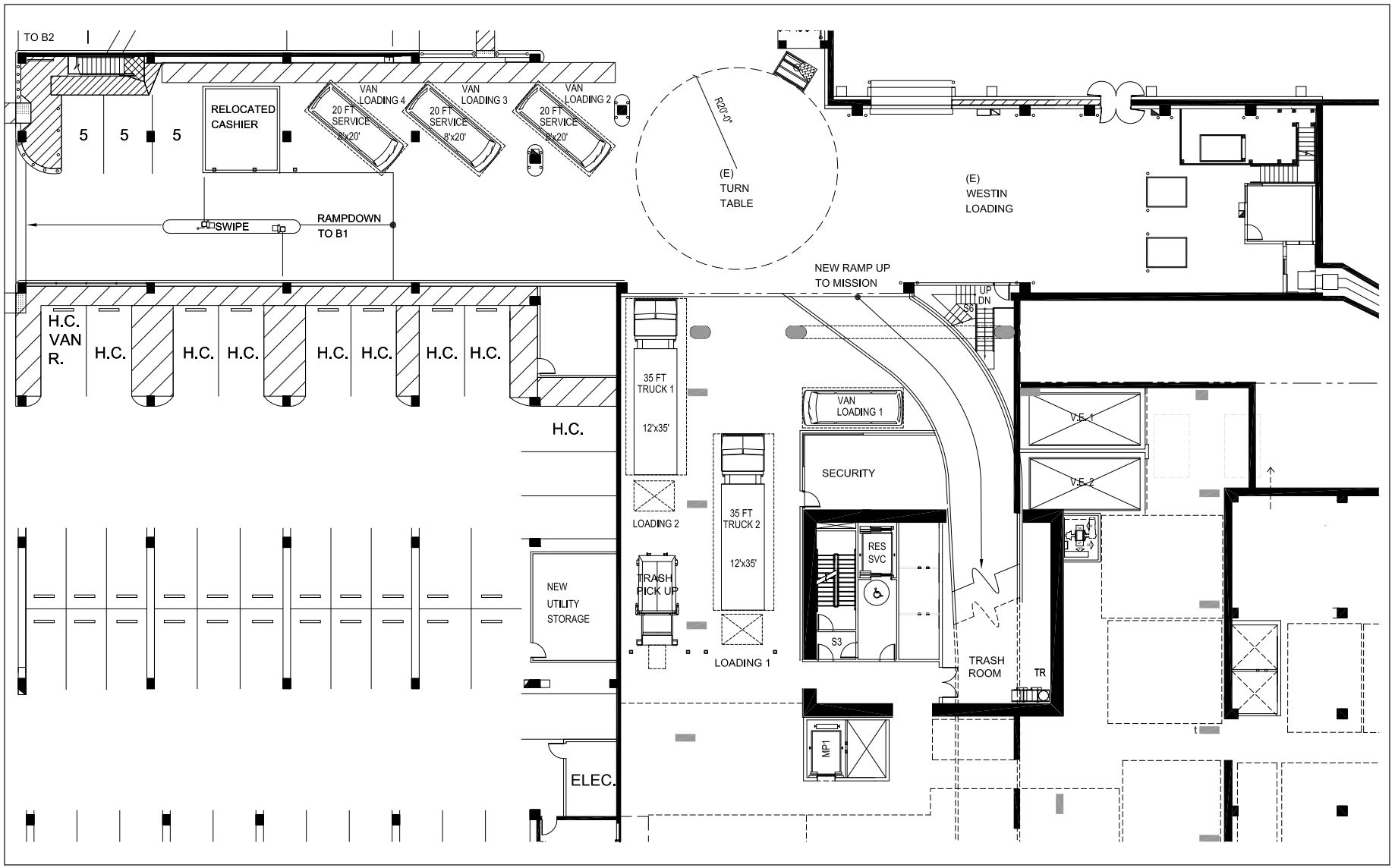
**FIGURE 3D: PROPOSED PROJECT BASEMENT LEVEL-B2**




SOURCE: Handel Architects




**FIGURE 3E: PROPOSED PROJECT BASEMENT LEVEL-B3**




SOURCE: Handel Architects

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**FIGURE 3F: BASEMENT LEVEL B1 - LOADING DOCK ENLARGED PLAN**

The project site currently contains the Aronson Building, a 10-story building, determined to be eligible for the National Register of Historic Places. The building is occupied by a retail tenant (Rochester Big and Tall) on the ground floor, and has office uses on the upper floors. There is an existing 19-foot wide curb cut on Third Street that provides access to an off-street loading/unloading area (not a full loading dock). The Jessie Square Garage currently contains 442 parking spaces, of which 372 spaces are designated for public parking (including 2 spaces reserved for St. Patrick's Church and 15 spaces reserved for the Contemporary Jewish Museum), and 70 spaces are reserved for Sports Club/LA uses. Primary ingress/egress to the garage is provided from Stevenson Street, and a secondary egress is via a driveway on Mission Street.

The Proposed Project entails the construction of a new 47-story 550-foot tower (a 520-foot-tall building with a 30-foot-tall elevator/mechanical penthouse) adjacent to and west of the existing 10-story, 154-foot-tall Aronson Building (a 144-foot-tall building with a 10-foot-tall mechanical penthouse). The new tower would be physically connected to the Aronson Building, which would be restored and rehabilitated. The Proposed Project would include residential dwelling units, as well as a museum, and retail/restaurant space. Floors four through ten of the Aronson Building have been designated as flex space for which two options are proposed, and referred to as the Residential Flex Option and the Office Flex Option. Under the Office Flex Option, existing office use of the Aronson Building would continue as part of the Proposed Project. Table 1 summarizes the maximum land uses proposed under both the Residential Flex Option and the Office Flex Option.

**Table 1**
**Proposed Project Characteristics**

| Land Use | Residential Flex Option | Office Flex Option |
|---|---|---|
| Residential[1] | 215 units | 191 units |
| Retail/Restaurant | 4,800 gsf | 4,800 gsf |
| Office | 0 | 61,320 gsf |
| Museum | 52,285 gsf | 52,285 gsf |
| Loading Spaces | 2 truck spaces<br>4 service vehicle spaces | 2 truck spaces<br>4 service vehicle spaces |
| Vehicle Parking Spaces[2] | 470 spaces | 470 spaces |
| Bicycle Parking Spaces | 91 spaces | 85 spaces |

Source: 706 Mission Street Co, LLC

Notes:

1. The maximum number of residential units is presented and analyzed for each option. Under both the Residential Flex Option and the Office Flex Option, the minimum number of residential units that would be constructed is 175.
2. Under the Residential Flex Option, the vehicle parking spaces would be allocated in the following manner: 210 public spaces (including 5 public car-share spaces), 215 residential parking spaces, 2 residential car-share parking spaces, and 43 parking spaces for other uses such as leased parking for nearby businesses. Under the Office Flex Option, the parking spaces would be allocated in the following manner: 210 public parking spaces (including 5 public car-share spaces), 191 residential spaces, 1 residential car-share space, and 68 spaces for other uses such as leased parking for nearby businesses.

The Redevelopment Agency proposes to convey the existing Jessie Square Garage to the project sponsor. The garage would be converted from a publicly owned garage to a privately owned garage. However, the basement mezzanine and upper basement levels would remain open to the public. On the mezzanine level of the existing garage, there is an existing space underneath the Contemporary Jewish Museum that is currently blocked off from the rest of the garage. As part of the Proposed Project, this existing space would be connected to the rest of the garage and would be striped to accommodate about 38 spaces. A total of approximately five existing spaces on various levels of the garage would need to be removed for vehicular access and circulation. As a result, there would be a net increase of 28 spaces, and the total number of parking spaces in the garage would increase from 442 to 470 spaces. The Proposed Project also includes the use of the Jessie Square Garage for access to the proposed on-site loading/unloading areas.

**Residential Use** – Under the Residential Flex Option, **t**he Proposed Project would include up to 215 two-bedroom and three-bedroom units, while under the Office Flex Option, the Proposed Project would include up to 191 two-bedroom and three-bedroom units. The pedestrian lobby would be accessed via Mission Street and from the vehicular drop-off/entry (via the Third Street driveway). See Figure 3A.

**Museum Use** – Under both the Residential Flex Option and Office Flex Option, the Proposed Project would include about 52,285 gross square feet for the planned Mexican Museum. Pedestrian access would be from Jessie Square Plaza via a ground-level museum lobby. Based on information from the nearby Contemporary Jewish Museum, average weekday daily attendance for the museum uses was estimated to be about 400 visitors per day.

**Retail/Restaurant Use** – Under both the Residential Flex Option and Office Flex Option, the Proposed Project would include about 4,800 square feet of retail/restaurant use that would be located on the ground floor level, at the southeast portion of the project site. Access to the retail/restaurant use would be from Third Street and/or Mission Street.

**Office Use** – Under the Office Flex Option for the Aronson Building, the Proposed Project would contain about 61,320 square feet of office within floors four through ten of the Aronson Building. Access to the office uses would be from Mission Street.

**Loading** – Under both the Residential Flex Option and the Office Flex Option, the Proposed Project would include two truck and four service vehicle loading spaces located within a loading area on the first basement level, with access via the Jessie Square Garage. See Figure 3C. A trash room would also be located within the first basement level.[2] The designated loading area would be adjacent to the existing truck turntable to accommodate trucks turning to exit the

[2] The existing uses in the basement level of the Aronson Building include storage and utility space. The basement level of the Mexican Museum parcel is currently vacant. Two double-height spaces were constructed underneath the Mexican Museum parcel when the Jessie Square Garage was built. The space is currently unoccupied.

loading space. See Figure 3C. Delivery and service vehicles would enter and exit primarily via the Stevenson Street driveway, although vans and small trucks would also be able to exit via the Mission Street driveway. Trucks and delivery vehicles would not utilize the Third Street driveway.

As part of the Proposed Project, the existing recessed passenger loading/unloading bay on Mission Street in front of Jessie Square would be extended for a distance of approximately 100 feet to the east by narrowing the sidewalk by eight feet. The extension of the passenger loading/unloading bay would support the proposed museum and residential uses, as well as the current users of the existing passenger bay. Extending the existing sidewalk bay on Mission Street would require sidewalk legislation through DPW and the Board of Supervisors.[3] In addition, it is anticipated that the project sponsor would request that the existing metered on-street freight loading spaces (four yellow spaces) adjacent to the project site on Third Street be converted to a passenger loading/unloading zone (i.e., a white curb zone) approximately 80 feet in length. The passenger loading/unloading zone on Third Street would support the retail/restaurant and residential uses, and would need to be approved at a public hearing through the SFMTA.

**Bicycle Parking Spaces** – Under the Residential Flex Option, the Proposed Project would include 67 Class 1 bicycle parking spaces for the residential uses within the garage level B2, and 24 Class 2 bicycle parking spaces as part of the public parking garage on the Mezzanine level.[4] Under the Office Flex Option, the Proposed Project would include 61 Class 1 bicycle parking spaces for the residential uses within the garage level B2, and 24 Class 2 bicycle parking spaces as part of the public parking garage on the Mezzanine level.

**Parking/Jessie Square Garage** – The existing Jessie Square Garage contains a total of 442 parking spaces. Of these spaces, 372 are public parking spaces (which include 2 spaces reserved for St. Patrick's Church and 15 spaces reserved for the Contemporary Jewish Museum), and 70 are spaces reserved for the nearby Sports Club/LA. Table 2 summarizes the existing vehicle and bicycle parking supply by floor for the existing Jessie Square Garage conditions.

[3] The extension of the passenger loading/unloading bay to the east woud require the relocation of the existing light pole and fire hydrant.

[4] Class 1 bicycle parking includes facilities that protect the entire bicycle, its components and accessories against theft and against inclement weather, including wind-driven rain. Examples of Class 1 spaces include lockers, check-in facilities, monitored parking, restricted access parking, and personal storage. Class 2 bicycle parking spaces include bicycle racks which permit the locking of the bicycle frame and one wheel to the rack and, which support the bicycle in a stable position without damage to wheels, frame or components.

**Table 2**
**Jessie Square Garage Parking Supply**
**Existing Conditions**

| Level | Vehicles | | | | | Bicycle |
|---|---|---|---|---|---|---|
| | Standard [1] | 5-minute | ADA Accessible [2] | Car-share | Total | |
| Mezzanine | 70 | 0 | 0 | 0 | 70 | 19 |
| B1 | 89 | 8 | 10 | 0 | 107 | 4 |
| B2 | 131 | 0 | 0 | 0 | 131 | 0 |
| B3 | 133 | 0 | 0 | 1 | 134 | 0 |
| Total | 423 | 8 | 10 | 1 | 442 | 23 |

Source: Millennium Partners, 2011.
Notes:
1. Existing parking supply includes two spaces reserved for St. Patrick's Church, 15 spaces reserved for the Contemporary Jewish Museum, and 70 spaces reserved for Sports Club/LA uses.
2. ADA accessible parking includes one van accessible parking space.

Figures 3B through 3E present the Jessie Square Garage parking levels. The Proposed Project proposes to reconfigure parking spaces in the garage to accommodate project construction, circulation, and loading. Additional parking spaces would be added in a currently unused area at the mezzanine level, as indicated on Figure 3B, while spaces would be removed elsewhere as required for the project. Table 3 compares the existing and proposed Jessie Square Garage parking supply by floor, and notes the change in the number of parking spaces. The public parking within the mezzanine and parking level B1 and the private parking spaces on levels B2 and B3 would be separated by gates and marked with signage.

**Table 3**
**Summary of Existing and Proposed Project Vehicle Parking Supply**
**Jessie Square Garage**

| Level | Existing [1] | | | Proposed [2] | | | Change |
|---|---|---|---|---|---|---|---|
| | Public | Reserved | Total | Public | Reserved | Total | |
| Mezzanine [3] | 0 | 70 | 70 | 109 | 0 | 109 | 39 |
| B1 | 107 | 0 | 107 | 101 | 1 | 102 | -5 |
| B2 | 131 | 0 | 131 | 0 | 122 | 122 | -9 |
| B3 | 134 | 0 | 134 | 0 | 137 | 137 | 3 |
| Total | 372 | 70 | 442 | 210 | 260 | 470 | 28 |

Source: Millennium Partners, 2011.
Notes:
1. Existing parking supply includes two spaces reserved for St. Patrick's Church, 15 spaces reserved for the Contemporary Jewish Museum, and 70 spaces reserved for Sports Club/LA uses.
2. Proposed public parking supply to include 2 spaces reserved for St. Patrick's Church, 15 spaces reserved for the Contemporary Jewish Museum, and 10 spaces reserved for the Mexican Museum.
3. Additional 38 spaces created within the Contemporary Jewish Museum Basement/Jessie Square Garage Mezzanine area that has been unused.

With the Proposed Project, under either the Residential Flex Option or the Office Flex Option, the Jessie Square Garage would contain a total of 470 parking spaces. The Proposed Project includes the reconfiguration of the existing garage from 372 public parking spaces and 70 spaces reserved/leased for the nearby Sports Club/LA uses (a total of 442 parking spaces), to 210 public parking spaces and 260 (including 43 or 68 leased spaces, depending on the Flex Option) private reserved parking.

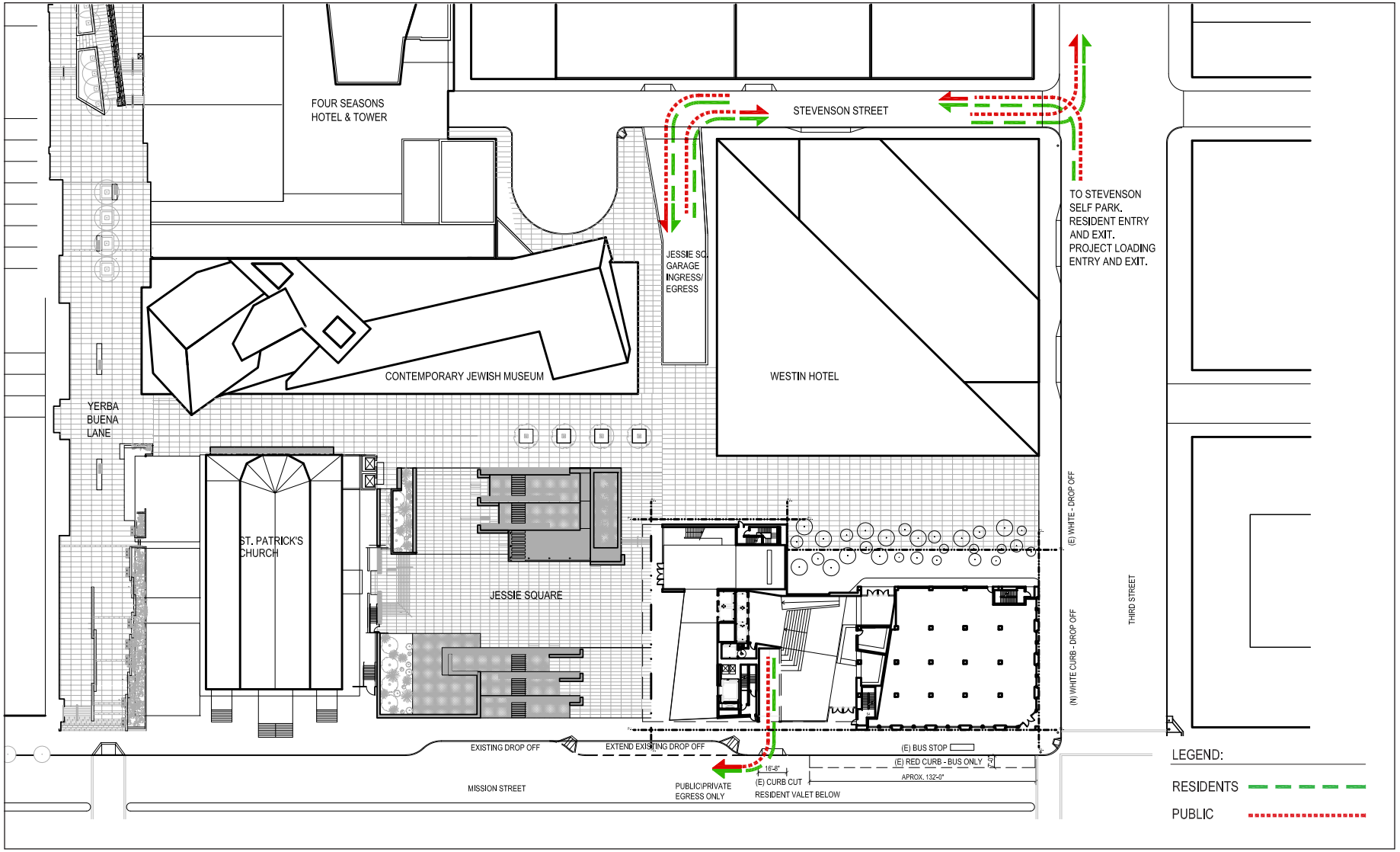
- The 210 public parking spaces would include 11 handicapped accessible spaces (10 standard plus one van space on level B1), and five car-share spaces. Similar to existing conditions, these public spaces would include two reserved parking spaces for St. Patrick's Church, 15 spaces reserved for the Contemporary Jewish Museum, and ten spaces would now be reserved for the Mexican Museum.
- The 260 private reserved spaces would vary by flex option. The Residential Flex Option would include 215 spaces for the residential dwelling units, 43 spaces reserved for other uses (to be determined), and 2 car-share spaces. The Office Flex Option would include 191 spaces for the residential dwelling units, 68 spaces reserved for other uses (to be determined), and 1 car-share parking space.

Under both the Residential Flex Option and the Office Flex Option, vehicle access into the residential parking spaces would be via the existing loading access curb cut on Third Street, which would provide new access into the existing parking garage via two car elevators using valet service. Residents could also access the parking garage via the existing ramp on Stevenson Street. Residents would have the option to self-park or utilize valet service (which would be provided at street level and/or within the garage on Basement Level B2). The valet drop-off area would be located outside of the building. See Figure 3A. Residents leaving the project site would pick up their vehicle within the project parking garage and exit onto Stevenson Street or Mission Street via the existing driveway ramps, or at the Mission Street extended existing recessed passenger loading/unloading bay. The driveway onto Mission Street would remain egress-only, while the Stevenson Street driveway would remain ingress and egress. The private parking spaces would be accessible 24-hours a day.

Ingress and egress to the Jessie Square public parking garage would remain unchanged for the general public (as well as for non-residential vehicle trips associated with the Proposed Project) – the primary ingress/egress would continue to be the Stevenson Street driveway, and secondary egress would continue to be the Mission Street driveway. As noted above, residents could utilize the same ingress and egress routes, except residents would also have the ability to access the garage directly from Third Street via the new ingress driveway and car elevators. Within the Jessie Square Garage, private and public parking areas and access to each would be separated by gates and signage.

**Project Variants** – This Transportation Study assesses seven variants to the Proposed Project. Five of the seven variants are related to curb cuts and driveways on Third Street and on Mission Street, which primarily affect how the vehicles associated with the residential uses access the project site. Two of the seven variants are related to changing the existing access into and out of the Jessie Square Garage via Stevenson Street. For each of the variants, as for the Proposed Project, the existing recessed passenger loading bay on Mission Street in front of Jessie Square would be extended by narrowing the sidewalk eight feet for a distance of approximately 100 feet to the east. Also, similar to the Proposed Project, for each variant the project sponsor would request that the existing metered loading spaces (four yellow curb spaces) adjacent to the project site on Third Street be converted to a passenger loading/unloading zone (white curb). Under each variant, project residents would have the option of parking and retrieving their own vehicles, or using a valet service, which would be provided on Basement Level B2 and/or drop-off at-grade.

- **Variant 1: No Third St Access** (see Figure 4) – Under this variant the existing loading access curb cut into the project site on Third Street would be abandoned, and the resident-only ingress and car elevators into the garage would not be constructed. Ingress and egress to the Jessie Square Garage for all vehicles (residential, non-residential, and trucks) would remain the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress-only on Mission Street.
- **Variant 2: Residential Ingress from Third St and Stevenson St** (see Figure 5) – Under this variant, the existing curb cut into the project site on Third Street would remain, and would only be used for residential vehicle trips entering the project site, similar to the Proposed Project. As part of this variant, rather than construct a valet drop-off area and two car elevators, a new ingress driveway ramp would be constructed to access the below grade garage levels. Otherwise, ingress and egress to the Jessie Square Garage for non-residential and truck vehicular access would remain the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress-only on Mission Street.
- **Variant 3: Residential Ingress from Mission St and Stevenson St** (see Figure 6) – Under this variant, the existing curb cut into the project site on Third Street would be abandoned. The existing Jessie Square Garage egress-only driveway ramp and curb cut on Mission Street would be widened from 16-feet 8-inches to 25 feet to allow for two-way operations. Ingress via this driveway would be permitted for resident vehicular ingress only. Otherwise, ingress/egress to the Jessie Square Garage for non-residential and truck vehicular access would remain the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress on Mission Street.




SOURCE: Handel Architects

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**FIGURE 4: VARIANT 1 - NO THIRD STREET ACCESS**

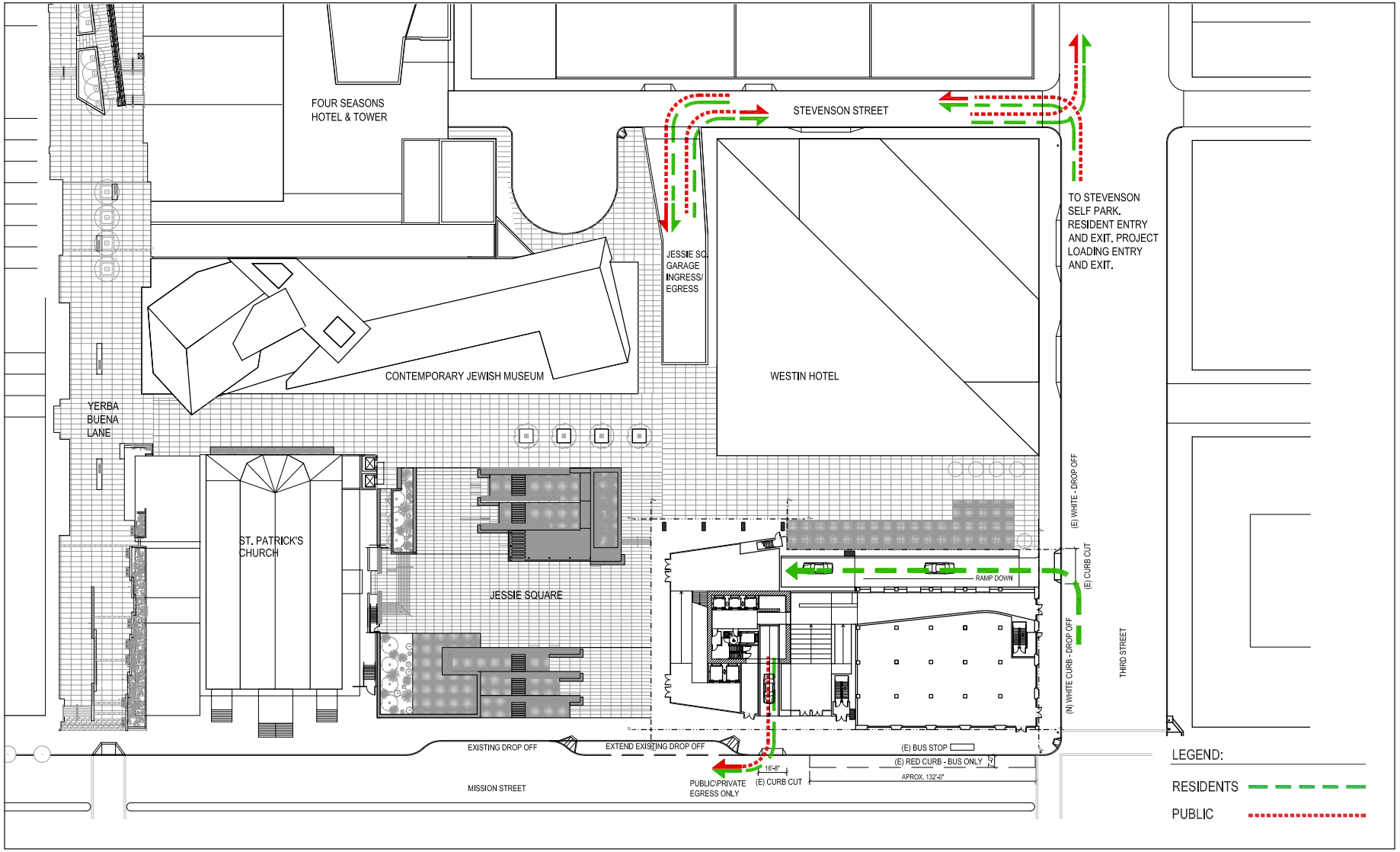


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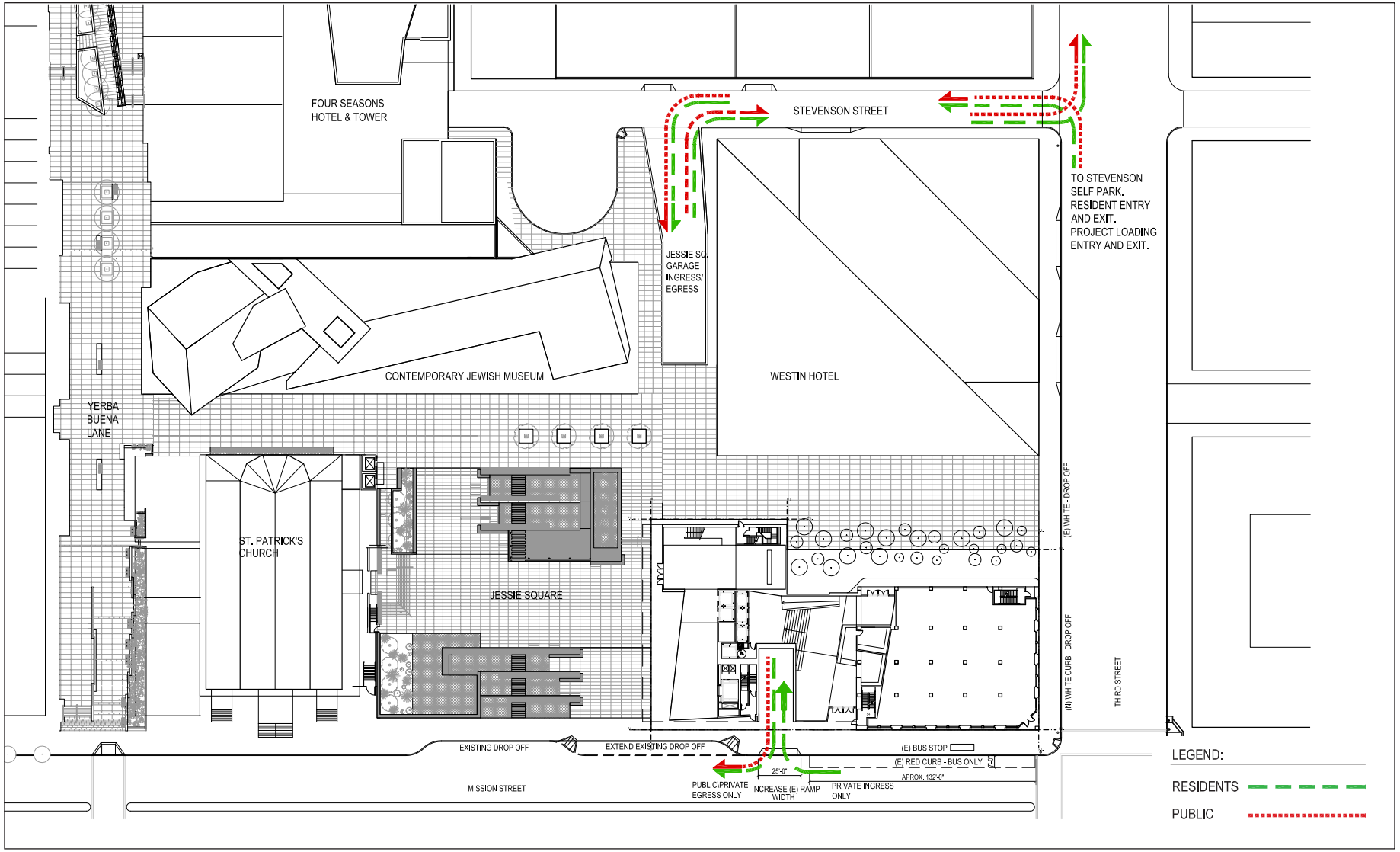
**FIGURE 5: VARIANT 2 - RESIDENTIAL INGRESS FROM THIRD STREET AND STEVENSON STREET**




SOURCE: Handel Architects

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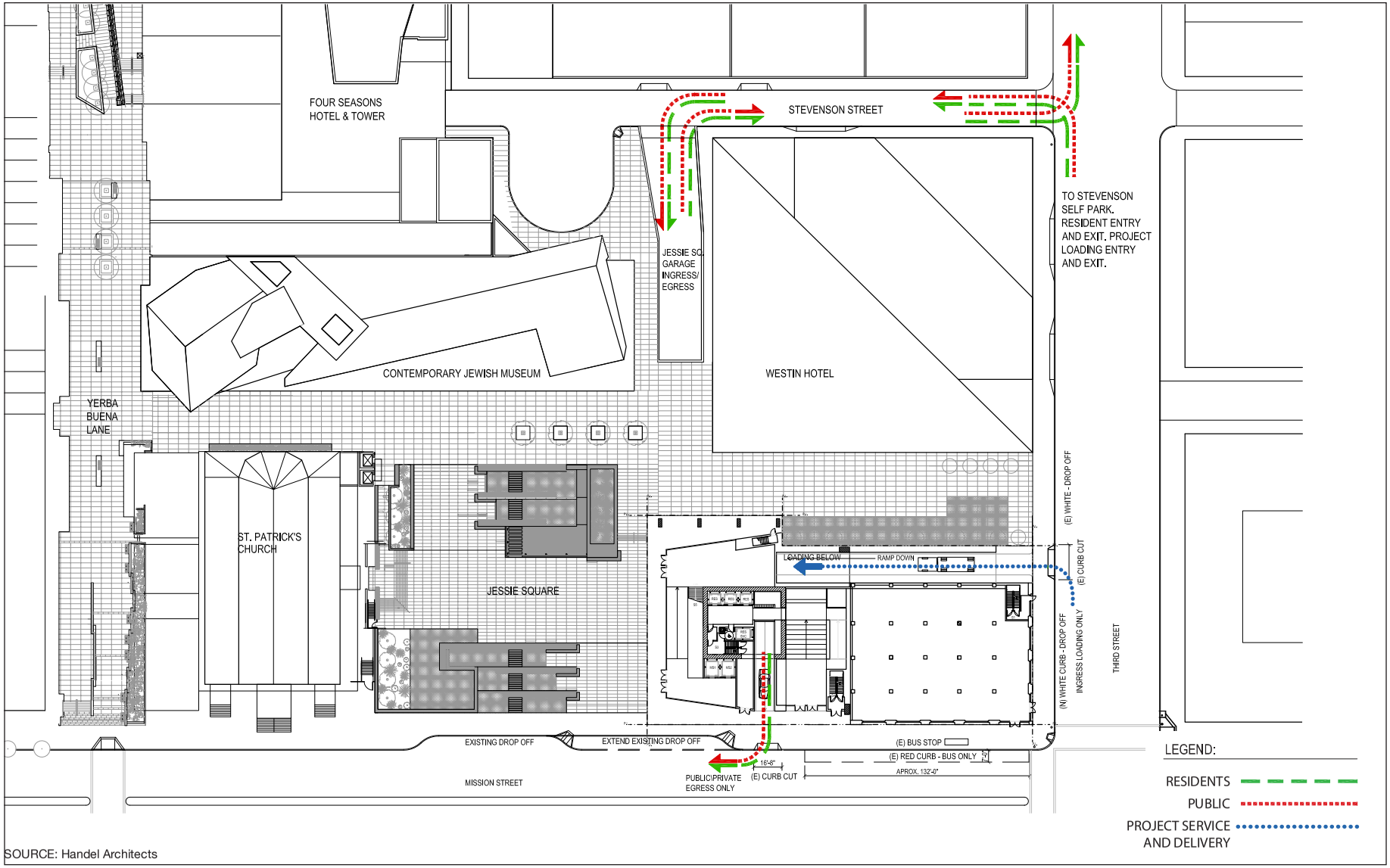
**FIGURE 6: VARIANT 3 - RESIDENTIAL INGRESS FROM MISSION STREET AND STEVENSON STREET**

- **Variant 4: Truck and Service Vehicle Access from Third St** (see Figure 7) – Under this variant, the existing curb cut into the project site on Third Street would remain, and an ingress-only driveway ramp into the garage would be constructed. As part of this variant, rather than permit residents to utilize this new driveway, only trucks and service vehicles would be permitted use of the new driveway, while residents would enter via the Stevenson Street driveway. The Mission Street driveway would remain egress-only. As under existing conditions, small trucks and service vehicles could exit via the Mission Street driveway (9-feet 6-inches clear), while larger trucks would need to exit via the Stevenson Street driveway (13-feet 6-inches clear). Otherwise, ingress and egress to the Jessie Square Garage for residential and non-residential vehicular access would remain the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress-only on Mission Street.
- **Variant 5: Residential Drop-off within Aronson Building** (see Figure 8) – Under this variant, the existing curb cut into the project site on Third Street would remain, and would only be used for residential vehicle trips entering the project site, similar to the Proposed Project. As part of this variant a residential drop-off area adjacent to and south of the driveway (the residential drop-off area would be provided within the Aronson Building). Similar to the Proposed Project, two car elevators would be constructed to access the below grade garage levels. Otherwise, ingress and egress to the Jessie Square Garage for non-residential and truck vehicular access would remain the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress-only on Mission Street.
- **Variant 6: Jessie Square Garage Vehicular Ingress/Egress from Mission St Only, except for Trucks and Service Vehicles** (see Figure 9) – Variant 6 would be similar to Variant 3, except that no cars would be allowed to enter or exit the Jessie Square Garage via Stevenson Street. Under Variant 6, all car access would via Mission Street. Under this variant, the existing curb cut into the project site on Third Street would be abandoned. The existing Jessie Square Garage egress-only driveway ramp and curb cut on Mission Street would be widened from 16-feet 8-inches to 25 feet to allow for two-way operations. As under existing conditions, small trucks and service vehicles could exit via the Mission Street driveway (9-feet 6-inches clear).

  Ingress and egress to the Jessie Square Garage via Stevenson Street would be restricted to existing and Proposed Project loading and service vehicles.




SOURCE: Handel Architects

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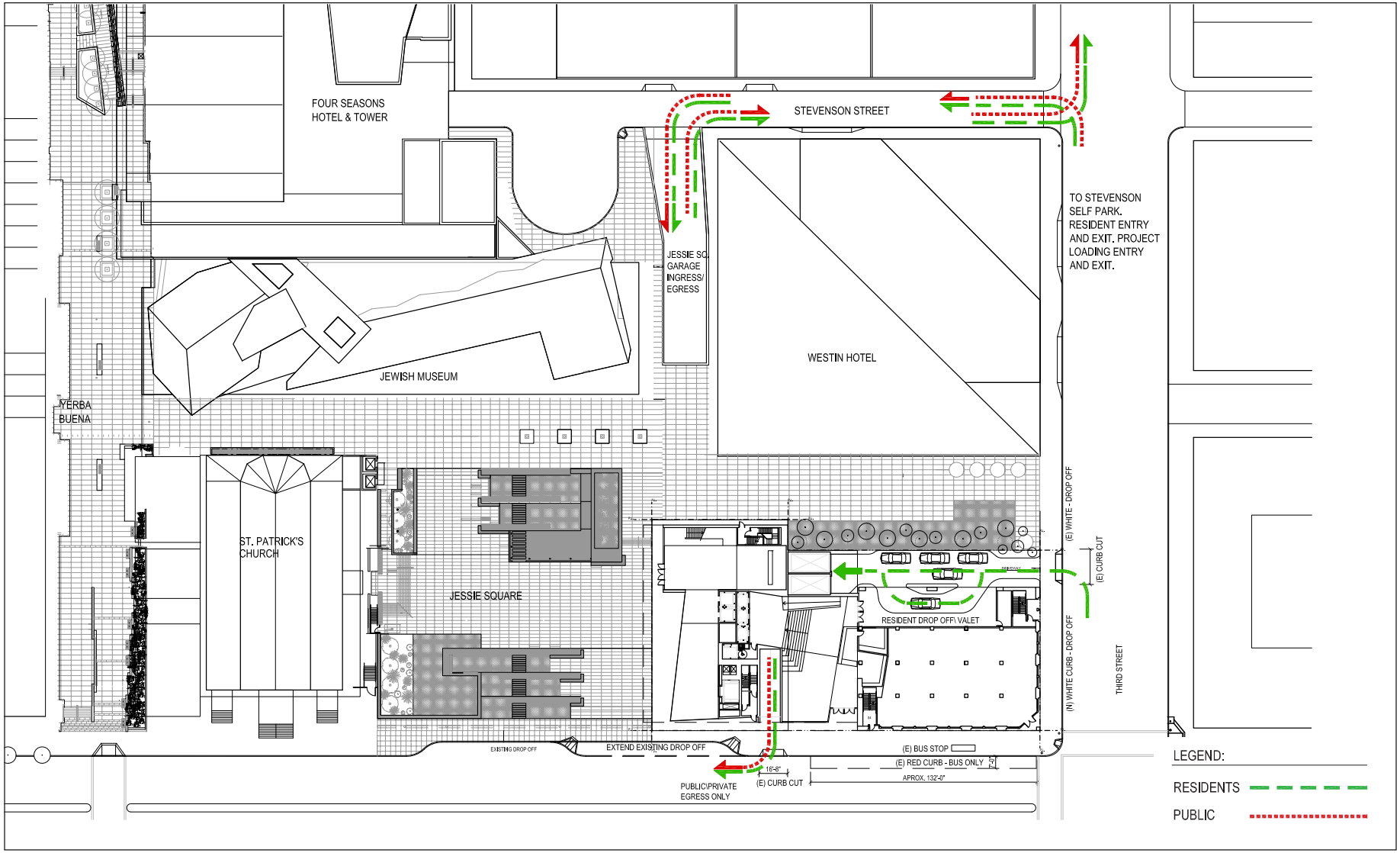
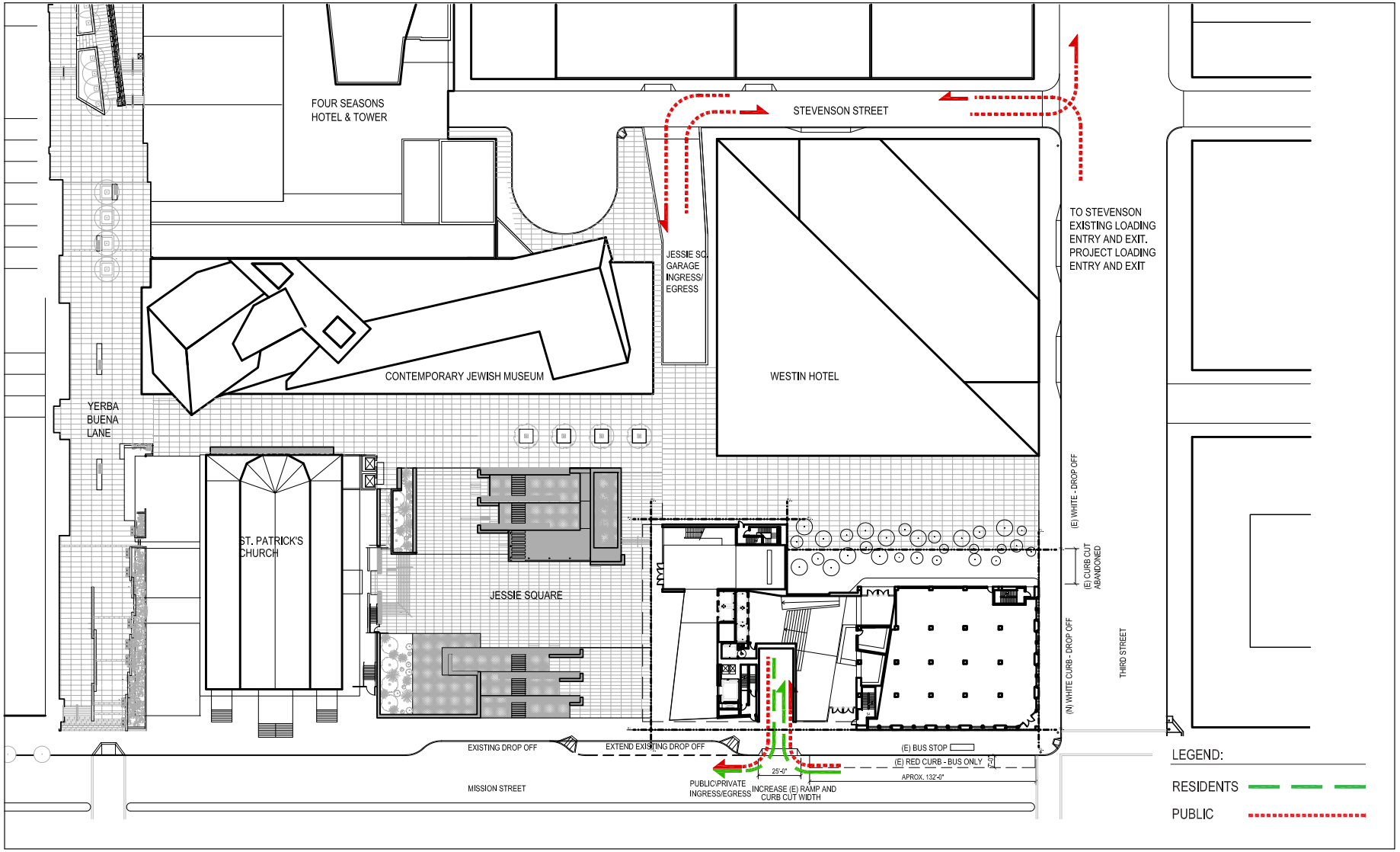
**FIGURE 7: VARIANT 4 - DELIVERY TRUCK RAMP INGRESS FROM THIRD STREET**




SOURCE: Handel Architects



**FIGURE 8: VARIANT 5 - RESIDENTIAL DROP OFF WITHIN ARONSON BUILDING**




SOURCE: Handel Architects



**FIGURE 9: VARIANT 6 - JESSIE SQUARE GARAGE VEHICULAR INGRESS/EGRESS FROM MISSION STREET ONLY EXCEPT FOR TRUCKS**

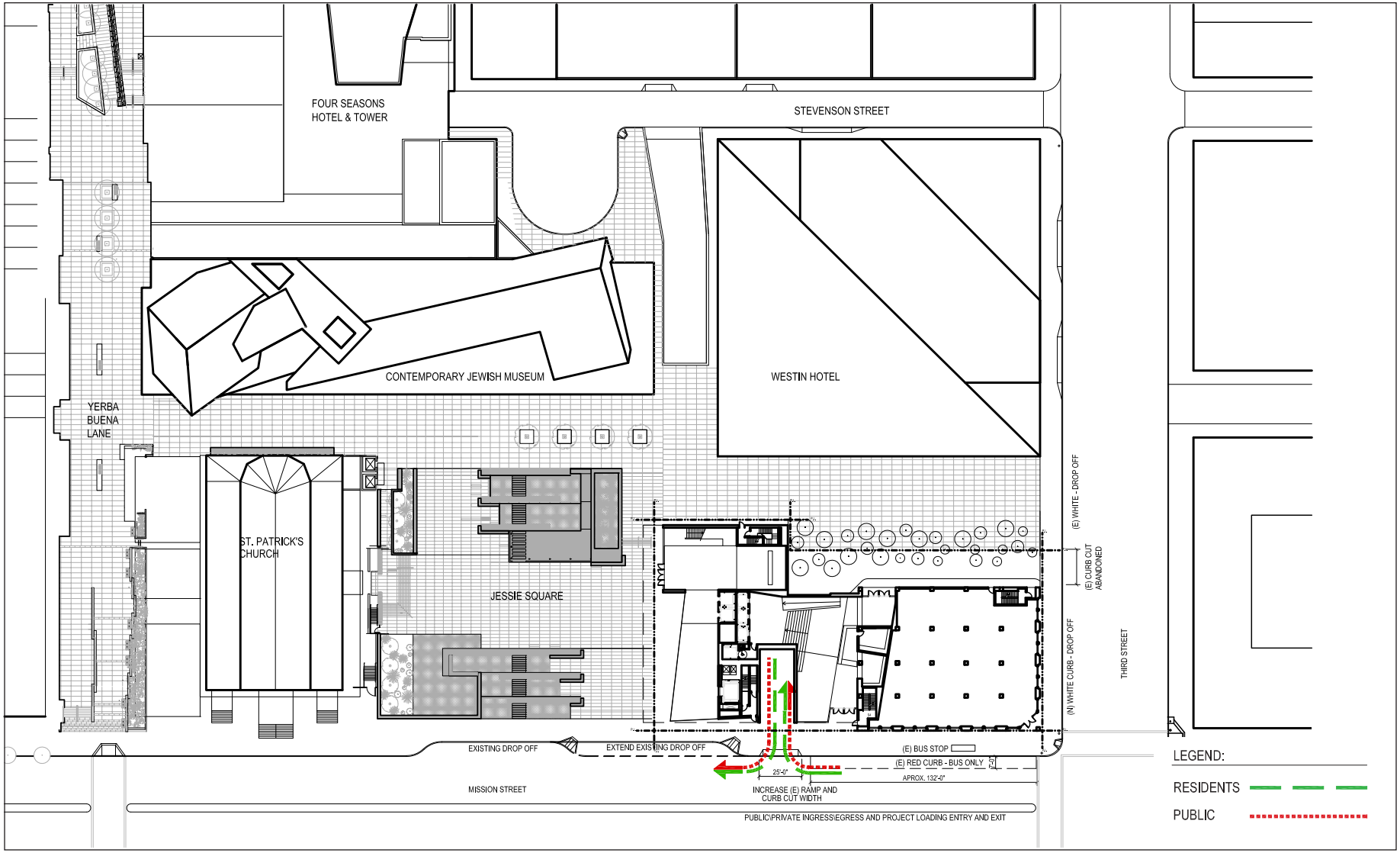
- **Variant 7: All Jessie Square Garage Vehicular Ingress/Egress from Mission St** (see Figure 10) – Variant 7 would be the same as Variant 6, except that all delivery and service vehicles would also enter and exit from Mission Street. Under Variant 7, no cars or trucks would be allowed to enter or exit the Jessie Square Garage via Stevenson Street from Third Street. The existing ramp and curb cut on Mission Street would need to be widened and the vertical clearance increased to accommodate both ingress and egress by truck, and the existing curb cut on Third Street would be removed (as noted in Variant 4, the Mission Street driveway has a vertical clearance of 9-feet 6-inches clear permitting only small trucks and service vehicle to use this driveway, while the Stevenson Street driveway has 13-feet 6-inches clear.

  All ingress and egress to the Jessie Square Garage for existing and Proposed Project residential and non-residential vehicular access would be via Mission Street. The entrance/exit to the Jessie Square Garage on Stevenson Street would be closed.

## 1.2 STUDY SCOPE AND APPROACH

This transportation study was prepared according to the scope of work approved by the San Francisco Planning Department (see Appendix A). For the analysis of the Proposed Project, the following transportation scenarios were examined in the study:

- Existing
- Existing plus Project
- Existing plus Variant 1
- Existing plus Variant 2
- Existing plus Variant 3
- Existing plus Variant 4
- Existing plus Variant 5
- Existing plus Variant 6
- Existing plus Variant 7
- 2030 Cumulative




SOURCE: Handel Architects

NORTH



**FIGURE 10: VARIANT 7 - ALL JESSIE SQUARE GARAGE VEHICULAR INGRESS/EGRESS FROM MISSION STREET**

The following intersections in the vicinity of the Proposed Project were analyzed for intersection Level of Service ("LOS") during the weekday PM peak hour (generally between 5 and 6 PM) of the PM peak period (generally between 4 and 6 PM).

- Third/Market
- Third/Stevenson
- Third/Mission
- Third/Howard
- Fourth/Market
- Fourth/Mission
- Fourth/Howard

Parking and transit conditions were evaluated for a study area bounded by Market Street to the north, Second Street to the east, Folsom Street to the south, and Fifth Street to the west. Figure 11 presents the analysis intersections and the parking and transit study areas.

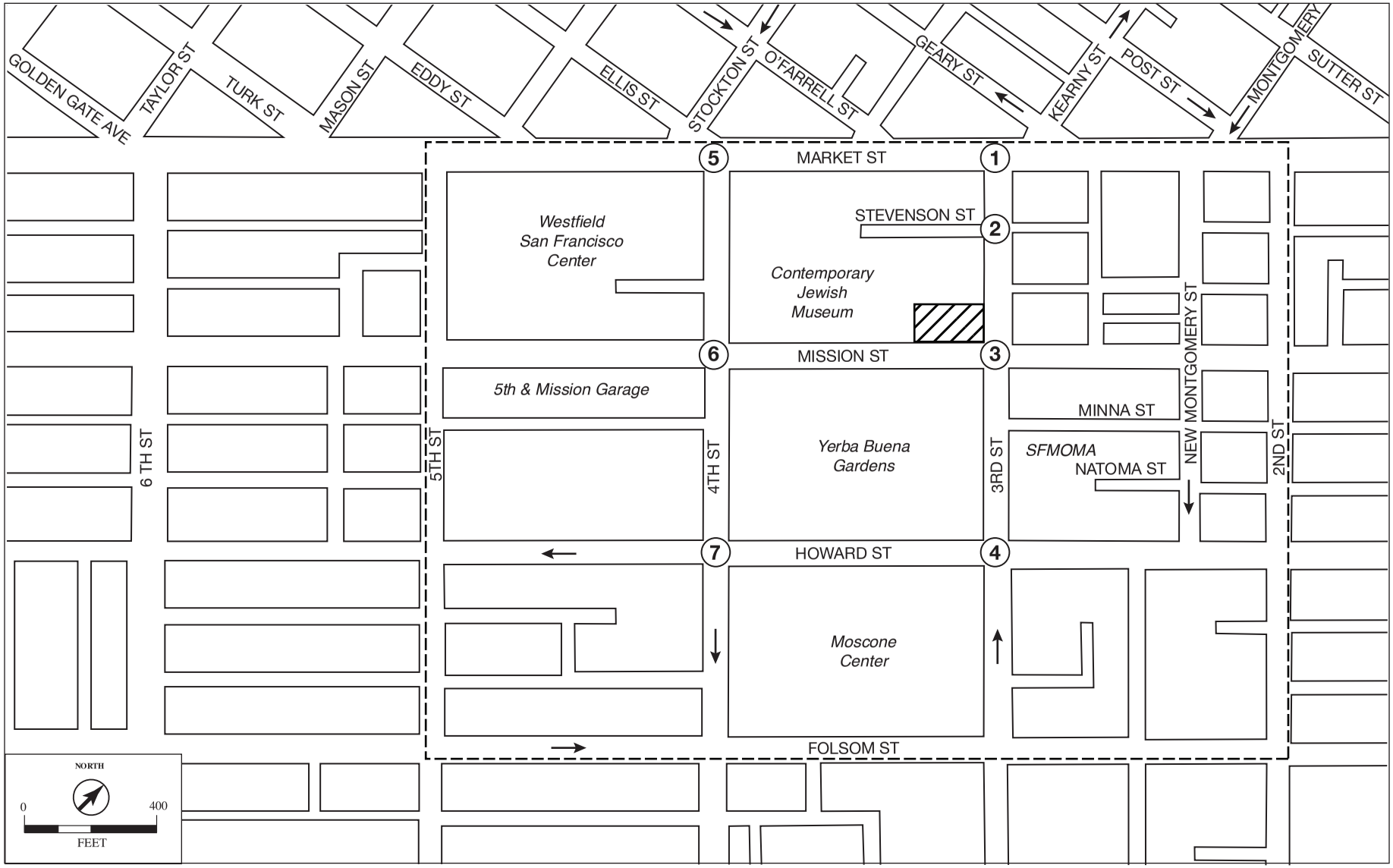





**FIGURE 11: STUDY AREA AND ANALYSIS LOCATIONS**

# Chapter 2
# SETTING

This chapter provides a description of the existing transportation conditions in the vicinity of the Proposed Project. Included in this chapter are descriptions of the existing roadway traffic, transit, parking, pedestrian, and bicycle conditions. Figure 11 presents the roadway network in the vicinity of the Proposed Project.

## 2.1 ROADWAY NETWORK

Appendix C contains definitions and regulatory requirements for the various San Francisco *General Plan* roadway classifications, plus the roadway levels of service for those streets in the Congestion Management Program ("CMP") Network.

### 2.1.1 Regional Access

This section provides a discussion of the existing regional roadway network in the vicinity of the Proposed Project, including the location of the nearest on-ramps and off-ramps.

**Interstate 80** ("I-80") provides the primary regional access to the project area. The San Francisco-Oakland Bay Bridge is part of I-80 and connects San Francisco with the East Bay and points east. I-80 runs to the south of the Proposed Project site. Access to the Proposed Project from I-80 westbound is via the Fremont Street off-ramp, about three blocks southeast of the Proposed Project site, and access to I-80 eastbound is via the on-ramps at Harrison/Essex and Harrison/First. Access from I-80 eastbound is via the Fifth/Harrison off-ramp, and access to I-80 westbound is via the Fourth/Harrison on-ramp.

**U.S. Highway 101** ("U.S. 101") provides access to both the north and south of the study area. I-80 joins U.S. 101 to the southwest of the Proposed Project and provides access to the Peninsula and South Bay. Nearby access to U.S. 101 to the south is provided from I-80, including the on- and off-ramps at Fourth Street. In addition, U.S. 101 connects San Francisco and the North Bay via the Golden Gate Bridge. Within the northern part of San Francisco, U.S. 101 operates on surface streets (i.e., Van Ness Avenue and Lombard Street).

**Interstate 280** ("I-280") provides regional access from the South of Market area of downtown San Francisco to southwest San Francisco and the South Bay/Peninsula. I-280 and U.S. 101 have an interchange to the south of downtown San Francisco. Nearby access points to I-280 are located at King Street (at Fourth Street) and Sixth Street (at Brannan Street).

### 2.1.2 Local Access

This section provides a discussion of the existing local roadway system in the vicinity of the Proposed Project, including the roadway designation, number of travel lanes, and traffic flow directions. In the South of Market area, streets that run in the northwest/southeast direction are considered north-south streets, whereas streets that run in the southwest/northeast direction are considered east-west streets.

**Market Street** is a two-way arterial that runs between Steuart Street and Portola Drive. Market Street runs in a northeast-southwest direction. In the vicinity of the project site, Market Street has two lanes in each direction, and on-street parking on both sides of the street. The F-Market historic streetcar line runs on Market Street between Steuart Street and Castro Street. In the San Francisco *General Plan*, Market Street is designated as a Transit Conflict Street in the CMP Network, a Transit Preferential Street (transit-oriented), a Citywide Pedestrian Network Street and a Neighborhood Commercial Street. In addition, Market Street between Castro Street and Steuart Street is part of Bicycle Route 50.

**Mission Street** is a four-lane arterial that runs in an east-west direction between The Embarcadero and Van Ness Avenue, and continues in a north-south direction west of Van Ness Avenue. Left turns from Mission Street are generally prohibited between Main/Beale Streets and Tenth Street. Between Third and Fourth streets, there is a planted median. One of Mission Street's two lanes in the eastbound and westbound directions, between 11th Street and Beale Street, is dedicated as a right-turn/bus-only lane on weekdays between 7 AM and 6 PM in the westbound direction, and 7 to 9 AM and 4 to 6 PM in the eastbound direction. On-street, metered parking is generally provided along both curbs, but is prohibited during the AM and PM peak periods. On-street parking is not permitted on Mission Street between Third Street and Fourth Street. The *General Plan* designates Mission Street as a Transit Conflict Street in the CMP Network, as a Transit Preferential Street (primary transit-oriented) within the downtown core, a Neighborhood Pedestrian Street (Neighborhood Commercial), and as a Citywide Pedestrian Network Street.

**Howard Street** runs between The Embarcadero and South Van Ness Avenue. It is a two-way arterial with two travel lanes in each direction between The Embarcadero and Fremont Street, and a one-way arterial west of Fremont Street with three to four travel lanes in the westbound direction. In the vicinity of the project site Howard Street has on-street parking on both sides of the street; however, parking is prohibited along the north curb during the PM peak period (4 to 6 PM). The San Francisco *General Plan* identifies Howard Street as a Major Arterial in the CMP Network, as an MTS Street and a Transit Preferential Street (transit-important) between Main and Beale Streets. Howard Street is part of the Bicycle Route 30, and a bicycle lane is provided on the north side of Howard Street between Fremont and Eleventh Streets.

**Folsom Street** runs continuously between The Embarcadero and Ripley Street (south of Cesar Chavez Street), with another segment south of Bernal Heights. In the vicinity of the project site, Folsom Street is a four-lane eastbound one-way arterial from Eleventh Street to Main Street, and is a two-way arterial with three eastbound lanes and one westbound lane between Main Street and The Embarcadero. The San Francisco *General Plan* identifies Folsom Street as a Major Arterial in the CMP Network and as an MTS Street. Folsom Street is part of Bicycle Route 30, and in the vicinity of the Proposed Project has a bicycle lane on the south side of the street.

**Second Street** is a two-way street between Market Street and King Street, with two lanes in both the northbound and southbound directions. Between Mission Street and Market Street, only one northbound lane is provided and all northbound traffic must turn right at Market Street. On-street parking is generally provided along both sides of the street. Second Street is designated as a Neighborhood Commercial Street in the San Francisco *General Plan*. In addition, Second Street is part of Bicycle Route 11.

**Third Street** is a north-south arterial between Bayshore Boulevard and Market Street. North of Townsend Street, Third Street is a one-way northbound roadway. In the vicinity of the project site, Third Street has five to six travel lanes, and the east curb lane is reserved for transit vehicles. On-street parking is generally provided along both sides of the street, but is prohibited during the morning and afternoon commute periods. In the San Francisco *General Plan*, Third Street is designated as a Major Arterial in the CMP Network, a Metropolitan Transportation System ("MTS") street, a Transit Preferential Street (transit important), a Citywide Pedestrian Network Street and a Neighborhood Commercial Street.

**Fourth Street** is a north-south roadway between Market Street and Third Street. North of Market Street, Fourth Street connects with Stockton Street and Ellis Street. Between Market and Townsend streets, Fourth Street is one-way southbound with four travel lanes. In the vicinity of the project site, Fourth Street has on-street metered parking and sidewalks on both sides of the street, and the west curb lane is for transit only. In the San Francisco *General Plan*, Fourth Street is designated as a Major Arterial in the CMP Network, an MTS Street, a Transit Preferential Street (transit important) and a Neighborhood Commercial Street.

**Fifth Street** is a north-south roadway between Market Street and Townsend Street. North of Market Street, Fifth Street becomes Cyril Magnin Street. Fifth Street is two-way, with two travel lanes in each direction. In the vicinity of the project site, Fifth Street has on-street metered parking and sidewalks on both sides of the street. In the San Francisco *General Plan*, Fifth Street is designated as a Major Arterial in the CMP Network, an MTS Street, a transit Preferential Street (transit important). Fifth Street is part of Bicycle Route 19.

**Stevenson Street** is an east-west roadway that runs discontinuously between First Street and Tenth Street. In the vicinity of the project site, Stevenson Street runs one-way westbound

between Annie Street and Third Street, and two-way between Third Street and the passenger loading area for the Four Seasons Hotel to the west (between Third and Fourth streets). Stevenson Street provides primary access to the Jessie Square Garage.

## 2.2 INTERSECTION OPERATING CONDITIONS

Existing intersection operating conditions were evaluated for the weekday PM peak hour (generally between 5 and 6 PM) of the PM peak period (4 to 6 PM). Intersection turning movement volumes at the seven study intersections were conducted on Wednesday July 16, 2008, and Thursday July 17, 2008. Additional intersection turning movement volumes were conducted on Tuesday, November 24, 2009 at the intersections of Third Street with Market Street, Stevenson Street, and Mission Street to determine if the March 2009 signalization of the intersection of Third/Stevenson substantially affected traffic volumes. Comparison of the 2008 and 2009 traffic volumes indicated that the volumes were similar, and the 2008 volumes slightly higher, and therefore, for a conservative analysis, the 2008 traffic volumes were used. Figure 12 presents the existing weekday PM peak hour traffic volumes at the study intersections.

All of the seven study intersections are signalized. The operating characteristics of intersections are described by the concept of Level of Service (LOS). LOS is a qualitative description of an intersection's performance based on the average delay per vehicle. Intersection levels of service range from LOS A, which indicates free flow or excellent conditions with short delays, to LOS F, which indicates congested or overloaded conditions with extremely long delays. LOS A through D are considered excellent to satisfactory service levels, LOS E is undesirable, and LOS F conditions are unacceptable. Appendix D presents level of service descriptions for signalized intersections.

The signalized intersections were evaluated using the *2000 Highway Capacity Manual* methodology.[5] For signalized intersections, this methodology determines the capacity for each lane group approaching the intersection. The LOS is based on average delay (in seconds per vehicle) for the various movements within the intersection. A combined weighted average delay and LOS is presented for the intersection.

[5] As part of the *HCM* methodology, adjustments are typically made to the capacity of each intersection to account for various factors that reduce the ability of the streets to accommodate vehicles (such as the downtown nature of the study area, number of pedestrians, vehicle type, lane widths and queues). These adjustments are performed to ensure that the LOS analysis results reflect the operating conditions that are observed in the field. See Appendix D for adjustments made at study intersections.

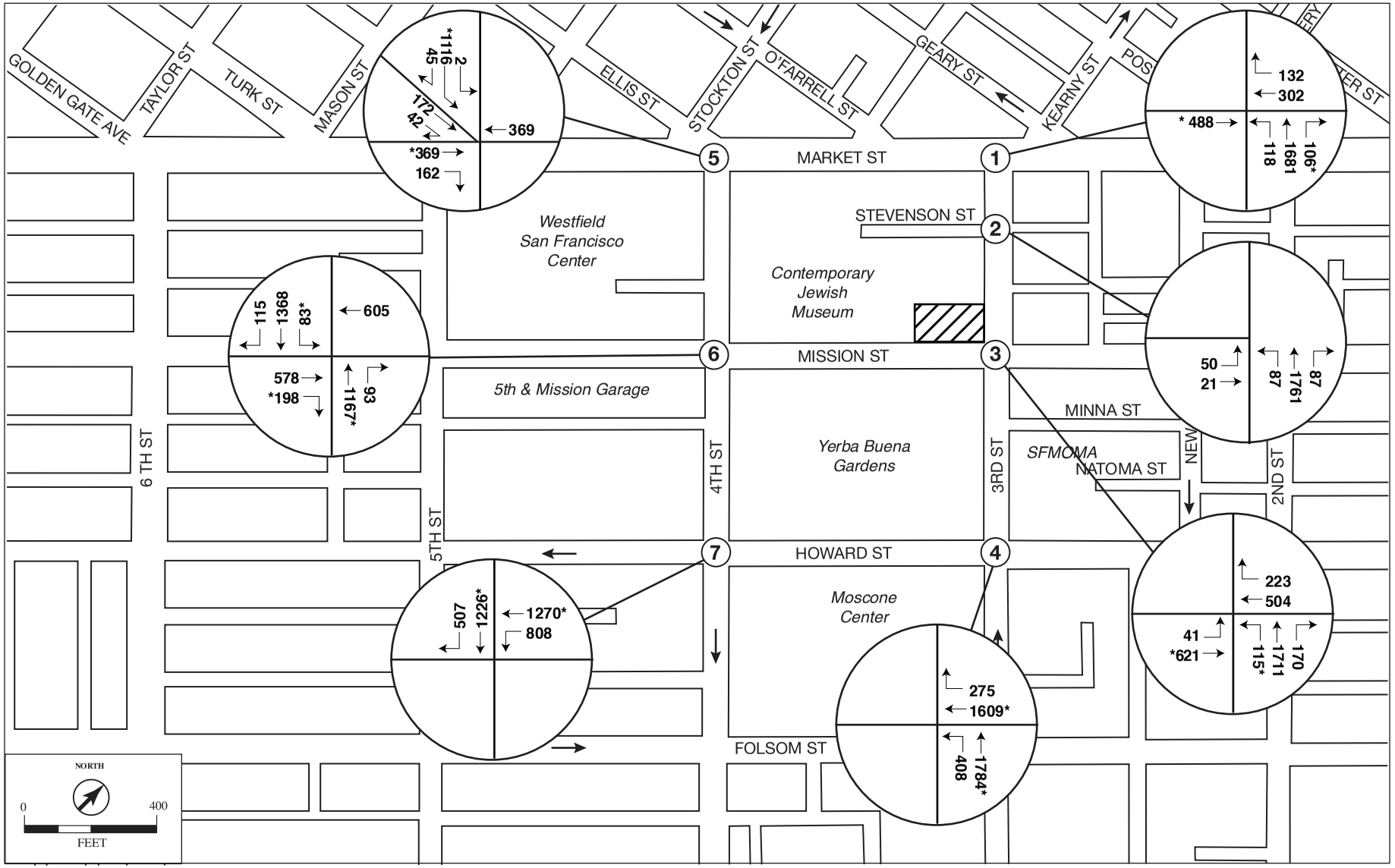





**FIGURE 12: EXISTING TRAFFIC VOLUMES**
**WEEKDAY PM PEAK HOUR**

Table 4 presents the results of the intersection LOS analysis for the existing weekday PM peak hour conditions. Appendix D contains the intersection LOS calculation sheets. During the weekday PM peak hour, five of the seven study intersections currently operate with acceptable conditions (LOS D or better).

**Table 4**
**Intersection Level of Service**
**Existing Conditions – Weekday PM Peak Hour**

| Intersection | Delay [1] | LOS [2] | v/c [3] |
|---|---|---|---|
| 1. Third/Market | **56.2** | **E** | **0.79** |
| 2. Third/Stevenson | 12.1 | B | **--** |
| 3. Third/Mission | 20.1 | C | -- |
| 4. Third/Howard | 36.1 | D | -- |
| 5. Fourth/Market | **>80** | **F** | **1.08** |
| 6. Fourth/Mission | 41.8 | D | -- |
| 7. Fourth/Howard | 42.5 | D | -- |

Source: LCW Consulting.
Notes:
1. Delay presented in seconds per vehicle.
2. Intersections operating at LOS E or LOS F highlighted in **bold.**
3. v/c = volume-to-capacity ratio – presented for signalized intersections operating at LOS F.

The signalized intersections of Third/Market and Fourth/Market currently experience the greatest average delay per vehicle, and operate at an overall intersection operating condition of LOS E and LOS F, respectively. While the intersection of Third/Stevenson operates at an overall LOS B condition, intersection operations are influenced by conditions at the downstream intersection with Market Street. Due to it's midblock location, during congested conditions on Third Street, vehicle queues often spill back from the northbound approach to Market Street into the intersection of Third/Stevenson, thereby blocking egress from eastbound Stevenson Street onto or across Third Street. Egress from Stevenson Street is also constrained under existing conditions by pedestrians who are frequently observed crossing Stevenson Street during the pedestrian "Don't Walk" phase and occasionally observed crossing Third Street at Stevenson Street signal, although pedestrian crossing is not permitted at this location and signs direct pedestrians to cross at Market Street. In addition to the previous unsignalized design at this location, the traffic and pedestrian signal head north of Stevenson Street is located about 30 feet north of the intersection, which is greater than the typical placement of the pedestrian signal head from the intersection, which may add to the confusion.

## 2.3 TRANSIT NETWORK

### 2.3.1 Local and Regional Transit Providers

The project site is well-served by public transit, with both local and regional service provided nearby. Local service is provided by the San Francisco Municipal Railway ("Muni") bus lines, which can be used to access regional transit operators. Service to and from the East Bay is provided by BART, AC Transit and ferries; service to and from the North Bay is provided by Golden Gate Transit buses and ferries; service to and from the Peninsula and South Bay is provided by Caltrain, SamTrans, and BART. Figure 13 presents the transit routes and local bus stop locations in the vicinity of the Proposed Project.

**Muni** provides transit service within the City and County of San Francisco, including bus (both diesel and electric trolley), light rail (Muni Metro), cable car and electric streetcar lines. Muni operates a number of bus lines in the vicinity of the Proposed Project. Immediately adjacent to the Proposed Project site, on Mission and Third streets, Muni operates frequent bus service, including electric and diesel, standard and articulated vehicles. On Mission Street, a transit-only lane is provided on the north curb lane, adjacent to the project site. The 14-Mission, 14L-Mission Limited, and Golden Gate Transit buses utilize the transit-only lane. On Third Street, a transit-only lane is provided on the east curb lane, across from the project site. Muni uses the west side travel lanes on Third Street for non-revenue turnbacks of Market Street buses (i.e., buses do not pick up passengers), including the 5-Fulton, 6-Parnassus, 9-San Bruno, 21-Hayes and 31-Balboa. Two sets of electric trolley wires, in the east and west curb lanes, are therefore provided for electric buses. Table 5 on page 35 presents the service frequencies and nearest stop location for the lines that operate in the nearby vicinity.

**Bus Stop Conditions:** The bus stop adjacent to the project site on Mission Street (westbound bus stop for the 14-Mission, 14L-Mission Limited and Golden Gate Transit) was observed during weekday PM peak hour field visits. At this stop between 5 and 16 people were observed waiting for the bus during the weekday PM peak hour. There is a bus shelter at this stop. No usual inadequacies or conflicts between waiting passengers and pedestrians were observed. Taxis are occasionally observed using this bus zone on Mission Street.

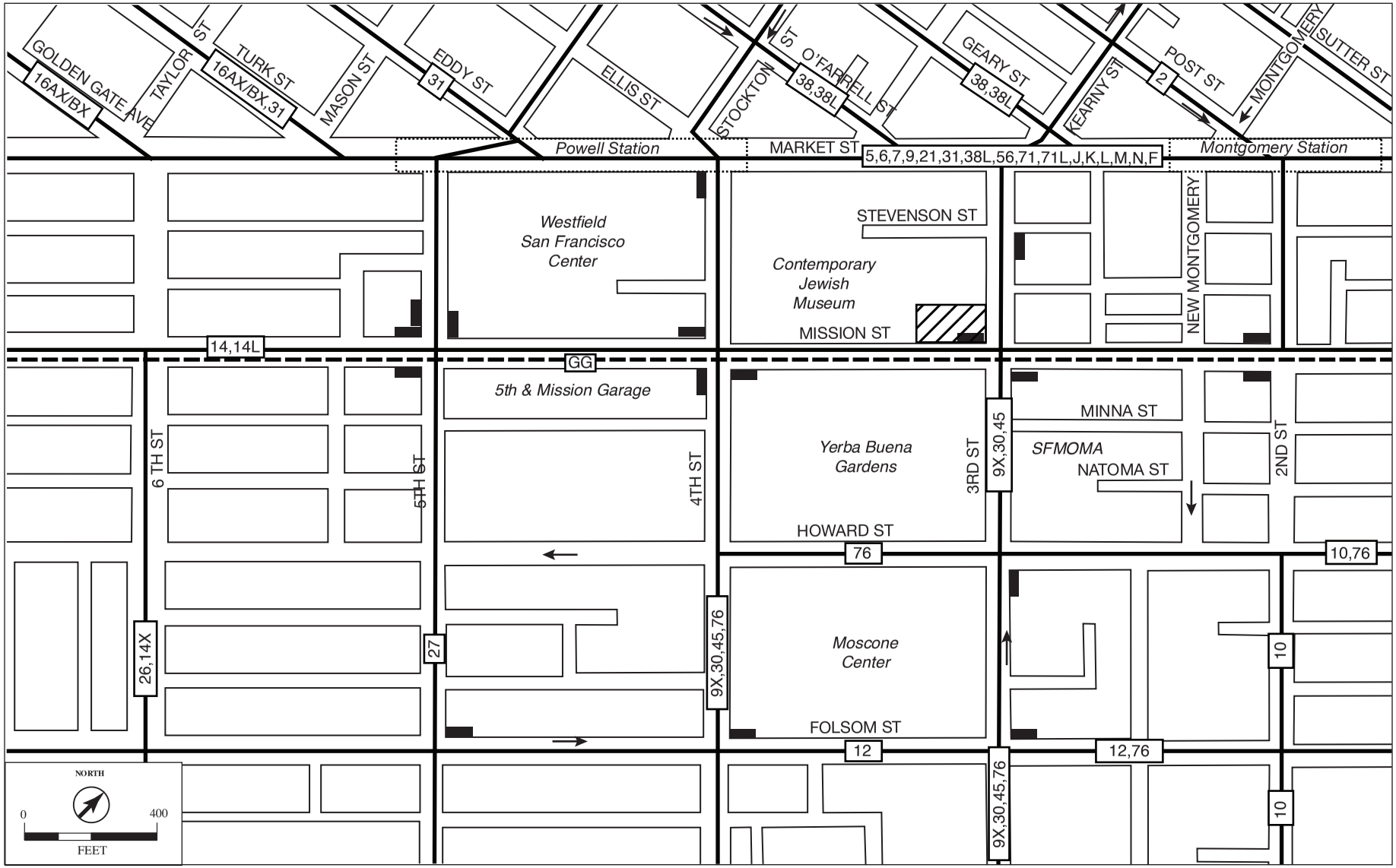





**FIGURE 13: EXISTING TRANSIT NETWORK AND STOP LOCATIONS**

| Table 5<br>Nearby Muni Service – Existing Weekday Conditions [1] | | | | |
|---|---|---|---|---|
| Route | Service Frequency (min.) | | | Nearest Stop Location (inbound, outbound) |
| | AM | Midday | PM | |
| 2-Clement | 10 | 20 | 10 | Market/N Montgomery, Market/N Montgomery |
| 5-Fulton | 5 | 7 | 5 | Market/Third, Market/N Montgomery |
| 6-Parnassus | 9 | 12 | 9 | Market/Third, Market/Second |
| 9-San Bruno | 10 | 10 | 10 | Market/N Montgomery, Market/Second |
| 8X-Bayshore Express [2,3] | 10 | 10 | 10 | Third/Howard, Fourth/Howard |
| 8AX-Bayshore Express [2, 4] | 7 | -- | 7 | Third/Howard, Fourth/Howard |
| 8BX-Bayshore Express | 7 | -- | 8 | Third/Howard, Fourth/Howard |
| 10- Townsend | 20 | 20 | 20 | Second/Folsom, Second/Folsom |
| 12-Folsom-Pacific | 20 | 20 | 20 | Folsom/Second, Howard/Second |
| 14-Mission | 11 | 6 | 6 | Mission/Third, Mission/Third |
| 14X- Mission Express | 7 | -- | 7 | Mission/Third, Mission/Third |
| 21-Hayes | 8 | 12 | 8 | Market/N Montgomery, Market/N Montgomery |
| 27-Bryant | 12 | 12 | 12 | Fifth/Mission, Fifth/Mission |
| 30-Stockton | 9 | 4 | 4 | Fourth/Mission, Third/Mission |
| 31-Balboa | 12 | 15 | 12 | Market/N Montgomery, Market/N Montgomery |
| 38-Geary | 6 | 7 | 6 | Market/Third, Market/N Montgomery |
| 38-Geary Limited | 6 | 6 | 6 | Market/Third, Market/N Montgomery |
| 45-Union-Stockton | 9 | 9 | 9 | Fourth/Mission, Third/Mission |
| 71/71L-Haight-Noriega | 8 | 12 | 8 | Market/N Montgomery, Market/Second |
| 76-Marin Headlands | Sundays, some holidays only | | | Howard/Third, Folsom/Third |
| F-Market | 7 | 8 | 7 | Market/Third, Market/Third |
| J-Church | 8 | 10 | 8 | Montgomery Station |
| K-Ingleside/T-Third | 9 | 9 | 9 | Montgomery Station |
| L-Taraval | 8 | 9 | 8 | Montgomery Station |
| M-Ocean View | 9 | 10 | 9 | Montgomery Station |
| N-Judah | 7 | 9 | 7 | Montgomery Station |

Source: SFMTA December 2009, LCW Consulting.

Notes:

1. Reflects December 2009 service changes.
2. In December 2009, the 9AX/BX-San Bruno Expresses were renamed to the 8AX/BX-Bayshore Expresses.
3. 8AX-Bayshore "A" Express operates inbound toward Chinatown via Downtown between 6:30 and 9:30 AM, and outbound from Chinatown between 3:30 and 7:00 PM.
4. 8BX-Bayshore "B" Express operates inbound toward Chinatown via Downtown between 6:30 and 8:30 AM, and outbound from Chinatown between 4 and 6 PM.

**Temporary Transbay Terminal:** The Transbay Terminal at First Street and Mission Street is currently being replaced with a new intermodal Transbay Transit Center. In August 2010, bus operations were relocated to an interim surface temporary terminal on the block bounded by Howard, Main, Folsom, and Beale Streets. The *Transportation Operations Report, Transbay Temporary Terminal Project* report (Fehr and Peers, March 2008), documented the potential impacts of the temporary terminal operations at 25 study intersections most likely to be affected by the required reconfiguration of the travel lanes. None of the Proposed Project study intersections were included as part of the 25 intersections. Review of the traffic volume throughput at intersections closest to the Proposed Project indicated that traffic flows would not

be affected by temporary terminal operations, and that no modifications to the intersections analysis would be required for the Proposed Project analysis.

**Central Subway Project:** The Central Subway is Phase 2 the SFMTA's Third Street Light Rail Program that will link Little Hollywood and Visitacion Valley with SoMa, Moscone Center, Union Square and Chinatown. The new, 1.7 -mile light rail line will serve regional destinations including Chinatown, Union Square, Moscone Convention Center, Yerba Buena, SoMa and AT&T Park, as well as connect to BART and Caltrain, the Bay Area's two largest regional commuter rail services. Utility relocation along Fourth Street for the future Moscone Station at Brannan Street and the Subway Portal between Harrison and Bryant Streets began in January 2010, and utility work along Fourth Street and around Union Square was completed by the end of 2011. The Central Subway is slated to open to the public in 2018.

Tunneling, via a Tunnel Boring Machine (TMB) would be used for the majority of the project. The only visible tunneling activity will occur at the portal construction location on Fourth Street between Bryant and Harrison streets, and at the excavation site on Columbus Avenue at Union Street. Construction of the Central Subway along Fourth Street would therefore not involve substantial closure of travel lanes, or significant reroutes of traffic. Increased truck activity to remove excavated materials would occur at the portal construction location on Fourth Street between Bryant and Harrison Streets. Construction of the Moscone Street station on Fourth Street between Clementina Street and Folsom Street and may require travel lane closures. Traffic volume counts for the Proposed Project analysis were conducted prior to the start of undergrounding of utilities on Fourth Street, and therefore no modifications to the intersection analysis would be required for the Proposed Project analysis.

**Muni's Transit Effectiveness Project:** The Transit Effectiveness Project (TEP) presents a thorough review of San Francisco's public transit system, initiated by SFMTA in collaboration with the City Controller's Office. The TEP is aimed at improving reliability, reducing travel times, providing more frequent service and updating Muni bus routes and rail lines to better match current travel patterns. The TEP recommendations were unanimously endorsed by the SFMTA Board of Directors in October 2008, pending any requisite environmental impact assessments. They include new routes and route extension, more service on busy routes, and elimination or consolidation of certain routes or route segments with low ridership. SFMTA recently published a TEP Implementation Strategy (April 5, 2011). The TEP Implementation Strategy anticipates that many of the service improvements would be implemented sometime between the end of Fiscal Year (FY) 2013 and FY 2015 and that the remainder of the service improvements would occur in FY 2016.[6] The following changes are proposed by the TEP for lines in the Proposed Project vicinity.

[6] SFMTA, Draft Transit Effectiveness Project Implementation Strategy, April 5, 2011, page 3-5.

- The 2-Clement service west of 14th Avenue would be discontinued. Sutter Street lines would be consolidated into the 2-Clement; the 3-Jackson would be discontinued as a separate route.
- A new 5L-Fulton Limited would be created to offer Richmond residents a faster ride downtown.
- The 9AX/BX-San Bruno Expresses would be renamed to the 8AX/BX-Bayshore Expresses, and frequencies would increase during the peak periods. Route segment north of Broadway would be eliminated, and segments south of 16th Street would be rerouted.
- The 10-Townsend route would be rerouted, with a new alignment through Mission Bay and Potrero Hill.
- A new 27-Folsom line would circulate around downtown, replacing the 12-Folsom in SoMa, and also connecting North Beach with the Montgomery BART/Muni station. Service on Bryant Street would be discontinued.
- The 14X-Mission Express would have increased service during the peak periods.
- The 21-Hayes would have more capacity during peak periods.
- The 30-Stockton would provide service with articulated buses to reduce crowding and improve reliability. The 30X-Stockton Express would have greater frequencies during the PM peak period.
- The 38-Geary would coordinate with the Geary Bus Rapid Transit (BRT) Study currently underway.
- The 71/71L-Haight-Noriega would be expanded to run all day in both directions, and would have more frequent service.
- The 76-Marin Headlands route segment south of Market Street would be discontinued, and service would be provided on Saturdays (currently Sundays only).
- The F-Market service would be shifted from the AM peak to midday and PM peak to reduce crowding during the busiest times of day.
- More frequent service during the peak periods on the J-Church, L-Taraval, and N-Judah light rail lines.

**BART** operates regional rail transit service in the metropolitan Bay Area. BART currently operates six lines: Pittsburg/Bay Point to Millbrae, Fremont to Daly City, Richmond to Daly City, Fremont to Richmond, Dublin/Pleasanton to San Francisco International Airport ("SFIA"), and Millbrae to SFIA. Within downtown San Francisco, BART operates underground below Market Street. During the weekday PM peak period, headways are generally 5 to 15 minutes for each line. The project site is located between the Powell and Montgomery BART stations on Market Street.

**Caltrain** provides rail passenger service on the Peninsula between Gilroy and San Francisco. The San Francisco terminal is located at Fourth and Townsend Streets (about 1.0 mile south of the

project site). Caltrain currently operates 66 trains each weekday, with a combination of express and local service. Headways during the evening peak period are approximately 5 to 30 minutes.

**SamTrans**, operated by the San Mateo County Transit District, provides bus service between San Mateo County and San Francisco. SamTrans operates three bus routes that serve the downtown San Francisco area. In general, SamTrans service to downtown San Francisco operates along Mission Street to the Transbay Terminal, located on Mission Street between First and Fremont Streets, about two blocks east of the project site.

**Golden Gate Transit**, operated by the Golden Gate Bridge, Highway, and Transportation District ("GGBHTD"), provides bus service between the North Bay (Marin and Sonoma Counties) and San Francisco. Golden Gate Transit operates 22 commute bus routes, nine basic bus routes and 16 ferry feeder bus routes into San Francisco, several of which are at or near the Transbay Terminal. Basic bus routes operate at regular intervals of 15 to 90 minutes depending on the time and day of week. Commute and ferry feeder bus routes operate at more frequent intervals in the mornings and evenings. Golden Gate Ferry operates ferry service between the North Bay and San Francisco. During the morning and evening commute periods, ferries operate between Larkspur and San Francisco, and between Sausalito and San Francisco. The San Francisco terminal is located at the Ferry Building, at The Embarcadero near Market Street (about 0.75 miles from the project site).

**AC Transit** is the primary bus operator for the East Bay, including Alameda and western Contra Costa Counties. AC Transit operates 37 routes between the East Bay and San Francisco, all of which terminate at the Transbay Terminal (about two blocks east of the project site). Most transbay service is peak-hour and peak-direction (to San Francisco during the AM peak period and from San Francisco during the PM peak period), with headways of 15 to 30 minutes per route.

### 2.3.2 Muni Screenline Analysis

The availability of Muni service capacity was analyzed in terms of a series of screenlines. The concept of screenlines is used to describe the magnitude of travel to or from the greater downtown area, and to compare estimated transit volumes to available capacities. Screenlines are hypothetical lines that would be crossed by persons traveling between downtown and its vicinity and other parts of San Francisco and the region. Four screenlines have been established in San Francisco to analyze potential impacts of projects on Muni service: Northeast, Northwest, Southwest, and Southeast, with sub-corridors within each screenline (see Appendix F). The bus and light rail lines used in this screenline analysis are considered the major commute routes from the downtown area. Other bus lines, such as "policy" lines and lines with greater than ten-minute headways are not included, due to their generally lower ridership.

It should be noted that the points of measurement for the screenline analysis do not actually follow the alignments shown in the figure (see Appendix F). Rather, the screenline for each route reflects the maximum load point ("MLP") for each Muni line that crosses one of the screenlines. The MLP for each individual line may occur at some point of either side of the schematic lines drawn for graphical representation. For the purpose of this analysis, Muni ridership measured at the four San Francisco screenlines and sub-corridors represents the peak direction of travel and patronage loads for the Muni system which corresponds with the evening commute in the outbound direction from the downtown area to other parts of San Francisco. As a means to determine the amount of available space within each screenline, capacity utilization is used, which relates the number of passengers per transit vehicle to the design capacity of the vehicle. The capacity per vehicle includes both seated and standing capacity, where standing capacity is somewhere between 30 to 80 percent of seated capacity (depending upon the specific transit vehicle configuration). For example the capacity of a light rail vehicle is 119 passengers, the capacity of a historic streetcar is 70 passengers, and the capacity of a standard bus is 63 passengers. Appendix F contains the capacity utilization calculations for the Muni screenlines.

Muni's established capacity utilization standard for peak period operations is 85 percent. It should be noted that the 85 percent utilization is of seated and standing loads, so at 85 percent all seats are taken and there are many standees. Muni screenlines and subcorridors at or near 85 percent capacity operate under noticeably crowded conditions with many standees. Because each screenline and most sub-corridors include multiple lines, each with several vehicles during the peak hour, some individual vehicles may operate at or above 85 percent of capacity and are extremely crowded, while others operate under less crowded conditions. Moreover, the extent of crowding is exacerbated whenever target headways are not met through either missed runs and/or bunching in service. Thus, in common with other types of transportation operations such as roadways and parking facilities, transit operators may experience substantial problems in service delivery even when operating at less than 85 percent of capacity.

The existing outbound transit passenger load, capacity and capacity utilization at each screenline during the weekday PM peak period are presented in Table 6**.** A total of 20,609 passengers cross the four Muni screenlines during the weekday PM peak hour. The majority of the trips (68 percent) cross the northwest (32 percent) and southwest (36 percent) screenlines. The remaining trips cross the northeast (9 percent) and southeast (23 percent) screeenlines. Capacity utilization of the screenlines is between 52 and 77 percent. Overall, with the exception of the subway lines within the Southwest screenline, all corridors are currently operating below 85 percent capacity utilization, and could accommodate additional passengers. The subway lines within the southwest screenline operate at capacity utilization of 87 percent.

**Table 6**
**Muni Screenline Analysis**
**Existing Conditions – Weekday PM Peak Hour**

| Screenline/Corridor | Hourly Ridership | Hourly Capacity | Capacity Utilization |
|---|---|---|---|
| **Northeast** | | | |
| Kearny/Stockton | 1,129 | 2,010 | 56% |
| Other | 757 | 1,589 | 48% |
| *Subtotal* | *1,886* | *3,599* | *52%* |
| **Northwest** | | | |
| Geary | 1,684 | 2,230 | 76% |
| California | 1,413 | 2,050 | 69% |
| Sutter/Clement | 565 | 1,008 | 56% |
| Fulton/Hayes | 861 | 1,260 | 68% |
| Balboa | 615 | 1,247 | 49% |
| Chestnut/Union | 1,483 | 2,328 | 64% |
| *Subtotal* | *6,621* | *10,123* | *65%* |
| **Southeast** | | | |
| Third | 554 | 714 | 78% |
| Mission | 1,254 | 2,350 | 53% |
| San Bruno/Bayshore | 1,671 | 2,256 | 74% |
| Other | 1,189 | 1,708 | 70% |
| *Subtotal* | *4,668* | *7,028* | *66%* |
| **Southwest** | | | |
| Subway | **5,883** | **6,783** | **87%** |
| Haight/Noriega | 1,247 | 2,140 | 58% |
| Other | 304 | 700 | 43% |
| *Subtotal* | *7,434* | *9,623* | *77%* |
| ***Total All Screenlines*** | *20,609* | *30,373* | *68%* |

Source: *Transit Center District Plan Transportation Impact Study*, AECOM, September 2011.
Note:
Screenlines and corridors operating at capacity utilization greater than 85 percent are highlighted in **bold.**

### 2.3.3 Regional Transit Screenline Analysis

A screenline analysis was also performed on the regional transit carriers (AC Transit, BART, Caltrain, Golden Gate Transit and SamTrans), in order to determine the current service volumes and capacity. Three regional screenlines have been established around San Francisco to analyze potential impacts of projects on the regional transit carriers (see Appendix F). For the purpose of this analysis, the ridership and capacity at the three screenlines represents the peak direction of travel and patronage loads, which corresponds with the evening commute in the outbound direction from downtown San Francisco to the region. As a means to determine the amount of available space for each regional transit provider, capacity utilization is also used. For all regional transit operators, the capacity is based on the number of seated passengers per vehicle. All of the regional transit operators have a one-hour load factor standard of 100 percent, which would indicate that all seats are full.

Table 7 presents the existing weekday PM peak-hour ridership and capacity information for each regional screenline. All regional transit providers operate at less than their load factor standards, which indicates that seats are generally available.

**Table 7**
**Regional Transit Screenline Analysis**
**Existing Conditions – Weekday PM Peak Hour**

| Screenline/Operator | Hourly Ridership | Hourly Capacity | Capacity Utilization |
|---|---|---|---|
| **East Bay** | | | |
| BART | 20,067 | 24,150 | 83% |
| AC Transit | 2,517 | 4,193 | 60% |
| Ferry | 702 | 1,519 | 46% |
| *Subtotal* | *23,286* | *29,862* | *78%* |
| **North Bay** | | | |
| GGT buses | 1,397 | 2,205 | 63% |
| Ferry | 906 | 1,700 | 53% |
| *Subtotal* | *2,303* | *3,905* | *59%* |
| **South Bay** | | | |
| BART | 10,202 | 16,800 | 61% |
| Caltrain | 1,986 | 3,250 | 61% |
| SamTrans | 575 | 940 | 61% |
| *Subtotal* | *12,763* | *20,990* | *61%* |
| ***Total All Screenlines*** | *38,352* | *54,757* | *70%* |

Source: *Transit Center District Plan Transportation Impact Study*, AECOM, September 2011.

## 2.4 BICYCLE CONDITIONS

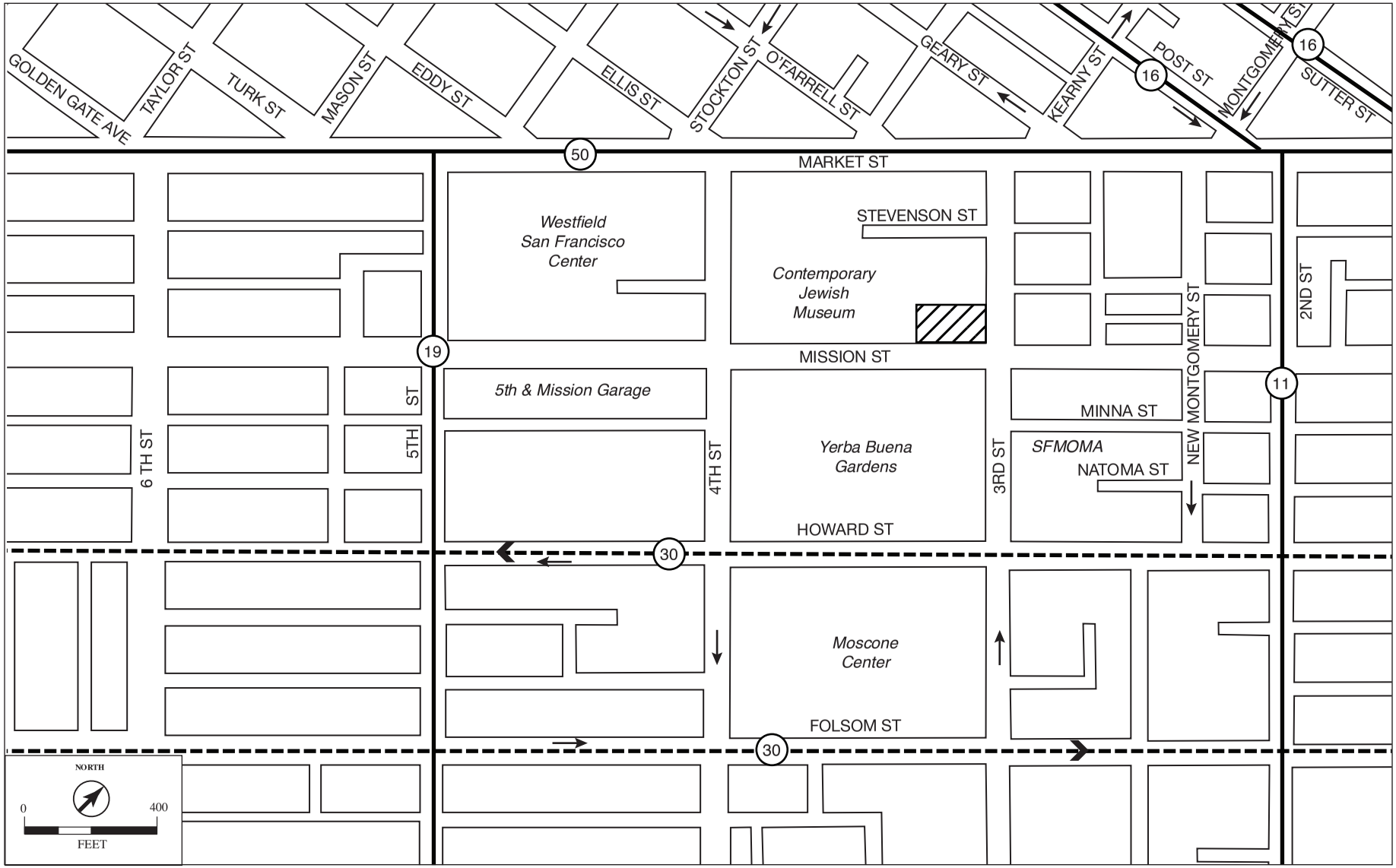
Figure 14 presents the bicycle route network in the vicinity of the project site. Bikeways are typically classified as Class I, Class II, or Class III facilities.[7] Class I bikeways are bike paths with exclusive right-of-way for use by bicyclists. Class II bikeways are bike lanes striped within the paved areas of roadways and established for the preferential use of bicycles, while Class III bikeways are signed bike routes that allow bicycles to share travel lanes with vehicles. As shown on Figure 14, there are four San Francisco Bicycle Routes in the vicinity of the Proposed Project:

- Bicycle Route 11 runs in both directions on Second Street between Market Street and King Street as a signed route only (Class III facility).
- Bicycle Route 19 runs in both directions on Fifth Street between Market Street and Townsend Street as a signed route only.
- Bicycle Route 30 runs westbound on Howard Street between The Embarcadero and Eleventh. On Howard Street a wider curb parking lane (Class III facility) is provided between Main and Fremont Streets, and a bicycle lane (Class II facility) is provided on the north side of Howard Street between Fremont and Eleventh Streets. Bicycle Route 30 runs eastbound on Folsom Street between 14th Street and The Embarcadero as a Class II facility (signed route with bicycle lane) with a bicycle lane on the south side of the street.
- Bicycle Route 50 runs eastbound and westbound on Market Street between The Embarcadero and Castro Street. West of Castro Street, Bicycle Route 50 continues along Corbett Street, Portola Avenue, and Sloat Boulevard to the Great Highway. Bicycle Route 50 is primarily a Class III facility, with a Class II bicycle facility on the section between Eighth Street and Castro Street.

On Mission Street there are sidewalk bicycle racks adjacent to the project site east of the exit driveway from the Jessie Square Garage, and west of the project site at the eastern end of the recessed passenger loading zone. There are no bicycle racks on the Third Street sidewalk either adjacent to, or north of, the project site.

During field surveys, a substantial number of bicyclists were observed to be riding in the vicinity of the project site, primarily along Market Street and Howard Street. The majority of the bicyclists were messengers and commuters. No substantial safety conflicts between bicyclist and pedestrians or vehicles, or right-of-way issues were observed during field surveys.

[7] Bicycle facilities are defined by the State of California in the California Streets and Highway Code Section, 890.4.




***Legend***

PROJECT SITE | ## BICYCLE LANE | ## BICYCLE ROUTE (BICYCLES AND CARS SHARE THE SAME TRAVEL LANE) | DIRECTION OF TRAVEL



**FIGURE 14: BICYCLE ROUTE NETWORK**

The *San Francisco Bicycle Plan* includes planned short-term improvements to Bicycle Route 11 on Second Street in the form of Class II and Class III bicycle facilities in both directions between King Street and Market Street. In addition, improvements are proposed to Bicycle Route 19 on Fifth Street to provide Class II and Class III facilities in both directions between Market Street and Townsend Street.

## 2.5 PEDESTRIAN CONDITIONS

A qualitative evaluation of existing pedestrian conditions in the vicinity of the project site was conducted during field visits to the site during the weekday midday and PM peak periods. In addition, a quantitative analysis of pedestrian sidewalk conditions adjacent to the project site, and intersection (Third Street and Mission Street) crosswalk and corner conditions, were conducted for the weekday midday and PM peak hours.

Sidewalks widths adjacent to the project site are 14 to 16 feet in width. Both Mission Street and Third Street are designated Neighborhood and Citywide Pedestrian Network streets in the San Francisco *General Plan*. The sidewalk on Third Street is 14 feet wide, and current obstructions adjacent to the project site include three traffic signals and Muni electric streetcar overhead wire poles, newspaper racks, and mailboxes. The mailboxes on Third Street extend furthest from the curb due to their location near the Muni overhead wire pole. The sidewalk on Mission Street is 16 feet wide, and current obstructions adjacent to the project site include four traffic signal and Muni electric streetcar overhead wire poles/streetlight poles, trees, a garbage receptacle, two water hydrants, a bike rack and a Muni bus shelter. The bus shelter on Mission Street extends furthest from the curb. Pedestrian crosswalks and signals are provided at intersections in the vicinity of the project site.

Pedestrian flows in the vicinity of the project site are moderate to high on both Third Street and Mission Street adjacent to the project site. The primary pedestrian generators/attractors in the immediate vicinity of the Proposed Project are Union Square, the Market Street transit lines, and the cultural uses to the south of the project site.

In the vicinity of the project site along Third Street and Mission Street, there are several existing driveways that create pedestrian-vehicle conflict areas.

- The freight loading area for the Aronson Building has a driveway that crosses the Third Street sidewalk. As described in section 2.6, this loading facility is very lightly utilized. Therefore this existing freight loading driveway creates a minor pedestrian-vehicle conflict zone on Third Street.
- Immediately north of the Aronson Building on Third Street is the Westin Hotel. The hotel has an off-street drive-through passenger loading area. The ingress driveway to the passenger loading area is constructed at a 45-degree angle to the street, compared to a

typical driveway that is perpendicular (i.e., 90-degree angle) to the street. This design enables vehicles to cross the sidewalk at higher speeds, increases the size of the pedestrian-vehicle conflict zone, and limits visibility between drivers and pedestrians. Also, vehicles parked within the passenger loading area typically spill out onto of the adjacent sidewalk, impeding pedestrian circulation.[8] Therefore, the Westin Hotel passenger loading area driveway creates a substantial pedestrian-vehicle conflict zone on Third Street.

- The Jessie Square Garage has an egress driveway that crosses the Mission Street sidewalk. Since there is no on-street parking on this block of Mission Street, driver visibility for vehicles exiting the garage is adequate. Because visibility is adequate, vehicles exiting the garage are generally able to wait within the driveway for gaps in vehicle and pedestrian traffic, rather than having to drive onto and block the sidewalk while waiting for gaps. However, when a bus is stopped at the upstream bus stop, driver visibility is obstructed, and some drivers were observe to pull forward and block the sidewalk while looking for gaps, rather than wait for the bus to complete loading and depart.[9] Therefore this parking garage egress driveway creates a moderate pedestrian-vehicle conflict zone.

Pedestrian conditions were quantitatively assessed at the following locations:

- At the two sidewalk walkway locations adjacent to the Proposed Project site on Mission Street west of Third Street, and on Third Street north of Mission Street.
- At the four crosswalks at the intersection of Third Street and Mission Street.
- At the four corners of the intersection of Third Street and Mission Street.

Figure 15 presents the existing weekday midday and PM peak hour pedestrian volumes at the study locations. At the two sidewalk locations, pedestrian counts were conducted on Tuesday, July 22, 2008 during the weekday midday (12 to 2 PM) and PM (4 to 6 PM) peak periods. During the midday peak hour, there were about 670 pedestrians at the Third Street location, and 950 pedestrians at the Mission Street location. During the PM peak hour there were about 660 pedestrians at the Third Street location, and 910 pedestrians at the Mission Street location.

[8] Based on site visits conducted by Planning Department staff on 11/16/11, 11/26/11 and 11/29/11.

[9] Based on site visits conducted by Planning Department staff on 11/16/11, 11/26/11 and 11/29/11.

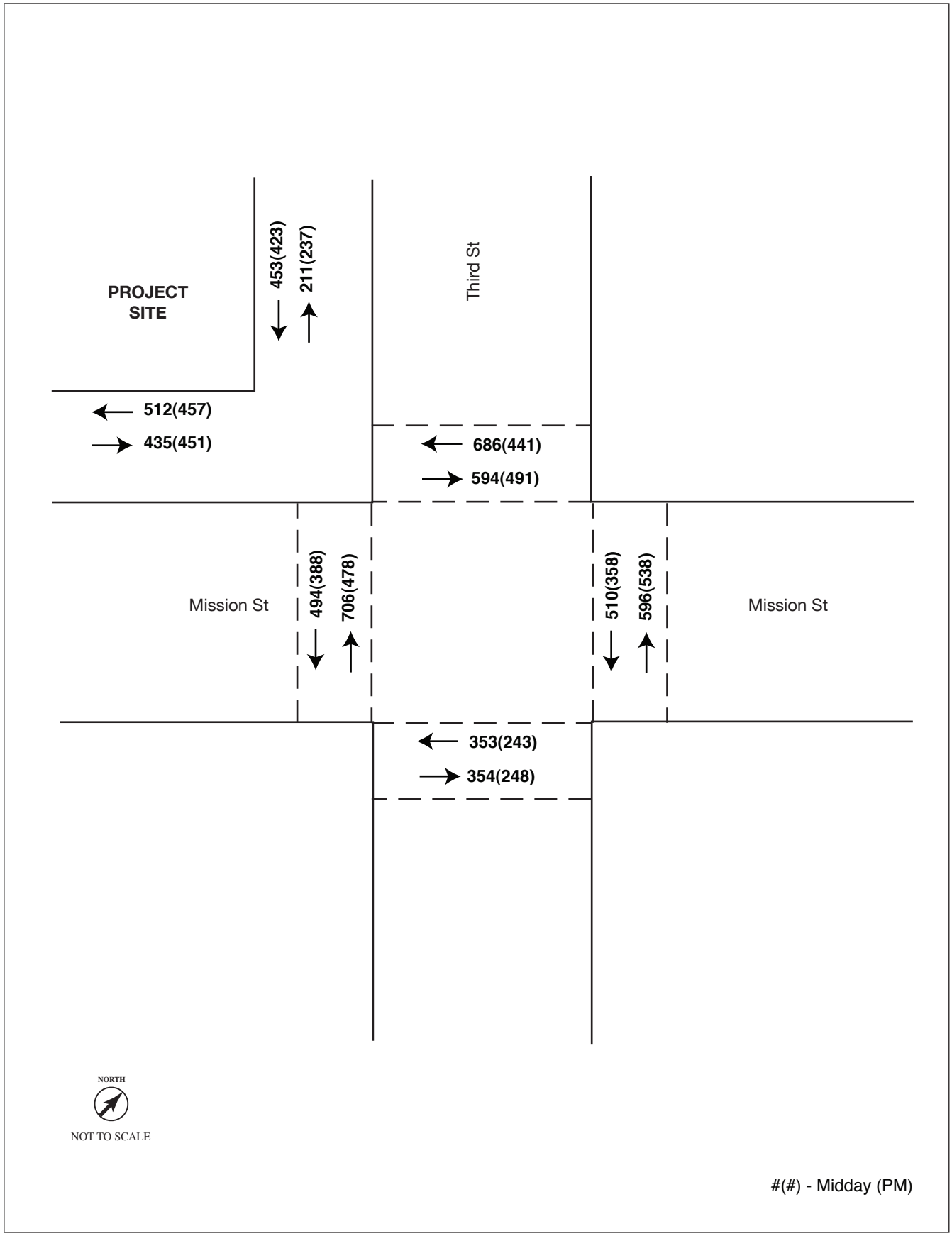





**FIGURE 15: EXISTING PEDESTRIAN VOLUMES WEEKDAY MIDDAY AND PM PEAK HOURS**

Analysis of operating characteristics of the pedestrian walkway, crosswalk and corner locations was conducted using the *HCM 2000* methodology. Appendix G presents the level of service description for pedestrian flows and the pedestrian analysis calculation sheets.

- Sidewalk operating conditions are measured by average pedestrian flow rate, which is defined as the average number of pedestrians that pass a specific point on the sidewalk during a certain period (pedestrians per minute per foot or p/m/f). The width of the sidewalk at this point is considered the "effective width", which accounts for reduction in amount of sidewalk available for travel due to street furniture and the side of buildings. The level of service for sidewalks is presented for "platoon" conditions, which represents the conditions when pedestrians are walking together in a group. Pedestrian level of service conditions were calculated at the most restrictive location adjacent to the project site.
- Crosswalk and corner LOS are measurements of the amount of space (square feet) each pedestrian has in the crosswalk or corner. These measurements depend on pedestrian volumes, signal timing, corner dimensions, crosswalk dimensions and roadway widths.

With the *HCM* methodology, an upper limit for acceptable conditions is LOS D, which equals approximately 15 pedestrians per minute per foot for walkways, and 15 to 24 square feet per pedestrian for crosswalks and corners. LOS E or LOS F would represent unacceptable conditions. At LOS E normal walking gaits are frequently adjusted due to congested conditions and independent movements difficult, and at LOS F walking speeds are severely restricted.

Table 8 presents the pedestrian analysis results for the midday peak hour conditions, while Table 9 presents the analysis for the PM peak hour conditions. During both the midday and PM peak hours, the pedestrian levels of service are LOS D or better at the sidewalk, crosswalk and corner analysis locations, the highest being LOS D on the west crosswalk of the Mission Street/Third Street intersection.

| Table 8<br>Pedestrian Walkway Level of Service<br>Existing Conditions – Weekday Midday (12 to 1 PM) Peak Hour | | | |
|---|---|---|---|
| **Analysis Locations** | **Pedestrians Per Hour** | **Level of Service** | |
| | | **Measure of Effectiveness** | **LOS** |
| **Walkways** | | ped/min/ft | LOS |
| Third Street [2] | 664 | 2.5 | B |
| Mission Street [3] | 947 | 2.6 | B |
| **Crosswalks** | | sq. ft/ped | LOS |
| North | 1,280 | 25.8 | C |
| South | 707 | 52.7 | B |
| East | 1,106 | 24.8 | C |
| West | 1,200 | 20.8 | D |
| **Corners** | | sq. ft/ped | LOS |
| Northwest | 2,680 | 29.0 | C |
| Northeast | 2,386 | 32.6 | C |
| Southwest | 2,107 | 24.7 | C |
| Southeast | 1,813 | 29.1 | C |

Source: LCW Consulting.

Notes:

1. p/m/f = pedestrians per minute per foot
2. Third Street sidewalk width is 14 feet, and the effective width was calculated as 5 feet 6 inches.
3. Mission Street sidewalk width is 16 feet, and the effective width was calculated as 7 feet 6 inches.

| Table 9<br>Pedestrian Walkway Level of Service<br>Existing Conditions – Weekday PM (5 to 6 PM) Peak Hour | | | |
|---|---|---|---|
| **Analysis Locations** | **Pedestrians Per Hour** | **Level of Service** | |
| | | **Measure of Effectiveness** | **LOS** |
| **Walkways** | | ped/min/ft | LOS |
| Third Street [2] | 660 | 2.5 | B |
| Mission Street [3] | 908 | 2.5 | B |
| **Crosswalks** | | sq. ft/ped | LOS |
| North | 932 | 29.4 | C |
| South | 491 | 62.4 | A |
| East | 896 | 39.5 | C |
| West | 866 | 37.6 | C |
| **Corners** | | sq. ft/ped | LOS |
| Northwest | 1,798 | 45.1 | B |
| Northeast | 1,828 | 44.9 | B |
| Southwest | 1,357 | 39.8 | C |
| Southeast | 1,387 | 38.5 | C |

Source: LCW Consulting.
Notes:
1. p/m/f = pedestrians per minute per foot
2. Third Street sidewalk width is 14 feet, and the effective width was calculated as 5 feet 6 inches.
3. Mission Street sidewalk width is 16 feet, and the effective width was calculated as 7 feet 6 inches.

## 2.6 LOADING CONDITIONS

The northeast corner of the Aronson Building contains a three-story annex that was added in 1978, approximately 20 feet wide and 45 feet long. The ground floor of the annex serves as a loading and trash pickup, and there is a curb cut serving this area on Third Street. Based on field observations conducted on Tuesday, July 22, 2008, the existing loading area is lightly utilized during the daytime hours.

On Third Street there are four one-hour metered commercial vehicle spaces (between 9 AM and 3 PM) adjacent to the project site. Two of the four spaces are for trucks with at least six wheels, and two are general commercial vehicle spaces. During field observations on weekdays, one to two of the four spaces were generally available. A curb utilization survey of the four spaces was conducted on Tuesday, July 22, 2008 between 9 AM and 12 PM. During the three-hour period, a total of 12 vehicles occupied the four spaces, with an average duration of 11 minutes. The four spaces were occupied 18 percent of the three-hour period. Destinations of vehicles parked during the survey period included the project site, the Westin Hotel, Peet's Coffee, Office Depot,

the UC Berkeley Extension, and Yerba Buena Center. No vehicles were observed double-parked adjacent to the project site. See Appendix H for detailed parking and loading data.

## 2.7 EMERGENCY VEHICLE ACCESS CONDITIONS

The project site is on the northwest corner of the intersection of Third Street with Mission Street, and emergency vehicle access is from Third Street northbound and Mission Street eastbound.

## 2.8 PARKING CONDITIONS

Existing off-street parking conditions were examined within a parking study area generally bounded by Market Street, Second Street, Folsom Street, and Fifth Street. Parking conditions were assessed for the weekday midday period (1 to 3 PM).

### 2.8.1 Off-Street Parking Conditions

Figure 16 presents the location of the public parking facilities in the study area, and Table 10 presents the weekday midday and evening parking supply and occupancy data. There are 11 off-street public parking facilities in the study area, providing about 6,200 spaces. Overall, the off-street parking facilities are at about 73 percent of capacity during the weekday midday.

**Table 10**
**Off-Street Parking Supply and Utilization – Weekday Midday Conditions**

| | Facility | Spaces | Occupied Spaces | Percent Occupied |
|---|---|---|---|---|
| 1 | Hearst Garage | 796 | 750 | 94% |
| 2 | Paramount Garage | 350 | 196 | 56% |
| 3 | SFMOMA Garage | 410 | 310 | 76% |
| 4 | Moscone Garage | 752 | 734 | 98% |
| 5 | Priority Parking Lot | 130 | 130 | 100% |
| 6 | 55 Hawthorne Garage | 289 | 206 | 71% |
| 7 | Hawthorne Plaza Garage | 424 | 263 | 62% |
| 8 | Jessie Square Garage | 372 | 273 | 73% |
| 9 | Pacific Place Garage | 100 | 55 | 55% |
| 10 | Pickwick Hotel Garage | 37 | 37 | 100% |
| 11 | Fifth & Mission Garage | 2,585 | 1,629 | 63% |
| **Total** | | **6,245** | **4,583** | **73%** |

Source: AECOM, LCW Consulting.

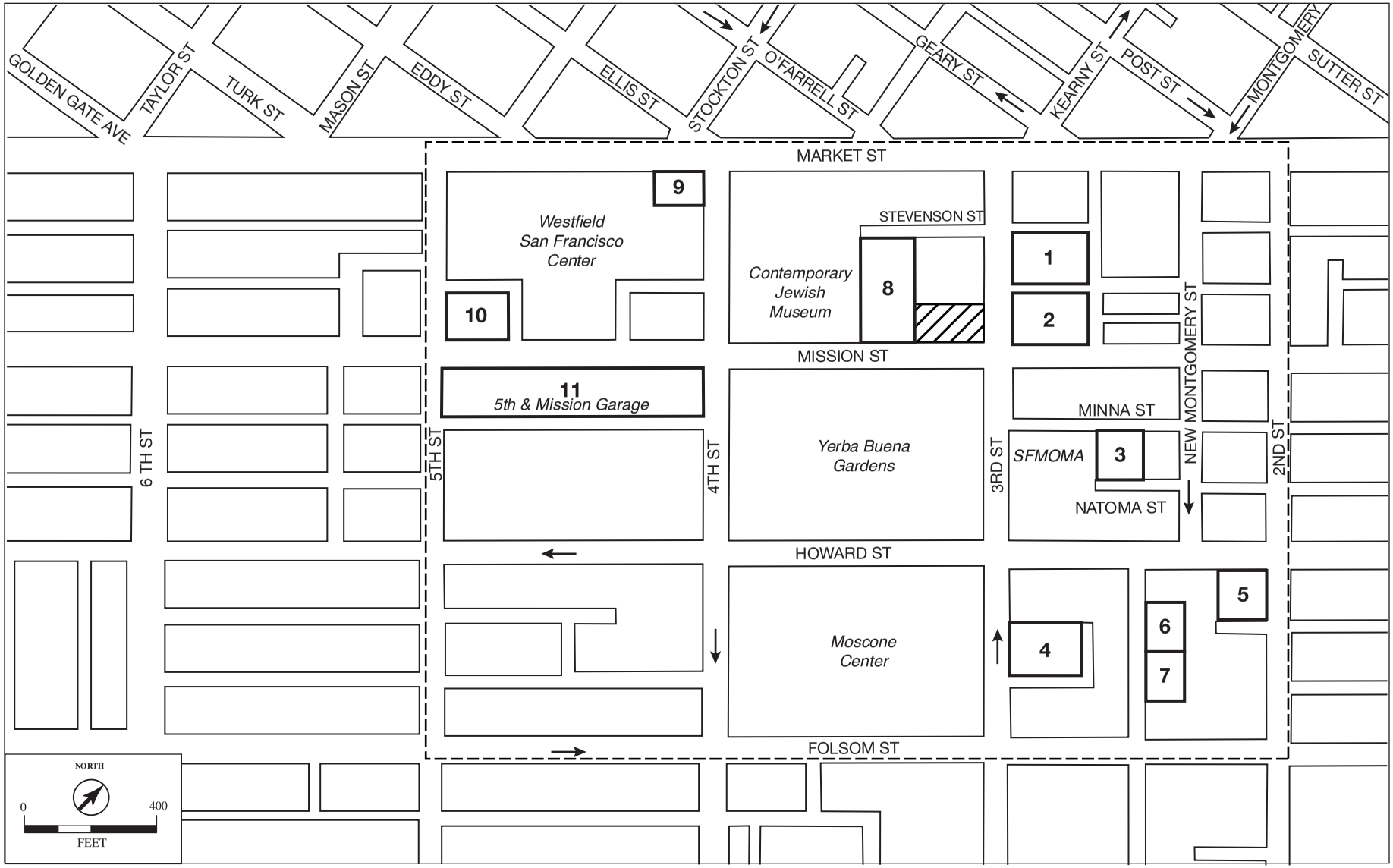





**FIGURE 16: OFF-STREET PARKING FACILITIES**

The Proposed Project includes the use of the existing Jessie Square Garage located to the west of the project site. The existing Jessie Square Garage contains a total of 442 parking spaces. Of these spaces, 372 are public parking spaces (which include 2 spaces reserved for St. Patrick's Church and 15 spaces reserved for the Contemporary Jewish Museum) and 70 are spaces reserved for the nearby Sports Club/LA. The primary entrance/exit for the garage is from Stevenson Street (via Third Street). There is a secondary exit-only from the garage onto Mission Street. The Jessie Square Garage is open between 5 AM and 11 PM on weekdays, and between 6 AM and 11 PM on weekends. Overnight parking is permitted, however, vehicles cannot be parked or accessed during the overnight hours when the garage is closed.

Parking utilization data for the Jessie Square Garage was obtained from the parking operator for the public parking spaces for July and September for calendar years 2008 (based on 363 public parking spaces) and 2009 (based on 350 public parking spaces). Table 11 summarizes the maximum utilization for weekday and weekend conditions.

- In 2008, the maximum utilization on weekdays occurred between 11 AM and 2 PM, and ranged between 69 and 79 percent depending on day of week, however average maximum utilization was about 75 percent. On weekends, the utilization of the garage was substantially lower, and averaged about 37 percent on Sundays, and 44 percent on Saturdays.
- In 2009, the overall maximum utilization was lower than in 2008. On weekdays, maximum utilization ranged between 56 and 76 percent, depending on day of week, and overall average utilization was about 67 percent. In 2009, Saturday and Sunday utilization of the garage was also lower than 2008 – 36 percent on Sundays and 42 percent on Saturdays.

**Table 11**
**Jessie Square Garage – Average Maximum Utilization**

| Analysis Year/Occupancy | Sunday | Monday – Friday | Saturday |
|---|---|---|---|
| **2008 Conditions** | | | |
| Occupied spaces | 136 | 273 | 160 |
| Percent Occupied | 37% | 75% | 44% |
| Period of maximum utilization | 7 and 8 AM | 11 AM and 2 PM | 2 and 4 PM |
| **2009 Conditions** | | | |
| Occupied spaces | 131 | 244 | 148 |
| Percent Occupied | 37% | 70% | 42% |
| Period of maximum utilization | 7 and 8 AM | 11 AM and 2 PM | 2 and 4 PM |

Source: CityPark Inc., LCW Consulting.
Note:
Based on public parking supply of 372 parking spaces for 2008 conditions, and 350 parking spaces for 2009 conditions.

### 2.8.1 On-Street Parking Conditions

The existing on-street parking conditions were qualitatively assessed during the same time period as the off-street parking facilities. In general, on-street parking within the vicinity of the project site is comprised of one-hour standard metered spaces and 30-minute commercial vehicle metered spaces. On most streets, the commercial vehicle meters are in effect from 9 AM to 3 PM. In general, the on-street parking spaces are well-utilized throughout the day, however, due to the 30-minute and commercial vehicle parking restrictions, commercial vehicle spaces are generally available.

On Mission Street there are no parking spaces adjacent to the project site, and on-street parking is not permitted on either side of the street between Third and Fourth Streets.

On Third Street there are four one-hour metered commercial vehicle spaces (between 9 AM and 3 PM) adjacent to the project site. See discussion in section 2.6, Loading Conditions, above. To the north of the project site on Third Street there is a red zone and a passenger loading/unloading zone for the Westin Hotel. There is a No-Stopping Tow-Away regulation on the west curb of Third Street on weekdays between 7 and 9 AM, and between 3 and 7 PM, when the parking lane becomes an extra travel lane.

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# Chapter 3
# PROJECT TRAVEL DEMAND

Travel demand refers to the new vehicle, transit, pedestrian and bicycle traffic generated by the Proposed Project. This chapter provides an estimate of the travel demand that would be generated by the new uses included in the Proposed Project. Parking demand, delivery/service vehicle trips and loading space demand for the new uses are also presented. The travel demand, parking demand and freight/service loading demand estimates were based on information contained in the San Francisco Planning Department's *Transportation Impact Analysis Guidelines for Environmental Review* (*SF Guidelines*), plus information obtained from the 1990 and 2000 U.S. Census journey-to-work data. See Appendix I for calculations and assumptions.

The project site currently contains office and retail uses. Since these uses would be displaced with the Proposed Project, counts of persons entering and exiting the existing building were conducted during the PM peak period on Tuesday, July 22, 2008. These trips were then subtracted from the Proposed Project trip generation to determine the net-new trips that would be generated by the Proposed Project.

As part of the Proposed Project, the existing vacant and inaccessible space in the Jessie Square Garage that is underneath the Contemporary Jewish Museum would be connected to the rest of the garage and striped, which would result in an increase of 28 parking spaces (from the existing 442 spaces, to 470 spaces). As part of the Proposed Project, the number of reserved parking spaces would increase from 70 spaces to up to 260 spaces. The existing 70 reserved spaces are currently reserved for Sports Club/LA uses. With the Proposed Project, the majority of the 260 reserved spaces would primarily serve the residential uses as long-term parking. The remaining 210 spaces would continue as public parking. This increase in the number of parking spaces that would be reserved could result in a reduction in parking space turnover, which in turn could reduce the number of vehicle trips entering and exiting the garage over the course of the day and during the PM peak period.

For the purpose of traffic analysis within the City of San Francisco, vehicle trips are generally not subtracted when parking facilities are removed or reconfigured, because any displaced vehicles would likely seek and find alternate parking facilities in the study vicinity. These vehicles would continue to travel on streets within the study area. For this reason, the net new vehicle trip generation presented in Table 14 and the traffic analysis presented in section 4.2.1 do not assume any reduction in vehicle trips associated with the reconfiguration of the Jessie Square Garage. Instead, the net new vehicle trips presented in Table 14 are added on top of the existing traffic volumes that were counted at the study intersections.

Travel demand is presented for both the Residential Flex Option (215 residential units, 4,800 sf retail or restaurant, and 52,285 sf museum space) and the Office Flex Option (191 residential units, 4,800 sf retail/restaurant, 61,320 sf office, and 52,285 sf museum space).

## 3.1 TRIP GENERATION

The person-trip generation for the proposed residential, office, retail/restaurant, and museum uses includes trips made by residents, employees and visitors to the Proposed Project. Person-trip generation is based on daily and weekday PM peak hour trip generation rates (number of trips per unit, and number of trips per 1,000 square feet of use) provided in the *SF Guidelines*. Museum trip generation was based on projected daily attendance and number of employees. See Appendix I for detailed trip generation and distribution tables.

Table 12 presents the weekday daily and PM peak hour trip generation rates and daily and PM peak hour person trips generated by the proposed uses for both the Residential Flex Option and the Office Flex Option. The Residential Flex Option would generate about 4,106 person trips on a weekday daily basis, and 551 person trips during the weekday PM peak hour, while the Office Flex Option would generate about 4,976 person trips on a daily basis and 603 person trips during the weekday PM peak hour.

**Table 12**
**Proposed Project Daily and PM Peak Hour Person-Trip Generation**
**Residential Flex and Office Flex Options**

| Project Option/ Land Use | Size | Person Trip Generation Rates | | Person Trips | |
|---|---|---|---|---|---|
| | | Daily Trip Rate | PM Peak Hour as % of Daily | Daily | PM Peak Hour |
| **Residential Flex Option** | | | | | |
| Residential: 2+ bedrooms | 215 units | 10 per unit | 17.3% | 2,150 | 372 |
| Retail/Restaurant | 4,800 gsf | 200 per 1,000 gsf | 13.5% | 960 | 130 |
| Museum [1] | 52,285 gsf | NA | 4.9% | 996 | 49 |
| | | | **Total** | **4,106** | **551** |
| **Office Flex Option** | | | | | |
| Residential: 2+ bedrooms | 191 units | 10 per unit | 17.3% | 1,910 | 330 |
| Office | 61,320 gsf | 18.1 per 1,000 gsf | 8.5% | 1,110 | 94 |
| Retail/Restaurant | 4,800 gsf | 200 per 1,000 gsf | 13.5% | 960 | 130 |
| Museum [1] | 52,285 gsf | NA | 4.9% | 996 | 49 |
| | | | **Total** | **4,976** | **603** |

Source: *SF Guidelines,* LCW Consulting.
Note:
1. Museum trip generation was based on projected daily attendance and number of employees, and information on visitor attendance and inbound/outbound hourly distribution from field surveys at the Contemporary Jewish Museum. See Appendix I.

## 3.2 MODE SPLIT

The project-generated person trips were assigned to travel modes in order to determine the number of auto, transit and "other" trips. "Other" includes walk, bicycle, motorcycle, taxi and additional modes. Mode split information for the residential uses was based on the 2000 U.S. Census journey-to-work data for census tract 105. Mode split information for the office, retail/restaurant, and museum uses was based on information contained in the *SF Guidelines* for employee and visitor trips to the C-3 district. An average vehicle occupancy rate, as obtained from the U.S. Census data (for residential uses) and *SF Guidelines* (for the office, retail/restaurant, and museum uses) was applied to the number of auto person trips to determine the number of vehicle trips generated by the Proposed Project.

Table 13 summarizes the weekday PM peak hour trip generation by mode for the Proposed Project for the Residential Flex Option and the Office Flex Option.

**Table 13**
**Proposed Project Trip Generation by Mode – Weekday PM Peak Hour**
**Residential Flex and Office Flex Options**

| Land Use | Person Trips | | | | Vehicle Trips |
|---|---|---|---|---|---|
| | Auto | Transit | Walk/Other[1] | Total | |
| **Residential Flex Option** | | | | | |
| Residential | 115 | 45 | 212 | 372 | 106 |
| Retail/Restaurant | 46 | 38 | 46 | 130 | 26 |
| Museum | 18 | 16 | 15 | 49 | 10 |
| **Total** | **179** | **99** | **273** | **551** | **142** |
| **Office Flex Option** | | | | | |
| Residential | 102 | 40 | 188 | 330 | 95 |
| Office | 31 | 55 | 8 | 94 | 23 |
| Retail/Restaurant | 46 | 38 | 46 | 130 | 26 |
| Museum | 18 | 16 | 15 | 49 | 10 |
| **Total** | **197** | **149** | **257** | **603** | **154** |

Source: *SF Guidelines*, *2000 U.S. Census*, LCW Consulting.
Note:
1. "Other" mode includes bicycles, motorcycles, and taxis.

- **Residential Flex Option** – During the weekday PM peak hour, about 32 percent of all person trips would be by auto, 18 percent by transit, and 50 percent by other modes (including walking and bicycling). The Residential Flex Option would generate about 142 vehicle trips during the weekday PM peak hour, of which 85 vehicle trips (60 percent) would be inbound to the project site, and 57 vehicle trips (40 percent) would be outbound from the project site. Of the 142 vehicle trips during the weekday PM peak hour, the 215 residential units would generate 71 inbound and 35 outbound vehicle trips.

- **Office Flex Option** – Due to the inclusion of office use, the transit mode split for the Office Flex Option is greater than for the Residential Flex Option. During the weekday PM peak hour, about 33 percent of all person trips would be by auto, 24 percent by transit, and 43 percent by other modes (including walking and bicycling). The Office Flex Option would generate about 154 vehicle trips during the weekday PM peak hour, of which 79 vehicle trips (51 percent) would be inbound to the project site, and 75 vehicle trips (49 percent) would be outbound from the project site. Of the 154 vehicle trips during the weekday PM peak hour, the 191 residential units would generate 63 inbound and 32 outbound vehicle trips.

Table 14 presents the mode split of the net-new trips generated by the Proposed Project for the weekday PM peak hour. The net-new trips generated by the Proposed Project were determined by subtracting the existing trips from the Proposed Project trip generation presented above. Field surveys indicated that during the PM peak hour, there are about 33 person trips entering and exiting the building (18 entering and 15 exiting). The mode split from the *SF Guidelines* for retail uses were applied to the existing trips to estimate the person trip distribution by mode for the existing uses. During the weekday PM peak hour, the Residential Flex Option would result in a total of 137 net-new vehicle trips, including 82 inbound and 55 outbound net-new vehicle trips. The Office Flex Option would result in a total of 149 net-new vehicle trips during the PM peak hour, including 76 inbound and 73 outbound net-new vehicle trips.

**Table 14**
**Net-New Trip Generation by Mode**
**Weekday PM Peak Hour**
**Residential Flex and Office Flex Options**

| | Person Trips | | | | Vehicle Trips |
|---|---|---|---|---|---|
| | Auto | Transit | Walk/Other[1] | Total | |
| **Residential Flex Option** | | | | | |
| Proposed Project | 179 | 99 | 273 | 551 | 142 |
| Credit for Existing Uses | (9) | (5) | (19) | (33) | (5) |
| **Net-New Trips** | **170** | **94** | **254** | **518** | **137** |
| **Office Flex Option** | | | | | |
| Proposed Project | 197 | 149 | 257 | 603 | 154 |
| Credit for Existing Uses | (9) | (5) | (19) | (33) | (5) |
| **Net-New Trips** | **188** | **144** | **238** | **570** | **149** |

Source: *SF Guidelines*, *2000 U.S. Census*, LCW Consulting.
Note:
1. "Other" mode includes bicycles, motorcycles, and taxis.

## 3.3 TRIP DISTRIBUTION/ASSIGNMENT

The directional distribution of the project-generated trips were obtained from the 1990 Census data (residential trips) and the *SF Guidelines* (for the office, retail/restaurant, and museum trips). The 1990 Census data was used because directional distribution information is not available from the 2000 Census. Distributions are based on the origin/destination of the trip, and are separated into the four quadrants of San Francisco (Superdistricts 1 through 4), East Bay, North Bay, South Bay and outside the region. As shown in Table 15, the majority of the project-generated residential trips during the weekday PM peak hour would come to and from Superdistrict 1.

**Table 15**
**Trip Distribution Patterns**
**Residential Flex and Office Flex Options**

| Origin/ Destination | Retail/Restaurant and Museum[1] | | Office[2] | | Residential[3] |
|---|---|---|---|---|---|
| | Visitor/ Non-Work | Work | Visitor/ Non-Work | Work | Work and Non-Work |
| San Francisco | | | | | |
| Superdistrict 1 | 8.0% | 14.1% | 17.0% | 7.9% | 57.7% |
| Superdistrict 2 | 8.0% | 15.7% | 14.0% | 15.3% | 8.3% |
| Superdistrict 3 | 12.0% | 19.9% | 14.0% | 22.1% | 8.3% |
| Superdistrict 4 | 4.0% | 12.0% | 7.0% | 11.3% | 8.3% |
| East Bay | 15.0% | 22.7% | 23.0% | 24.1% | 9.0% |
| North Bay | 10.0% | 2.9% | 8.0% | 4.3% | 1.1% |
| South Bay | 5.0% | 11.1% | 13.0% | 13.7% | 5.8% |
| Outside of Region | 38.0% | 1.6% | 4.0% | 1.3% | 1.5% |
| **Total** | **100%** | **100%** | **100%** | **100%** | **100%** |

Source: *SF Guidelines, 1990 U.S. Census.*
Notes:
1. Table E-2: Work Trips to C-3 District – All Other, and Table E-9: Visitor Trips to C-3 District – All Other.
2. Table E-1: Work Trips to C-3 District – Office, and Table E-7: Visitor Trips to C-3 District – Office.
3. 1990 US Census

These trip distribution patterns were used as the basis for assigning project-generated vehicle trips to the local streets in the study area. The Proposed Project office, retail/restaurant, and museum vehicle trips were assigned to the Jessie Square public parking garage, with access via Stevenson Street, and egress via both Stevenson Street and Mission Street. Under both the Residential Flex Option and the Office Flex Option, vehicle access into the residential parking spaces would be via the existing curb cut on Third Street, although residents would also be able to access the parking garage via the existing ramp on Stevenson Street. The traffic assignment assumed that inbound resident vehicle trips would access the project parking via Third Street. Residents leaving the project site would pick up their vehicle within the project parking garage

and exit via either Stevenson Street or Mission Street. Figure 17 presents the vehicle-trip assignments for the Proposed Project for inbound and outbound trips.

As noted in section 1.1, Variants 1 through 7 represent variations to the Proposed Project, with respect to access for the residential parking component of the Proposed Project (Variants 1 through 5), as well as two variants (Variants 6 and 7) that address neighborhood concerns regarding the existing entrance/exit to the Jessie Square Garage on Stevenson Street.

The variants would not affect the travel demand associated with the Proposed Project, but only the vehicle trip assignment with respect to the location of the access into the project site. Some variants differ only slightly in the design, and therefore vehicle trip assignment would be similar.

- Variant 1 does not include vehicle access into the residential parking via the existing curb cut on Third Street. Instead, under both the Residential Flex Option and the Office Flex Option, vehicle access into the residential parking would be via the existing Jessie Square Garage entrance/exit at Stevenson Street. The vehicular assignment would be similar to the Proposed Project, however, instead of vehicles accessing the residential parking via the driveway into the Proposed Project site on Third Street, drivers would continue to the intersection of Third/Stevenson, turn left onto Stevenson Street westbound, and access the residential parking at the exiting entrance/exit at Stevenson Street.
- Under Variant 4, the existing curb cut into the project site on Third Street would remain, and an ingress-only driveway ramp into the garage would be constructed for trucks and service vehicles. With the exception of the relatively minor volume of delivery vehicles during the PM peak hour, the vehicular access would be the same as under Variant 1. Therefore, the vehicle trip assignment would be the same as described for Variant 1 above.
- Vehicle trip assignment for Variant 2 and Variant 5, which are design variations for the driveway into the residential parking via the existing curb cut on Third Street, would be the same as for the Proposed Project.
- Under Variant 3 the existing curb cut into the project site would be abandoned. Inbound access to the residential parking would be via the existing Jessie Square Garage egress-only driveway ramp on Mission Street that would be widened to allow for two-way operations. To access the revised ramp, residents traveling to the site by auto on Third Street northbound would turn left at Mission Street, while vehicles traveling westbound on Mission Street would continue through at Third Street (as opposed to turning right).

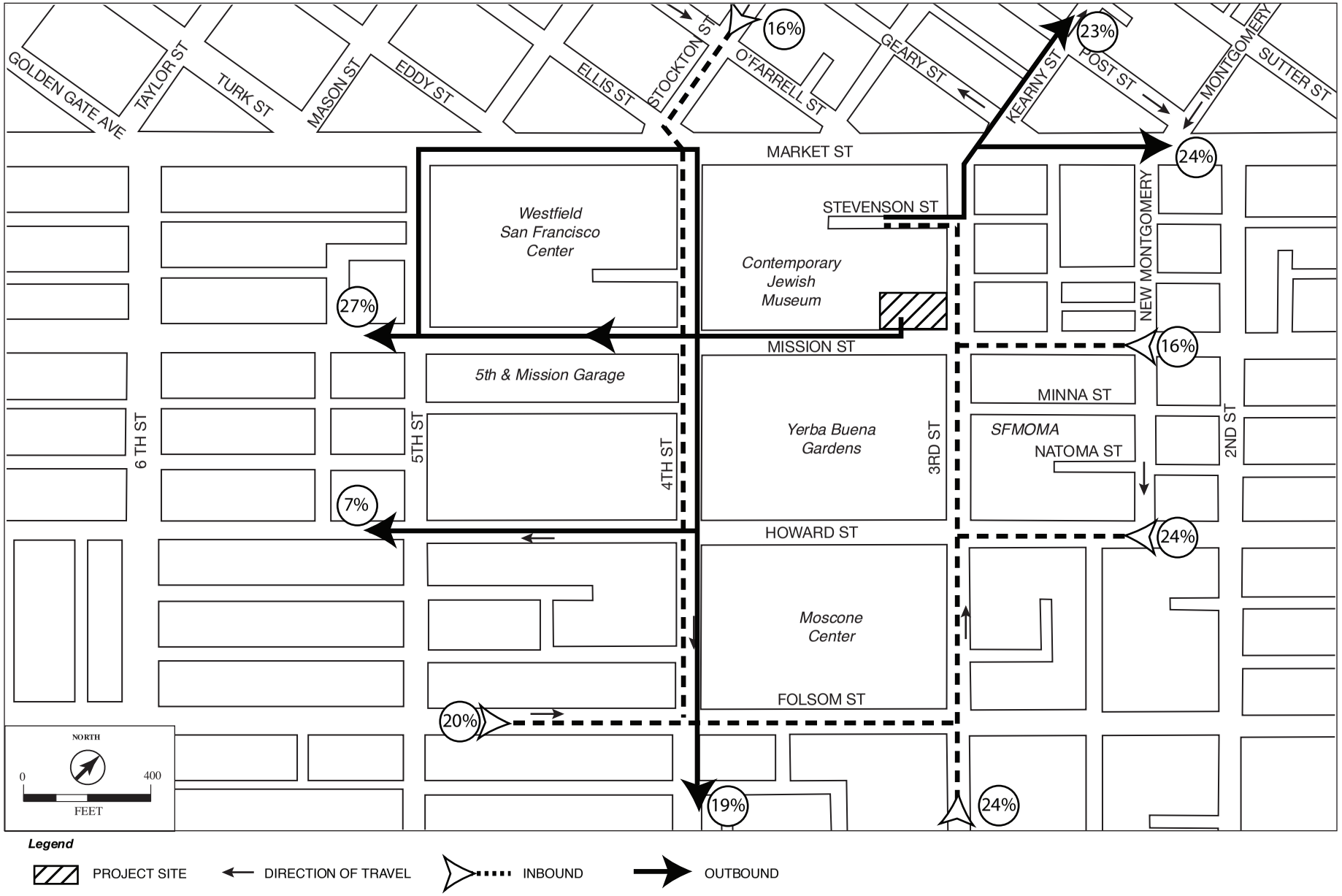




**FIGURE 17: VEHICLE TRIP DISTRIBUTION PATTERNS**

- Under Variant 6 and Variant 7 all auto access to the Jessie Square Garage and Proposed Project would be via the existing Jessie Square Garage egress-only driveway ramp that would be widened to allow for two-way operations. As with Variant 3, to access the revised ramp, residents traveling to the site by auto on Third Street northbound would turn left at Mission Street, while vehicles traveling westbound on Mission Street would continue through at Third Street (as opposed to turning right). Under Variant 6, trucks and service vehicles would be permitted to utilize the existing entrance/exit to the Jessie Square Garage on Stevenson Street, while under Variant 7 the existing entrance/exit would be closed to all vehicles, including autos and trucks.

Table 16 summarizes the weekday PM peak hour inbound and outbound vehicle trips at the three access points to the Jessie Square Garage – at the existing Stevenson Street entrance/exit, at the existing Mission Street egress-only, and at the proposed inbound-only access for residential parking on Third Street.

## 3.4 LOADING DEMAND

The delivery/service vehicle demand is estimated based on the methodology and truck trip generation rates presented in the *SF Guidelines*. Delivery/service vehicle demand is based on the types and amount of land uses. As shown in Table 17, the new uses associated with the Proposed Project would generate between 40 and 51 delivery/service vehicle trips per day, depending on whether the Residential Flex Option or Office Flex Option is constructed.

For the Residential Flex Option this corresponds to a demand for about two loading spaces during the peak and average hours of loading activity, while for the Office Flex Option this corresponds to a demand for about three loading spaces during the peak hour of loading activity and two loading spaces for the average hour of loading activity.

**Table 16**
**Jessie Square Garage Inbound and Outbound Vehicle Trips – Proposed Project and Variants[1]**
**Weekday PM Peak Hour**

| Scenario | Stevenson Street | | | Mission Street | | | Third Street | | | Total Garage | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total |
| **Proposed Project, Variant 2, Variant 5** | | | | | | | | | | | | |
| Existing Jessie Square Garage[2] | 37 | 63 | 100 | 0 | 45 | 45 | 0 | 0 | 0 | 37 | 108 | 145 |
| Proposed Project Uses | 13 | 34 | 47 | 0 | 39 | 39 | 63 | 0 | 63 | 76 | 73 | 149 |
| *Total* | *50* | *97* | *147* | *0* | *84* | *84* | *63* | *0* | *63* | *113* | *181* | *294* |
| **Variant 1, Variant 4** | | | | | | | | | | | | |
| Existing Jessie Square Garage | 37 | 63 | 100 | 0 | 45 | 45 | 0 | 0 | 0 | 37 | 108 | 145 |
| Proposed Project Uses | 76 | 34 | 111 | 0 | 39 | 39 | 0 | 0 | 0 | 76 | 73 | 149 |
| *Total* | *113* | *97* | *210* | *0* | *84* | *84* | *0* | *0* | *0* | *113* | *181* | *294* |
| **Variant 3** | | | | | | | | | | | | |
| Existing Jessie Square Garage | 37 | 63 | 100 | 0 | 45 | 45 | 0 | 0 | 0 | 37 | 108 | 145 |
| Proposed Project Uses | 13 | 34 | 47 | 63 | 39 | 102 | 0 | 0 | 0 | 76 | 73 | 149 |
| *Total* | *50* | *97* | *147* | *63* | *84* | *147* | *0* | *0* | *0* | *113* | *181* | *294* |
| **Variant 6, Variant 7** | | | | | | | | | | | | |
| Existing Jessie Square Garage | 0 | 0 | 0 | 37 | 108 | 145 | 0 | 0 | 0 | 37 | 108 | 145 |
| Proposed Project Uses | 0 | 0 | 0 | 76 | 73 | 149 | 0 | 0 | 0 | 75 | 71 | 146 |
| *Total* | *0* | *0* | *0* | *113* | *181* | *294* | *0* | *0* | *0* | *113* | *181* | *294* |

Source: LCW Consulting.

Notes:

1. Vehicular Access Summary:
Project: Residential ingress from Third St, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 3A.
Variant 1: No access on Third St, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 4.
Variant 2: Residential ingress from Third St but no ground floor valet parking, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 5.
Variant 3: No access on Third St, residential ingress from Mission Street, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 6.
Variant 4: Loading ingress only on Third St, ingress/egress from Stevenson St & secondary egress onto Mission St. See Figure 7.
Variant 5: Residential ingress from Third St, residential drop-off/valet within Aronson Building, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 8.
Variant 6: Jessie Square Garage and Proposed Project ingress/egress on Mission St, except for existing and project truck and service vehicle access on Stevenson St. See Figure 9.
Variant 7: All Jessie Square Garage and Proposed Project ingress/egress on Mission St. Stevenson St ramp closed to all traffic. See Figure 10.
2. Existing weekday PM peak hour vehicle trips at the Jessie Square Garage entrance/exits.

| Table 17<br>Proposed Project<br>Delivery/Service Vehicle Trips and Loading Space Demand<br>Residential Flex and Office Flex Options | | | |
|---|---|---|---|
| **Land Use** | **Daily Truck Trip Generation** | **Peak Hour Loading Spaces** | **Average Hour Loading Spaces** |
| **Residential Flex Option** | | | |
| Residential | 17.5 | 1.0 | 0.8 |
| Retail/Restaurant | 17.3 | 1.0 | 0.8 |
| Museum[1] | 5.2 | 0.3 | 0.2 |
| Total | 40.0 | 2.3 | 1.8 |
| **Office Flex Option** | | | |
| Residential | 15.9 | 0.9 | 0.7 |
| Office | 12.9 | 0.7 | 0.6 |
| Retail/Restaurant | 17.3 | 1.0 | 0.8 |
| Museum[1] | 5.2 | 0.3 | 0.2 |
| Total | 51.3 | 2.9 | 2.3 |

Source: *SF Guidelines*, LCW Consulting.
Note:
1. The "Institutional" truck trip generation rate was used for the museum use.

It is anticipated that most of the delivery/service vehicles that would be generated by the Proposed Project would primarily consist of small trucks and vans. The residential and museum uses would also generate an occasional demand for large and small moving vans. The size of the moving vans/trucks would depend on the size of the move and distance. Local residential moves are typically conducted by 16 to 26-foot long trucks, while long distance and larger moves are often conducted by trucks 53 feet in length or longer.

## 3.5 PARKING DEMAND

The parking demand associated with the Proposed Project was determined based on the methodology presented in the *SF Guidelines*. Parking demand consists of both long-term demand (typically residents and employees) and short-term demand (typically visitors and patrons). For residential units, the long-term parking demand is based on the number and size of the units at a rate of 1.1 and 1.5 spaces per unit for studios/one bedroom and 2-plus bedroom units, respectively. For the office, retail/restaurant and museum uses, the long-term parking demand was derived by estimating the number of employees, and applying the trip mode split and average vehicle occupancy from the trip generation calculations. The short-term parking for the office, retail/restaurant and museum uses was estimated from the total daily visitor trips by private automobile and an average daily turnover rate of 5.5 vehicles per space.

Table 18 presents the estimated parking demand for the Proposed Project. The Proposed Project would generate a parking demand of between 367 and 400 parking spaces, depending whether the Residential Flex Option or the Office Flex Option is constructed.

**Table 18**
**Proposed Project Parking Demand**
**Residential Flex and Office Flex Options**

| Land Use | Long-Term Parking Spaces | Short-Term Parking Spaces | Total |
|---|---|---|---|
| **Residential Flex Option** | | | |
| Residential | 323 | 0 | 323 |
| Retail/Restaurant | 3 | 16 | 19 |
| Museum | 11 | 14 | 25 |
| Total | 337 | 30 | 367 |
| **Office Flex Option** | | | |
| Residential | 287 | 0 | 287 |
| Office | 59 | 10 | 69 |
| Retail/Restaurant | 3 | 16 | 19 |
| Museum | 11 | 14 | 25 |
| Total | 360 | 40 | 400 |

Source: *SF Guidelines,* LCW Consulting.

- **Residential Flex Option** – The 215 residential units would generate a demand for 323 long-term parking spaces. The peak residential parking demand would occur primarily at night, although a portion of the residential demand would also occur during the day. During the weekday midday, the residential parking demand is estimated to be about 80 percent of the overnight demand, or about 258 parking spaces. The retail/restaurant and museum uses would generate a parking demand for 44 parking spaces, including 14 long-term parking spaces, and 30 short-term parking spaces.
- **Office Flex Option** – The 191 residential units would generate a demand for 287 long-term parking spaces. The peak residential parking demand would occur primarily at night, although a portion of the residential demand would also occur during the day. During the weekday midday, the residential parking demand is estimated to be about 80 percent of the overnight demand, or about 230 parking spaces. The office, retail/restaurant, and museum uses would generate a parking demand for 113 parking spaces, including 73 long-term parking spaces, and 40 short-term parking spaces.

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# Chapter 4
# IMPACT ANALYSIS

This chapter presents the assessment of transportation impacts resulting from the Proposed Project. The impacts are grouped into seven areas: traffic, transit, parking, pedestrians, bicyclists, loading and construction. Transportation conditions were assessed and presented separately for the following scenarios:

- Existing plus Project
- Existing plus Variant 1
- Existing plus Variant 2
- Existing plus Variant 3
- Existing plus Variant 4
- Existing plus Variant 5
- Existing plus Variant 6
- Existing plus Variant 7
- 2030 Cumulative conditions.

## 4.1 SIGNIFICANCE CRITERIA

The following are the significance criteria used by the Planning Department for the determination of impacts associated with a proposed project:

- In San Francisco, the threshold for a significant adverse impact on traffic has been established as deterioration in the level of service (LOS) at a signalized intersection from LOS D or better to LOS E or LOS F, or from LOS E to LOS F. For an intersection that operates at LOS E or LOS F under existing conditions, there may be a significant adverse impact depending upon the magnitude of the project's contribution to the worsening of delay. In addition, a project would have a significant adverse effect if it would cause major traffic hazards, or would contribute considerably to the cumulative traffic increases that would cause the deterioration in LOS to unacceptable levels (i.e., to LOS E or LOS F).
- The project would have a significant effect on the environment if it would cause a substantial increase in transit demand that could not be accommodated by adjacent transit capacity, resulting in unacceptable levels of transit service; or cause a substantial increase in operating costs or delays such that significant adverse impacts in transit service levels could result. With the Muni and regional transit screenlines analyses, the project would have a significant effect on the transit provider if project-related transit trips would cause the capacity utilization standard to be exceeded during the peak hour.

- The project would have a significant effect on the environment if it would result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas.
- The project would have a significant effect on the environment if it would create potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility to the site and adjoining areas.
- The project would have a significant effect on the environment if it would result in a loading demand during the peak hour of loading activities that could not be accommodated within the proposed on-site loading facilities or within convenient on-street loading zones, and if it would create potentially hazardous traffic conditions or significant delays affecting traffic, transit, bicycles or pedestrians.
- A project would have a significant effect on the environment is it would result in inadequate emergency access.
- Construction-related impacts generally would not be considered significant due to their temporary and limited duration.

## 4.2 EXISTING PLUS PROJECT CONDITIONS

### 4.2.1 Traffic Impacts

Since the number of PM peak hour net-new vehicle trips generated with the Office Flex Option (149 vehicles – 76 inbound, 73 outbound) of the Proposed Project would be more than the number generated by the Residential Flex Option (137 vehicles – 82 inbound, 55 outbound), and because the Office Flex Option would add more vehicle trips to the intersection of Third/Stevenson intersection (because office and museum trips would not enter via the new Third Street curb cut) the intersection LOS analysis was conducted based on the Office Flex Option. The Office Flex Option would result in six fewer inbound vehicles than the Residential Flex Option, but 18 more outbound vehicles, and in total, 12 more vehicles than the Residential Flex Option. The differences at the study intersections between the Office Flex Option and the Residential Flex Option would not materially change the intersection LOS analysis results.[10]

During the weekday PM peak hour, the Proposed Project would generate 76 inbound and 73 outbound vehicle trips, for a total of 149 net-new vehicle trips. Project-generated vehicle trips were assigned to and from the project residential driveway on Third Street or to the Jessie Square Garage driveways on Stevenson Street and Mission Street, based on whether the trip would be a

[10] The determination that the differences at the study intersections between the Office Flex Option and the Residential Flex Option would not materially change the intersection LOS analysis results was based on a sensitivity analysis for the six additional inbound trips during the PM peak hour that would be associated with the Residential Flex Option.

residential, office, retail/restaurant, or museum trip, an inbound or outbound trip, and the projected directional distribution (general trip distributions are shown on Figure 17).

As noted in Chapter 3, the Proposed Project office, retail/restaurant and museum vehicle trips were assigned to the Jessie Square public parking garage, with access via Stevenson Street, and egress via both Stevenson Street and Mission Street. All residential vehicle-trips accessing the building were assumed to access the project parking via the Third Street driveway into the project site, although some residents may chose to enter via the Stevenson Street driveway.[11] Residents leaving the project site would pick up their vehicle within the project parking garage and exit via the Stevenson Street or Mission Street exits.

Of the 76 inbound vehicle trips, 63 vehicles were assigned to the Third Street project driveway and 13 vehicles were assigned to the Jessie Square Garage Stevenson Street driveway. Of the 73 outbound vehicle trips, 39 vehicles were assigned to the Jessie Square Garage Mission Street exit, and 34 vehicles to the Jessie Square Garage Stevenson Street driveway. The resulting Existing plus Project traffic volumes for the study intersections are presented in Figure 18. Appendix D contains the detailed calculations of the intersection LOS analysis.

Table 19 presents the Existing plus Project intersection levels of service for the weekday PM peak hour. In general, the addition of the 149 project-generated vehicle trips would result in small increases in the average delay per vehicle at the study intersections. All study intersections would continue to operate at the same LOS as under Existing conditions. The intersection of Third/Market would continue to operate at LOS E, the intersection of Fourth/Market would continue to operate at LOS F. The contribution of the Proposed Project to the critical movements that operate poorly were reviewed to determine if the project contribution would be significant.

- At the intersection of **Third/Market**, which currently operates at LOS E conditions during the PM peak hour, the Proposed Project would add 34 vehicle trips during the PM peak hour. At this intersection, the northbound approach operates at LOS F conditions. The project would add 34 vehicle trips to the northbound movement, which represents 1.8 percent of the total PM peak hour northbound approach volume of 1,939 vehicles. The project contribution to this poorly-operating approach would not be considerable, and therefore the contribution to the overall intersection LOS E conditions would not be considered significant.

[11] All residential vehicle-trips accessing the building were assumed to access the project parking via the Third Street driveway into the project site. Residents choosing to enter via the Stevenson Street driveway would not change LOS conditions at the study intersections. See section 4.3, which presents Existing plus Variant 1 conditions (assumes that all residents enter the garage via Stevenson Street).

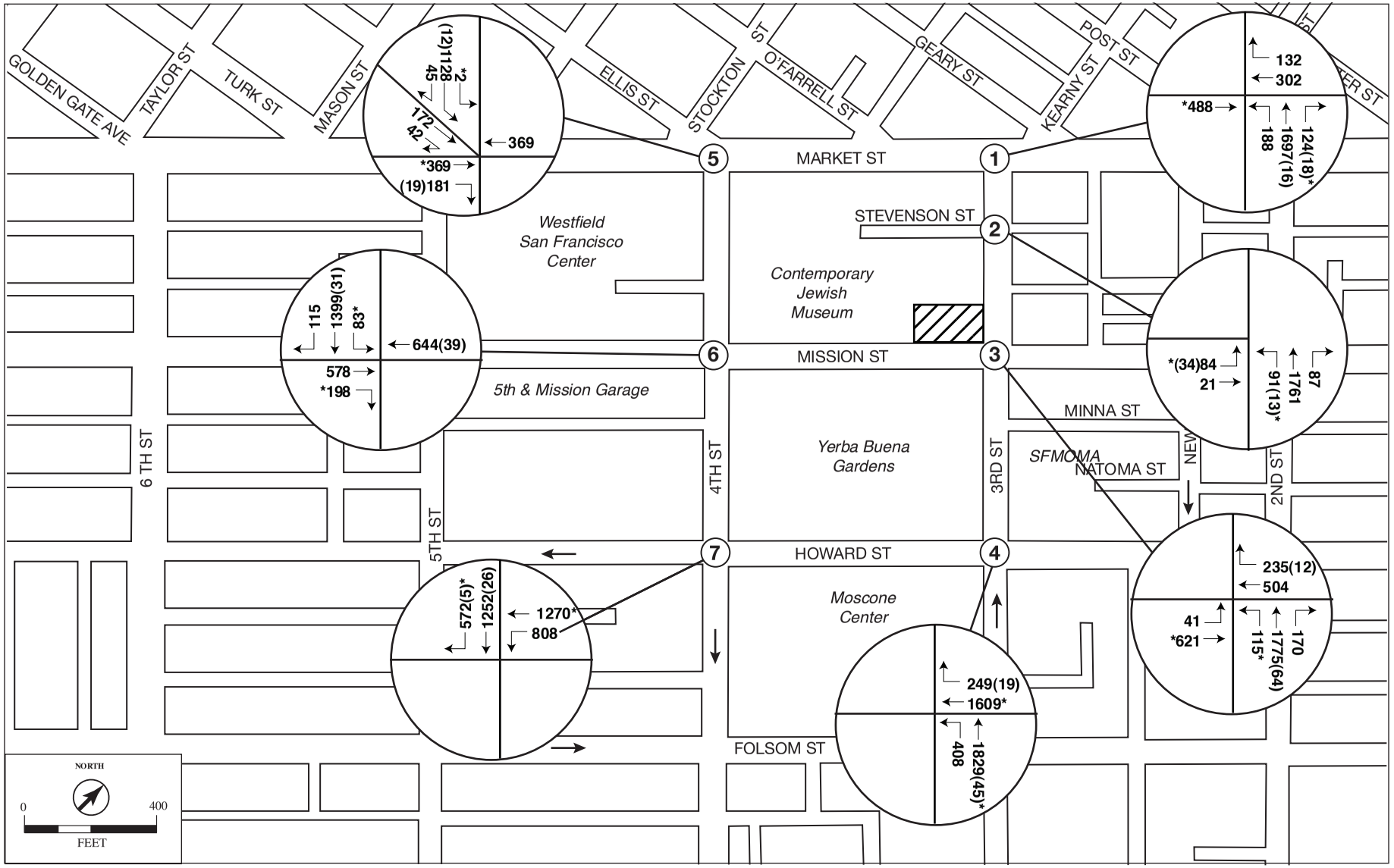




**FIGURE 18: EXISTING PLUS PROJECT TRAFFIC VOLUMES**
**WEEKDAY PM PEAK HOUR**

**Table 19**
**Intersection Level of Service**
**Existing plus Project and Existing plus Variant Conditions[3] – Weekday PM Peak Hour**

| Intersection | Existing | | Existing plus Project or Variant 2 or Variant 5 | | Existing plus Variant 1 or Variant 4 | | Existing plus Variant 3 | | Existing plus Variant 6 or Variant 7 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Delay (v/c)[1] | LOS | Delay (v/c)[1] | LOS | Delay (v/c)[1] | LOS | Delay (v/c)[1] | LOS | Delay (v/c)[1] | LOS |
| 1. Third/Market | **56.2** | **E** | **63.8** | **E** | **63.8** | **E** | **63.8** | **E** | 45.9 | D |
| 2. Third/Stevenson | 12.1 | B | 12.8 | B | 14.3 | B | 12.8 | B | 11.1 | B |
| 3. Third/Mission | 20.1 | C | 20.9 | C | 20.9 | C | 21.0 | C | 21.1 | C |
| 4. Third/Howard | 36.1 | D | 40.4 | D | 40.4 | D | 40.4 | D | 40.4 | D |
| 5. Fourth/Market | **>80 (1.1)** | **F** | **>80 (1.1)** | **F** | **>80 (1.1)** | **F** | **>80 (1.1)** | **F** | **>80 (1.1)** | **F** |
| 6. Fourth/Mission | 41.8 | D | 45.7 | D | 45.7 | D | 45.7 | D | 54.2 | D |
| 7. Fourth/Howard | 42.5 | D | 44.5 | D | 44.5 | D | 44.5 | D | 44.5 | D |

Source: LCW Consulting.

Notes:

1. Delay presented in seconds per vehicle. Intersections operating at LOS E or LOS F highlighted in **bold.** Volume-to-capacity (v/c) ratio presented for intersections operating at LOS F

2. Shaded intersections reflect locations where the number of project-generated vehicle trips would vary due to the variants. Appendix D contains project-generated trips and total vehicle trips for each variant.

3. Vehicular Access Summary:

Project: Residential ingress from Third St, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 3A.

Variant 1: No access on Third St, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 4.

Variant 2: Residential ingress from Third St but no ground floor valet parking, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 5.

Variant 3: No access on Third St, residential ingress from Mission Street, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 6.

Variant 4: Loading ingress only on Third St, ingress/egress from Stevenson St & secondary egress onto Mission St. See Figure 7.

Variant 5: Residential ingress from Third St, residential drop-off/valet within Aronson Building, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 8.

Variant 6: Jessie Square Garage and Proposed Project ingress/egress on Mission St, except for existing and project truck and service vehicle access on Stevenson St. See Figure 9.

Variant 7: All Jessie Square Garage and Proposed Project ingress/egress on Mission St. Stevenson St ramp closed to all traffic. See Figure 10.

- At the intersection of **Fourth/Market**, which currently operates at LOS F conditions during the PM peak hour, the Proposed Project would add 31 vehicle trips during the PM peak hour. At this intersection, the southbound through/left movement operates at LOS F conditions. The project would add 12 vehicle trips to the southbound through/left movement, which represent less than 1 percent of the PM peak hour southbound through/left volume of 1,302 vehicles. The project contribution to this poorly-operating approach would not be considerable, and therefore, the contribution to the overall intersection LOS F conditions would not be considered significant.

The Proposed Project traffic would not represent a considerable contribution to the Existing plus Project intersection operating conditions, and therefore, the Proposed Project would not result in significant traffic impacts at these intersections. Because the Proposed Project would not change the LOS at any study intersections and would not represent a considerable contribution at the two study intersections currently operating at LOS E or LOS F, the Proposed Project impacts on traffic operations would be ***less than significant.***

As noted above, the Proposed Project's underground parking garage would be accessed via Third Street or Stevenson Street and the parking garage's two vehicle elevators would be staffed 24 hours a day. Depending on the demand (e.g., peak hours versus overnight), the garage would be staffed with between one and two attendants. Residential access from Third Street represents in increase in the number of vehicles utilizing this curb cut which is currently used for loading access only. As indicated on Figure 4A, the vehicle elevator would be located about 120 feet from the driveway entrance to the building, which would allow for on-site queuing space for approximately five inbound vehicles, and with room for a bypass lane for drivers to directly access the car elevators. The access driveway to the entryway would not be gated.

Drivers parking vehicles would enter the valet court and pull up to the designated drop-off area, where they would be met by a valet attendant. The passenger would then exit the vehicle and the attendant would drive the vehicle into the vehicle elevator to the below-grade parking floor. Information on valet operations at the nearby St. Regis Residences (see discussion in section 4.2.4, Pedestrian Impacts) was used to estimate the number of vehicles that would access the Proposed Project site via the Third Street driveway. During the PM peak hour it is anticipated that there would be approximately 19 inbound vehicle trips.[12] When leaving the site, residents would have the option of retrieving their own vehicles, or using the valet service on Level B2 of the garage or at street level (see Figure 3D).

[12] It should be noted that the number of vehicles projected to access the project site based on information from the St. Regis Residences is less than the trip generation estimates using the standard *SF Guidelines* trip generation and mode split methodology. The characteristics of the Proposed Project's residences would be similar to the St. Regis Residences, and the *SF Guidelines* rates result in a conservative estimate of trip generation.

Section 5.1.2 identifies two improvement measures to minimize pedestrian-vehicle and vehicle-vehicle conflicts at the intersection of Third/Stevenson, and an improvement measure to minimize project-generated queues at the Third Street project driveway. **Improvement Measure 1** would enhance the ability of drivers exiting Stevenson Street at Third Street to merge into and across Third Street traffic flow. This improvement measure includes review and adjustment to signal timing at the intersection of Third/Stevenson and relocation of the pedestrian signal heads on Third Street on the north side of Stevenson Street closer to the intersection. **Improvement Measure 2** would minimize vehicles accessing Stevenson Street when the Jessie Square Garage is full by installing "Garage Full" signs at the intersection of Third Street at Stevenson Street. **Improvement Measure 3** would reduce the potential for queuing by vehicles accessing the project site by requiring monitoring of the project access driveway on Third Street, and if a recurring queue occurs, the owner/operator of the Proposed Project shall employ abatement methods as needed to abate the queue.

### 4.2.2 Transit Impacts

Since the number of net-new PM peak hour transit trips generated with the Office Flex Option (144 transit trips) of the Proposed Project would be more than the number generated by the Residential Flex Option (94 transit trips), the transit screenline analysis was conducted based on the Office Flex Option. The Proposed Project would generate 144 net-new transit trips (46 inbound and 98 outbound) during the weekday PM peak hour. These transit trips to and from the Proposed Project would utilize the nearby Muni lines and regional transit lines, and may include transfers to other Muni bus and light rail lines, or other regional transit providers. Based on the location of the project site and the anticipated origin/destination of the residents and employees and visitors to the retail/restaurant and museum uses, the transit trips were assigned to Muni and the various regional transit operators. Based on the trip distribution patterns, it was estimated that out of the 98 outbound transit trips, about 58 would cross the Muni screenlines, 31 would cross the regional screenlines, and the remaining nine would not cross any screenlines.

In the immediate vicinity of the project site, the transit lines generally have available capacity during the weekday PM peak hour that could be used to accommodate the inbound and outbound transit trips generated by the Proposed Project.

#### Muni Screenlines

The analysis of Muni screenlines assesses the effect of project-generated transit-trips on transit conditions in the outbound direction during the weekday PM peak hour. Based on the origins/destinations of the transit trips generated by the Project, the outbound transit trips within San Francisco were assigned to the four screenlines and the sub-corridors within each screenline. It should be noted that some transit trips that would travel within Superdistrict 1 would remain in the downtown area (e.g., trips to Union Square) and therefore, would not cross one of the screenlines. As such, not all outbound Muni trips generated by the Project appear in the screenline analysis. For analysis purposes, half of the Superdistrict 1 trips were estimated to

remain in the downtown area and the out-of-region trips were added to the Superdistrict 1 trips, assuming that a portion of those trips would be made on Muni.

Table 20 presents the Muni screenline analysis for the Existing plus Project conditions. Overall, the addition of the project-generated riders to the four screenlines would not substantially increase the peak hour capacity utilization. Capacity utilization for all screenlines would remain similar to those under existing conditions. Capacity utilization of the screenlines would be below 85 percent capacity utilization, with the exception of the subway lines within the Southwest screenline, which would continue to operate at capacity utilization of 87 percent. The addition of the eight transit trips generated by the Proposed Project to the Southwest screenline subway corridor would not represent a significant contribution to the existing conditions.

**Table 20**
**Muni Screenline Analysis**
**Existing plus Project Conditions – Weekday PM Peak Hour**

| Screenline/ Corridor | Existing Ridership | Project Trips | Existing plus Project Ridership | Capacity | Capacity Utilization |
|---|---|---|---|---|---|
| **Northeast** | | | | | |
| Kearny/Stockton | 1,129 | 8 | 1,137 | 2,010 | 57% |
| Other | 757 | 6 | 763 | 1,589 | 48% |
| *Subtotal* | *1,886* | *14* | *1,900* | *3,599* | *53%* |
| **Northwest** | | | | | |
| Geary | 1,684 | 4 | 1,688 | 2,230 | 76% |
| California | 1,413 | 3 | 1,416 | 2,050 | 69% |
| Sutter/Clement | 565 | 1 | 566 | 1,008 | 56% |
| Fulton/Hayes | 861 | 2 | 863 | 1,260 | 68% |
| Balboa | 615 | 1 | 616 | 1,247 | 49% |
| Chestnut/Union | 1,483 | 4 | 1,487 | 2,328 | 64% |
| *Subtotal* | *6,621* | *15* | *6,636* | *10,123* | *66%* |
| **Southeast** | | | | | |
| Third | 554 | 2 | 556 | 714 | 78% |
| Mission | 1,254 | 5 | 1,259 | 2,350 | 54% |
| San Bruno/Bayshore | 1,671 | 7 | 1,678 | 2,256 | 74% |
| Other | 1,189 | 5 | 1,194 | 1,708 | 70% |
| *Subtotal* | *4,668* | *19* | *4,687* | *7,028* | *67%* |
| **Southwest** | | | | | |
| Subway | **5,883** | **8** | **5,891** | **6,783** | **87%** |
| Haight/Noriega | 1,247 | 2 | 1,249 | 2,140 | 58% |
| Other | 304 | 0 | 304 | 700 | 43% |
| *Subtotal* | ***7,434*** | *10* | *7,444* | ***9,623*** | *77%* |
| ***Total All Screenlines*** | *20,609* | *58* | *20,667* | *30,373* | *68%* |

Source: AECOM, LCW Consulting.
Note:
Screenlines and corridors operating at capacity utilization greater than 85 percent are highlighted in **bold.**

#### Regional Transit Screenlines

Similar to Muni, the analysis of regional transit screenlines assess the effect of project-generated transit-trips on transit conditions in the outbound direction during the weekday PM peak hour. Based on the origins/destinations of the transit trips generated by the Proposed Project, the outbound regional transit trips were assigned to the three regional transit screenlines. It was estimated that during the weekday PM peak hour there would be 22 transit trips destined to the East Bay, two transit trip to the North Bay, and seven transit trips to the South Bay.

Table 21 presents the Existing plus Project screenline analysis for the regional transit carriers. In general, the addition of project-related passengers would not have a substantial effect on the regional transit providers during the weekday PM peak hour, as the capacity utilization for all screenlines would remain similar to those under Existing conditions. In addition, the capacity utilization for all regional transit providers would be under their capacity utilization standards.

**Table 21**
**Regional Transit Screenline Analysis**
**Existing plus Project Conditions – Weekday PM Peak Hour**

| Screenline/ Operator | Existing Ridership | Project Trips | Existing plus Project Ridership | Capacity | Capacity Utilization |
|---|---|---|---|---|---|
| **East Bay** | | | | | |
| BART | 20,067 | 19 | 20,086 | 24,150 | 83% |
| AC Transit | 2,517 | 2 | 2,519 | 4,193 | 60% |
| Ferries | 702 | 1 | 703 | 1,519 | 46% |
| *Subtotal* | *23,286* | *22* | *23,308* | *29,862* | *78%* |
| **North Bay** | | | | | |
| GGT buses | 1,397 | 1 | 1,398 | 2,205 | 63% |
| GGT ferries | 906 | 1 | 907 | 1,700 | 53% |
| *Subtotal* | *2,303* | *2* | *2,305* | *3,905* | *59%* |
| **South Bay** | | | | | |
| BART | 10,202 | 6 | 10,208 | 16,800 | 61% |
| Caltrain | 1,986 | 1 | 1,987 | 3,250 | 61% |
| SamTrans | 575 | 0 | 575 | 940 | 61% |
| *Subtotal* | *12,763* | *7* | *12,770* | *20,990* | *61%* |
| ***Total All Screenlines*** | ***38,352*** | ***31*** | ***38,383*** | ***54,757*** | ***70%*** |

Source: AECOM, LCW Consulting.

#### Inbound Transit Conditions

For conditions with the Residential Flex Option, the majority of the person-trips generated by the Proposed Project during the PM peak hour would be inbound to the site. As such, more of the transit trips generated by the Proposed Project during the weekday PM peak hour (48 of the 94 transit trips) would be inbound trips. Since Muni and regional transit screenline analyses are performed for transit trips outbound from downtown San Francisco, a qualitative analysis was performed for transit trips inbound to the downtown area. These would represent transit trips

from other parts of San Francisco (i.e., those from Superdistricts 2, 3 and 4), plus the East Bay, North Bay and South Bay, to downtown San Francisco (including to the project site).

Since the predominant flow of travel in the weekday PM peak hour is away from downtown San Francisco, Muni and regional transit lines that travel into downtown San Francisco from other parts of the City and the region have relatively low ridership. For example, the Muni bus and rail lines that operate inbound along Market Street, the bus lines that serve the Transbay Terminal, and the T-Third to the Caltrain Terminal all have available capacity during a typical weekday PM peak hour. Since existing capacity is currently available in the inbound direction, it is anticipated that the addition of the project-related transit trips in the inbound direction would not substantially affect transit conditions.

Overall, the Proposed Project would not substantially affect the capacity utilization of the local and regional transit lines, and therefore, impacts on local and regional transit capacity utilization would be ***less than significant.***

#### Project Driveway Impacts on Transit Operations

The Proposed Project residential driveway would be located on the west side of Third Street, and would not interfere with Muni bus operations within the bus only lane and at the bus stop on the east side of Third Street between Market Street and Mission Street. However, Muni also uses the west side lanes for non-revenue turnbacks of Market Street buses (i.e., buses do not pick up passengers), including the 5-Fulton, 6-Parnassus, 9-San Bruno, 21-Hayes and 31-Balboa. If drivers waiting to access the Proposed Project driveway block adjacent travel lanes, these Muni buses could be affected, depending on the time of day and conditions along Third Street. Since the number of buses traveling within the west lanes of Third Street are limited to non-revenue trips, and since buses are not picking up passengers, impacts of the Proposed Project driveway on transit operations would be ***less than significant.***

It should be noted that the retail/restaurant and museum uses might be subject to the Transit Impact Development Fee ("TIDF"). The TIDF attempts to recover the cost of carrying additional riders generated by new development by obtaining fees on a square footage basis. TIDF funds may be used to increase revenue service hours reasonably necessary to mitigate the impacts on non-residential development on public transit.

Currently Muni electric trolley coaches operate on Third Street and on Mission Street. Support poles for the overhead wires are located on both Third Street and Mission Street, adjacent to the project site. No wires are attached via eyebolts to the existing 706 Mission Street building. Section 5.1.2 identifies an improvement measure (**Improvement Measure 4**) that would require the project sponsor to meet with and review with SFMTA whether it would be appropriate to install eyebolts in the renovated building to support its overhead wire system.

Since the Proposed Project would not substantially affect the capacity utilization of the local and regional transit lines, and would not affect the operations of the adjacent and nearby Muni bus stops, transit impacts would be ***less than significant.***

### 4.2.3 Bicycle Impacts

**Supply:** The Residential Flex Option would provide 67 Class 1 bicycle parking spaces within the garage level B2 (see Figure 3D) for the 215 residential dwelling units, and 24 Class 2 spaces on the mezzanine level as part of the 43 private reserved parking spaces and the 210 public vehicle parking spaces.[13] The Office Flex Option would provide 61 Class 1 bicycle parking spaces for the 191 residential dwelling units, and 24 Class 2 bicycle parking spaces for the 68 private reserved parking spaces and the 210 public vehicle parking spaces.

***Planning Code*** **Requirements (see Appendix J):**

- Proposed Uses – Per the *San Francisco Planning Code (Planning Code)*, the Residential Flex Option would be required to provide 66 bicycle parking spaces for the proposed residential uses (for projects with more than 50 dwelling units, 25 spaces, plus 1 for every 4 dwelling units over 50). No bicycle parking spaces would be required for the proposed retail/restaurant and museum uses.[14] Since the Residential Flex Option would provide 67 bicycle parking spaces, it would meet the *Planning Code* requirement. The Office Flex Option would be required to provide 60 bicycle parking spaces for the proposed residential units, and no bicycle parking would be required for the proposed office, retail/restaurant, and museum uses. Since the Office Flex Option would provide 61 bicycle parking spaces, it would meet the *Planning Code* requirement.
- Jessie Square Garage – Per the *Planning Code*, the public and private parking components of the Proposed Project would be required to provide bicycle parking spaces.

  Based on 470 automobile spaces for both the Residential Flex Option and Office Flex Option, the garage would be required to provide 24 bicycle parking spaces (one bicycle parking space for every 20 automobile spaces). Since 24 Class 2 bicycle parking spaces would be provided for both the Residential Flex Option and the Office Flex Option, this component would meet the *Planning Code* requirement.

**Demand:** The project site is within bicycling distance of office and retail buildings in downtown San Francisco and the Financial District and major transit hubs (Ferry Building, Transbay Terminal and Caltrain). As such, it is anticipated that a portion of the 254 "walk/other" trips

[13] Class 1 bicycle parking includes facilities that protect the entire bicycle, its components and accessories against theft and against inclement weather, including wind-driven rain. Examples of Class 1 spaces include lockers, check-in facilities, monitored parking, restricted access parking, and personal storage. Class 2 bicycle parking spaces include bicycle racks which permit the locking of the bicycle frame and one wheel to the rack and, which support the bicycle in a stable position without damage to wheels, frame or components.

[14] Per Planning Code Section 155.3, shower and lockers are not required for buildings used primarily as hotel or residential buildings.

generated by the Residential Flex Option and 238 walk/other trips generated by the Office Flex Option would be bicycle trips.

As noted in section 2.4, there are several bicycle routes nearby to the project site, with the closest routes on along Howard Street (Bicycle Route 30), on Second Street (Bicycle Route 11), and on Market Street (Bicycle Route 50). Neither Third Street nor Mission Street are designated bicycle routes. Although the Proposed Project would result in an increase in the number of vehicles in the vicinity of the project site, this increase would not be substantial enough to affect bicycle travel in the area, and therefore, impacts to bicyclists would be ***less than significant.***

### 4.2.4 Pedestrian Impacts

#### Pedestrian Level of Service on Sidewalks, Corners, and Crosswalks

Since the number of PM peak hour pedestrian trips generated with the Office Flex Option (382 pedestrian trips) of the Proposed Project would be more than the number generated by the Residential Flex Option (348 pedestrian trips), the pedestrian analysis was conducted based on the Office Flex Option.

Pedestrian trips generated by the Proposed Project would include walk trips to and from the Proposed Project uses plus walk trips to and from the local and regional transit operators, and some walk trips to and from nearby parking facilities. Overall, the Proposed Project would add about 382 net-new pedestrian trips (189 inbound and 193 outbound) to the surrounding streets during the weekday PM peak hour. During the midday peak hour, the Proposed Project would generate lower pedestrian volumes, resulting in about 268 net-new pedestrian trips (133 inbound and 135 outbound).[15] Pedestrians would enter and exit the Proposed Project via the residential lobby on Mission Street and off of Third Street, the ground floor retail/restaurant access on Mission or Third Street, office access on Mission Street, and the museum lobby on Jessie Square plaza, and would be dispersed throughout the study area, depending upon the origin/destination of each trip. It is anticipated that a majority of the new pedestrian trips would be to and from Market Street, and to Union Square via Third Street and Mission Street. Figure 13 presents the Proposed Project-generated pedestrian trips on the sidewalk, crosswalk and corner analysis locations for the midday and PM peak hours.

Table 22 presents the results of the pedestrian analyses for Existing plus Project conditions. During the midday and PM peak hours, the addition of the new pedestrian trips on the adjacent *sidewalks* would not substantially affect the operating conditions, and all analysis locations would operate at LOS C or better.

[15] During the midday peak hour, residential trip generation would be about 44 percent of the PM peak hour trip generation (Pushkarev and Zupan, *Urban Space for Pedestrians*). To estimate total Proposed Project-generated midday trips, residential trip generation was reduced by 50 percent.

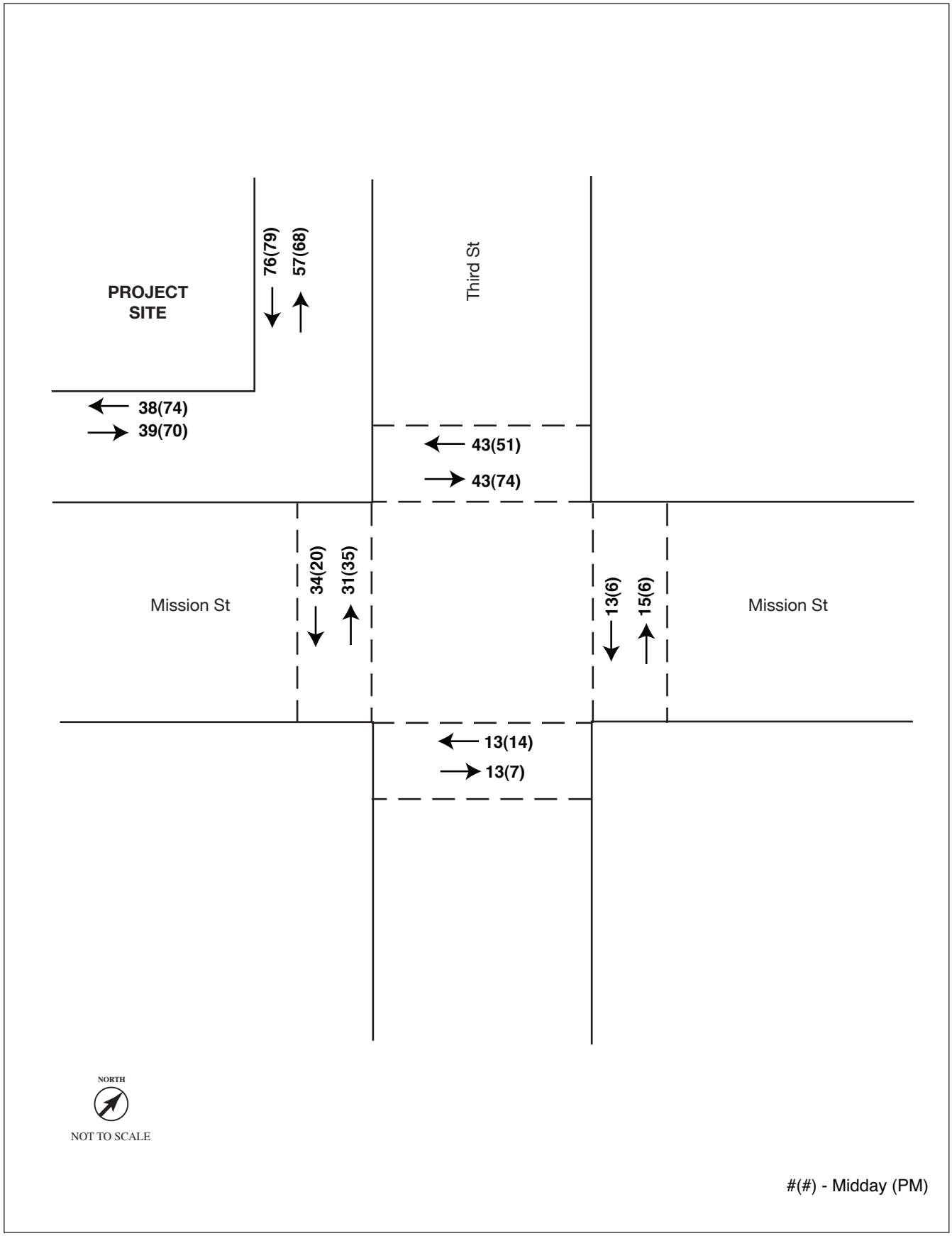




**FIGURE 19: PROPOSED PROJECT PEDESTRIAN TRIPS**
**WEEKDAY MIDDAY AND PM PEAK HOURS**

| Table 22<br>Pedestrian Level of Services<br>Existing plus Project Conditions – Weekday Midday and PM Peak Hours | | | | |
|---|---|---|---|---|
| **Peak Hour/ Location** | **Existing** | | **Existing plus Project** | |
| **Walkways** | **p/m/f[1]** | **LOS** | **p/m/f** | **LOS** |
| **Midday Peak Hour** | | | | |
| Third Street [2] | 2.5 | B | 3.0 | C |
| Mission Street [3] | 2.6 | B | 2.8 | B |
| **PM Peak Hour** | | | | |
| Third Street [2] | 2.5 | B | 3.1 | C |
| Mission Street [3] | 2.5 | B | 2.9 | B |
| **Crosswalks** | **sf/ped** | **LOS** | **sf/ped** | **LOS** |
| **Midday Peak Hour** | | | | |
| North | 25.8 | C | 24.1 | C |
| South | 52.7 | B | 50.7 | B |
| East | 24.8 | C | 24.2 | C |
| West | 20.8 | D | 19.6 | D |
| **PM Peak Hour** | | | | |
| North | 29.4 | C | 25.7 | C |
| South | 62.4 | A | 59.8 | B |
| East | 39.5 | C | 39.0 | C |
| West | 37.6 | C | 35.2 | C |
| **Corners** | **sf/ped** | **LOS** | **sf/ped** | **LOS** |
| **Midday Peak Hour** | | | | |
| Northeast | 32.6 | C | 30.9 | C |
| Northwest | 29.0 | C | 27.1 | C |
| Southeast | 29.1 | C | 28.2 | C |
| Southwest | 24.7 | C | 23.5 | D |
| **PM Peak Hour** | | | | |
| Northeast | 44.9 | B | 41.6 | B |
| Northwest | 45.1 | B | 40.6 | B |
| Southeast | 38.5 | C | 37.5 | C |
| Southwest | 39.8 | C | 37.4 | C |

Source: LCW Consulting.

Notes:

1. p/m/f = pedestrians per minute per foot
2. sf/ped = square feet per pedestrian

As indicated in Chapter 2, the LOS calculation for the sidewalk analysis was conducted at the most constrained location adjacent to the project site, which is at the mailbox on Third Street and at the bus shelter on Mission Street. Section 5.1.2 identifies improvement measures to reduce existing pole clutter and pedestrian obstructions on the Third Street sidewalk adjacent to the project site.

During the midday and PM peak hours, the level of services at the four *crosswalk* and four *corner* analysis locations would remain LOS D or better. The LOS designation would remain the same as under Existing conditions, with the exception of the southwest corner during the midday peak hour, where the LOS would change from LOS C to LOS D. Therefore, the Proposed Project impacts on pedestrian LOS on sidewalks, corners, and crosswalks would be ***less than significant.***

Section 5.1.2 identifies an improvement measure (**Improvement Measure 5**) to eliminate pole clutter, reduce pedestrian obstructions on the Third Street sidewalk adjacent to the project site, and to improve pedestrian flow, by consolidating the traffic signal and overhead wire poles, and relocating the existing mailbox.

#### Pedestrian Conflicts at Project Garage Driveways

The Proposed Project would construct a new valet driveway into the existing Jessie Square Garage on Third Street at the location of an existing curb cut. The new driveway would be for residents only to access the ground floor valet drop-off area. While the curb cut does currently exist to access a loading area that is minimally used, the Proposed Project would remove the loading area, and construct a new driveway to provide new access into the garage. In order to minimize the potential for conflicts between project-generated vehicles and pedestrians on the adjacent Third Street sidewalk, the driveway would be for inbound vehicles only, and for valet access only. Self-park access for residents would be via the existing driveway on Stevenson Street.

Under the Residential Flex Option, the Proposed Project would generate 82 net-new inbound vehicle trips during the PM peak hour, with 71 of the 82 vehicle trips related to the residential use, while under the Office Flex Option, the Proposed Project would generate 76 net-new inbound vehicle trips, with 63 of the 76 vehicle trips during the PM peak hour related to the residential use. It is anticipated that the majority of inbound vehicle trips related to the residential use would be via the Third Street driveway, although residents would also be able to access the garage via the existing Stevenson Street entrance. Therefore, the number of vehicle trips crossing the Third Street sidewalk to access the project site via the Third Street driveway would increase over the existing freight loading dock access, with up to 71 inbound vehicles during the PM peak hour.

As indicated above, Third Street has high pedestrian volumes. As shown in Figure 15, the west sidewalk currently has approximately 660 pedestrians per hour during both the midday and PM peak hour. In the future, additional growth in pedestrian volumes is anticipated due to the planned Moscone Center expansion, SFMOMA expansion, and general growth in the South of Market area including the Transit Center District Plan, Transbay Redevelopment Project, and the Central Corridor Project.

It should be noted that Third Street is designated in the San Francisco *General Plan* as a Citywide Pedestrian Network Street and a Neighborhood Commercial Street. San Francisco *Planning Code* section 155(r)(4) specifies that new curb cuts accessing off-street parking or loading on these types of streets are prohibited when alternative frontage is available.[16] The Jessie Square Garage does have alternative frontage available on Stevenson Street where driveway access to the garage currently exists and would remain with the Proposed Project, although the project site does not abut Stevenson Street. The project applicant would need to seek either an exception from the Planning Commission (*Planning Code* Section 309) or a variance from the Zoning Administrator (*Planning Code* Section 305).

Immediately north of the project site on Third Street is the Westin Hotel, which has an off-street drive-through passenger loading area accessed from Third Street. As described in section 2.5, this passenger loading area is a substantial pedestrian-vehicle conflict zone that negatively affects the west sidewalk of Third Street. The ingress driveway is at a 45-degree angle to the street, compared to a typical driveway that is perpendicular (at a 90-degree angle to the street). This design enables vehicles to cross the sidewalk at higher speeds, increases the size of the pedestrian-vehicle conflict zone, and limits visibility between drivers and pedestrians. Also, vehicles parked within the passenger loading area typically spill out onto the adjacent sidewalk, impeding pedestrian circulation.

The Proposed Project Third Street driveway for access to the valet drop-off would be approximately 100 feet south of the existing Westin Hotel passenger loading area ingress driveway. Due to the proximity to the passenger loading area ingress driveway, the Proposed Project valet driveway would compound the existing degraded pedestrian environment along the western Third Street sidewalk, specifically, by adding a new pedestrian-vehicle conflict zone in close proximity to an existing substantial pedestrian-vehicle conflict zone. This impact would be considered ***less than significant***.

[16] While the Proposed Project curb cut would reconstruct or repurpose the existing curb cut, this would be considered a new curb cut because the existing use of the curb cut (freight loading dock) would be removed and a new use (valet driveway) would be constructed.

Section 5.1.2 identifies two improvement measures to minimize pedestrian-vehicle conflicts on Third Street by positioning a traffic control attendant at the project driveway, ensuring adequate on-site queuing space, and using alternate pavement treatment for the sidewalks on Third Street adjacent to the project site (**Improvement Measure 6**), working with DPW, SFMTA, and the Planning Department to assess the feasibility of implementing other measures treatments to reduce pedestrian-vehicle conflicts on Third Street between Market and Mission Streets (**Improvement Measure 7**).

### 4.2.5 Loading Impacts

**Supply:** Under both the Residential Flex Option and the Office Flex Option, the Proposed Project would provide two truck loading spaces that would be 12 feet wide and 35 feet in length, and four service vehicle loading spaces that would be 8 feet wide and 20 feet in length within the first below-grade level of the garage, with access from Stevenson Street (clearance at the Stevenson Street garage ramps is 14 feet 6 inches in height). See Figure 3F on page 9 (Basement Level B1-Loading Dock Enlarged Plan). The loading area would be located on a level between level B1 and the street, and would have a vertical clearance of about 13 feet six inches between the access ramp and loading area. Clearance at the Stevenson Street ramp is 13 feet 5 inches, while clearance at the Mission Street ramp is 9 feet 6 inches. A vertical clearance of 14 feet is provided within the loading area. The loading stalls inside of the garage would have access to the museum/retail/restaurant and residential elevators, as well as the adjacent trash room. The designated loading area would be adjacent to the existing truck turntable that can accommodate trucks up to 45 feet in length turning to exit the loading area.

In order to accommodate on-street passenger loading/unloading activities for the retail/restaurant use, the project sponsor would request that the four existing metered commercial loading spaces (yellow curb) on Third Street adjacent to the project site be converted to a passenger loading/unloading zone (white curb) approximately 80 feet in length. The passenger loading/unloading zone would need to be approved at a public hearing through the SFMTA.

***Planning Code* Supply Requirements (see Appendix J):**

Per the *Planning Code*, the Residential Flex Option would be required to provide three truck loading spaces for the residential units and museum use (for residential and museum use over 500,000 square feet, three spaces, plus one space for each additional 400,000 square feet). No loading spaces would be required for the retail/restaurant use (less than 10,000 square feet of use).

The Office Flex Option would be required to provide three truck loading spaces for the residential units and museum use. Since the office use would be a replacement of existing office, no off-street loading spaces would be required. Off-street loading would also not be required for the retail/restaurant use.

For either option, the first space would be required to be 25 feet in length, 10 feet in width, with a vertical clearance of 12 feet, and the second and third spaces would be required to be 35 feet in length, 12 feet in width, and with a vertical clearance of 14 feet.

Since both the Residential Flex Option and the Office Flex Option would include two truck and four service vehicle spaces (per *Planning Code* Section 153(a)(6) two service vehicle spaces could be substituted for one truck space), the Proposed Project would meet the *Planning Code* requirements for the supply of loading spaces.

**Demand:** The Residential Flex Option would have a demand for two loading spaces during the peak and average hours of loading activity, while the Office Flex Option would have a demand for three loading spaces during the peak hour of loading activity and two loading spaces for the average hour of loading activity.

It is anticipated that the demand would primarily be accommodated on site in the four loading spaces within the loading area. Although white curb zones are not intended for commercial loading (driver must remain with vehicle in this zone), some Proposed Project-related loading/unloading would also likely occur within the proposed extension of the recessed passenger zone on Mission Street, and within the proposed on-street passenger (white) zone on Third Street.

As indicated above, the project sponsor would request the four existing metered loading spaces on Third Street adjacent to the project site (in effect between 9 AM and 3 PM) be converted to a passenger loading/unloading zone for project office and retail/restaurant visitors. As described in section 2.6, during field observations the four spaces were occupied about 18 percent of the three-hour survey period. Due to the low occupancy of the existing loading zones, the displaced loading activities could be accommodated at other on-street loading spaces in the vicinity, namely on Third Street north of Stevenson Street where there are five existing metered commercial loading spaces.

**Loading Access:** During field observations, trucks were observed parked and loading on Stevenson Street.[17] Parking is prohibited on both sides of Stevenson Street, although it is common practice. When trucks park on Stevenson Street, traffic capacity is reduced down to one lane for both directions, which can cause localized congestion. This condition would likely continue with implementation of the Proposed Project, especially considering the proposed conversion on on-street yellow curb commercial loading zones into white curb passenger loading zones. However, given the low occupancy of the on-street spaces as described in section 2.6, this condition would likely not be exacerbated compared to existing conditions.

[17] Observations of traffic and loading/unloading conditions on Stevenson Street west of Third Street were conducted on July 22, 2008, November 24, 2009, and November 9, 2011.

**Move-In and Move-out Activities:** Residential move-in and move-out activities, and large furniture deliveries, are anticipated to occur within from the loading area inside the garage. For moving trucks that could not be accommodated on site, trucks would be accommodated within the proposed passenger zone on Third Street.

**Trash/Recycling/Compost Pick-up:** The Proposed Project would contain trash and recycling chutes.[18] A trash and recycling storage area would be located in the loading area (See Figure 3C). It is anticipated that garbage trucks would access the project garage via Stevenson Street to remove trash and recycling associated with the residential, retail/restaurant and museum uses.

Since the Proposed Project would provide off-street loading, and since the loading demand could be accommodated within the proposed supply, loading impacts would be ***less than significant.*** Section 5.1.2 identifies an improvement measure (**Improvement Measure 8**) to reduce the potential for double-parking on Mission Street or Third Street during move-in or move-out activities by requiring move-in and move-out, as well as larger deliveries, to be scheduled and coordinated through building management.

### 4.2.6 Emergency Vehicle Access Impacts

Emergency vehicle access to the project site would remain unchanged from existing conditions, and the Proposed Project would not change adjacent travel lanes. Emergency service providers would continue to be able to pull up to the project site from Third Street or Mission Street. Detailed plans for wet standpipes and fire exits have not been designed as part of the plans required for CEQA review, however, the building would be designed to meet the 2010 California Building Code with San Francisco Amendments. The plans would need to be reviewed and approved by the San Francisco Department of Building Inspection, the department within San Francisco that ensures that all state and local codes and requirements related to construction are met. The Proposed Project impacts on emergency vehicle access would, therefore, be ***less than significant.***

### 4.2.7 Construction Impacts

The construction impact assessment is based on currently available information from the project sponsor. Prior to construction, as part of the construction application phase, the project sponsor and construction contractor(s) would be required to meet with DPW and SFMTA staff to develop

[18] The Proposed Project would comply with San Francisco Green Building Requirements for solid waste by providing space for recycling, composting, and trash storage, collection and loading that is convenient for all users of the building. Such space is provided on Basement Level B1 of the proposed tower. Each residential floor would have one tri-sorter chute (composting, recycling, and trash) that leads down to the respective bins on Basement Level B1. For the Aronson Building, under the Residential Flex Option, solid waste would also be collected by a single tri-sorter chute. Under the Office Flex Option, solid waste would be collected by a janitorial service and brought to the loading area trash room for sorting (composting, recycling, and trash). Solid waste collection for the proposed Mexican Museum would also be collected by a janitorial service and brought to the loading area for sorting. From 706 Mission Street Project Compliance Checklist and Greenhouse Gas Analysis, August 2011.

and review truck routing plans for demolition, disposal of excavated materials, materials delivery and storage, as well as staging for construction vehicles. The construction contractor would be required to meet the *City of San Francisco's Regulations for Working in San Francisco Streets*, (the Blue Book), including those regarding sidewalk and lane closures, and would meet with SFMTA staff to determine if any special traffic permits would be required.[19] Prior to construction, the project contractor would coordinate with Muni's Street Operations and Special Events Office to coordinate construction activities and reduce any impacts to transit operations. In addition to the regulations in the Blue Book, the contractor would be responsible for complying with all city, state and federal codes, rules and regulations.

Preliminary information on the construction program, including site staging and plan, for the Proposed Project was provided by the Project Sponsor and is included in Appendix K. It is anticipated that construction of the Project would take approximately 36 months. Detailed plans for construction activities have not yet been finalized; however, there would be six partially overlapping construction phases:

Phase 1 – Demolition (6 months)
Phase 2 – Excavation and shoring (5 months)
Phase 3 – Foundation and below-grade construction (5 months)
Phase 4 – Building superstructure (14 months)
Phase 5 – Exterior finishing (12 months)
Phase 6 – Interior finishing (18 months)

Construction-related activities would typically occur Monday through Saturday, between 7 AM and 8 PM. Construction is not anticipated to occur on Sundays or major legal holidays, but may occur on an as-needed basis. The hours of construction would be stipulated by the Department of Building Inspection, and the contractor would need to comply with the San Francisco Noise Ordinance and the Blue Book, including requirements to avoid peak hour construction activities on adjacent streets and coordinate with major events at the Moscone Convention Center. [20]

Construction staging would occur primarily within the project site and the adjacent sidewalks on Mission Street and Third Street. To accommodate construction staging on the sidewalk and to provide temporary pedestrian walkways, the parking lane on Third Street and the bus stop lane on Mission Street would be closed during the entire construction duration. The Muni and Golden Gate Transit bus stop (about 120 feet in length) adjacent to the project site on Mission Street would be temporarily relocated through coordination between the transit authorities and the project sponsor. The preliminary construction site staging and plan identifies relocation of the Muni and Golden Gate Transit bus zone to the west of the existing driveway from the Jessie

[19] The SFMTA Blue Book, 7th Edition, is available on-line through SFMTA (www.sfmta.com)

[20] The San Francisco Noise Ordinance permits construction activities seven days a week, between 7 AM and 8 PM.

Square Garage. A bus stop of similar length could be provided. The existing bus shelter would be temporarily relocated with the bus stop. The plans for bus stop relocation would need to be reviewed and approved by SFMTA.

On Mission Street, parking is not permitted on either side of the street between Third Street and Fourth Street. Preliminary construction plans indicate that the Mission Street sidewalk adjacent to the project site (north side of Mission Street) would be closed for the duration of project construction, and that a truck staging zone would be implemented in the curb lane (existing bus zone). Closure of the pedestrian sidewalk at this location, without providing a covered temporary walkway in the curb travel lane would impact pedestrian access to the relocated bus zone, and impede east/west movement on Mission Street adjacent to the project site. As noted above, plans for construction activities affecting city streets would need to be reviewed and approved by DPW and SFMTA Special Projects and Street Use section. It is possible that SFMTA would not approve a street space permit to close the Mission Street sidewalk, as currently proposed, and that as part of the construction application phase, the construction contractor would work with DPW and SFMTA to ensure adequate pedestrian access to the bus zone on Mission Street – either through a temporary walkway within the sidewalk and curb lane – or signage for pedestrian detours for travel south, east and west of the project site.

The Third Street sidewalk is anticipated to remain open for the duration of project construction, and a covered pedestrian walkway would be installed within the existing sidewalk area. The newspaper rack and mailbox adjacent to the project site are proposed to be temporarily removed from the sidewalk to provide additional pedestrian circulation space. As noted above, preliminary plans call for a truck staging area adjacent to the project within the curb parking lane on Third Street. Accommodating truck staging adjacent to the project site on Third Street would require the use of four metered commercial vehicle loading/unloading spaces during construction hours. In addition during the weekday AM (7 to 9 AM) and PM (3 to 7 PM) peak periods there is a tow-away restriction on Third Street that provides for an additional northbound travel lane. The use of the curb parking lane/tow-away lane during the peak periods would impact traffic operations on Third Street, as this lane serves northbound vehicles turning left from Third Street onto Market Street and Geary Street westbound. As part of the construction application phase, DPW and SFMTA would determine whether the truck staging zone would be permitted during the AM and/or PM peak period when tow-away restrictions are in place.

Vehicular access onto Mission Street from the Jessie Square Garage would be closed from the start of demolition until the new replacement ramp structure is completed. Jessie Square Garage is anticipated to remain open and accessible via Stevenson Street during project construction.

If it is determined that temporary traffic lane closures on Third Street or Mission Street would be needed, the closures would be coordinated with the City in order to minimize the impacts on local traffic. In general, lane and sidewalk closures are subject to review and approval by the

City's Transportation Advisory Staff Committee (TASC) that consists of representatives of City departments including SFMTA, DPW, Fire, Police, Public Health, Port and the Taxi Commission.

During the construction period the poles supporting the overhead wire system on Third Street and Mission Street would need to be maintained. Support poles for the overhead wires are located on both Third Street and Mission Street, adjacent to the project site. No wires are attached via eyebolts to the existing 706 Mission Street building. On Mission Street, the Muni pole adjacent to the project site would be temporarily relocated to the Mission Street median for the duration of the project construction. This effort would be coordinated with Muni's Overhead Lines Department.

During the construction period, there would be a flow of construction-related trucks into and out of the site. The impact of construction truck traffic would be a temporary lessening of the capacities of streets due to the slower movement and larger turning radii of trucks, which may affect both traffic and Muni operations.

It is anticipated that a majority of the construction-related truck traffic would use I-80/U.S. 101, Third Street and Fourth Street to travel to and from the project site. To access the project site from I-80/U.S. 101, trucks would use the nearby off-ramps at Fremont and First Streets and Fifth/Harrison, and travel on Third Street to the project site. Trucks would then turn west into the northeast corner of the site, continue to move in a one-way direction along the north and west sides of the site, and exit from the southwest corner of the site onto Mission Street. To return to I-80/U.S. 101, trucks would use the on-ramps at First/Harrison or Fourth/Harrison. In order to avoid the impact of construction truck traffic on Market Street, preliminary plans indicate that the Mission Street center median would be cut in the vicinity of the exit ramp from the Jessie Square Garage to permit access to Mission Street eastbound. Trucks could then continue to First Street to the I-80 eastbound on-ramp at Harrison Street, or access Howard Street westbound via New Montgomery Street to Fourth Street to the I-80 westbound on-ramp at Harrison Street. The Mission Street center median would be replaced and restored following construction.

Table 23 presents the average and peak number of construction trucks and construction workers arriving at the project site on a daily basis. There would be an average of between 3 and 24 construction truck trips (one-way trips) traveling to the site on a daily basis, with the greatest number during the excavation and shoring phase. The peak number of 30 trucks per day is anticipated to occur during three of the six phases: excavation and shoring, foundation and below grade, and building superstructure.

| Table 23<br>Summary of Proposed Project Construction Trucks and Workers by Phase | | | | |
|---|---|---|---|---|
| Phase | Number of Daily Construction Trucks | | Number of Daily Construction Workers | |
| | Peak | Average | Peak | Average |
| 1. Demolition | 15 | 9 | 50 | 25 |
| 2. Excavation and Shoring | 15 | 9 | 50 | 25 |
| 3. Foundation & Below Grade | 25 | 12 | 60 | 50 |
| 4. Building Superstructure | 25 | 16 | 150 | 120 |
| 5. Exterior Finishing | 16 | 12 | 160 | 120 |
| 6. Interior Finishing | 8 | 6 | 125 | 85 |

Source: Millennium Partners, 2009.

There would be an average of between 25 and 120 construction workers per day at the project site, with the greatest number during the superstructure construction (120 to 150 workers) and exterior finishes (120 to 160 workers) phases. The trip distribution and mode split of construction workers are not known. In San Francisco, some construction workers use transit or carpool to the site, particularly when located downtown, to reduce traffic and parking problems during construction. However, it is anticipated that the addition of the worker-related vehicle- or transit-trips would not substantially affect transportation conditions, as any impacts on local intersections or the transit network would be similar to, or less than, those associated with the Proposed Project. Construction workers who drive to the site would cause a temporary parking demand. Since the nearby parking facilities currently have availability during the day, it is anticipated that construction worker parking demand could be accommodated without substantially affecting areawide parking conditions.

It is anticipated that construction activity of the Proposed Project may overlap with the construction activity of other proposed projects in the area, notably the proposed expansion of the SFMOMA on Third Street between Howard and Mission Streets and construction of the Central Subway on Fourth Street.[21] The construction activities associated with these projects would affect access, traffic operations and pedestrian movements. It is anticipated that the construction manager for each project would be required to work with the various departments of the City to develop a detailed and coordinated plan that would address construction vehicle

[21] Tunneling, via a Tunnel Boring Machine (TMB) would be used for the majority of Central Subway construction on Fourth Street. The only visible tunneling activity will occur at the portal construction location on Fourth Street between Bryant and Harrison streets, and at the excavation site on Columbus Avenue at Union Street. Construction of the Central Subway along Fourth Street would therefore not involve substantial closure of travel lanes, or significant reroutes of traffic. Increased truck activity to remove excavated materials would occur at the portal construction location on Fourth Street between Bryant and Harrison Streets. Construction of the Moscone station on Fourth Street between Clementina Street and Folsom Street and may require travel lane closures.

routing, traffic control and pedestrian movement adjacent to the construction area for the duration of the overlap in construction activity.

Prior to construction, the project contractor would coordinate with SFMTA's Street Operations and Special Events Office to coordinate construction activities and reduce any impacts to transit operations, particularly on Mission Street.

Overall, the Proposed Project construction-related transportation impacts would be ***less than significant.*** Section 5.1.2 identifies an improvement measure (**Improvement Measure 9**) to reduce potential conflicts between construction activities and pedestrians, transit and autos, including the preparation of a traffic control plan for construction, carpool and transit access for construction workers, construction truck traffic management, and project construction updates for adjacent businesses and residents.

### 4.2.8 Parking Information

San Francisco does not consider parking supply as part of the permanent physical environment and therefore, does not consider changes in parking conditions to be environmental impacts as defined by CEQA. The San Francisco Planning Department acknowledges, however, that parking conditions may be of interest to the public and the decision makers. Therefore, this report presents a parking analysis for information purposes.

Parking conditions are not static, as parking supply and demand varies from day to day, from day to night, from month to month, etc. Hence, the availability of parking spaces (or lack thereof) is not a permanent physical condition, but changes over time as people change their modes and patterns of travel.

Parking deficits are considered to be social effects, rather than impacts on the physical environment as defined by CEQA. Under CEQA, a project's social impacts need not be treated as significant impacts on the environment. Environmental documents should, however, address the secondary physical impacts that could be triggered by a social impact (CEQA Guidelines § 15131(a)). The social inconvenience of parking deficits, such as having to hunt for scarce parking spaces, is not an environmental impact, but there may be secondary physical environmental impacts, such as increased traffic congestion at intersections, air quality impacts, safety impacts, or noise impacts caused by congestion. In the experience of San Francisco transportation planners, however, the absence of a ready supply of parking spaces, combined with available alternatives to auto travel (e.g., transit service, taxis, bicycles or travel by foot) and a relatively dense pattern of urban development, induces many drivers to seek and find alternative parking facilities, shift to other modes of travel, or change their overall travel habits. Any such resulting shifts to transit service in particular, would be in keeping with the City's "Transit First" policy. The City's Transit First Policy, established in the City's Charter Article

8A, Section 8A.115. provides that "parking policies for areas well served by public transit shall be designed to encourage travel by public transportation and alternative transportation."

The transportation analysis accounts for potential secondary effects, such as cars circling and looking for a parking space in areas of limited parking supply, by assuming that all drivers would attempt to find parking at or near the project site and then seek parking farther away if convenient parking is unavailable. Moreover, the secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to others who are aware of constrained parking conditions in a given area. Hence, any secondary environmental impacts which may result from a shortfall in parking in the vicinity of the proposed project would be minor, and the traffic assignments used in the transportation analysis, as well as in the associated air quality, noise and pedestrian safety analyses, reasonably addresses potential secondary effects.

In summary, changes in parking conditions are considered to be social impacts rather than impacts on the physical environment. Accordingly, the following parking analysis is presented for informational purposes only.

**Supply:** The Proposed Project includes the reconfiguration of the existing garage from 372 public parking spaces and 70 spaces reserved/leased for the nearby Sports Club/LA uses (a total of 442 parking spaces), to 210 public parking spaces and 260 (including 43 or 68 leased spaces, depending on the Flex Option) private reserved parking.

- The 210 public parking spaces would include 11 handicapped accessible spaces (10 standard plus one van space on level B1), and five car-share spaces. Similar to existing conditions, these public spaces would include two reserved parking spaces for St. Patrick's Church, 15 spaces reserved for the Contemporary Jewish Museum, and ten spaces would now be reserved for the Mexican Museum.
- The 260 private reserved spaces would vary by flex option. The Residential Flex Option would include 215 spaces for the residential dwelling units, 43 spaces reserved for other uses (to be determined), and 2 car-share spaces. The Office Flex Option would include 191 spaces for the residential dwelling units, 68 spaces reserved for other uses, and 1 car-share parking space.

Access and egress to the Jessie Square public parking garage would remain unchanged (i.e., the public parking spaces, and not the reserved parking spaces). The primary ingress/egress to Jessie Square Garage would continue to be via Stevenson Street, and secondary egress would continue to be via Mission Street.

***Planning Code* Parking Supply Requirements (see Appendix J):**

- For dwelling units in C-3 districts with at least two bedrooms and 1,000 square feet of occupied space, *Planning Code* section 151.1 permits up to 1 parking space for each four dwelling units, and therefore, up to 53 parking spaces would be permitted for the Residential Flex Option and 47 parking spaces for the Office Flex Option. For the non-residential uses (retail/restaurant, office, and museum), the *Planning Code* permits parking not to exceed seven percent of gross floor area.
- As part of Section 309 permit review, the Proposed Project could be allowed to provide up to 215 parking spaces (up to one space per unit permitted for dwelling units with at least two bedrooms and at least 1,000 square feet of occupied space) for the Residential Flex Option and 191 parking spaces for the Office Flex Option. Both options would provide the maximum permitted, and would therefore meet the *Planning Code* requirements.
- Per the *Planning Code*, the Residential Flex Option would be required to provide two car-share parking spaces for the residential component for use by carsharing programs such as ZipCar or City CarShare, and the Office Flex Option would be required to provide one car-share parking space. The Residential Flex Option would provide two car-share parking spaces and the Office Flex Option would provide one car-share parking space, and the Proposed Project would therefore meet the car-share requirement.
- Per the *Planning Code*, the private reserved supply of 260 spaces would be required to include ten handicapped-accessible parking spaces (one handicapped-accessible space of every 25 automobile spaces provided). Overall, the public and private components of the garage would meet the *Planning Code* requirement (19 handicapped-accessible spaces of a total of 470 parking spaces).
- Per the *Planning Code*, the public parking component of the Jessie Square Garage would be required to provide handicapped-accessible and car-share parking spaces. Based on the revised number of public parking spaces at the Jessie Square Garage of 210 automobile spaces, the garage would be required to provide eight handicapped-accessible parking spaces (one handicapped-accessible parking space of every 25 automobile spaces), and four car-share parking spaces (one, plus one for every 50 parking spaces over 50). As noted above, overall the public and private components of the garage would meet the *Planning Code* requirement for handicapped-accessible spaces. Since the reconfigured public parking garage would contain five car-share spaces, it would meet and exceed the *Planning Code* requirements. A vertical clearance of 8 feet 2 inches (minimum required for van accessibility) is currently provided on the first below-grade level that would include the two van handicapped-accessible parking spaces (a vertical clearance of 7 feet is provide on the second and third below grade levels and within the mezzanine).

- Per the *Planning Code* section 167, the project sponsor would be required to unbundle the sale of parking spaces from the sale of the residential units.

**Demand:** The new uses associated with the Proposed Project would generate a long-term parking demand of between 323 and 287 spaces for the residential uses, and a short-term and long-term demand for the office, retail/restaurant and museum uses of between 43 and 103 spaces. See Table 18.

Overnight Demand

The long-term residential parking demand generally occurs during the overnight hours. Under the Residential Flex Option, the residential demand of 323 spaces would not be accommodated within the residential parking supply of 215 parking spaces, which would result in a shortfall of 108 spaces. Under the Office Flex Option, the residential demand of 287 spaces would not be accommodated within the residential parking supply of 191 spaces, which would result in a shortfall of 96 spaces. The overnight shortfall could be accommodated within the public parking component of the Jessie Square Garage or in other nearby garages. The Jessie Square Garage is open between 5 AM and 11 PM on weekdays, and between 6 AM and 11 PM on weekends. Overnight parking is permitted, however, vehicles cannot be parked or accessed during the overnight hours when the garage is closed.

Midday Demand

During the weekday midday, the residential parking demand is estimated to be about 80 percent of the overnight parking demand, or about 258 spaces for the Residential Flex Option and 230 spaces for the Office Flex Option. Depending on where vehicles were parked overnight, there would be a midday shortfall of between 43 and 108 parking spaces for the Residential Flex Option, and between 39 and 96 spaces for the Office Flex Option.

During the weekday midday period, the Proposed Project office, retail/restaurant and museum uses would generate a short-term and long-term parking demand. This demand would be accommodated within the public parking component of the Jessie Square Garage. As noted above, the Proposed Project includes the proposed reconfiguration of the garage that would reduce the number of public parking spaces from 372 to 210, and elimination of the 70 spaces reserved for the Sports Club/LA use. The demand associated with the public parking and reserved spaces needs to be considered in the comparison of the proposed supply to the projected demand for weekday midday conditions. Table 24 presents the parking supply and demand comparisons for the public parking component of the reconfigured Jessie Square Garage.

| Table 24<br>Jessie Square Garage – Public Parking Supply and Demand Comparison<br>Weekday Midday Conditions | | |
|---|---|---|
| **Supply and Demand** | **Residential Flex Option** | **Office Flex Option** |
| **Public Parking Supply** [1] | 210 | 210 |
| **Public Parking Demand** | | |
| Existing: public parking [2] | 259 | 259 |
| Existing: reserved spaces to be eliminated [3] | 70 | 70 |
| Project office, retail/restaurant and museum uses [4] | 44 | 113 |
| Total Demand | 373 | 442 |
| Shortfall | (163) | (232) |

Source: LCW Consulting

Notes:

1. With Proposed Project, of 470 total parking spaces in Jessie Square Garage, 210 would be public parking spaces (including 27 reserved spaces, and 5 car-share spaces), and 260 would be private reserved spaces (including 43 leased spaces).
2. Average 2008 and 2009 utilization of existing public parking spaces during weekday midday peak period. See Table 11.
3. Existing spaces reserved for Sports Club/LA use. As a conservative assessment demand assumed same as number of reserved spaces.
4. Short-term and long-term demand associated with proposed office, retail/restaurant and museum uses. See Table 18.

The total parking shortfall during the midday would include the residential shortfall, plus the Jessie Square Garage public parking shortfall, for a total shortfall of up to 271 spaces for the Residential Flex Option (108 maximum residential shortfall plus 163 Jessie Square Garage public parking shortfall = 271 total parking space shortfall), and 328 spaces for the Office Flex Option (96 maximum residential shortfall plus 232 Jessie Square Garage public parking shortfall = 328 total parking space shortfall). The shortfall would need to be accommodated within other off-street facilities that have available capacity. There is some availability in nearby public parking garages such as the Paramount Garage (56 percent midday occupancy) and the SFMOMA Garage (76 percent midday occupancy), while the Fifth and Mission Garage, located one block (about 800 feet) to the west of the project site, has the most availability during the weekday midday period (63 percent midday occupancy).

As noted above, in San Francisco, parking supply is not considered a permanent physical condition, and changes in the parking supply would not be a significant environmental impact under CEQA, but rather a social effect. The loss of parking may cause potential social effects, which would include cars circling and looking for a parking space in neighboring streets. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle

trips due to some drivers, who are aware of constrained parking conditions in a given area, shifting to other modes. Hence, any secondary environmental impacts that may result from a shortfall in parking would be minor.

Section 5.1.2 identifies an improvement measure (**Improvement Measure 10**) that would require the project sponsor to prepare a transportation insert for the residential and non-residential move-in packet that would provide information on transit service would encourage the use of alternative modes.

## 4.3 EXISTING PLUS VARIANT 1 CONDITIONS

Under Variant 1 (No Third Street Access – see Figure 4) the existing loading access curb cut into the project site on Third Street would be abandoned, and the resident-only ingress and car elevators into the garage that are included as part of the Proposed Project would not be constructed. Ingress and egress to the Jessie Square Garage for all vehicles (residential, non-residential, and trucks) would remain the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress-only on Mission Street.

### Traffic Impacts

Under Variant 1, ingress and egress to the Jessie Square Garage for all vehicles (residential, non-residential, and trucks) would remain the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress-only on Mission Street.

As noted in section 3.3, the assignment of the project-generated vehicle trips to the study intersections would be the same as for the Proposed Project, with the exception of the intersection of Third/Stevenson. Since under Variant 1, the Proposed Project's residential driveway access on Third Street would not be constructed, drivers accessing the project site would continue to the intersection of Third/Stevenson. As indicated in Table 16, the number of project-generated vehicles at the intersection of Third/Stevenson would increase from 147 vehicles with the Proposed Project, to 210 vehicles under Variant 1.

As indicated on Table 19, under Variant 1, with the addition of project-generated vehicle trips to the seven study intersections, weekday PM peak hour LOS conditions would remain the same as under Existing and Existing plus Project conditions. Although Variant 1 would result in additional vehicles being added to the Third/Stevenson intersection, as compared to the Proposed Project, and vehicle delay would be slightly higher, the overall operating conditions would remain at LOS B. In addition, similar to the Proposed Project, Variant 1 would not result in a significant contribution to the existing poor operating conditions at the intersections of Third/Market (LOS E) and Fourth/Market (LOS F). Therefore, the impact of Variant 1 on traffic operations would be ***less than significant.***

**Improvement Measure 1**, described in section 5.1.2, which includes review and adjustment to signal timing at the intersection of Third/Stevenson and relocation of the pedestrian signal heads on Third Street on the north side of Stevenson Street closer to the intersection, would also be applicable for Variant 1. **Improvement Measure 2**, described in section 5.1.2, which would minimize the number of vehicles accessing Stevenson Street when the Jessie Square Garage is full by installing "Garage Full" signs at the intersection of Third Street and Stevenson Street, would also be applicable for Variant 1.

**Improvement Measure 3** would not apply to Variant 1, because access from Third Street would remain similar to existing conditions, via Stevenson Street.

#### Transit Impacts

Under Variant 1, the project-generated transit trips would be the same as the Proposed Project, and therefore, impacts on local and regional transit capacity utilization would also be ***less than significant.***

Under Variant 1 the existing curb cut into the project site on Third Street would be abandoned, and ingress and egress to the Jessie Square Garage for all vehicles (residential, non-residential, and trucks) would remain the same as under existing conditions. All vehicles destined to the project parking would turn left onto Stevenson Street at the intersection of Third/Stevenson. Non-revenue Muni buses would travel within the same lane as turning vehicles, however, due to the limited number of buses within the west lanes of Third Street, impacts of Variant 1 on transit operations would be ***less than significant.***

**Improvement Measure 4**, described in section 5.1.2, which would require the project sponsor to meet with and review with SFMTA whether it would be appropriate to install eyebolts in the renovated building to support its overhead wire system, would also be applicable for Variant 1.

#### Bicycle Impacts

Variant 1 would not substantially change bicycle travel in the vicinity of the project site, and therefore, similar to the Proposed Project, impacts to bicyclists would be ***less than significant.***

#### Pedestrian Impacts

Similar to the Proposed Project, Variant 1 impacts on pedestrian LOS on sidewalks, corners, and crosswalks would be ***less than significant.***

It should be noted that, unlike the Proposed Project, under Variant 1 a new driveway for residents to access the garage from Third Street would not be constructed, and a new pedestrian-vehicle conflict zone would not be created along the Third Street west sidewalk, and therefore **Improvement Measures 6 and 7** relating to treatments and management of the Third Street driveway, and working with DPW, SFMTA, and the Planning Department to assess the

feasibility of implementing other measures treatments to reduce pedestrian-vehicle conflicts on Third Street between Market and Mission Streets would not be applicable to Variant 1.

**Improvement Measure 5**, described in section 5.1.2, which would eliminate pole clutter, reduce pedestrian obstructions on the Third Street sidewalk adjacent to the project site, would also be applicable for Variant 1.

#### Loading Impacts

Similar to the Proposed Project, Variant 1 would provide off-street loading, and since the loading demand could be accommodated within the proposed supply, loading impacts would be ***less than significant.*** **Improvement Measure 8**, described in section 5.1.2, which would require move-in and move-out, as well as larger deliveries, to be scheduled and coordinated through building management, would also be applicable for Variant 1.

#### Emergency Vehicle Access Impacts

Variant 1 would not affect emergency vehicle access to the project site or vicinity, and would not change adjacent travel lanes. Similar to the Proposed Project, Variant 1 impacts on emergency vehicle access would be ***less than significant.***

#### Construction Impacts

Construction activities associated with Variant 1 would be similar to those described for the Proposed Project, and construction-related transportation impacts would be ***less than significant.*** **Improvement Measure 9**, described in section 5.1.2, which would reduce potential conflicts between construction activities and pedestrians, transit and autos, and includes the preparation of a traffic control plan for construction, carpool and transit access for construction workers, construction truck traffic management, and project construction updates for adjacent businesses and residents, would also be applicable to Variant 1.

#### Parking Information

Under Variant 1 parking demand and supply conditions would be the same as described for the Proposed Project. **Improvement Measure 10**, described in section 5.1.2, which would require the project sponsor to prepare a transportation insert for the residential and non-residential move-in packet that would provide information on transit service would encourage the use of alternative modes, would also be applicable to Variant 1.

## 4.4 EXISTING PLUS VARIANT 2 CONDITIONS

Under Variant 2 (Residential Ingress from Third Street and Stevenson Street – see Figure 5) the existing curb cut into the project site on Third Street would remain, and would be used for residential vehicle trips entering the project site, similar to the Proposed Project. As part of this variant, rather than construct a valet drop-off area and two car elevators, a new ingress driveway ramp would be constructed to access the below grade garage levels. Otherwise, ingress and egress to the Jessie Square Garage for non-residential and truck vehicular access would remain

the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress-only on Mission Street.

#### Traffic Impacts

Under Variant 2 vehicular access to the project site would be the same as the Proposed Project, except that a ramp, rather than two car elevators, would be constructed to provide access to the below grade garage levels. Therefore, traffic impacts at the study intersections would be the same as for the Proposed Project. As described in section 4.2.1 for the Proposed Project, the impact of Variant 2 on traffic operations would be ***less than significant.***

**Improvement Measure 1**, described in section 5.1.2, which includes review and adjustment to signal timing at the intersection of Third/Stevenson and relocation of the pedestrian signal heads on Third Street on the north side of Stevenson Street closer to the intersection, would also be applicable for Variant 2. **Improvement Measure 2**, described in section 5.1.2, which would minimize the number of vehicles accessing Stevenson Street when the Jessie Square Garage is full by installing "Garage Full" signs at the intersection of Third Street and Stevenson Street, would also be applicable for Variant 2. **Improvement Measure 3,** described in section 5.1.2, which would require monitoring of the project access driveway on Third Street, and if a recurring queue occurs, employing abatement methods as needed to abate the queue, would also be applicable for Variant 2.

#### Transit Impacts

Under Variant 2, the project-generated transit trips would be the same as the Proposed Project, and therefore, impacts on local and regional transit capacity utilization would also be ***less than significant.***

Under Variant 2, the residential driveway would be located on the west side of Third Street, the same as the Proposed Project. Similar to the Proposed Project, it is not anticipated that vehicles accessing the project driveway would conflict with Muni buses that use the west side lanes for non-revenue turnbacks of Market Street buses (i.e., buses do not pick up passengers). Therefore, impact of Variant 2 driveway on transit operations would be ***less than significant.***

**Improvement Measure 4**, described in section 5.1.2, which would require the project sponsor to meet with and review with SFMTA whether it would be appropriate to install eyebolts in the renovated building to support its overhead wire system, would also be applicable for Variant 2.

#### Bicycle Impacts

Variant 2 would not substantially change bicycle travel in the vicinity of the project site, and therefore, similar to the Proposed Project, impacts to bicyclists would be ***less than significant.***

#### Pedestrian Impacts

Similar to the Proposed Project, Variant 2 impacts on pedestrian LOS on sidewalks, corners, and crosswalks would be ***less than significant.*** **Improvement Measure 5**, described in section 5.1.2, would eliminate pole clutter, reduce pedestrian obstructions on the Third Street sidewalk adjacent to the project site, and would also be applicable for Variant 2.

Similar to the Proposed Project (as described in section 4.2.4), Variant 2 would include a driveway on Third Street that would be used for residential access into the project site. This driveway would create a new pedestrian-vehicle conflict zone, which in combination with the existing Westin Hotel off-street passenger loading area driveway would compound the existing pedestrian-vehicle conflict zone along the Third Street west sidewalk. Similarly, **Improvement Measure 6** and **Improvement Measure 7**, described in section 5.1.2,which include a number of improvements to the Third Street project driveway, and working with DPW, SFMTA, and the Planning Department to assess the feasibility of implementing other measures treatments to reduce pedestrian-vehicle conflicts on Third Street between Market and Mission Streets, would also be applicable to Variant 2.

#### Loading Impacts

Similar to the Proposed Project, Variant 2 would provide off-street loading, and since the loading demand could be accommodated within the proposed supply, loading impacts would be ***less than significant.*** **Improvement Measure 8**, described in section 5.1.2, which would require move-in and move-out, as well as larger deliveries, to be scheduled and coordinated through building management, would also be applicable for Variant 2.

#### Emergency Vehicle Access Impacts

Variant 2 would not affect emergency vehicle access to the project site or vicinity, and would not change adjacent travel lanes. Similar to the Proposed Project, Variant 2 impacts on emergency vehicle access would be ***less than significant.***

#### Construction Impacts

Construction activities associated with Variant 2 would be similar to those described for the Proposed Project, and construction-related transportation impacts would be ***less than significant.*** **Improvement Measure 9**, described in section 5.1.2, which would reduce potential conflicts between construction activities and pedestrians, transit and autos, and includes the preparation of a traffic control plan for construction, carpool and transit access for construction workers, construction truck traffic management, and project construction updates for adjacent businesses and residents, would also be applicable to Variant 2.

#### Parking Information

Under Variant 2 parking demand and supply conditions would be the same as described for the Proposed Project. **Improvement Measure 10**, described in section 5.1.2, which would require the project sponsor to prepare a transportation insert for the residential and non-residential move-

in packet that would provide information on transit service would encourage the use of alternative modes, would also be applicable to Variant 2.

## 4.5 EXISTING PLUS VARIANT 3 CONDITIONS

Under Variant 3 (Residential Ingress from Mission Street and from Stevenson Street – see Figure 6) the existing curb cut into the project site on Third Street would be abandoned. The existing Jessie Square Garage egress-only driveway ramp and curb cut on Mission Street would be widened from 16-feet 8-inches to 25 feet to allow for two-way operations. Ingress via this driveway would be permitted for resident vehicular ingress only. Otherwise, ingress/egress to the Jessie Square Garage for non-residential and truck vehicular access would remain the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress on Mission Street.

#### Traffic Impacts

Under Variant 3 the existing curb cut into the project site would be abandoned. Inbound access to the residential parking would be via the existing Jessie Square Garage egress-only driveway ramp on Mission Street that would be widened to allow for two-way operations. To access the revised ramp, residents traveling to the site by auto on Third Street northbound would turn left at Mission Street, while vehicles traveling westbound on Mission Street would continue through at Third Street (as opposed to turning right).

Variant 3 would not substantially affect the study intersection operations, and as shown in Table 19, weekday PM peak hour LOS conditions would remain the same as under Existing plus Project conditions. In addition, similar to the Proposed Project, Variant 3 would not result in a significant contribution to the existing poor operating conditions at the intersections of Third/Market (LOS E) and Fourth/Market (LOS F). Therefore, the impact of Variant 3 on traffic operations would be ***less than significant.***

**Improvement Measure 1**, described in section 5.1.2, which includes review and adjustment to signal timing at the intersection of Third/Stevenson and relocation of the pedestrian signal heads on Third Street on the north side of Stevenson Street closer to the intersection, would also be applicable for Variant 3. **Improvement Measure 2**, described in section 5.1.2, which would minimize the number of vehicles accessing Stevenson Street when the Jessie Square Garage is full by installing "Garage Full" signs at the intersection of Third Street and Stevenson Street, would also be applicable for Variant 3.

**Improvement Measure 12 (**similar to Improvement Measure 3 related to Third Street) for Variant 3 would require monitoring of the Jessie Square Garage ingress driveway on Mission Street, and if a recurring queue occurs, employing abatement methods as needed to abate the queue.

**Improvement Measure 3** would not apply to Variant 3, because access from Third Street would remain similar to existing conditions, via Stevenson Street.

#### Transit Impacts

Under Variant 3, the project-generated transit trips would be the same as the Proposed Project, and therefore, impacts on local and regional transit capacity utilization would also be ***less than significant.***

Under Variant 3, the existing Jessie Square Garage egress-only driveway ramp and curb cut on Mission Street would be widened to allow for two-way operations. Ingress via this driveway would be permitted for resident vehicular ingress only.

Based on SFMTA review of operations at the Muni bus stop and the project number of inbound residential vehicles that would be destined to the garage via Mission Street, it was determined that the new ingress would not substantially conflict with Muni and Golden Gate Transit bus operations on Mission Street.

Under Variant 3, the new Mission Street ingress into Jessie Square Garage would have one entry gate with an access gate located about 130 feet from the building line. A queuing analysis was conducted to determine whether the residential vehicles entering the garage would queue out into the adjacent travel lanes on Mission Street, thereby blocking Mission Street transit operations. As described above for the Proposed Project, the number of vehicles accessing the project site during the PM peak hour would be 71 vehicles under the Residential Flex Option and 63 vehicles under the Office Flex Option. Based on the PM peak hour residential demand of 71 vehicles, the 95th percentile queue would be less than two vehicles. Queuing analysis calculation sheets are included in Appendix E. The maximum queue would therefore be accommodated with the ramp and would not spill back onto the sidewalk or adjacent travel lanes. The impact of spillover into the adjacent travel lanes from the garage operations would be ***less than significant.***

**Improvement Measure 4**, described in section 5.1.2, which would require the project sponsor to meet with and review with SFMTA whether it would be appropriate to install eyebolts in the renovated building to support its overhead wire system, would also be applicable for Variant 3.

#### Bicycle Impacts

Variant 3 would not substantially change bicycle travel in the vicinity of the project site, and therefore, similar to the Proposed Project, impacts to bicyclists would be ***less than significant.***

#### Pedestrian Impacts

Similar to the Proposed Project, Variant 3 impacts on pedestrian LOS on sidewalks, corners, and crosswalks would be ***less than significant.*** **Improvement Measure 5**, described in section 5.1.2, which would eliminate pole clutter, reduce pedestrian obstructions on the Third Street sidewalk adjacent to the project site, would also be applicable for Variant 3.

Variant 3 would widen the existing Jessie Square Garage driveway on Mission Street to enable vehicular ingress as well as egress. This would result in an intensification of a driveway across a sidewalk with high pedestrian volumes, located adjacent to a bus stop/zone on Mission Street. Similar to Third Street, Mission Street is designated in the San Francisco *General Plan* as a Neighborhood Pedestrian Street (Neighborhood Commercial) and as a Citywide Pedestrian Network Street. While Variant 3 would intensify an existing moderate pedestrian hazard and conflict with the proposed Mission Street ingress to Jessie Street Garage, it would not create a hazardous condition for pedestrian access to the project site because the vehicles accessing the garage would be accommodated within the ramp, and would not spill back onto the sidewalk or adjacent travel lanes.

Section 5.1.2 identifies **Improvement Measure 13** (similar to **Improvement Measure 6** regarding Third Street) for Variant 3, to minimize pedestrian-vehicle conflicts adjacent to the project by positioning a traffic control attendant at the project driveway and by ensuring adequate on-site queuing space on Mission Street. Correspondingly, **Improvement Measure 6** and **Improvement Measure 7**, relating to design measures to address and reducing existing vehicle-pedestrian conflict areas on Third Street, would not be applicable to Variant 3.

#### Loading Impacts

Similar to the Proposed Project, Variant 3 would provide off-street loading, and since the loading demand could be accommodated within the proposed supply, loading impacts would be ***less than significant.*** **Improvement Measure 8**, described in section 5.1.2, which would require move-in and move-out, as well as larger deliveries, to be scheduled and coordinated through building management, would also be applicable for Variant 3.

#### Emergency Vehicle Access Impacts

Variant 3 would not affect emergency vehicle access to the project site or vicinity, and would not change adjacent travel lanes. Similar to the Proposed Project, Variant 3 impacts on emergency vehicle access would be ***less than significant.***

#### Construction Impacts

Construction activities associated with Variant 3 would be similar to those described for the Proposed Project, and construction-related transportation impacts would be ***less than significant.*** **Improvement Measure 9,** described in section 5.1.2, which would reduce potential conflicts between construction activities and pedestrians, transit and autos, and includes the preparation of a traffic control plan for construction, carpool and transit access for construction workers, construction truck traffic management, and project construction updates for adjacent businesses and residents, would also be applicable to Variant 3.

#### Parking Information

Under Variant 3 parking demand and supply conditions would be the same as described for the Proposed Project. **Improvement Measure 10**, described in section 5.1.2, which would require

the project sponsor to prepare a transportation insert for the residential and non-residential move-in packet that would provide information on transit service would encourage the use of alternative modes, would also be applicable to Variant 3.

## 4.6 EXISTING PLUS VARIANT 4 CONDITIONS

Under Variant 4 (Truck and Service Vehicle Access from Third Street – see Figure 7) the existing curb cut into the project site on Third Street would remain, and an ingress-only driveway ramp into the garage would be constructed. As part of this variant, rather than permit residents to utilize this new driveway, only trucks and service vehicles would be permitted use of the new driveway, while residents would enter via the Stevenson Street driveway. The Mission Street driveway would remain egress-only. As under existing conditions, small trucks and service vehicles could exit via the Mission Street driveway (9-feet 6-inches clear), while larger trucks would need to exit via the Stevenson Street driveway (13-feet 6-inches clear). Otherwise, ingress and egress to the Jessie Square Garage for residential and non-residential vehicular access would remain the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress-only on Mission Street.

#### Traffic Impacts

Under Variant 4, the existing curb cut into the project site on Third Street would remain, and an ingress-only driveway ramp into the garage would be constructed, similar to Variant 2. As part of this variant, rather than permit residents to utilize this new driveway, only trucks and service vehicles would be permitted use of the new driveway, while residents would enter via the Stevenson Street driveway. Since trucks would be pulling into the driveway front-first (i.e., not backing into a loading space), trucks would not likely need to conduct access maneuvers within Third Street.

Under Variant 4, the Mission Street driveway would remain egress-only. As under existing conditions, small trucks and service vehicles could exit via the Mission Street exit driveway (9-feet 6-inches clear), while larger trucks would need to exit via the Stevenson Street driveway (13-feet 6-inches clear). Otherwise, ingress and egress to the Jessie Square Garage for residential and non-residential vehicular access would remain the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress-only on Mission Street.

With the exception of the relatively minor volume of delivery vehicles, the vehicular access for Variant 4 would be the same as under Variant 1, which would provide access for residential, non-residential, and truck vehicles the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress on Mission Street. Therefore, the intersection analysis results for Variant 4 would be the same as presented in Table 19 for Existing plus Variant 1 conditions.

The proposed land uses are projected to generate about 40 truck and service vehicle trips per day, with most trips occurring between 10 AM and 1 PM. The average hour (outside peak demand period) truck trip generation (demand) for the Propose Project is anticipated to be two truck trips. When compared to the Proposed Project, the use of the Third Street driveway and ramp to access the loading area would reduce the number of midmorning and mid-afternoon inbound truck and service vehicle trips on Stevenson Street by about five to seven trips per hour. However, outbound truck and service vehicle trips would continue to exit via the Mission Street and Stevenson Street driveways, and outbound truck volumes on Stevenson Street would therefore be the same as with the Proposed Project. Similar to existing conditions, delivery and service vehicles would exit primarily via the Stevenson Street driveway, although vans and small trucks would be able to use the Mission Street exit.

As indicated on Table 19, under Variant 4, with the addition of project-generated vehicle trips to the seven study intersections, weekday PM peak hour LOS conditions would remain the same as under Existing and Existing plus Project conditions. In addition, similar to the Proposed Project, Variant 4 would not result in a significant contribution to the existing poor operating conditions at the intersections of Third/Market (LOS E) and Fourth/Market (LOS F). Therefore, the impact of Variant 4 on traffic operations would be ***less than significant.***

**Improvement Measure 1**, described in section 5.1.2, which includes review and adjustment to signal timing at the intersection of Third/Stevenson and relocation of the pedestrian signal heads on Third Street on the north side of Stevenson Street closer to the intersection, would also be applicable for Variant 4. **Improvement Measure 2**, described in section 5.1.2, which would minimize the number of vehicles accessing Stevenson Street when the Jessie Square Garage is full by installing "Garage Full" signs at the intersection of Third Street and Stevenson, would also be applicable for Variant 4.

**Improvement Measure 3,** described in section 5.1.2, which would require the monitoring of the project access driveways, would not apply to Variant 4, since vehicle access to the garage would be similar to existing conditions.

#### Transit Impacts

Under Variant 4, the project-generated transit trips would be the same as the Proposed Project, and therefore, impacts on local and regional transit capacity utilization would also be ***less than significant.***

The potential conflicts between project vehicles and Muni buses associated with Variant 4 would be similar to those identified for the Proposed Project. However, due to the limited number of truck and service vehicles generated by the Proposed project uses, the potential for conflicts with non-revenue Muni buses would be substantially reduced, and impacts on Variant 4 on transit operations would be ***less than significant.***

**Improvement Measure 4,** described in section 5.1.2, which would require the project sponsor to meet with and review with SFMTA whether it would be appropriate to install eyebolts in the renovated building to support its overhead wire system, would also be applicable for Variant 4.

#### Bicycle Impacts

Variant 4 would not substantially change bicycle travel in the vicinity of the project site, and therefore, similar to the Proposed Project, impacts to bicyclists would be ***less than significant.***

#### Pedestrian Impacts

Similar to the Proposed Project, Variant 4 impacts on pedestrian LOS on sidewalks, corners, and crosswalks would be ***less than significant.*** **Improvement Measure 5**, described in section 5.1.2, would eliminate pole clutter, reduce pedestrian obstructions on the Third Street sidewalk adjacent to the project site, and would also be applicable for Variant 4.

Variant 4 would allow trucks to access the project site from Third Street, which would increase the potential for conflicts between trucks/service vehicles and pedestrians. The existing driveway on Third Street is currently used for small trucks and service vehicles to serve the existing uses on the project site, and under Variant 4 this use would intensify. As described above, the proposed land uses are projected to generate about 40 truck and service vehicle trips per day, with most trips occurring between 10 AM and 1 PM. The average hour (outside peak demand period) truck trip generation (demand) for the Propose Project is anticipated to be two truck trips.

Section 5.1.2 identifies **Improvement Measure 14** for Variant 4, which would limit the hours of use of the Third Street driveway for truck access in order to not coincide with peak pedestrian volumes on Third Street. No trucks should be permitted to access the project site via the Third Street driveway between 7 AM and 7 PM, seven days per week.

Correspondingly **Improvement Measure 6** and **Improvement Measure 7**, relating to design measures to address and reduce existing vehicle-pedestrian conflict areas on Third Street would not be applicable to Variant 4.

#### Loading Impacts

Similar to the Proposed Project, Variant 4 would provide off-street loading, and since the loading demand could be accommodated within the proposed supply, loading impacts would be ***less than significant.*** **Improvement Measure 8**, described in section 5.1.2, which would require move-in and move-out, as well as larger deliveries, to be scheduled and coordinated through building management, would also be applicable for Variant 4.

#### Emergency Vehicle Access Impacts

Variant 4 would not affect emergency vehicle access to the project site or vicinity, and would not change adjacent travel lanes. Similar to the Proposed Project, Variant 4 impacts on emergency vehicle access would be ***less than significant.***

#### Construction Impacts

Construction activities associated with Variant 4 would be similar to those described for the Proposed Project, and construction-related transportation impacts would be ***less than significant.*** **Improvement Measure 9**, described in section 5.1.2, which would reduce potential conflicts between construction activities and pedestrians, transit and autos, and includes the preparation of a traffic control plan for construction, carpool and transit access for construction workers, construction truck traffic management, and project construction updates for adjacent businesses and residents, would also be applicable to Variant 4.

#### Parking Information

Under Variant 4 parking demand and supply conditions would be the same as described for the Proposed Project. **Improvement Measure 10**, described in section 5.1.2, which would require the project sponsor to prepare a transportation insert for the residential and non-residential move-in packet that would provide information on transit service would encourage the use of alternative modes, would also be applicable to Variant 4.

## 4.7 EXISTING PLUS VARIANT 5 CONDITIONS

Under Variant 5 (Residential Drop-off within Aronson Building – see Figure 8), the existing curb cut into the project site on Third Street would remain, and would only be used for residential vehicle trips entering the project site, similar to the Proposed Project. As part of this variant a residential drop-off area adjacent to and south of the driveway (the residential drop-off area would be provided within the Aronson Building). Similar to the Proposed Project, two car elevators would be constructed to access the below grade garage levels. Otherwise, ingress and egress to the Jessie Square Garage for non-residential and truck vehicular access would remain the same as under existing conditions – primary ingress/egress on Stevenson Street, and secondary egress-only on Mission Street.

#### Traffic Impacts

Since Variant 5 would be the same as the Proposed Project, except that the on-site residential drop-off area would be provided within the Aronson Building, traffic impacts at the study intersections would be the same as for the Proposed Project. Since the vehicular access for Variant 5 would be the same as under the Proposed Project, the intersection analysis results would be the same as presented in Table 19 for Existing plus Project conditions. As indicated on Table 19, under Variant 5, with the addition of project-generated vehicle trips to the seven study intersections, weekday PM peak hour LOS conditions would remain the same as under Existing and Existing plus Project conditions. In addition, similar to the Proposed Project, Variant 5

would not result in a significant contribution to the existing poor operating conditions at the intersections of Third/Market (LOS E) and Fourth/Market (LOS F). Therefore, the impact of Variant 5 on traffic operations would be ***less than significant.***

**Improvement Measure 1**, described in section 5.1.2, which includes review and adjustment to signal timing at the intersection of Third/Stevenson and relocation of the pedestrian signal heads on Third Street on the north side of Stevenson Street closer to the intersection, would also be applicable for Variant 5. **Improvement Measure 2**, described in section 5.1.2, which would minimize the number of vehicles accessing Stevenson Street when the Jessie Square Garage is full by installing "Garage Full" signs at the intersection of Third Street and Stevenson, would also be applicable for Variant 5. **Improvement Measure 3,** described in section 5.1.2, which would require monitoring of the project access driveway on Third Street, and if a recurring queue occurs, employing abatement methods as needed to abate the queue, would also be applicable for Variant 5.

#### Transit Impacts

Under Variant 5, the project-generated transit trips would be the same as the Proposed Project, and therefore, impacts on local and regional transit capacity utilization would also be ***less than significant.***

Under Variant 5, the residential driveway would be located on the west side of Third Street, the same as the Proposed Project. Similar to the Proposed Project, it is not anticipated that vehicles accessing the project driveway would conflict with Muni buses that use the west side lanes for non-revenue turnbacks of Market Street buses (i.e., buses do not pick up passengers). Therefore, impact of Variant 5 driveway on transit operations would be ***less than significant.***

**Improvement Measure 4**, described in section 5.1.2, which would require the project sponsor to meet with and review with SFMTA whether it would be appropriate to install eyebolts in the renovated building to support its overhead wire system, would also be applicable for Variant 5.

#### Bicycle Impacts

Variant 5 would not substantially change bicycle travel in the vicinity of the project site, and therefore, similar to the Proposed Project, impacts to bicyclists would be ***less than significant.***

#### Pedestrian Impacts

Similar to the Proposed Project, Variant 5 impacts on pedestrian LOS on sidewalks, corners, and crosswalks would be ***less than significant.*** **Improvement Measure 5**, described in section 5.1.2, would eliminate pole clutter, reduce pedestrian obstructions on the Third Street sidewalk adjacent to the project site, and would also be applicable for Variant 5.

Similar to the Proposed Project (as described in section 4.2.4), Variant 5 would include a driveway on Third Street that would be used for residential access into the project site. This

driveway would create a new pedestrian-vehicle conflict zone, which in combination with the existing Westin Hotel off-street passenger loading area driveway would compound the existing pedestrian-vehicle conflicts along the Third Street west sidewalk. Similar to the Proposed Project, **Improvement Measure 6** and **Improvement Measure 7**, described in section 5.1.2, include a number of improvements to the Third Street project driveway, and working with DPW, SFMTA, and the Planning Department to assess the feasibility of implementing other measures treatments to reduce pedestrian-vehicle conflicts on Third Street between Market and Mission Streets, would also be applicable to Variant 5.

#### Loading Impacts

Similar to the Proposed Project, Variant 5 would provide off-street loading, and since the loading demand could be accommodated within the proposed supply, loading impacts would be ***less than significant.*** **Improvement Measure 8**, described in section 5.1.2, which would require move-in and move-out, as well as larger deliveries, to be scheduled and coordinated through building management, would also be applicable for Variant 5.

#### Emergency Vehicle Access Impacts

Variant 5 would not affect emergency vehicle access to the project site or vicinity, and would not change adjacent travel lanes. Similar to the Proposed Project, Variant 5 impacts on emergency vehicle access would be ***less than significant.***

#### Construction Impacts

Construction activities associated with Variant 2 would be similar to those described for the Proposed Project, and construction-related transportation impacts would be ***less than significant.***

**Improvement Measure 9**, described in section 5.1.2, which would reduce potential conflicts between construction activities and pedestrians, transit and autos, and includes the preparation of a traffic control plan for construction, carpool and transit access for construction workers, construction truck traffic management, and project construction updates for adjacent businesses and residents, would also be applicable to Variant 5.

#### Parking Information

Under Variant 5 parking demand and supply conditions would be the same as described for the Proposed Project. **Improvement Measure 10,** described in section 5.1.2, which would require the project sponsor to prepare a transportation insert for the residential and non-residential move-in packet that would provide information on transit service would encourage the use of alternative modes, would also be applicable to Variant 5.

## 4.8 EXISTING PLUS VARIANT 6 CONDITIONS

Variant 6 (Jessie Square Garage Vehicular Ingress/Egress from Mission Street Only, except for Trucks and Service Vehicles – see Figure 9) would be similar to Variant 3 described above, except that no autos would be allowed to enter or exit the Jessie Square Garage via Stevenson

Street. Under Variant 6, all auto access would be via Mission Street.[22] Under this variant, the existing curb cut into the project site on Third Street would be abandoned. The existing Jessie Square Garage egress-only driveway ramp and curb cut on Mission Street would be widened from 16-feet 8-inches to 25 feet to allow for two-way operations. As under existing conditions, small trucks and service vehicles could exit via the Mission Street driveway (9-feet 6-inches clear).

Ingress and egress to the Jessie Square Garage via Stevenson Street would be restricted to existing and project-generated truck and service vehicles.

**Traffic Impacts**

Under Variant 6, all auto access into and out of the Jessie Square Garage and Proposed Project would be via the existing Jessie Square Garage Mission Street egress-only driveway ramp that would be widened to allow for two-way operations. To access the revised ramp, drivers traveling to the site by auto on Third Street northbound would turn left at Mission Street, while drivers traveling westbound on Mission Street would continue through at Third Street (as opposed to turning right). As indicated on Table 16, during the PM peak hour, there would be a total of 113 vehicles entering and 181 vehicles exiting the Jessie Square Garage via the Mission Street driveway.

Under Variant 6, trucks and service vehicles would be permitted to utilize the existing entrance/exit to the Jessie Square Garage on Stevenson Street.

Table 19 presents the weekday PM peak hour intersection LOS operating conditions for Existing plus Variant 6 conditions at the seven study intersections. Since autos traveling to and from the Jessie Square Garage would no longer access the garage via Stevenson Street, the number of vehicles at the intersection of Third/Stevenson would decrease from Existing conditions. As a result, during the PM peak hour, the intersection operations would improve to LOS D.

However, under Variant 6 all vehicles exiting the Jessie Square Garage would exit onto Mission Street, which would increase the number of westbound vehicles at the Mission Street approach to Fourth Street, and would result in some vehicles making around the block movements via Market Street eastbound to access the destinations east of Third Street.[23] During the weekday PM peak hour, unlike the Proposed Project, Variant 6 would result in a significant contribution to the existing poor operating conditions at the intersections of Fourth/Market (LOS F), and

[22] This transportation study does not assess the feasibility of reconfiguring the Jessie Square Garage to provide inbound and outbound access via Mission Street only. The analysis assumes that similar vehicle and bicycle parking, and loading facilities, as included as part of the Proposed Project would be provided.

[23] Since left turns from Mission Street eastbound are not permitted, vehicles destined to locations south and east would make around-the-block routings via Market Street to assess southbound and eastbound streets.

therefore the impact of Variant 6 on traffic operations at the intersection of Fourth/Market during the PM peak hour would be ***significant.***[24]

At the intersection of Fourth/Market, travel lane capacity has been maximized, and providing additional travel lanes to mitigate impacts would require reductions in sidewalk widths, which would require reconstruction of the BART stairways and elevators, and would be inconsistent with the transit and pedestrian environment encouraged by the City of San Francisco. Signal timing adjustments would be infeasible due to the traffic, transit, and pedestrian signal timing requirements, and the need to maintain transit signal priority along Market Street. Therefore, Variant 6 traffic impacts at the intersection of Fourth/Market would be ***significant and unavoidable.***

**Mission Street Garage Operations** – A queuing analysis was conducted to determine whether the vehicles entering the Jessie Square Garage would queue out into the adjacent travel lanes, thereby blocking Mission Street traffic and transit operations. Under Variant 6, the Jessie Square Garage entrance/exit at Stevenson Street would be closed to all vehicles except for truck deliveries and service vehicles, and both existing Jessie Square Garage and project-generated vehicles (excluding trucks) would enter and exit via a widened Mission Street ramp.

Both AM and PM peak hour conditions were assessed for the queuing analysis (see Appendix E). During the PM peak hour, the number of vehicles entering the garage would be 113 vehicles, which includes 37 existing vehicles entering Jessie Square Garage via the Stevenson Street entrance/exit (September 2010 counts), and 76 inbound vehicles generated by the Proposed Project uses. AM peak hour conditions were estimated by assuming that all vehicles accessing Stevenson Street from Third Street would be entering the garage (during the AM peak hour 102 vehicles make the left turn from Third Street onto Stevenson Street – these include vehicles destined to the Jessie Square Garage, the Four Seasons passenger loading area, the Four Seasons garage, and on-street loading operations), and factoring the PM peak hour Proposed Project trip generation to reflect AM peak hour conditions. During the AM peak hour, it was estimated that the Proposed Project uses would generate about 46 inbound vehicle trips (21 residential, 20 office, 2 retail/restaurant, and 3 museum, for a total of 44 vehicles). In total, during the AM peak hour there would be a maximum of 148 vehicles that would access the garage under Variant 6 conditions.

[24] At the intersection of Fourth/Market, which currently operates at LOS F conditions during the PM peak hour, the Proposed Project would add 31 vehicle trips during the PM peak hour. At this intersection, the southbound through/left movement operates at LOS F conditions and the eastbound through/right operates at LOS E conditions. The project would add 12 vehicle trips to the southbound through/left movement, which represent less than 1 percent of the PM peak hour southbound through/left volume of 1,302 vehicles, and would not be considered considerable. The project contribution to the eastbound through/right would be 6.3 percent for project-generated vehicles only, and 7.0 percent for combined existing Jessie Square Garage and project-generated vehicle. Therefore, the contribution to the overall intersection LOS F conditions would be considered significant.

Under Variant 6, the Jessie Square Garage would have one entry gate with an automated ticket machine located about 130 feet from the building line on Mission Street. Based on the AM peak hour demand, the 95th percentile queue would be less than five vehicles. Queuing analysis calculation sheets are included in Appendix E. The maximum queue could therefore be accommodated with the ramp and would not spill back onto the sidewalk or adjacent travel lanes. The impact of inbound queue spillover into the adjacent travel lanes from the garage operations would be ***less than significant.*** Although less than significant, an improvement measure is recommended for this Variant (and Variant 7 below). **Improvement Measure 11**, described in section 5.1.2, would reduce the potential for queuing on Mission Street by vehicles accessing the Jessie Square Garage when it is full by installing a "Garage Full" sign at the garage entrance on Mission Street, would be applicable for Variant 6.

**Improvement Measures 1, 2 and 3**, described in section 5.1.2, which relate to traffic improvements for garage access to and from Stevenson Street, would not be applicable for Variant 6.

**Improvement Measure 12** and **Improvement Measure 13,** described in section 5.1.2, which would require monitoring of the Jessie Square Garage access driveway on Mission Street, and if a recurring queue occurs, employing abatement methods as needed to abate the queue, and also providing a driveway attendant from 7 AM to 7 PM, would also be applicable for Variant 6.

#### Transit Impacts

Under Variant 6, the project-generated transit trips would be the same as the Proposed Project, and therefore, impacts on local and regional transit capacity utilization would also be ***less than significant.***

Under Variant 6, the existing curb cut into the project site on Third Street would be abandoned, however, the existing Jessie Square Garage egress-only driveway ramp and curb cut on Mission Street would be widened to allow for two-way operations. Similar to Variant 3, providing inbound access for residents on Mission Street, could potentially conflict with Muni and Golden Gate Transit bus operations on Mission Street. Buses would be delayed if drivers waiting to access the Jessie Square Garage driveway block the curb travel lane/transit only lane, which would occur when vehicles have to yield to pedestrians on the north Mission Street sidewalk adjacent to the project site. Additionally, a conflict could occur if a bus was loading at the western portion of the bus zone, and vehicles entering the garage would enter the transit only lane and either have to wait until bus enters back into traffic or turn in front of the loading bus in an attempt to enter the garage.

During the PM peak hour, the number of vehicles entering and exiting via the Mission Street driveway would increase from 45 vehicles (all outbound) under Existing conditions, to 294 vehicles (113 inbound and 181 outbound). Therefore, Variant 6 would introduce a significant

new traffic and transit conflict for the 14-Mission and 14L-Mission Limited Muni bus lines, potentially cause unsafe traffic maneuvering in front of transit vehicles and make it more difficult for transit vehicles stopped in the bus zone to merge back into Mission Street traffic. For these reasons, the Variant 6 impacts on transit operations would be considered ***significant.***

The significant conflict would be generated by vehicles inbound to the parking garage that could not be controlled. Therefore, no mitigation is feasible, and Variant 6 impacts on transit operations on Mission Street would remain ***significant and unavoidable.***

**Improvement Measure 4**, described in section 5.1.2, which would require the project sponsor to meet with and review with SFMTA whether it would be appropriate to install eyebolts in the renovated building to support its overhead wire system, would also be applicable for Variant 6.

#### Bicycle Impacts

Variant 6 would not substantially change bicycle travel in the vicinity of the project site, and therefore, similar to the Proposed Project, impacts to bicyclists would be ***less than significant.***

#### Pedestrian Impacts

Similar to the Proposed Project, Variant 6 impacts on pedestrian LOS on sidewalks, corners, and crosswalks would be ***less than significant.*** **Improvement Measure 5**, described in section 5.1.2, which would eliminate pole clutter, reduce pedestrian obstructions on the Third Street sidewalk adjacent to the project site, and would also be applicable for Variant 6.

Variant 6 would widen the existing Jessie Square Garage driveway on Mission Street to enable vehicular ingress as well as egress for existing Jessie Square Garage autos (trucks would continue to access the loading areas within Jessie Square Garage via Stevenson Street). This would result in a intensification of an existing vehicle-pedestrian conflict across a sidewalk with high pedestrian volumes, located adjacent to a bus stop/zone on Mission Street. Similar to Third Street, Mission Street is designated in the San Francisco *General Plan* as a Neighborhood Pedestrian Street (Neighborhood Commercial) and as a Citywide Pedestrian Network Street, and Variant 6 would intensify an existing moderate pedestrian hazard and conflict with the proposed Mission Street ingress to Jessie Street Garage. **Improvement Measure 13,** which would provide a driveway attendant on Mission Street, would reduce the amount of pedestrian-vehicle conflicts that could occur at this location.

Correspondingly **Improvement Measure 6** and **Improvement Measure 7**, relating to design measures to address and reducing existing vehicle-pedestrian conflict areas on Third Street would not be applicable to Variant 6.

#### Loading Impacts

Similar to the Proposed Project, Variant 6 would provide off-street loading, and since the loading demand could be accommodated within the proposed supply, loading impacts would be ***less than***

***significant.*** **Improvement Measure 8**, described in section 5.1.2, which would require move-in and move-out, as well as larger deliveries, to be scheduled and coordinated through building management, would also be applicable for Variant 6.

#### Emergency Vehicle Access Impacts

Variant 6 would not affect emergency vehicle access to the project site or vicinity, and would not change adjacent travel lanes. Similar to the Proposed Project, Variant 6 impacts on emergency vehicle access would be ***less than significant.***

#### Construction Impacts

Construction activities associated with Variant 6 would be similar to those described for the Proposed Project, and construction-related transportation impacts would be ***less than significant.***

**Improvement Measure 9**, described in section 5.1.2, which would reduce potential conflicts between construction activities and pedestrians, transit and autos, and includes the preparation of a traffic control plan for construction, carpool and transit access for construction workers, construction truck traffic management, and project construction updates for adjacent businesses and residents, would also be applicable to Variant 6.

#### Parking Information

Under Variant 6 parking demand and supply conditions would be the same as described for the Proposed Project. **Improvement Measure 10**, described in section 5.1.2, which would require the project sponsor to prepare a transportation insert for the residential and non-residential move-in packet that would provide information on transit service would encourage the use of alternative modes, would also be applicable to Variant 6.

## 4.9 EXISTING PLUS VARIANT 7 CONDITIONS

Variant 7 (All Jessie Square Garage Vehicular Ingress/Egress from Mission Street – see Figure 10) would be the same as Variant 6, except that all delivery and service vehicles would also enter and exit from Mission Street. Under Variant 7, no cars or trucks would be allowed to enter or exit the Jessie Square Garage via Stevenson Street from Third Street. The existing ramp and curb cut on Mission Street would need to be widened and the vertical clearance increased to accommodate both ingress and egress by truck, and the existing curb cut on Third Street would be removed (as noted in Variant 4, the existing Mission Street driveway has a vertical clearance of 9-feet 6-inches clear permitting only small trucks and service vehicle to use this driveway, while the Stevenson Street driveway has 13-feet 6-inches clear).

All ingress and egress to the Jessie Square Garage for existing and Proposed Project residential and non-residential vehicular access would be via Mission Street. The entrance/exit to the Jessie Square Garage on Stevenson Street would be closed.

#### Traffic Impacts

Under Variant 7, all project-generated and existing Jessie Square Garage vehicle trips (including trucks and service vehicles) would be restricted to the reconfigured Mission Street driveway. Traffic operations under Variant 7 would be similar to those described for Variant 6 in section 4.8 above. Under Variant 7, all delivery and service vehicles would also enter and exit from the Mission Street driveway, however, during the PM peak hour, the truck and service vehicle demand would be low and would not substantially affect intersection operations. As under Variant 6, traffic impacts at the intersection of Fourth/Market would be ***significant and unavoidable.***

Mission Street garage operations would also be similar as described for Variant 6, and impacts related to inbound queue spillover into the adjacent travel lanes would be ***less than significant.*** **Improvement Measure 11**, described in section 5.1.2, which would reduce the potential for queuing on Mission Street by vehicles accessing the Jessie Square Garage when it is full by installing a "Garage Full" sign at the garage entrance on Mission Street, would also be applicable for Variant 7.

**Improvement Measure 12** and **Improvement Measure 13,** described in section 5.1.2, which would require monitoring of the Jessie Square Garage access driveway on Mission Street, and if a recurring queue occurs, employing abatement methods as needed to abate the queue, and also require providing a driveway attendant from 7 AM to 7 PM, would also be applicable for Variant 7.

**Improvement Measures 1, 2 and 3**, described in section 5.1.2, which relate to traffic improvements for garage access to and from Stevenson Street, would not be applicable for Variant 7.

#### Transit Impacts

Under Variant 7, the project-generated transit trips would be the same as the Proposed Project, and therefore, impacts on local and regional transit capacity utilization would also be ***less than significant.***

Similar to Variant 6, Variant 7 would result in significant impacts on transit operations on Mission Street. Since Variant 7 would require that all existing and project-generated trucks and service enter and exit via Mission Street, the potential for conflicts between vehicles entering and exiting the garage and transit on Mission Street would increase over Variant 6 conditions.[25] The significant conflict would be generated by trucks inbound to the parking garage that could not be controlled. Therefore, no mitigation is feasible, and Variant 7 impact on transit operations on Mission Street would remain ***significant and unavoidable.***

[25] A portion of Argent Hotel loading/unloading occurs within Jessie Square Garage parking level B1.

**Improvement Measure 4**, described in section 5.1.2, which would require the project sponsor to meet with and review with SFMTA whether it would be appropriate to install eyebolts in the renovated building to support its overhead wire system, would also be applicable for Variant 7.

#### Bicycle Impacts

Variant 7 would not substantially change bicycle travel in the vicinity of the project site, and therefore, similar to the Proposed Project, impacts to bicyclists would be ***less than significant.***

#### Pedestrian Impacts

Similar to Variant 6, Variant 7 impacts on pedestrian LOS on sidewalks, corners, and crosswalks would be ***significant.*** **Improvement Measure 5**, described in section 5.1.2, would eliminate pole clutter, reduce pedestrian obstructions on the Third Street sidewalk adjacent to the project site, and would also be applicable for Variant 7. **Improvement Measure 13,** which would provide a driveway attendant on Mission Street, would reduce the amount of pedestrian-vehicle conflicts that could occur at this location.

Variant 7 would allow trucks to access the project site from Mission Street, which would increase the potential for conflicts between trucks/service vehicles and pedestrians. The existing driveway on Mission Street currently is too constrained for truck access, but under Variant 7 the driveway would be enlarged to allow truck ingress and egress. As described above, the proposed land uses are projected to generate about 40 truck and service vehicle trips per day, with most trips occurring between 10 AM and 1 PM. The average hour (outside peak demand period) truck trip generation (demand) for the Propose Project is anticipated to be two truck trips.

Section 5.1.2 identifies **Improvement Measure 15** for Variant 7, which would limit the hours of use of the Mission Street driveway for truck access in order to not coincide with peak pedestrian volumes on Mission Street. No trucks should be permitted to access the project site via the Third Street driveway between 7 AM and 7 PM, seven days per week.

Correspondingly **Improvement Measure 6** and **Improvement Measure 7**, relating to design measures to address and reduce existing pedestrian-vehicle conflict areas on Third Street, would not be applicable to Variant 7.

#### Loading Impacts

Similar to the Proposed Project, Variant 7 would provide off-street loading, and since the loading demand could be accommodated within the proposed supply, loading impacts would be ***less than significant.*** **Improvement Measure 8**, described in section 5.1.2, which would require move-in and move-out, as well as larger deliveries, to be scheduled and coordinated through building management, would also be applicable for Variant 7.

#### Emergency Vehicle Access Impacts

Variant 7 would not affect emergency vehicle access to the project site or vicinity, and would not change adjacent travel lanes. Similar to the Proposed Project, Variant 7 impacts on emergency vehicle access would be ***less than significant.***

#### Construction Impacts

Construction activities associated with Variant 7 would be similar to those described for the Proposed Project, and construction-related transportation impacts would be ***less than significant.*** **Improvement Measure 9**, described in section 5.1.2, which would reduce potential conflicts between construction activities and pedestrians, transit and autos, and includes the preparation of a traffic control plan for construction, carpool and transit access for construction workers, construction truck traffic management, and project construction updates for adjacent businesses and residents, would also be applicable to Variant 7.

#### Parking Information

Under Variant 7 parking demand and supply conditions would be the same as described for the Proposed Project. **Improvement Measure 10**, described in section 5.1.2, which would require the project sponsor to prepare a transportation insert for the residential and non-residential move-in packet that would provide information on transit service would encourage the use of alternative modes, would also be applicable to Variant 7.

## 4.10 FUTURE 2030 CUMULATIVE CONDITIONS

### 4.10.1 Approach

Future year 2030 Cumulative traffic conditions were based on the traffic analysis conducted for the Transit Center District Plan EIR. The San Francisco County Transportation Authority (SFCTA) countywide travel demand forecasting model was used to develop future year 2030 Cumulative traffic volumes at the study intersections and transit ridership projections. The SFCTA model output, based on projections developed for the Transit Center District Plan, takes into account both the future development expected in the Transbay/South of Market area, as well as the expected growth in housing and employment for the remainder of San Francisco and the nine-county Bay Area.

### 4.10.2 Traffic Impacts

Figure 20 presents the 2030 Cumulative traffic volumes for weekday PM peak hour for the seven study intersections, while Table 25 presents a comparison between the Existing and 2030 Cumulative intersection operating conditions for the weekday PM peak hour. Under 2030 Cumulative conditions vehicle delays would increase at the study intersections over Existing conditions, and all seven study intersections would operate at LOS F conditions (as compared with two at LOS E or LOS F under Existing conditions).

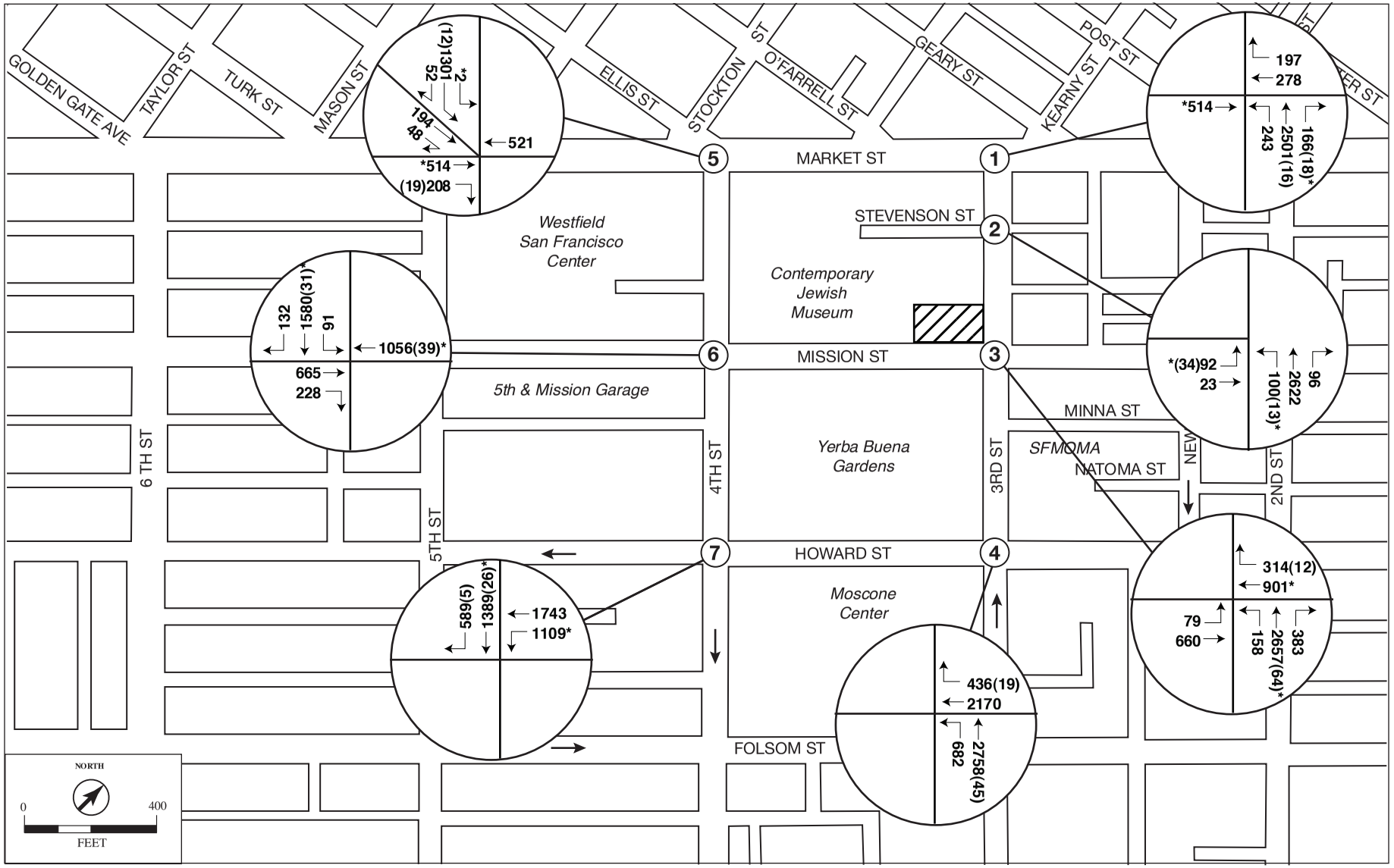




**FIGURE 20: CUMULATIVE TRAFFIC VOLUMES**
**WEEKDAY PM PEAK HOUR**

| Table 25<br>Intersection Level of Service<br>Existing and 2030 Cumulative Conditions – Weekday PM Peak Hour | | | | |
|---|---|---|---|---|
| Intersection | Existing | | 2030 Cumulative | |
| | Delay (v/c)[1] | LOS | Delay (v/c)[1] | LOS |
| 1. Third/Market | **56.2** | **E** | **>80(1.02)** | **F** |
| 2. Third/Stevenson | 12.1 | B | **>80(1.08)** | **F** |
| 3. Third/Mission | 20.1 | C | **>80(1.2)** | **F** |
| 4. Third/Howard | 36.1 | D | **>80(1.4)** | **F** |
| 5. Fourth/Market | **>80(1.1)** | **F** | **>80(1.35)** | **F** |
| 6. Fourth/Mission | 41.8 | D | **>80(1.25)** | **F** |
| 7. Fourth/Howard | 42.5 | D | **>80(1.16)** | **F** |

Source: LCW Consulting.
Note:
1. Delay presented in seconds per vehicle. Intersections operating at LOS E or LOS F highlighted in **bold.**
Volume-to-capacity (v/c) ratio is presented for intersections operating at LOS F.

The Proposed Project contribution to 2030 Cumulative traffic volumes at the critical movements was examined (presented in Appendix D). Based on this assessment, it was determined that Proposed Project vehicle trips would represent less than cumulatively considerable contributions to intersections operating at LOS E or LOS F, and therefore, traffic impacts at the study intersections would be ***less than significant.***

- At the intersection of **Third/Market,** the Proposed Project would add 34 vehicle trips during the PM peak hour. At this intersection, the northbound approach would continue to operate at LOS F conditions. The project would add 34 vehicle trips to the northbound movement, which would represent approximately 1.2 percent of the total PM peak hour northbound approach volume of 2,910 vehicles. The project contribution to this poorly-operating approach would not be considerable, and therefore the contribution to the overall intersection LOS F conditions under 2030 Cumulative conditions would not be considered significant.
- At the intersection of **Third/Mission,** the Proposed Project would add 76 vehicle trips during the PM peak hour. At this intersection, the northbound and eastbound approaches would operate at LOS F conditions. The project would add no vehicles to the eastbound approach and 64 vehicle trips to the northbound movement, which would represent approximately 2.0 percent of the total PM peak hour northbound approach volume of 3,198 vehicles. The project contribution to this poorly-operating approach would not be considerable, and therefore the contribution to the overall intersection LOS F conditions under 2030 Cumulative conditions would not be considered significant.
- At the intersection of **Third/Howard,** the Proposed Project would add 64 vehicle trips during the PM peak hour. At this intersection, both the northbound and westbound approaches would operate at LOS F conditions. The project would add 45 vehicle trips to

the northbound movement, which would represent approximately 1.3 percent of the total PM peak hour northbound approach volume of 3,440 vehicles, and 19 vehicle trips to the westbound movement, which would represent about 0.7 percent of the total PM peak hour approach volume of 2,606 vehicles. The project contribution to these poorly-operating approaches would not be considerable, and therefore the contribution to the overall intersection LOS F conditions under 2030 Cumulative conditions would not be considered significant.

- At the intersection of **Fourth/Market**, the Proposed Project would add 31 vehicle trips during the PM peak hour. At this intersection, the southbound through/left movement and eastbound approach would operate at LOS F conditions. The project would add 12 vehicle trips to the southbound through/left movement, which represent less than 1 percent of the PM peak hour southbound through/left volume of 1,502 vehicles. The project would add 19 vehicles to the eastbound approach, which represents about 2.6 percent of the eastbound approach volume of 722 vehicles. The project contribution to these poorly-operating approaches would not be considerable, and therefore, the contribution to the overall intersection LOS F conditions under 2030 Cumulative conditions would not be considered significant.
- At the intersection of **Fourth/Mission**, the Proposed Project would add 70 vehicle trips during the PM peak hour. At this intersection, the southbound through/left movement and westbound approach (critical movement changes from eastbound to westbound between existing and 2030 Cumulative conditions) would operate at LOS F conditions. The project would add 31 vehicle trips to the southbound through/left movement, which represents approximately 1.9 percent of the PM peak hour southbound through/left volume of 1,665 vehicles. The project would add 39 vehicles to the westbound approach, which represents about 3.7 percent of the eastbound approach volume of 1,056 vehicles. The project contribution to these poorly-operating approaches would not be considerable, and therefore, the contribution to the overall intersection LOS F conditions under 2030 Cumulative conditions would not be considered significant.
- At the intersection of **Fourth/Howard**, the Proposed Project would add 31 vehicle trips during the PM peak hour. At this intersection, the southbound through/right movement would operate at LOS F conditions. The project would add 31 vehicle trips to this approach, which represents about 1.6 percent of the PM peak hour southbound approach volume of 1,972 vehicles. The project contribution to this poorly-operating approach would not be considerable, and therefore, the contribution to the overall intersection LOS F conditions under 2030 Cumulative conditions would not be considered significant.

The poor operating conditions at the seven study intersections would be due to traffic volume increases associated with other developments in the Proposed Project vicinity. Since the Proposed Project would not result in considerable contribution to these operating conditions, the

Proposed Project's impacts at these intersections would be ***less than significant.*** No mitigation measures would be required.

The contributions to critical movements were also examined for the seven variants, and calculations are included in Appendix D. For project Variants 1 through 5, the project-generated vehicle contributions to the critical movements at the seven study intersections would not result in a considerable contribution, and therefore, the Proposed Project impacts for Variants 1 through 5 would also be less than significant.

For Variants 6 and 7, the reassignment of both existing Jessie Square Garage and project-generated traffic to and from Mission Street would result in the significant contributions at the intersections of Fourth/Market (contribution of 5.7 percent) and Fourth/Mission (contribution of 12.9 percent). Review of the contributions of only the Proposed Project traffic, indicated that the contributions would remain ***significant***. Therefore:

- Variant 6 would contribute considerably to critical movements at the intersection of Fourth/Market that would operate at LOS F under 2030 Cumulative conditions, and contribution would be considered ***significant project and cumulative impact.***
- Variant 6 would contribute considerably to critical movements at the intersection of Fourth/Mission that would operate at LOS F under 2030 Cumulative conditions, and contribution would be considered ***significant project and cumulative impact.***
- Variant 7 would contribute considerably to critical movements at the intersection of Fourth/Market that would operate at LOS F under 2030 Cumulative conditions, and contribution would be considered ***significant project and cumulative impact.***
- Variant 7 would contribute considerably to critical movements at the intersection of Fourth/Mission that would operate at LOS F under 2030 Cumulative conditions, and contribution would be considered ***significant project and cumulative impact.***

At the intersections of **Fourth/Market** and **Fourth/Mission,** travel lane capacity has been maximized, and providing additional travel lanes to mitigate impacts would require reductions in sidewalk widths, which would require reconstruction of the BART stairways and elevators at the intersection of Fourth/Market, and would be inconsistent with the transit and pedestrian environment encouraged by the City of San Francisco. Conversion of bus-only lanes on either Fourth Street or Mission Street to mixed flow travel lanes would provide additional capacity, but would be inconsistent with the transit environmental encouraged by the City of San Francisco. Signal timing adjustments would be infeasible due to the traffic, transit, and pedestrian signal timing requirements, and the need to maintain transit signal priority along Market Street and Mission Street. Therefore, Variant 6 and Variant 7 traffic impacts at the intersections of Fourth/Market and Fourth Mission would remain significant and unavoidable:

- Variant 6 significant project and cumulative impacts at the intersection of Fourth/Market would remain ***significant and unavoidable.***

- Variant 6 significant project and cumulative impacts at the intersection of Fourth/Mission would remain ***significant and unavoidable.***
- Variant 7 significant project and cumulative impacts at the intersection of Fourth/Market would remain ***significant and unavoidable.***
- Variant 7 significant project and cumulative impacts at the intersection of Fourth/Mission would remain ***significant and unavoidable.***

### 4.10.3 Transit Impacts

Future year 2030 Cumulative Muni and regional transit screenlines were obtained from the transit analysis conducted for the Transit Center District Plan EIR.

Table 26 presents the Muni screenline analysis for 2030 Cumulative conditions for the weekday PM peak hour. Under 2030 Cumulative weekday PM peak hour conditions, the future year ridership would exceed Muni's capacity utilization standard of 85 percent at the following corridors:

- Northwest Screenline – Geary, California, Sutter/Clement, Chestnut/Union
- Southeast Screenline – Third, Other
- Southwest Screenline – Subway

The contribution of the Proposed Project to 2030 Cumulative PM peak hour transit ridership on these corridors was conducted to determine if they would have a significant contribution to transit ridership. The Proposed Project would contribute between one and eight transit trips to the Muni corridors operating at greater than 85 percent capacity utilization under 2030 Cumulative conditions, which would be less than 1.0 percent of total ridership, and would not be a cumulatively considerable contribution. Therefore, the Proposed Project's contribution to the 2030 Cumulative capacity utilization exceedances for Muni operations would be ***less than significant.***

**Table 26**
**Muni Screenline Analysis**
**Existing and 2030 Cumulative Conditions – Weekday PM Peak Hour**

| Screenline/Corridor | Existing | | | 2030 Cumulative | | |
|---|---|---|---|---|---|---|
| | Ridership | Capacity | Utilization | Ridership | Capacity | Utilization |
| **Northeast** | | | | | | |
| Kearny/Stockton | 1,129 | 2,010 | 56% | 1,328 | 1,694 | 78% |
| Other | 757 | 1,589 | 48% | 1,522 | 2,065 | 74% |
| *Subtotal* | *1,886* | *3,599* | *52%* | *2,850* | *3,759* | *76%* |
| **Northwest** | | | | | | |
| Geary | 1,684 | 2,230 | 76% | **2,485** | **2,700** | **92%** |
| California | 1,413 | 2,050 | 69% | **2,275** | **2,050** | **111%** |
| Sutter/Clement | 565 | 1,008 | 56% | **849** | **945** | **90%** |
| Fulton/Hayes | 861 | 1,260 | 68% | 1,144 | 1,638 | 70% |
| Balboa | 615 | 1,247 | 49% | 647 | 1,326 | 49% |
| Chestnut/Union | 1,483 | 2,328 | 64% | **1,732** | **2,013** | **86%** |
| *Subtotal* | *6,621* | *10,123* | *65%* | ***9,132*** | ***10,672*** | ***86%*** |
| **Southeast** | | | | | | |
| Third | 554 | 714 | 78% | **2,827** | **2,856** | **99%** |
| Mission | 1,254 | 2,350 | 53% | 1,546 | 2,256 | 69% |
| San Bruno/Bayshore | 1,671 | 2,256 | 74% | 2,492 | 3,008 | 83% |
| Other | 1,189 | 1,708 | 70% | **1,661** | **1,820** | **91%** |
| *Subtotal* | *4,668* | *7,028* | *66%* | ***8,526*** | ***9,940*** | ***86%*** |
| **Southwest** | | | | | | |
| Subway | **5,883** | **6,783** | **87%** | **7,364** | **7,973** | **92%** |
| Haight/Noriega | 1,247 | 2,140 | 58% | 1,530 | 1,890 | 81% |
| Other | 304 | 700 | 43% | 345 | 840 | 41% |
| *Subtotal* | *7,434* | *9,623* | *77%* | ***9,239*** | ***10,703*** | ***86%*** |
| ***Total All Screenlines*** | *20,609* | *30,373* | *68%* | *29747* | *35,074* | *85%* [1] |

Source: *Transit Center District Plan Transportation Impact Study*, AECOM, September 2011.
Note:
Screenlines and corridors operating at capacity utilization greater than 85 percent are highlighted in **bold.**
1. Total All Screenlines would operate at 84.8 percent capacity utilization and would not exceed the 85 percent threshold.

As indicated in Table 27, under 2030 Cumulative conditions, transit ridership on regional transit lines is projected to exceed the available capacity at several corridors, and capacity utilization standards would not be met for BART to the East Bay, AC Transit, and Golden Gate Transit bus lines. In addition, ferry service to the North Bay would approach 100 percent of capacity.

**Table 27**
**Regional Screenline Analysis**
**Existing and 2030 Cumulative Conditions – Weekday PM Peak Hour**

| Screenline/Corridor | Existing | | | 2030 Cumulative | | |
|---|---|---|---|---|---|---|
| | Ridership | Capacity | Utilization | Ridership | Capacity | Utilization |
| **East Bay** | | | | | | |
| BART | 20,067 | 24,150 | 83% | **33,140** | **24,400** | **113%** |
| AC Transit | 2,517 | 4,193 | 60% | **7,689** | **6,600** | **117%** |
| Ferries | 702 | 1,519 | 46% | 2,178 | 2,719 | 80% |
| *Subtotal* | *23,286* | *29,862* | *78%* | *43,007* | *38,719* | *111%* |
| **North Bay** | | | | | | |
| GGT buses | 1,397 | 2,205 | 63% | **2,564** | **2,205** | **118%** |
| Ferries | 906 | 1,700 | 53% | 1,663 | 1,700 | 99% |
| *Subtotal* | *2,303* | *3,905* | *59%* | *4,227* | *3,905* | *109%* |
| **South Bay** | | | | | | |
| BART | 10,202 | 16,800 | 61% | 12,019 | 21,000 | 57% |
| Caltrain | 1,986 | 3,250 | 61% | 4,084 | 6,400 | 64% |
| SamTrans | 575 | 940 | 61% | 412 | 940 | 44% |
| Ferries | 0 | 0 | 0% | 76 | 300 | 25% |
| *Subtotal* | *12,763* | *20,990* | *61%* | *16,591* | *28,640* | *58%* |
| ***Total All Screenlines*** | **38,352** | ***54,757*** | ***70%*** | ***63,870*** | **71,264** | **90%** |

Source: *Transit Center District Plan Transportation Impact Study*, AECOM, September 2011.

During the PM peak hour, the Proposed Project's contribution to cumulative ridership on these regional transit operators would not represent a considerable contribution (a total of 31 transit trips). The contributions of the Proposed Project to the regional operators that would exceed 100 percent capacity utilization under 2030 Cumulative conditions would be less than 1.0 percent. Therefore, the Proposed Project's contribution to the 2030 Cumulative capacity utilization exceedances for the regional transit operators would be ***less than significant.***

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# Chapter 5
# MITIGATION AND IMPROVEMENT MEASURES

This chapter presents the transportation mitigation measures that would be required to reduce the impacts of the Proposed Project to less-than-significant levels. In addition, improvement measures have been identified that would improve conditions where there would be non-significant impacts. These measures were developed for the Existing plus Project and 2030 Cumulative conditions, as appropriate.

## 5.1 EXISTING PLUS PROJECT CONDITIONS

The following sections describe the Mitigation Measures and Improvement Measures identified for the Proposed Project and Project Variants for Existing plus Project conditions.

Table 28 summarizes the transportation impacts associated with the Proposed Project and Project Variants and identifies the significance determination, while Table 29 identifies the improvement measures that would be applicable to the Proposed Project and Project Variants for Existing plus Project conditions.

### 5.1.1 Mitigation Measures

No mitigation measures have been identified for Existing Plus Project conditions.

### 5.1.2 Improvement Measures (see Table 29)

**Improvement Measure 1: Signal Timing Modifications**

As an improvement measure to enhance ability of drivers exiting Stevenson Street at Third Street to merge into and across Third Street traffic flow, the signal timing and off-sets could be revised by SFMTA to ensure that sufficient clearance time is provided so that vehicles do not spill back into the midblock intersection (the intersection is currently striped "KEEP CLEAR"). In addition, the pedestrian signal heads on the north side of Stevenson Street could be relocated closer to the intersection to reduce the propensity of pedestrians crossing Stevenson Street during a red pedestrian phase (and thereby green phase for the Stevenson Street eastbound approach).

**Improvement Measure 2: "Garage Full" Sign on Third Street**

As an improvement measure to minimize the number of vehicles accessing Stevenson Street when the Jessie Square Garage is full, the project sponsor shall strive to install, or cause to be installed, an LED (or similar) "Garage Full" sign at the intersection of Third Street at Stevenson Street.

**Table 28**
**Summary of Transportation Impacts[1] for Proposed Project and Project Variants[2]**
**Existing plus Project Conditions**

| Impact | Proposed Project | Variant 1 | Variant 2 | Variant 3 | Variant 4 | Variant 5 | Variant 6 | Variant 7 |
|---|---|---|---|---|---|---|---|---|
| **Traffic Impacts** | | | | | | | | |
| Intersections operating at LOS D | LTS | LTS | LTS | LTS | LTS | LTS | -- | -- |
| Third/Market (LOS E) | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |
| Fourth/Market (LOS F) | LTS | LTS | LTS | LTS | LTS | LTS | **SU** | **SU** |
| **Transit Impacts** | | | | | | | | |
| Muni and Regional Screenlines | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |
| Transit Operations | LTS | LTS | LTS | LTS | LTS | LTS | **SU** | **SU** |
| **Bicycle Impacts** | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |
| **Pedestrian Impacts** | | | | | | | | |
| Sidewalk, Corner & Crosswalk LOS | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |
| Garage Driveways | LTS | -- | LTS | LTS | LTS | LTS | LTS | LTS |
| **Loading Impacts** | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |
| **Emergency Vehicle Access Impacts** | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |
| **Construction Impacts** | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |

Source: LCW Consulting.

Notes:

1. LTS = Less than Significant, SU = Significant and Unavoidable. Significant impacts highlighted in **bold.**

2. Vehicular Access Summary:

Project: Residential ingress from Third St, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 3A.

Variant 1: No access on Third St, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 4.

Variant 2: Residential ingress from Third St but no ground floor valet parking, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 5.

Variant 3: No access on Third St, residential ingress from Mission Street, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 6.

Variant 4: Loading ingress only on Third St, ingress/egress from Stevenson St & secondary egress onto Mission St. See Figure 7.

Variant 5: Residential ingress from Third St, residential drop-off/valet within Aronson Building, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 8.

Variant 6: Jessie Square Garage and Proposed Project ingress/egress on Mission St, except for existing and project truck and service vehicle access on Stevenson St. See Figure 9.

Variant 7: All Jessie Square Garage and Proposed Project ingress/egress on Mission St. Stevenson St ramp closed to all traffic. See Figure 10.

**Table 29**
**Summary of Transportation Improvement Measures for Proposed Project and Project Variants[1, 2]**
**Existing plus Project Conditions**

| Improvement Measure | Proposed Project | Variant 1 | Variant 2 | Variant 3 | Variant 4 | Variant 5 | Variant 6 | Variant 7 |
|---|---|---|---|---|---|---|---|---|
| 1. Signal Timing Modifications | X | X | X | X | X | X | -- | -- |
| 2. "Garage Full" sign at Third/Stevenson | X | X | X | X | X | X | -- | -- |
| 3. Queue Abatement: Third St Driveway | X | -- | X | -- | -- | X | -- | -- |
| 4. Installation of Eyebolts | X | X | X | X | X | X | X | X |
| 5. Consolidation of Signal and Wire Poles | X | X | X | X | X | X | X | X |
| 6. Pedestrian Measures on Third Street | X | -- | X | -- | -- | X | -- | -- |
| 7. Reduce Pedestrian-Vehicle Conflict Areas | X | -- | X | -- | -- | X | -- | -- |
| 8. Coordination of Moving Activities | X | X | X | X | X | X | X | X |
| 9. Coordination of Construction Activities | X | X | X | X | X | X | X | X |
| 10. Transportation Demand Management | X | X | X | X | X | X | X | X |
| 11. "Garage Full" Sign on Mission Street | -- | -- | -- | -- | -- | -- | X | X |
| 12. Queue Abatement: Mission St Driveway | -- | -- | -- | X | -- | -- | X | X |
| 13. Mission Street Driveway Attendant | -- | -- | -- | X | -- | -- | X | X |
| 14. Third Street Truck Access Restrictions | -- | -- | -- | -- | X | -- | -- | -- |
| 15. Mission Street Truck Access Restrictions | -- | -- | -- | -- | -- | -- | -- | X |

Source: LCW Consulting.

Notes:

1. X = Improvement Measure is Applicable. -- = Improvement Measure is Not Applicable.

2. Vehicular Access Summary:

Project: Residential ingress from Third St, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 3A.

Variant 1: No access on Third St, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 4.

Variant 2: Residential ingress from Third St but no ground floor valet parking, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 5.

Variant 3: No access on Third St, residential ingress from Mission Street, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 6.

Variant 4: Loading ingress only on Third St, ingress/egress from Stevenson St & secondary egress onto Mission St. See Figure 7.

Variant 5: Residential ingress from Third St, residential drop-off/valet within Aronson Building, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 8.

Variant 6: Jessie Square Garage and Proposed Project ingress/egress on Mission St, except for existing and project truck and service vehicle access on Stevenson St. See Figure 9.

Variant 7: All Jessie Square Garage and Proposed Project ingress/egress on Mission St. Stevenson St ramp closed to all traffic. See Figure 10.

**Improvement Measure 3: Monitoring and Abatement of Queues on Third Street**
As an improvement measure to reduce the potential for queuing by vehicles accessing the project site, it shall be the responsibility of the owner/operator of the Proposed Project to ensure that recurring vehicle queues do not occur on Third Street adjacent to the Proposed Project site. A vehicle queue is defined as one or more vehicles (destined to the parking facility) blocking any portion of the Third Street sidewalk or roadway for a consecutive period of three minutes or longer on a daily and/or weekly basis.

If the Planning Director, or his or her designee, suspects that a recurring queue is present, the Planning Department shall notify the project sponsor in writing. Upon request, the owner/operator shall hire a qualified transportation consultant to evaluate the conditions at the site for no less than 7 days. The consultant shall prepare a monitoring report to be submitted to the Department for review. If the Planning Department determines that a recurring queue does exist, the facility owner/operator shall have 90 days from the date of the written determination to abate the queue.

**Improvement Measure 4: Installation of Eyebolts**
As an improvement measure to reduce pole clutter on Third Street and on Mission Street, the project sponsor could review with SFMTA whether it would be appropriate to install eyebolts in the renovated building to support its overhead wire system.

**Improvement Measure 5: Consolidation of Traffic Signal and Overhead Wire Poles**
As an improvement measure to eliminate pole clutter and reduce pedestrian obstructions on the Third Street sidewalk adjacent to the project site, and to improve pedestrian flow, it may be possible to consolidate the three traffic signal and overhead wire poles, and relocate the existing mailbox which extends further from the curb than the adjacent newspaper rack. (The newspaper rack and mailbox are proposed to be removed from the sidewalk during project construction.)

**Improvement Measure 6: Pedestrian Measures on Third Street**
Improvement Measure 6 includes the following measures to reduce conflicts between pedestrians and vehicles on Third Street adjacent to the project site.

- During peak periods of pedestrian activity on Third Street (7 AM to 7 PM), the project sponsor shall staff the driveway entry on Third Street with a traffic control attendant to facilitate vehicular ingress into the project driveway from Third Street.
- The project sponsor shall provide adequate valet service to ensure that queuing space for a minimum of two vehicles within the internal drop-off area is available at all time (the internal driveway can accommodate up to six vehicles).
- The project sponsor shall use alternate pavement treatment for the sidewalk at the driveway on Third Street, as determined appropriate by DPW, SFMTA, and the Planning Department.

- The project sponsor shall explore the potential for providing audio and/or visual treatments to alert pedestrians that a vehicle is about to cross the sidewalk from the adjacent travel lanes (typically such treatments are for vehicles exiting, not entering a driveway).

**Improvement Measure 7: Reduce Pedestrian-Vehicle Conflict Areas**
Pedestrian conditions on Third Street between Mission and Market Streets include an existing pedestrian-vehicle conflict area associated with the Westin Hotel passenger loading operations located on the west side of Third Street. To improve the pedestrian experience on Third Street between Mission and Market Streets, the project sponsor shall work with DPW, SFMTA, and the Planning Department to assess the feasibility of other measures or treatments to reduce pedestrian-vehicle conflicts in this area. Measures to be assessed for feasibility could include the construction of bulb outs at the intersection of Third and Mission Streets, additional signage, alternate pavement treatment for sidewalks at driveways, automated warning devices, and/or the potential reconfiguration of parking and loading strategies in the area. The project sponsor shall cooperate with the City in seeking the consent to or participation in such measures by other property owners on Third Street between Mission and Market Streets, provided that such measures shall not be required for the project where such consent or participation cannot be secured in a reasonable, timely, and economic manner.

**Improvement Measure 8: Coordination of Move-In and Move-Out Activities**
To ensure that residential move-in and move-out activities do not impede traffic flow on Mission Street or Third Street, move-in and move-out operations, as well as larger deliveries should be scheduled and coordinated through building management.

**Improvement Measure 9: Coordination of Construction Activity**
Traffic Control Plan for Construction – As an improvement measure to reduce potential conflicts between construction activities and pedestrians, transit and autos, SFMTA could require that the contractor prepare a traffic control plan for project construction. The Project Sponsor and construction contractor(s) would meet with DPW, SFMTA, the Fire Department, Muni, and other City agencies to coordinate feasible measures to reduce traffic congestion, including temporary transit stop relocations (if determined necessary) and other measures to reduce potential traffic and transit disruption and pedestrian circulation effects during construction of the Proposed Project, as well as construction of nearby projects such as the SFMOMA Expansion to the south. The contractor would be required to comply with the *City of San Francisco's Regulations for Working in San Francisco Streets (Blue Book)*, which establish rules and permit requirements so that construction activities can be done safely and with the least possible interference with pedestrians, bicyclists, transit and vehicular traffic

Carpool and Transit Access For Construction Workers – As an improvement measure to minimize parking demand associated with construction workers, the project sponsor could

request the construction contractor to encourage carpooling and transit access to the site by construction workers.

Construction Truck Traffic Management – As an improvement measure to minimize construction traffic impacts on Third Street and Mission Street, and on pedestrian, transit and traffic operations, the construction contractor could be required to retain San Francisco Police Department traffic control officers during peak construction periods.

Project Construction Updates for Adjacent Businesses and Residents – As an improvement measure to minimize construction impacts on access for nearby institutions and businesses, SFDPW could require the project sponsor to provide nearby residences and adjacent businesses with regularly-updated information regarding project construction, including construction activities, peak construction vehicle activities (e.g., concrete pours), travel lane closures, and lane closures. The information should include contact information, including that the public can contact SFMTA General Enforcement Division for blocked driveways and access, DPW's Street Use and Mapping for complaints regarding construction activities interfering with travel lanes, or the San Francisco Police Department (SFPD) for violations related to construction street space permits issued by DPW or Special Traffic Permits issues by SFMTA. A web site could be created by project sponsor that would provide current construction information of interest to neighbors.

**Improvement Measure 10: Transportation Demand Management**

As an improvement measure to encourage use of alternative modes, and reduce the Proposed Project's parking demand and parking shortfall, the project sponsor could provide a transportation insert for the move-in packet. This packet could provide information on transit service (Muni and BART lines, schedules and fares), information on where transit passes could be purchased, and information on the 511 Regional Rideshare Program.

**Improvement Measure 11: "Garage Full" Sign on Mission Street**

As an improvement measure to minimize the number of vehicles accessing the Jessie Square Garage from Mission Street when the garage is full, an LED (or similar) "Garage Full" sign could be installed at the driveway entrance on Mission Street.

**Improvement Measure 12: Monitoring and Abatement of Queues on Mission Street**

As an improvement measure to reduce the potential for queuing by vehicles accessing the project site, it shall be the responsibility of the owner/operator of Jessie Square Garage to ensure that recurring vehicle queues do not occur on Mission Street adjacent to the Proposed Project site. A vehicle queue is defined as one or more vehicles (destined to the parking facility) blocking any portion of the Mission Street sidewalk or roadway for a consecutive period of three minutes or longer on a daily and/or weekly basis.

If the Planning Director, or his or her designee, suspects that a recurring queue is present, the Planning Department shall notify the project sponsor in writing. Upon request, the owner/operator shall hire a qualified transportation consultant to evaluate the conditions at the site for no less than 7 days. The consultant shall prepare a monitoring report to be submitted to the Department for review. If the Planning Department determines that a recurring queue does exist, the facility owner/operator of the Jessie Square Garage shall have 90 days from the date of the written determination to abate the queue.

**Improvement Measure 13: Pedestrian Measures on Mission Street**
During peak periods of pedestrian activity on Mission Street (7 AM to 7 PM), the project sponsor shall staff the driveway entry on Mission Street with a traffic control attendant to facilitate vehicular ingress and egress at the project driveway on Mission Street.

**Improvement Measure 14: Truck Access Restrictions on Third Street**
The project sponsor should limit the hours of use of the Third Street driveway for truck access in order to avoid peak pedestrian volumes on Third Street. No trucks should be permitted to access the project site via the Third Street driveway during the following hours: between 7 AM and 9AM, between 12 and 1 PM, and between 4 and 6 PM, Monday through Friday. The hours of restrictions could be modified by the Planning Department based on post-occupancy monitoring.

**Improvement Measure 15: Truck Access Restrictions on Mission Street**
The project sponsor should limit the hours of use of the Mission Street driveway for truck access in order to avoid peak pedestrian volumes on Mission Street. No trucks should be permitted to access the project site via the Mission Street driveway during the following hours: between 7 AM and 9AM, between 12 and 1 PM, and between 4 and 6 PM, Monday through Friday. The hours of restrictions could be modified by the Planning Department based on post-occupancy monitoring.

## 5.2 2030 CUMULATIVE CONDITIONS

Table 30 summarizes the traffic and transit impacts associated with the Proposed Project and Project Variants and identifies the significance determination for 2030 Cumulative conditions.

### 5.2.1 Mitigation Measures

#### Traffic

Under 2030 Cumulative conditions, all seven study intersections are projected to operate at LOS F conditions during the weekday PM peak hour. The Proposed Project, and Variants 1 through 5 would have less than significant contributions at these seven intersections, and impacts on 2030 Cumulative traffic conditions would be less than significant. No mitigation measures would be required.

**Table 30**
**Summary of Transportation Impacts for Proposed Project and Project Variants[1,2]**
**2030 Cumulative Conditions**

| Impact | Proposed Project | Variant 1 | Variant 2 | Variant 3 | Variant 4 | Variant 5 | Variant 6 | Variant 7 |
|---|---|---|---|---|---|---|---|---|
| **Traffic Impacts** | | | | | | | | |
| Third/Market (LOS F) | LTS | LTS | LTS | LTS | LTS | LTS | **SU** | **SU** |
| Third/Stevenson (LOS F) | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |
| Third/Mission (LOS F) | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |
| Third/Howard (LOS F) | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |
| Fourth/Market (LOS F) | LTS | LTS | LTS | LTS | LTS | LTS | **SU** | **SU** |
| Fourth/Mission (LOS E) | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |
| Fourth/Howard (LOS F) | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |
| **Transit Impacts** | | | | | | | | |
| Muni and Regional Screenlines | LTS | LTS | LTS | LTS | LTS | LTS | LTS | LTS |

Source: LCW Consulting.

Notes:

1. LTS = Less than Significant, SU = Significant and Unavoidable. Significant impacts highlighted in **bold.**
2. Vehicular Access Summary:

Project: Residential ingress from Third St, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 3A.
Variant 1: No access on Third St, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 4.
Variant 2: Residential ingress from Third St but no ground floor valet parking, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 5.
Variant 3: No access on Third St, residential ingress from Mission Street, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 6.
Variant 4: Loading ingress only on Third St, ingress/egress from Stevenson St & secondary egress onto Mission St. See Figure 7.
Variant 5: Residential ingress from Third St, residential drop-off/valet within Aronson Building, ingress/egress on Stevenson St, secondary egress onto Mission St. See Figure 8.
Variant 6: Jessie Square Garage and Proposed Project ingress/egress on Mission St, except for existing and project truck and service vehicle access on Stevenson St. See Figure 9.
Variant 7: All Jessie Square Garage and Proposed Project ingress/egress on Mission St. Stevenson St ramp closed to all traffic. See Figure 10.

Under 2030 Cumulative conditions, feasible mitigation measures were not identified for the intersections of Fourth/Market and Fourth/Mission, therefore, Variant 6 and Variant 7 would have the following impacts:

- Variant 6 significant project and cumulative impacts at the intersection of Fourth/Market would remain ***significant and unavoidable.***
- Variant 6 significant project and cumulative impacts at the intersection of Fourth/Mission would remain ***significant and unavoidable.***
- Variant 7 significant project and cumulative impacts at the intersection of Fourth/Market would remain ***significant and unavoidable.***
- Variant 7 significant project and cumulative impacts at the intersection of Fourth/Mission would remain ***significant and unavoidable.***

#### Transit

Under 2030 Cumulative conditions, some Muni and regional transit screenlines would exceed the capacity utilization standard. Proposed Project transit ridership contributions would not be considerable at these screenlines, and Proposed Project impacts on 2030 Cumulative transit conditions would be less than significant. No mitigation measures would be required.

### 5.2.2 Improvement Measures

No improvement measures have been identified for 2030 Cumulative conditions.

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# APPENDIX F: 706 MISSION STREET AIR QUALITY TECHNICAL REPORT (WITHOUT APPENDICES)

# 706 Mission Street
# Air Quality Technical Report

Prepared for

**City and County of San Francisco**
**Planning Department**

Prepared by

**Aspen Environmental Group**

**February 2012**

# Contents



# Tables

# Air Quality Technical Report
## Executive Summary

This analysis uses tools and methodology established as part of the Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines[1] to identify criteria air pollutant emission increases and community risk and hazards related to the proposed project, 706 Mission Street – The Mexican Museum and Residential Tower Project (see Attachment A01 for figure of project site location). The approach is based on an Air Quality Scope of Work, dated May 17, 2011 (Attachment A02).

The analysis is divided into two primary discussions, to separately describe criteria air pollutants and community risk and hazards, and for each type of impact, construction and operation of the proposed project are described separately. The analysis finds the following:

- Unmitigated emissions of criteria air pollutants during construction of the proposed project and during its subsequent operation would be below the applicable BAAQMD significance thresholds.
- Localized concentrations of criteria air pollutants would also be below the applicable thresholds.
- Fine particulate matter or PM2.5, although it is a criteria air pollutant, is also considered separately as part of community risk. Construction-related mass emissions of PM2.5 would be well below the criteria air pollutant threshold, and incremental concentrations of PM2.5 in the ambient air from construction-phase activity would be below the applicable BAAQMD project-level threshold for community risk related to annual average PM2.5 concentrations (0.3 $\mu g/m^3$).
- During construction, the maximum excess lifetime cancer risk, including age-sensitivity factors (ASF), would potentially exceed the project-level threshold (10 per million) for the nearest off-site sensitive receptors, residences across Third Street about 100 feet away to the northeast. Mitigation of diesel particulate matter (DPM) from construction equipment would reduce the cancer risk impact experienced by off-site receptors. Mitigation would be needed to reduce emissions of DPM from on-site construction by approximately 65 percent to reduce the impact to below the cancer risk threshold. By using electricity from the grid, propane fuel, or the lowest-emitting engines found feasible to power equipment, or by installing diesel particulate filters on engines, the project sponsor would be required to control DPM and PM2.5 emissions from equipment like cranes, excavators, forklifts, backhoes, and pumps. With achievement of the level of performance specified by Mitigation Measure M-AQ-1, Construction Emissions Minimization, the mitigated project impact would not exceed the cancer risk threshold of 10 incremental cancer cases per million.
- Cumulative construction projects would occur in conjunction with construction-phase impacts and emissions from existing roadways and existing permitted sources to temporarily increase concentrations of toxic air contaminants and PM2.5. Cumulative construction-phase risk and hazards would not exceed the cumulative cancer risk threshold of 100 per million or the cumulative PM2.5 threshold of 0.8 $\mu g/m^3$. Although no mitigation measures would be required for reducing cumulative construction-phase risk and hazards, the cumulative construction-phase impact would be further reduced with implementation of Mitigation Measure M-AQ-1 identified above for project construction emissions.
- The proposed new standby generator engine would increase community risk, hazards, and PM2.5 concentrations, but not to levels that would exceed the thresholds for a new project source.
- The existing roadways, other existing permitted sources, and the proposed project new sources would not expose the proposed project new residential receptors to risk, hazards, and PM2.5 concentrations that would exceed the thresholds for individual sources or cumulative sources.

[1] BAAQMD, CEQA Air Quality Guidelines (Updated May 2011). Cited as "BAAQMD guidelines" or "BAAQMD 2011a."

# 1. Understanding of Proposed Project

The proposed project, 706 Mission Street – The Mexican Museum and Residential Tower Project, consists of the construction of a new 47-story, 550-foot-tall tower with three underground floors, demolition of the non-historic portions of the adjacent Aronson Building, and restoration and rehabilitation of the Aronson Building on the northwest corner of Third and Mission Streets, near the southern edge of San Francisco's Financial District neighborhood.[2]

The new tower would house the Mexican Museum on the ground through fourth floors, with potential terrace access and mechanical space on the fourth floor, and residential, residential amenity, and mechanical space on the fifth through 47th floors. The adjoining Aronson Building would have residential lobby space, commercial (retail/restaurant space), and/or museum (retail/restaurant space) on the ground level and the Mexican Museum on the second and third floors. The fourth floor of the Aronson Building would have either residential flex or office flex space, and space for mechanical. Five floors of the Aronson Building, the fifth through ninth, would be developed under either the residential flex option or the office flex option. The tenth floor of the Aronson Building would have residential flex or office flex space , or residential amenity space. The residential flex option would result in an overall project total of up to 215 residential units and no office space. Under the office flex option, these seven floors would continue to be used as office space, resulting in an overall project total of up to 191 residential units and approximately 61,320 gross square feet (gsf) of office space.

In addition, motor vehicle access to the project site could occur through one of seven project variants. The proposed variants are as follows:

- Variant 1 - No Third Street Access
- Variant 2 - Residential Ingress from Third Street and Stevenson Street
- Variant 3 - Residential Ingress from Mission Street and Stevenson Street
- Variant 4 - Delivery Truck Ramp Ingress from Third Street
- Variant 5 - Residential Drop Off within Aronson Building
- Variant 6 - Vehicular Ingress/Egress from Mission Street Only Except for Trucks
- Variant 7 - All Vehicular Ingress/Egress from Mission Street Only

These variants would change how traffic flows on Third Street and Mission Street around the site, but they would not change overall vehicle trip generation rates, which are a function of the proposed land use changes. Because the variants would not change overall vehicle trip generation rates, motor vehicle emission rates would be identical among the variants. Changing how project traffic would access the site would result in minor variations in pollutant levels around the site, but because of higher levels of emissions from existing traffic on Third Street and Mission Street, the ambient air pollutant concentrations around the site would be similar to the proposed project for all the variants.

The San Francisco Redevelopment Agency, or a successor agency of the City, would convey the existing subsurface Jessie Square Garage to the project sponsor, thus converting the garage from public to private ownership. As part of the project, the garage capacity would be expanded, from 442 to 470 spaces by converting existing space inside the garage. Proposed project uses by floor and floor area by use are presented in **Table 1** and **Table 2**.

[2] San Francisco Planning Department, Notice of Preparation of an Environmental Impact Report. 706 Mission Street – The Mexican Museum and Residential Tower Project. April 13, 2011.

The proposed project would introduce new sources of air emissions and the new residential uses would be sensitive receptors. Emissions from the proposed project and the two flex options are quantified separately. Project variants for motor vehicle access would not notably alter the air pollutant concentrations analyzed. This analysis quantifies the construction and operational criteria air pollutant emissions that would result from the proposed project. These include nitrogen dioxide ($NO_2$), inhalable particulate matter less than 10 microns in diameter (PM10), and fine particulate matter less than 2.5 microns in diameter (PM2.5). Nitrogen oxides (NOx, consisting primarily of nitric oxide [NO] and nitrogen dioxide [$NO_2$]), and volatile organic compounds (VOCs), also known as reactive organic gases (ROG), are quantified as they are precursors to ozone. In addition, community risk and hazards due to construction and operational emissions of the separate class of pollutants categorized as toxic air contaminants (TACs), including organic gases and diesel particulate matter (DPM), are also analyzed.

**Table 1. Proposed Project Use by Floor**

| Floor/Level | Proposed Tower | Existing Aronson Building | Proposed Aronson Building | Existing Jessie Square Garage | Proposed Jessie Square Garage |
|---|---|---|---|---|---|
| B3, Basement Level | Foundation | N/A | N/A | Parking | Parking |
| B2, Basement Level | Foundation, storage, mechanical | N/A | N/A | Parking | Parking |
| B1, Basement Level | Loading, storage, mechanical | Storage & utility space | Storage & utility space | Parking & loading | Parking & loading |
| Basement Level Mezzanine | N/A | N/A | N/A | Parking | Parking |
| Ground Floor | Museum, mechanical, residential lobby | Retail | Retail & residential lobby, potentially museum | Jessie Square | Jessie Square |
| 2nd to 3rd Floors | Museum | Office | Museum | N/A | N/A |
| 4th Floor | Museum, roof terrace, mechanical | Office | Flex Space (residential, office, or mechanical) | N/A | N/A |
| 5th Floor | Residential amenity or Residential | Office | Flex Space (residential or office) | N/A | N/A |
| 6th to 9th Floors | Residential | Office | Flex Space (residential or office) | | |
| 10th Floor | Residential | Office | Flex Space (residential or office or residential amenity) | N/A | N/A |
| 11th to 12th Floors | Residential | N/A | N/A | N/A | N/A |
| 13th Floor | Residential | N/A | Solarium and Roof terrace | N/A | N/A |
| 14th to 43rd Floors | Residential | N/A | N/A | N/A | N/A |
| 46th to 47th Floors | Residential, roof terrace, mechanical | N/A | N/A | N/A | N/A |

Source: Table 2 and Table 4 of Notice of Preparation, April 13, 2011; updated January 6, 2012.

**Table 2. Proposed Floor Area by Use**

| Use | Existing | Proposed Under Residential Flex Option | Proposed Under Office Flex Option |
|---|---|---|---|
| Residential | None | Up to 215 units<br>580,630 gsf | Up to 191 units<br>519,310 gsf |
| Residential amenity | None | 22,199 gsf | 22,199 gsf |
| Retail | 10,660 gsf | 4,800 gsf | 4,800 gsf |
| Institutional (museum) | N/A | 52,285 gsf | 52,285 gsf |
| Office | 95,980 gsf | None | 61,320 gsf |
| Other* | 13,700 gsf | 50,611 gsf | 50,611 gsf |
| Vacant | 18,000 gsf | None | None |
| Parking | 442 spaces | 470 spaces | 470 spaces |
| Total | 138,340 gsf and<br>442 parking spaces | 710,525 gsf and<br>470 parking spaces | 710,525 gsf and<br>470 parking spaces |

*Includes loading, storage, and utility space.
Source: Table 3 of Notice of Preparation, April 13, 2011; updated January 6, 2012.

## Anticipated Construction-Related Sources

Construction equipment, construction-related vehicle trips, worker vehicle trips, and ground disturbing activities would generate direct emissions of toxic air contaminants, criteria air pollutants (*e.g.*, ROG, NOx, PM10, PM2.5, and CO), and fugitive dust emissions. Diesel-fueled equipment would result in emissions of diesel particulate matter (DPM), which is a toxic air contaminant (TAC) that is a primary concern because many toxic compounds adhere to diesel exhaust particles.

The following types of construction emissions sources would occur:

- on-road vehicle trips (including haul trucks and worker commutes);
- off-road construction equipment (including excavators, cranes, and generators);
- demolition activity; and
- on-site grading and excavation.

Off-road construction equipment is likely to dominate the overall quantity of construction-related emissions (Source: project sponsor, 5/27/2011). On-road haul truck traffic would be dominated by material delivery to the site and removal of demolition and excavation materials. Volumes of material that must be hauled away in cubic yards (cy) include: Aronson Building demolition (4,207 cy); existing material on the Mexican Museum parcel (1,260 cy); tower base excavation (2,500 cy); and tower ramp option excavation (1,085 cy). (Source: project sponsor, 3/8/2011.)

No helicopter use would occur during tower completion, and no off-site storage of construction materials would be needed other than at subcontractors' or vendors' own existing shops and yards. (Source: project sponsor, 3/16/2011.)

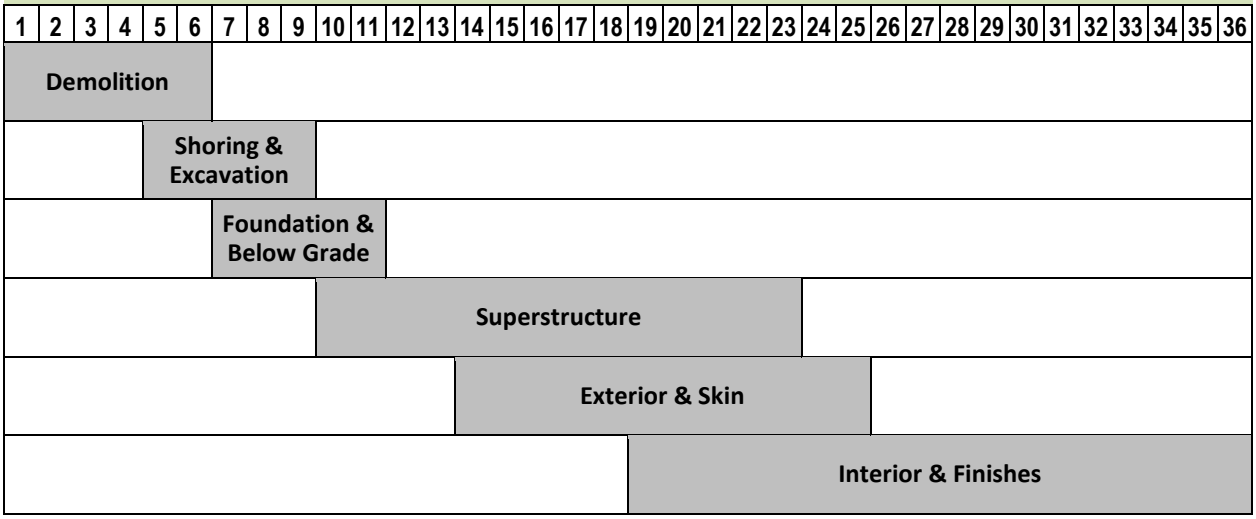
Project construction is anticipated to begin in 2013 and be completed in late 2015 or early 2016. No portion of the project would be occupied until completion. Project construction would occur over a 36-month period, consisting of six phases: demolition; shoring and excavation; foundations and below grade work; superstructure; exterior and skin; and interior and finishes. The construction durations for each phase are shown in **Table 3** and overall construction schedule and overlapping periods are shown in **Table 4**.

**Table 3. Construction Duration by Phase**

| Construction Activity | Expected Duration (months) |
|---|---|
| Demolition | 6 |
| Shoring & excavation | 5 |
| Foundations & below grade work | 5 |
| Superstructure | 14 |
| Exterior & skin | 12 |
| Interior & finishes | 18 |

Source: 706 Mission Street Co., LLC., 3/22/2011

**Table 4. Construction Schedule and Phasing (by month)**




Source: 706 Mission Street Co., LLC., 3/22/2011.

## Anticipated Operation-Related Sources

The following types of operation-related emissions sources would occur:

- new stationary sources subject to permitting requirements (a diesel-fueled standby emergency generator engine and natural gas–fired mechanical systems or boilers);
- vehicle trips generated by use and occupation of the land uses; and
- area sources (including on-site domestic use of natural gas for heating and cooking).

The dominant operation-related emission sources for land use development are usually the vehicle trips generated by residents, office workers (under the office flex option), museum visitors, and miscellaneous deliveries for retail space or amenities. This mobile source activity is defined for the proposed project in a separate Transportation Impact Study (TIS; LCW 2012).

New project-related stationary emission sources likely to require pre-construction permits from the BAAQMD would be a diesel-fueled emergency generator engine and an on-site boiler firing natural gas. These permits are typically issued after the CEQA process.

**Proposed Standby Generator Engine.** The expected standby diesel generator engine would likely be limited to 50 hours per year of non-emergency use because of Airborne Toxic Control Measure (ATCM) requirements, and it would be subject to BAAQMD limits and best available control technology (BACT) requirements. The engine would likely be located in the basement with exhaust/intake oriented toward the north property line at or above the first floor, and it would not typically run more than 10 hours annually for routine testing of emergency-use standby equipment. (Source: project sponsor, 7/27/2011 and 7/29/2011.). The capacity of the standby generator would be around 800 kW (kilowatts) minimum output or about 1,490 horsepower (hp) nameplate rating. This proposed source would be subject to certain limits including an emission limit of 0.15 g/hp-hr (0.493 lb/hr) for PM2.5 or DPM and an operation limit of no more than 50 hours per year (0.0675 lb per average day) for non-emergency purposes, as required by state regulations (17 CCR §§93115.4 & 93115.6. ATCM for Stationary CI Engines - Emergency Standby Diesel-Fueled CI Engine).

**Proposed Natural Gas–Fired Mechanical Systems.** For natural gas–fired mechanical systems, the preliminary estimate for hot water and space heating boiler capacity is approximately 10,000,000 British thermal units per hour (10 MMBtu/hr). Additional natural gas would be used on-site for domestic heating and cooking. (Response to AQ Data Request, 3/16/2011.) The BAAQMD identifies non-diesel boilers, cooking, and space heating equipment as "minor, low-impact sources" and unlikely to pose a significant community risk or hazard or adverse health impact, even in combination with other sources (BAAQMD 2011b). This means the proposed natural gas–fired systems may be excluded from the analysis of local risk and hazards, but emission increases of criteria pollutants from these sources are subject to permitting and are included in discussions of project emissions. This source would be subject to best available control technology (BACT) requirements and emission limits in BAAQMD Regulation 9, Rule 6 or Rule 7, depending on the date of installation and ultimate capacity.

In sum, the emissions increases attributable to operation of the proposed project would be from the total of project-related stationary sources subject to permitting, vehicle trips, and area sources.

# 2. Air Quality Setting

The project site is located on the northwest corner of Third Street and Mission Street, near the southern edge of San Francisco's Financial District neighborhood. The project site consists of: the 10-story, 154-foot-tall Aronson Building; the existing ramp from Stevenson Street into the Jessie Square Garage; and portions of Lot 277 (currently owned by San Francisco Redevelopment Agency) that include the subsurface Jessie Square Garage and a vacant surface lot between the Aronson Building and Jessie Square Garage. The Jessie Square Garage is located west of and adjacent to the vacant lot. These properties are bordered by roadways that have more than 10,000 average annual daily traffic (AADT), and the site is generally surrounded by other developed properties, many of which include stationary sources of emissions, permitted by BAAQMD. The BAAQMD recommends investigating a 1,000 foot radius around the project property boundary for assessing the individual and cumulative effects of nearby sources (BAAQMD 2011a); this is the "zone of influence" for air pollution sources and receptors related to this project (see figure in Attachment A01).

## Existing Sources

### Stationary Sources

**Table 5** lists the stationary sources of emissions permitted by BAAQMD, with locations refined by aerial photography search using GIS parcel maps; **Table 5** also shows the average emission rates of DPM as reported by the BAAQMD in support of the Risk and Hazard Stationary Source Inquiry Form (see Attachment A03 and Attachment A04).

**Table 5. Stationary Sources Permitted by BAAQMD within or near a 1,000-Foot Radius**

| Plant No. | Facility Name | UTM_E (m) | UTM_N (m) | Reported DPM Emissions (lb/day) | Facility DPM (g/s) |
|---|---|---|---|---|---|
| 9310 | San Francisco Marriott Hotel | 552,396 | 4,182,166 | 0.04820 | 0.000667155 |
| 9341 | Sheraton Palace Hotel | 552,623 | 4,182,449 | 0.03470 | 0.000182175 |
| 10110 | Yerba Buena Center for the Arts | 552,609 | 4,182,205 | — | — |
| 13346 | Third & Mission Associates | 552,665 | 4,182,356 | 0.00661 | 0.000034703 |
| 13843 | Seagate Properties Inc | 552,663 | 4,182,639 | 0.03210 | 0.000168525 |
| 13989 | CFRI Market Street Corp | 552,375 | 4,182,193 | 0.01150 | 0.000069891 |
| 14119 | Westfield Metreon LLC | 552,571 | 4,182,008 | 0.03330 | 0.000174825 |
| 14222 | Crocker Plaza Co | 552,615 | 4,182,557 | 0.00494 | 0.000025935 |
| 14223 | G&G Martco LP | 552,839 | 4,182,147 | 0.00734 | 0.000038535 |
| 14427 | Cushman & Wakefield of California | 552,530 | 4,182,510 | 0.02916 | 0.000196872 |
| 15560 | Four Seasons Hotel San Francisco | 552,415 | 4,182,273 | — | — |
| 15624 | 199 New Montgomery Owners Assoc | 552,919 | 4,182,308 | — | — |
| 16526 | Hines 55 Second Street LP | 552,789 | 4,182,533 | 0.01620 | 0.000085250 |
| 16708 | San Francisco Museum of Modern Art | 552,795 | 4,182,246 | 0.05510 | 0.000289275 |
| 16743 | Neiman Marcus | 552,276 | 4,182,380 | 0.00113 | 0.000013699 |
| 16795 | Westfield San Francisco Center | 552,280 | 4,182,137 | 0.20000 | 0.001050000 |
| 16798 | SF Museum Tower LLC | 552,735 | 4,182,266 | 0.10000 | 0.000525000 |
| 16974 | Patelco Credit Union | 552,902 | 4,182,383 | — | — |
| 18609 | Stockbridge 140 New Montgomery | 552,859 | 4,182,343 | — | — |
| 18763 | Glenborough New Montgomery, LLC | 552,683 | 4,182,521 | 0.01840 | 0.000096600 |
| 18804 | Contemporary Jewish Museum | 552,519 | 4,182,266 | — | — |
| 19153 | Ritz-Carlton Club & Residences | 552,545 | 4,182,481 | 0.00203 | 0.000066515 |
| 19929 | The Moscone Center | 552,713 | 4,182,017 | 0.20000 | 0.001050000 |
| 19990 | Woolf House | 552,593 | 4,181,910 | 0.01430 | 0.000075075 |
| *(New)* | *706 Mission Street, Proposed Diesel Emergency IC Engine* | *552,581* | *4,182,263* | *0.0675* | *0.0003544* |

Note: "—" means no PM2.5 or DPM emissions rate reported by BAAQMD (Attachment A04) or source does not emit PM2.5 or DPM.

Source: BAAQMD website and BAAQMD Response to CCSF Planning Department data request (3/15/2011 Stationary Source Inquiry Report); locations calculated using GIS parcel maps for vicinity of 706 Mission Street. See Attachment A03 and Attachment A04.

## Major Roadways

**Table 6** lists the roadways within the project area that have at least 10,000 AADT. Aside from the surrounding major roadways, no other areas of mobile-source activity or otherwise "non-permitted" sources (e.g., railyards, trucking distribution facilities, and high volume fueling stations) are located within 1,000 feet of the project site.

Emissions of PM2.5 per roadway segment are based on a San Francisco County average 2015 emission factor of 0.0305 g PM2.5/VMT, which includes tire wear, brake wear, and vehicle exhaust (provided by EMFAC2011; see Attachment A09).

**Table 6. Major Roadways within a 1,000-Foot Radius**

| Street Name | Segment Length (feet) | Width (feet) | AADT (traffic volume/day) | Total VMT in Segment (VMT/day) | 2015 PM2.5 Emissions (g/sec) |
|---|---|---|---|---|---|
| Third | 2,045 | 82 | 32,100 | 12,433 | 0.00439 |
| Mission | 3,544 | 82 | 13,200 | 8,860 | 0.00313 |
| Fourth | 1,815 | 82 | 22,810 | 7,841 | 0.00277 |
| Market | 3,504 | 120 | 41,000 | 27,209 | 0.00960 |
| Kearny | 688 | 74 | 21,100 | 2,749 | 0.00097 |
| Grant | 1,032 | 74 | 20,900 | 4,085 | 0.00144 |
| Howard | 3,549 | 82 | 23,940 | 16,091 | 0.00568 |
| New Montgomery | 1,182 | 68 | 23,100 | 5,171 | 0.00182 |
| O'Farrell | 920 | 68 | 19,700 | 3,433 | 0.00121 |
| Second | 1,815 | 82 | 22,400 | 7,700 | 0.00272 |

Source: Roadway Segment Volumes, CCSF Transportation Authority CHAMP Model data provided by Planning Department as of 3/2/2011; segment lengths and public right-of-way width calculated using GIS parcel maps; Attachment A09, p.2.

## Sensitive Receptors

The proposed project would introduce new sensitive receptors in the vicinity of the nearby sources as part of the proposed residential units. Sensitive receptors are defined in the BAAQMD CEQA Guidelines (Glossary, Appendix E of BAAQMD 2011a) as: facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals, and residential areas. Along with the new sensitive receptors introduced by the project, the proposed project would be near various existing sensitive land uses listed in **Table 7**.

**Table 7. Existing and Proposed Sensitive Receptors**

| Name of Land Use | Street Address | Elevation | Distance to Site (ft) |
|---|---|---|---|
| Proposed Residential Units | 706 Mission St | On Site; 4th Floor, 40 ft | On site |
| Four Seasons Hotel (Residences) | 757 Market St | High-rise; 18th Floor, 180 ft | 300 |
| St Regis Residences | 125 Third St | High-rise; 21st Floor, 210 ft | 150 |
| Paramount Residences | 680 Mission St | High-rise; 6th Floor, 60 ft | 100 |
| Ritz-Carlton Club & Res., San Fran | 690 Market St | High-rise; 13th Floor, 130 ft | 650 |
| Woolf House Apartments | 801 Howard St | Mid-rise; 2nd Floor, 20 ft | 1,000 |
| **Nearby Child Care (Daycare) Locations** | | | |
| Yerba Buena Gardens Child Development Center (located adjacent to Zeum) | 790 Folsom Street | 2nd Floor, 20 ft | 920 |

Source: Planning Department data, 5/3/2011; telephone correspondence, 7/25/2011 and 7/26/2011.

# 3. Criteria Air Pollutants

## Methodology for Criteria Air Pollutants Analysis

All construction- and operation-related emissions are quantified using URBEMIS v.9.2 (2007).[3] Where project-specific detail is not available, default settings are used. The settings applied in URBEMIS are listed in an attachment to this Technical Report (see Attachment A08), and summary output pages are also attached. For all emission calculations, estimates were developed for both the residential flex option and office flex option, and although the differences are minor, the results include notes showing which flex option results in the highest emissions.

**Table 8** and **Table 9** show the basic elements of the methodology for construction-phase and operation-related criteria pollutant impacts, respectively. Construction-related pollutants are quantified, as recommended by initial BAAQMD screening guidance, because of the proposed demolition. Operation-related emissions are quantified and compared to adopted thresholds in the BAAQMD guidelines. Project-related stationary source emissions are also separately quantified and described along with their minor potential to cause or contribute to violations of the ambient air quality standards.

The potential for criteria pollutant emissions to cause localized concentrations affecting the ambient air quality standards is described according to the BAAQMD guidelines. For example, localized carbon monoxide concentrations from motor vehicles are described through the use of qualitative screening criteria.

[3] URBEMIS2007 for Windows, Version 9.2. Software User's Guide: Emissions Estimation for Land Use Development Projects. Prepared for: South Coast Air Quality Management District. Prepared by: Jones & Stokes Associates, Sacramento. November 2007.

**Table 8. Criteria Air Pollutants, Methodology, Construction**

| Input | Emission Factors | Tool | Output | Thresholds |
|---|---|---|---|---|
| On-road vehicle trip generation rate<br>(average daily per phase) | Years 2013 to 2015, URBEMIS for on-road from MVEI and EMFAC | URBEMIS (Attachment A08) | (average lb/day, exhaust only) | Project-level thresholds:<br>54 lb/day ROG/NOx/PM2.5<br>82 lb/day PM10 |
| Off-road equipment inventory from project sponsor<br>(#, type equipment daily per phase) | URBEMIS for factors from OFFROAD 2007 | URBEMIS | (average lb/day, exhaust only) | (included with above) |
| Demolition/Renovation:<br>93,740 sf | URBEMIS factors for demolition | URBEMIS | (average lb/day per phase, fugitive dust) | Best Management Practices |
| On-site Grading/Excavation | URBEMIS factors for site disturbance | URBEMIS | (average lb/day per phase, fugitive dust) | Best Management Practices |

**Table 9. Criteria Air Pollutants, Methodology, Operation**

| Input | Emission Factors | Tool | Output | Thresholds |
|---|---|---|---|---|
| New project-related stationary sources, inventory from project sponsor | Typical limits for natural gas boiler and emergency-use diesel internal combustion engine (U.S. EPA Tier 2) | Spreadsheets with U.S. EPA emission factors cited, regulatory limits (Attachment A08) | (average lb/day, tpy) | Project-level thresholds:<br>54 lb/day ROG/NOx/PM2.5<br>82 lb/day PM10<br>10 tpy ROG/NOx/PM2.5<br>15 tpy PM10 |
| Vehicle trip generation rate, from TIS<br>(average daily) | Year 2016 (buildout),<br>URBEMIS defaults,<br>SF default trip length | URBEMIS | (average lb/day, tpy) | (included with above) |
| Land uses (area sources):<br>Residential: 488,200 sf<br>Retail: 5,200 sf<br>Museum: 36,560 sf<br>Mechanical: 143,940 sf | Year 2016 (buildout),<br>URBEMIS defaults | URBEMIS | (average lb/day, tpy) | (included with above) |

Acronyms: TIS = Transportation Impact Study; (sf = square-feet); (lb/day = pounds per day); (tpy = tons per year).

## Results of Criteria Air Pollutants Analysis

### Construction-Phase Project Level Analysis, Criteria Air Pollutants

**Construction-Related Emissions.** Demolition, excavation, foundation installation and erecting the structure all involve construction activities that would temporarily affect local air quality during the anticipated 3-year construction schedule. This would cause temporary increases in particulate matter (fugitive dust) and other pollutant emissions. Construction dust includes PM10 and PM2.5, primarily from "fugitive" sources; use of construction equipment and worker vehicles results in combustion-related emissions of criteria air pollutants (ROG, NOx, PM10, and PM2.5); and evaporative emissions (ROG) occur during application of architectural coatings for interior and exterior finishes.

Each of the major categories of construction emissions sources are counted by the URBEMIS tool. On-road vehicle trips include emissions from haul trucks for delivering construction material and removing debris and excavation spoils, and on-road emissions also include worker commutes that may occur locally or elsewhere in the region if workers access mass transit. The inventory of off-road equipment comes from project sponsor plans with project-specific equipment capacity information (Attachment A08, p. 15).

Emission estimates include implementation of Best Management Practices (BMPs) for fugitive dust as required by the San Francisco Construction Dust Control Ordinance. Compliance with the Construction Dust Control Ordinance would satisfy the BAAQMD recommendation to implement BMPs for reducing fugitive dust in accordance with the threshold of significance for construction dust. The VOC content for architectural coatings in the unmitigated ROG emissions of **Table 10** reflects an URBEMIS default value of 250 g/L although the VOC content of coatings would be limited to 150 g/L, based on the maximum allowable concentration for non-specialty coatings (effective in 2011) stated in BAAQMD's Regulation 8, Rule 3, which would further reduce ROG emissions by 40 percent.

Criteria pollutant emissions from use of construction equipment and other construction-related sources are quantified in **Table 10**, which shows the unmitigated results. Unmitigated emissions of criteria air pollutants during construction of the proposed project would be below the applicable BAAQMD significance thresholds. Therefore, no mitigation is required for construction criteria pollutant emissions.

#### *Mitigation for Construction-Phase, Criteria Air Pollutants*

No mitigation measures would be required since the unmitigated criteria air pollutant construction-phase emissions would be below the BAAQMD thresholds of significance.

**Table 10. Construction-Phase Daily Emissions of Criteria Air Pollutants (lb/day, average)**

| Phases | ROG | NOx | Exhaust PM10 | Exhaust PM2.5 |
|---|---|---|---|---|
| Off Road, Construction Equipment | 5.52 | 47.97 | 2.03 | 1.87 |
| On Road, Construction Vehicles | 0.11 | 1.28 | 0.05 | 0.04 |
| Worker Trips | 0.29 | 0.51 | 0.03 | 0.03 |
| Architectural Coating | 22.74 | 0.00 | 0.00 | 0.00 |
| **Total Average Daily Emissions** | **28.66** | **49.76** | **2.11** | **1.94** |
| **BAAQMD Thresholds** | **54** | **54** | **82** | **54** |

Source: URBEMIS results; 706 Mission Street, Office Flex Option (worst-case for construction-phase emissions); Attachment A08, p. 12.

Note: BMPs = Fugitive Dust PM10 and Total PM2.5 emissions reflect compliance with the San Francisco Construction Dust Control Ordinance and implementing Best Management Practices in accordance with the BAAQMD threshold of significance for construction dust.

## Operation-Related Project Level Analysis, Criteria Air Pollutants

**Operation-Related Emissions.** The emissions increases attributable to operation of the proposed project would be from the total of project-related stationary sources subject to permitting, operational vehicle trips generated by use and occupation of the proposed project, and area sources such as use of natural gas for heating and cooking. The project would bring increased high-density, compact cultural and residential development to within walking distance of major transit hubs in the downtown Financial District and Transbay neighborhoods.[4] This would maximize walking and use of public transportation to access the site and minimize the use and potential emissions from private automobiles. As such, the project would generate a relatively low number of motor vehicle trips compared to development in a non-urban or suburban setting.

Emission estimates are based upon the following regulatory requirements:

- Standby emergency generator engine compliant with U.S. EPA Tier 2 emission standards, or higher, and compliant with ATCM and BACT in compliance with current regulations.
- Natural gas–fired mechanical systems compliant with BAAQMD Regulation 9, Rule 7 and BACT.

Criteria pollutant emissions from the anticipated operation-related sources are quantified in **Table 11** and **Table 12**. Unmitigated emissions of criteria air pollutants during operation of the proposed project would be below the applicable BAAQMD significance thresholds. Therefore, no mitigation is required for operational criteria pollutant emissions.

**Table 11. Operation-Related Daily Emissions of Criteria Air Pollutants (lb/day, average)**

| Sources | ROG | NOx | Exhaust PM10 | Exhaust PM2.5 |
|---|---|---|---|---|
| Proposed Standby Generator | 0.58 | 1.57 | 0.07 | 0.07 |
| Proposed Mechanical Systems | 1.68 | 4.80 | 1.680 | 1.680 |
| Area Sources (e.g., natural gas, domestic) | 14.47 | 4.88 | < 0.005 | < 0.005 |
| Mobile Sources (vehicle trips) | 8.33 | 7.62 | < 16.82 | < 3.18 |
| **Total Average Daily Emissions** | **25.1** | **18.9** | **18.6** | **4.9** |
| **BAAQMD Thresholds (lb/day)** | **54** | **54** | **82** | **54** |

Source: URBEMIS results and supporting calculations; 706 Mission Street, with Office Flex Option (worst-case for mobile source emissions) and Residential Flex Option (worst-case for area source emissions); Attachment A08, pp. 2, 4, 19.

**Table 12. Operation-Related Annual Emissions of Criteria Air Pollutants (tons per year, tpy)**

| Sources | ROG | NOx | Exhaust PM10 | Exhaust PM2.5 |
|---|---|---|---|---|
| Proposed Standby Generator | 0.11 | 0.29 | 0.01 | 0.01 |
| Proposed Mechanical Systems | 0.31 | 0.88 | 0.31 | 0.31 |
| Area Sources (e.g., natural gas, domestic) | 2.64 | 0.89 | < 0.005 | < 0.005 |
| Mobile Sources (vehicle trips) | 1.52 | 1.39 | < 3.07 | < 0.58 |
| **Total Annual Emissions** | **4.6** | **3.5** | **3.4** | **0.9** |
| **BAAQMD Thresholds (tpy)** | **10** | **10** | **15** | **10** |

Source: URBEMIS results and supporting calculations; 706 Mission Street, with Office Flex Option (worst-case for mobile source emissions) and Residential Flex Option (worst-case for area source emissions); Attachment A08, pp. 1, 3, 19.

[4] The Transbay Joint Powers Authority (TJPA) tracks the status of the new Transbay Transit Center, scheduled to open in 2017. Available at: http://transbaycenter.org.

**Localized Carbon Monoxide.** Emissions from traffic at congested intersections can, under certain circumstances, cause a localized build-up of CO concentrations. Regional ambient air quality monitoring data demonstrate that CO concentrations are well below the applicable standards, despite long-term upward trends in vehicle miles traveled. This confirms that the potential for localized increases in CO concentrations from increased traffic has been greatly reduced in recent years. Improvements in motor vehicle exhaust controls since the early 1990s and the use of oxygenated fuels have drastically reduced vehicle CO emissions.

Elevated concentrations of localized CO from congested traffic would not have the potential to cause a violation of ambient air quality standards if the following three criteria are met:

- The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans. The proposed project would be consistent with these regional plans.
- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour. The Transportation Study (LCW 2012) indicates that the study intersections with the highest volumes would experience fewer than 10,000 vehicles per peak hour under existing plus project and cumulative scenarios.
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway). The Transportation Study (LCW 2012) indicates that fewer than 10,000 vehicles per peak hour would travel through the urban street canyons near the site, and that the proposed project would not introduce or increase traffic to these levels in the proposed underground parking area.

Because each of the three criteria would be met, elevated concentrations of localized CO from congested traffic would not cause a violation of ambient air quality standards.

### *Mitigation for Operation, Criteria Air Pollutants*

No mitigation measures would be required since the unmitigated criteria air pollutant emissions during the operational phase would be below the BAAQMD thresholds of significance and would not cause a violation of ambient air quality standards.

## Cumulative Analysis of Criteria Air Pollutants

**Table 10** to **Table 12** identify the emissions increases that would occur as a result of construction and operation of the proposed project. According to the BAAQMD CEQA Guidelines, if a project's criteria air pollutant emissions exceed the project-level thresholds, then emissions from a proposed project would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Project-related criteria air pollutant emission increases would be less than the BAAQMD significance thresholds, and therefore not at levels that would be cumulatively considerable. Additional analysis to assess cumulative impacts of criteria air pollutants is deemed unnecessary by BAAQMD, and the project would not result in a significant cumulative impact with regard to ROG, NOx, PM10, PM2.5, or CO emissions increases.

***Mitigation for Cumulative, Criteria Air Pollutants***

No mitigation measures would be required for cumulative emission increases of unmitigated criteria air pollutants occurring below the BAAQMD thresholds of significance.

## Summary for Criteria Air Pollutants

Emission increases of criteria air pollutants and precursors would below BAAQMD's thresholds of significance.

# 4. Community Risk and Hazards

"Initial Screening" and "Advanced Screening" according to the approach in the BAAQMD Risk and Hazard Screening Analysis Process Flow Chart (BAAQMD 2011c) indicate that existing receptors near the project site could be exposed to project-related risk or hazards exceeding BAAQMD thresholds during construction (BAAQMD 2010a) and that new project receptors could be exposed to risk or hazards exceeding the single source thresholds (see Attachment A05). In addition, emissions from project-related stationary and mobile sources could affect existing nearby sensitive receptors. Therefore, to refine the screening, this technical report presents a refined modeling analysis of these scenarios.

**Table 13** and **Table 14** show the basic elements of the methodology for construction-phase and operation-related analysis of project-level community risk and hazards, respectively. The methodology for assessing cumulative community risk and hazards is in **Table 15** for construction-phase and **Table 16** for operation.

**Table 13. Community Risk Analysis, Methodology, Construction, Project-Level**

| Input | Emission Factors | Tool | Output | Thresholds |
|---|---|---|---|---|
| Construction-phase sources<br>(source types in Table 8) | URBEMIS for DPM and exhaust PM2.5,<br>Emission factors for other TACs from U.S. EPA SPECIATE database<br>(Attachment A09) | ISC results, spreadsheet risk calculation (Attachment A09) | (distance to less than significant impact, in meters), or<br>(cancer risk adjusted with age sensitivity factor, hazard index, and annual PM2.5) | Project-level thresholds:<br>10 in a million increased cancer risk including ASF,<br>1.0 hazard index increase, or<br>0.3 µg/$m^3$ PM2.5 annual average |

**Table 14. Community Risk Analysis, Methodology, Operation, Project-Level**

| Input | Emission Factors | Tool | Output | Thresholds |
|---|---|---|---|---|
| Stationary sources, within 1,000-foot radius<br>(see Table 5) | Initial screening:<br>BAAQMD Health Risk Screening Data (Attachment A05)<br>Refined modeling:<br>Source-specific emission rates (Attachment A04)<br>(public record search) | ISC results, Downwash and source-specific stack parameters, spreadsheet risk calculation (Attachment A09) | (cancer risk adjusted with age sensitivity factor, hazard index, and annual PM2.5) | Project-level ("single source") thresholds:<br>10 in a million increased cancer risk including ASF,<br>1.0 hazard index increase, or<br>0.3 µg/$m^3$ PM2.5 annual average |
| Major roadways, within 1,000-foot radius, with traffic over 10,000 vehicles per day<br>(see Table 6) | Initial screening:<br>BAAQMD Roadway Risk Screening Table<br>Refined modeling:<br>EMFAC for TOG, DPM and PM2.5 | ISC results, spreadsheet risk calculation (Attachment A09) | (adjusted cancer risk, hazard index, and annual PM2.5) | Project-level thresholds:<br>10 in a million increased cancer risk including ASF,<br>1.0 hazard index increase, or<br>0.3 µg/$m^3$ PM2.5 annual average |
| New project-related stationary sources, inventory from project sponsor | Typical limits for natural gas boiler and emergency-use diesel internal combustion engine (Attachment A08) | ISC results, Downwash and source-specific stack parameters, spreadsheet risk calculation (Attachment A09) | (adjusted cancer risk, hazard index, and annual PM2.5) | Project-level thresholds:<br>10 in a million increased cancer risk including ASF,<br>1.0 hazard index increase, or<br>0.3 µg/$m^3$ PM2.5 annual average |

Acronyms: ASF = Age Sensitivity Factor or cancer risk adjustment factor (10x for construction; 1.7x for constant 70-year residential exposure); (µg/$m^3$ = micrograms per cubic meter).

**Table 15. Community Risk Analysis, Methodology, Construction, Cumulative**

| Input | Emission Factors | Tool | Output | Thresholds |
|---|---|---|---|---|
| Construction-phase sources (project), with Cumulative projects' construction (source types in Table 8).<br>Stationary sources (existing).<br>Major roadways (existing) | As above for individual source types with cumulative projects' construction | ISC results, Downwash and source-specific stack parameters, spreadsheet risk calculation (Attachment A09) | (cancer risk adjusted with age sensitivity factor, hazard index, and annual PM2.5) | Cumulative thresholds:<br>100 in a million increased cancer risk including ASF,<br>10.0 hazard index increase (chronic), or<br>0.8 µg/$m^3$ PM2.5 annual average |

**Table 16. Community Risk Analysis, Methodology, Operation, Cumulative**

| Input | Emission Factors | Tool | Output | Thresholds |
|---|---|---|---|---|
| New project-related stationary sources, with Cumulative Sources.<br>Stationary sources (existing).<br>Major roadways with project-related traffic. | As above for individual source types with cumulative projects' sources, where known | ISC results, Downwash and source-specific stack parameters, spreadsheet risk calculation (Attachment A09) | (adjusted cancer risk, hazard index, and annual PM2.5) | Cumulative thresholds:<br>100 in a million increased cancer risk including ASF,<br>10.0 hazard index increase (chronic), or<br>0.8 µg/$m^3$ PM2.5 annual average |

Acronyms: ASF = Age Sensitivity Factor or cancer risk adjustment factor (10x for construction; 1.7x for constant 70-year residential exposure); (µg/$m^3$ = micrograms per cubic meter).

# Methodology for Refined Modeling Analysis

This section describes the portions of the approach that are common to the refined modeling analysis for construction and operation-phase impacts for the project-level and cumulative scenarios.

## Site Specific Air Dispersion Modeling

### *Air Dispersion Model Selection*

The BAAQMD modeling recommendations (BAAQMD 2011b) are to use SCREEN3, ISC, AERMOD, or CAL3QHCR. Because this project involves complex nearby building configurations and numerous neighboring stationary sources and major roadways, SCREEN3 would not be useable. A multi-source modeling system such as ISC (Industrial Source Complex) or AERMOD (the American Meteorological Society/Environmental Protection Agency Regulatory Model) is necessary. Because all stationary sources in the vicinity of this project site would be affected by the turbulent zones of surrounding structures, building downwash information would need to be included.

The ISC model in its base form is not appropriate for determining concentrations from sources inside building cavity regions, the downwind zone where recirculation can occur. As such, this assessment uses ISC in the following configuration:

- ISC3-Prime (version 04269) is used for the point sources (permitted stationary sources) and traffic on major roadways, with nearest building dimensions entered into the Building Profile Input Program (BPIP-Prime). ISC3-Prime addresses the entire structure of the building wake and computes concentrations in the cavity regions.[5]
- The major roadways surrounding the site are configured in the model as adjacent volume sources. In ISC, the building downwash algorithms do not apply to volume or area sources.[6,7]

### *Meteorological Data*

Standard, pre-processed meteorological data for years 2004 and 2005 from a weather tower in Mission Bay is readily available from the BAAQMD for use with the ISC model. The pre-processed site-specific meteorological data is available on the BAAQMD web site at: http://hank.baaqmd.gov/tec/data/.

### *Dispersion Coefficients and Terrain Considerations*

ISC requires selection of either rural or urban dispersion coefficients for representing boundary-layer mixing. The “urban” designation applies, and urban dispersion coefficients are used. Because no notable terrain features lie within the nearest 1,000 feet, the terrain surrounding the project site is set at zero elevation baseline from which all source release heights and receptor elevations are measured.

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5 U.S. EPA and Electric Power Research Institute, Addendum to ISC3 User’s Guide, The Prime Plume Rise and Building Downwash Model. 1997.

6 U.S. EPA, User’s Guide for the Industrial Source Complex (ISC3) Dispersion Models. Volume I – User Instructions (p. 3-39). 1995.

7 U.S. EPA, User’s Guide for the Industrial Source Complex (ISC3) Dispersion Models. Volume II – Description of Model Algorithms (p. 1-49). 1995.

### *Downwash Building Dimensions*

Nearby buildings greatly influence how plumes disperse from relatively low release heights. The vertices and tiers of the dominant structures nearest the project site are digitized from aerial photography. All point sources near the project site are affected by building downwash and many are inside building cavity regions where recirculation of the plume may occur, and most receptors near the site are within turbulent wake zones of these buildings. The orientation of building tiers in the ISC model is shown on two figures attached to this Technical Report (see Attachment A06 and Attachment A07).

### *Receptor Selection*

The orientation of receptors in the ISC model is shown on two figures attached to this Technical Report (see Attachment A06 and Attachment A07).

**On-Site Receptors.** One network of receptors surrounds the envelope of the project site at 10-meter intervals of spacing (see Attachment A06). This series represents the lowest occupied floor of new residences in the proposed project, or the lowest elevation where outdoor air could be drawn into residences, at approximately 40 feet above grade (12.2 m). Residences at this elevation would be nearest to the existing roadways and existing stationary sources and would experience the highest concentrations of pollutants. On-site receptors are not included in the analysis of construction impacts because no portion of the proposed project would be occupied until completion of construction.

**Off-Site Receptors.** The second network of receptors include the actual residential and daycare land uses nearest to the project site boundary at 10-meter intervals of spacing (see Attachment A07). For this series, receptor heights correspond with the actual lowest upper-floor elevations occupied by residences (as in **Table 7**). Receptors are not located within areas covered by roadways or other areas unless occupied by sensitive land uses. The following analysis identifies each impact and the location of the maximally exposed individual (MEI) if the point of maximum impact occurs off-site.

## Dispersion Modeling Source Configurations

### *Construction-Phase Source Configurations*

The proposed construction activity represents multiple emission sources moving within the construction boundary. To represent construction activity in the dispersion model, volume sources are distributed within the project boundary and located within 5 meters of the site boundary. The following release parameters are used:

- Volume source release height: 12 feet (3.66 meters, typical equipment location or tailpipe).
- Initial lateral dimension (sigma-y): 9 feet (2.74 meters, lateral mixing due to moving equipment).
- Initial vertical dimension (sigma-z): 6 feet (1.83 meters, vertical mixing due to moving equipment).

Construction emissions are modeled at annual average rates although they would actually vary and diminish to zero upon operation of the proposed project. Project-related construction emissions would be limited only to the duration of construction (36-month period), and modeling for project-level construction impacts describes only the impacts on existing receptors off-site.

### *Operation-Phase Stationary Source Configurations*

The following release parameters are used for each permitted source (see orientation on figure in Attachment A06). Because advanced screening shows only facilities with diesel-fueled sources having screening results over or approaching the thresholds (stationary diesel engines for standby generators or fire

pump engines; see Attachment A05), and because BAAQMD considers non-diesel-fueled sources to be "minor, low-impact" and unlikely to pose a significant health impact (BAAQMD 2011b), no other type of stationary source warrants refined modeling.

The following release parameters are used for each permitted stationary source. Where field observation indicates an exhaust point on a roof tier or mezzanine, the observed release height is used. This means that for the following existing sources, the release heights are: 16 meters for SF Museum Tower (# 16798); 18 meters for Third & Mission Associates (# 13346); and 20 meters for SF Marriott Hotel (# 9310). For the proposed new standby generator engine and other existing sources, the typical worst-case stack parameters for a diesel engine with a horizontal outlet near ground level are used,[8] as follows:

- Stack release height: 12 feet (3.66 meters), or actual release height, if known.
- Release diameter: 0.6 feet (0.18 meters).
- Release velocity: 0.01 meters per second (for horizontal outlet).
- Release temperature: 738.7 K (872 F).

***Operation-Phase Major Roadway Source Configurations***

Major roadway locations are derived from a parcel map of the public right-of-way in GIS. The widths of the roadways are defined by vertices of the parcels surrounding the public right-of-way (see orientation on figure in Attachment A07). Mobile sources are configured as adjacent volume sources, with the length of each side determined by the width of the public right-of-way. Emission rates (PM2.5) are based on San Francisco County fleet-wide average emissions per vehicle-mile-traveled (VMT) and the total VMT within each segment (see **Table 6**). The following release parameters[9] are used:

- Volume source release height: 1.5 feet (0.46 meters), typical tailpipe.
- Initial lateral dimension sigma-y: width of road right-of-way (typically 82 feet) divided by 2.15.
- Initial vertical dimension sigma-z: 2.8 feet (0.85 meters), vertical dimension of source (6 feet) divided by 2.15.

## Calculating Community Risk and Hazards

***Cancer Risk Adjustment Factors***

Cancer risks are weighted by age-sensitivity factors (ASF) to account for the possible differences in risk associated with a population that is early-in-life compared to the adult population (OEHHA 2009). This accounts for an "anticipated sensitivity to carcinogens" of infants and children. The age-specific cancer risk adjustment factor (CRAF) approach originates from the Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA) and is recommended by BAAQMD for health risk screening analysis (HRSA) of sources subject to permitting (BAAQMD 2010b).

Cancer risk estimates from refined modeling are weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to two years of age and by a factor of three for exposures that occur from two years through 15 years of age. No weighting factor (i.e., a CRAF of one, which is equivalent to no adjustment) is applied to ages 16 to 70 years. Screening results from the BAAQMD guidelines take these factors into account, and to derive comparable results from refined modeling, the ASF is also applied here. All else being equal, this translates to an ASF of 10x for receptors exposed to construction-

[8] Sonoma Technology, Inc. (STI) Technical Memorandum, Prepared for: Bay Area Air Quality Management District, Re: Default Modeling Parameters for Stationary Sources (Median Values, Table 1). April 1, 2011.

[9] BAAQMD 2011b (at Section 4.2.3; Table 7; p. 49).

related contaminants or 1.7x for receptors exposed to a constant 70-year lifetime of operation-related contaminants.

***Risk and Hazards Calculations for Construction and Other Diesel-Powered Sources***

**Cancer Risk, Diesel-Powered Construction Equipment and Stationary Sources.** BAAQMD Regulation 2-5 requires that DPM should be used as a surrogate for all TAC emissions from diesel-fueled compression-ignition internal combustion engines.[10] Diesel-fueled equipment exhaust PM2.5 is by definition DPM, which is a toxic air contaminant (TAC). DPM is a primary concern because many toxic compounds adhere to diesel exhaust particles. By assuming all exhaust-related PM2.5 from construction and diesel-powered sources is DPM, this analysis conservatively overestimates construction-phase DPM emission rates because a small fraction of construction equipment would be gasoline powered.

Breathing rates, along with the frequency and duration of exposure, affect the inhalation dose of the contaminants. The inhalation dose differs depending on the type of receptor as follows:

**Inhalation Dose** (mg/kg-day) =
[chi ($\mu g/m^3$) ] * [Daily Breathing Rate] * [Exposure Frequency] * [Exposure Duration] / [Averaging Time]

where:

chi DPM = annual average concentration from dispersion model, $\mu g/m^3$
Daily Breathing Rate (DBR) = 302 L/kg body weight-day, for resident adult; 581 L/kg-day, for child
Exposure Frequency (EF) = 350 days/year for resident; 245 days/year for daycare
Exposure Duration (ED) = 70 years for lifetime exposure; 3 years for construction-phase
Averaging Time = 25,550 days to determine a cancer risk over 70 years.

Using the assumptions here as recommended by BAAQMD (2011b) lead to an adult (resident) inhalation unit risk factor (URF per $\mu g/m^3$) for DPM ($319 \times 10^{-6}$ per $\mu g/m^3$) that is conservatively high when compared to the inhalation unit risk factor approved by OEHHA ($300 \times 10^{-6}$ per $\mu g/m^3$).[11]

Estimating the cancer risk is accomplished from the inhalation dose as follows:

**Cancer Risk** = [Dose (mg/kg-day) ] * [ Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$ ] * CRAF

where:

Cancer Potency Factor = 1.1 $(mg/kg\text{-}day)^{-1}$ for DPM
CRAF = Age-Specific Cancer Risk Adjustment Factor (10x for construction or 1.7x for constant 70-year residential exposure).

**Non-Cancer Hazards, Diesel-Powered Construction Equipment and Stationary Sources.** This analysis illustrates non-cancer hazards of acrolein and other TACs likely to occur in the speciation of organic compounds. The non-cancer hazards from the diesel sources are approximations for a variety of reasons: acrolein lacks standard test methods to determine emission rates; none of the nearby stationary sources have been assigned acrolein emissions in public reports to the BAAQMD (see Attachment A04); acrolein can be formed by secondary degradation of other TACs and is subject to photochemical reac-

[10] Emissions need not be determined for individual TACs from diesel-fueled compression ignition internal combustion engines in the process of obtaining permits from BAAQMD. DPM has the greatest cancer risk by far of any TAC emitted by diesel fuel combustion. However, DPM does not have the greatest non-cancer risk; acrolein is one of the most toxic contaminants associated with diesel exhaust based on its non-cancer toxicity value (BAAQMD 2010a).

[11] OEHHA/ARB Consolidated Table of Risk Assessment Health Values. Updated 2/14/2011.

tion in the presence of other TACs and daylight, making it unstable in the ambient air and modeling extremely complex. Currently, CARB does not offer certified emission factors or an analytical test method for acrolein. Absent the appropriate tools to determine acrolein emission rates and implement emission limits, the BAAQMD does not conduct health risk screening as part of its permitting process for stationary sources of acrolein (BAAQMD 2010b).

This analysis conservatively considers speciation of toxic contaminants, including acrolein, present in diesel exhaust TOG along with DPM to arrive at non-cancer hazards. The surrounding stationary sources that are likely to contribute to elevated risks are exclusively diesel-fueled compression ignition engines. Screening revealed that no other type of stationary source would be likely contribute to community risk and hazard (see Attachment A05); therefore, community risk and hazard due to the diesel-powered sources would be dominated by the cancer risk of DPM. Similarly, as part of its effort to standardize risk screening for diesel-powered construction equipment, the BAAQMD found that the worst-case screening distances would be driven by the DPM cancer risks including ASFs (BAAQMD 2010a), and that non-cancer hazards would be minor in comparison based upon the types of construction projects BAAQMD modeled. Toxicity-weighted factors for speciated TOG emissions from diesel-powered construction equipment and stationary sources are based on TOG emission factors from U.S. EPA's SPECIATE database and the inhalation-based Reference Exposure Level (REL) for each speciated TOG from OEHHA-approved toxicity values[12] (detailed in Attachment A09, p. 7 and p. 12). Because acute toxicity values do not exist for DPM, acute hazard levels for the diesel sources are based on speciated TOG.

Estimating the non-cancer hazard indices from diesel-powered engines is accomplished as follows:

**Chronic Hazard Index** = [(chi DPM / REL) + (chi Diesel TOG / REL)]

where:

chi = annual average concentration from dispersion model, $\mu g/m^3$
Chronic Inhalation REL(DPM) = Reference Exposure Level(DPM) = 5 $\mu g/m^3$ (BAAQMD Reg. 2-5)
Chronic Inhalation REL(Diesel TOG) = toxicity-weighted factor from U.S. EPA, SPECIATE emission factors and inhalation based OEHHA toxicity values (Attachment A09, p.7 and p.12).

**Acute Hazard Index** = (chi Diesel TOG / REL)

where:

chi = maximum hourly concentration from dispersion model (10x annual), $\mu g/m^3$
Acute Inhalation REL(Diesel TOG) = toxicity-weighted factor from U.S. EPA, SPECIATE emission factors and inhalation based OEHHA toxicity values (Attachment A09, p.7 and p.12).

***Risk and Hazards Calculations for Major Roadways***

**Cancer Risk, Major Roadways and On-Road Motor Vehicles.** Cancer risks from on-road motor vehicles are dominated by DPM, with substantial contributions to hazards and toxicity from organic compounds that are also TACs[13] (dominant are benzene, toluene, and xylenes); only a fraction (less than 20%) of the PM2.5 from motor vehicles and traffic on roadways is DPM (EMFAC2011 for San Francisco County; Attachment A09).

In estimating cancer risks associated with roadway and on-road motor vehicle emissions, this analysis follows the BAAQMD (2011b) recommendations for toxic speciation[14] and by considering sensitivity-

[12] OEHHA/ARB Consolidated Table of Risk Assessment Health Values. Updated 2/14/2011.

[13] BAAQMD, *Community Air Risk Evaluation (CARE) Program Phase I Study Results*, 2006.

[14] As in Sections 6.0 to 6.2 and Tables 14 & 15 of BAAQMD 2011b.

weighting factors and the foreseeable 70-year emissions trends[15] of the following types of contaminants (see Attachment A09, p.3):

- DPM emissions from all diesel vehicles (passenger cars, trucks, and buses);
- TOG emissions from tailpipes of non-diesel vehicles; and
- TOG emissions from evaporative running losses from non-diesel vehicles.

Estimating the cancer risk and hazard indices from roadways can be accomplished as follows:

**Cancer Risk** = [(chi DPM * URF) + (chi TOG Exhaust * URF) + (chi TOG Evaporative * URF)] * CRAF

where:

chi = annual average concentration from dispersion model, $\mu g/m^3$
URF(DPM) = $3.19 \times 10^{-4}$ per $\mu g/m^3$ (derived above for adult, resident, lifetime exposure)
URF(TOG Exhaust, non-diesel) = $1.81 \times 10^{-6}$ per $\mu g/m^3$
(TOG Exhaust, non-diesel, speciation from Table 14 of BAAQMD 2011b)
URF(TOG Evaporative, non-diesel) = $1.07 \times 10^{-7}$ per $\mu g/m^3$
(TOG Evaporative, non-diesel, speciation from Table 15 of BAAQMD 2011b)
CRAF = Age-Specific Cancer Risk Adjustment Factor (sensitivity-weighted factors from Tables 10 to 12 of BAAQMD 2011b).

**Non-Cancer Hazards, Major Roadways and On-Road Motor Vehicles.** Non-cancer hazards for the roadway sources are derived by estimating long-term (for chronic) and short-term (for acute) exposure to speciated TOG constituents (including benzene, toluene, and xylenes), as well as DPM for chronic hazards. The toxic speciation of TOG due to tailpipe emissions and evaporative losses from non-diesel on-road sources and the toxicity-weighted Reference Exposure Level (REL) factors for these contaminants are in BAAQMD guidance[16] (BAAQMD 2011b, see Attachment A09).

**Chronic Hazard Index** = [(chi DPM / REL) + (chi TOG Exhaust / REL) + (chi TOG Evaporative / REL)]

where:

chi = annual average concentration from dispersion model, $\mu g/m^3$
Chronic Inhalation REL(DPM) = 5 $\mu g/m^3$ (BAAQMD Reg. 2-5)
Chronic Inhalation REL(TOG Exhaust, non-diesel) = 283.77 $\mu g/m^3$
(TOG Exhaust, non-diesel, speciation from Table 14 of BAAQMD 2011b)
Chronic Inhalation REL(TOG Evaporative, non-diesel) = 120 $\mu g/m^3$
(TOG Evaporative, non-diesel, speciation from Table 15 of BAAQMD 2011b).

**Acute Hazard Index** = [(chi TOG Exhaust / REL) + (chi TOG Evaporative / REL)]

where:

chi = maximum hourly concentration from dispersion model (10x annual), $\mu g/m^3$
Acute Inhalation REL(TOG Exhaust, non-diesel) = 3282.58 $\mu g/m^3$
(TOG Exhaust, non-diesel, speciation from Table 14 of BAAQMD 2011b)
Acute Inhalation REL(TOG Evaporative, non-diesel) = 762 $\mu g/m^3$
(TOG Evaporative, non-diesel, speciation from Table 15 of BAAQMD 2011b).

[15] As in Tables 10 to 12 of BAAQMD 2011b.

[16] As in Sections 6.3 to 6.4 and Tables 14 & 15 of BAAQMD 2011b.

## Results of Construction-Phase Risk and Hazards

### *Project Construction, Risk and Hazards*

**Table 17** shows the results of refined modeling for the proposed construction-phase emissions. Unmitigated emissions would cause an impact exceeding the risk threshold for the nearest residential land use. The compact project site and lack of buffer space between the site boundary and sensitive receptors limit the ability for construction-phase emissions to disperse. The maximally exposed individual (MEI) location and the highest concentrations would be experienced by existing residential receptors across Third Street about 100 feet to the northeast. The concentrations experienced at the nearest daycare location, approximately 920 feet to the south, would be substantially lower.

**Table 17. Summary of Risk and Hazards, Unmitigated Construction Impacts to Sensitive Receptors**

| Location | Excess Cancer Risk with Age-Sensitivity Factors (per million) | Chronic Non-Cancer Hazard Index | Acute Non-Cancer Hazard Index | Incremental Annual Average PM2.5 ($\mu g/m^3$) |
|---|---|---|---|---|
| Existing Resident Child (MEI) | **27.3** | 0.121 | 0.019 | 0.1998 |
| Existing Daycare | 1.6 | 0.013 | 0.002 | 0.0214 |
| **BAAQMD Individual Source Thresholds** | **10** | **1.0** | **1.0** | **0.3** |

Source: ISC modeling results; Attachment A09, pp. 12-14.

Construction-phase risk and hazards would be dominated by the cancer risk of DPM and PM2.5 concentrations nearest the sources. Incremental concentrations of PM2.5 in the ambient air from construction-phase activity would not exceed the BAAQMD project-level threshold for community risk from PM2.5 (0.3 $\mu g/m^3$). However, maximum excess lifetime cancer risk, with age-sensitivity factors (ASF) for a resident from the third trimester of pregnancy to two years of age, would exceed the project-level threshold (10 per million) at the nearest sensitive receptors. The non-cancer hazards would be below the hazard thresholds and minor in comparison to the potential cancer risk with ASF. Mitigation would be required to address the increased cancer risk of DPM.

### *Mitigation for Construction-Phase, Risk and Hazards*

Construction-phase cancer risk and PM2.5 concentrations could be substantially reduced with implementation of feasible mitigation measures to reduce construction-related emissions. Unmitigated construction-phase impacts (as in **Table 17**) could be reduced with aggressive control of diesel construction equipment emissions. Because unmitigated construction-phase cancer risk would exceed the BAAQMD thresholds of significance for the nearest off-site sensitive receptor and because construction-phase cancer risk would be dominated by risk due to exposure to diesel particulate matter (DPM), feasible mitigation would need to reduce DPM emissions from the construction equipment used on-site (including excavators, cranes, and generators). Construction impacts would need to be reduced by approximately 65 percent from the level shown in **Table 17** to result in an impact that is below the cancer risk threshold. If all diesel construction equipment were to meet Interim Tier 4 diesel engine standards, or were to be retrofitted with a Level 3 Verified Diesel Emissions Control Strategy (VDECS), DPM emissions could be reduced by as much as 85 percent, depending on the engine. Interim Tier 4 standards took effect for many types of engines in model year 2011, and for some types of engines, manufacturers may phase the controlled engines into production between model years 2011 and 2014. Construction equipment fleet owners and operators have incentives to continually improve the emissions performance of their fleets,

but not all fleets are required by CARB to retrofit their engines. Because construction equipment meeting Tier 4 standards has only recently become available, and it is not mandatory that fleets be retrofitted with VDECS, equipment with these newer engines may not be readily available to the project sponsor. Accordingly, the following mitigation measure (M-AQ-1) would specify the necessary equipment or allow an alternative approach for reducing construction emissions by 65 percent in order to result in less-than-significant impacts to off-site receptors. **Table 18** shows the mitigated construction air quality impact results for risk and hazards with implementing the **Construction Emissions Minimization Plan** delineated below.

**Table 18. Summary of Risk and Hazards, Mitigated Construction Impacts to Sensitive Receptors**

| Location | Excess Cancer Risk with Age-Sensitivity Factors (per million) | Incremental Annual Average PM2.5 ($\mu g/m^3$) |
|---|---|---|
| Existing Resident Child (MEI) | 9.7 | 0.071 |
| Existing Daycare | 0.6 | 0.008 |
| **BAAQMD Individual Source Thresholds** | **10** | **0.3** |

Source: ISC modeling results, with a 65 percent reduction of DPM emissions.

Implementation of the following mitigation measure would reduce the cancer risk impacts experienced by off-site receptors to below the project-level threshold of significance:

**Mitigation Measure M-AQ-1: Construction Emissions Minimization.** To reduce the potential health risk resulting from project construction activities, the project sponsor shall prepare a Construction Emissions Minimization Plan designed to reduce construction-related diesel particulate matter emissions from off-road construction equipment used at the site by at least 65 % as compared to the construction equipment list, schedule, and inventory provided by the sponsor on May 27, 2011.

The project sponsor shall include all requirements identified in the Construction Emissions Minimization Plan in contract specifications for the entire duration of construction activities.

The Construction Emissions Minimization Plan shall include the following requirements, which would achieve the required 65 % reduction in construction period diesel particulate matter emissions:

- Limiting idling times by either shutting equipment off when not in use or reducing the maximum idling time to two minutes.
- Prohibiting use of diesel generators for electric power because on-site distribution of electricity is available.
- Requiring construction contractors to use electric or propane powered devices for the following types of equipment:
  - Tower Crane
  - Fork Lifts and Manlifts
  - Portable Welders
  - Concrete Placing Booms
- Requiring construction contractors to use portable compressors that are either electric powered or powered by gasoline engines or engines compliant with Tier 4 standards.

- Requiring use of Interim Tier 4 or Tier 4 equipment where such equipment is available and feasible for use. Use of Interim Tier 4 or Tier 4 equipment would be feasible for the following types of equipment:
  - Backhoes
  - Rubber-Tired Dozers
- Requiring use of Tier 2/Tier 3 equipment retrofitted with ARB Level 3 Verified Diesel Emissions Control System (VDECS, which includes diesel particulate filters). The following types of equipment are identified as candidates for retrofitting with ARB-certified Level 3 VDECS, (which are capable of reducing DPM emissions by 85 percent or more), due to their expected operating modes (i.e., fairly constant use at high revolutions per minute):
  - Excavators
  - Concrete Boom Pumps
  - Concrete Trailer Pumps
- Use of Tier 3 equipment for the following types of equipment:
  - Portable Cranes
  - Soil Mix Drill Rigs
  - Soldier Pile Drill Rigs
  - Shoring Drill Rigs

If the foregoing requirements are implemented, no further quantification of emissions shall be required. Alternatively, the project sponsor may elect to substitute alternative measures in the Construction Emissions Minimization Plan for review and approval by the Environmental Review Officer (ERO). Such alternative measures would be subject to demonstrating that the alternative measures would achieve the required 65 % reduction in construction period diesel particulate matter emissions, including without limitation the following:

- Use of other late-model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and add-on devices such as particulate filters; and
- Other options as such become available.

The project sponsor shall submit the Construction Emissions Minimization Plan to the Environmental Review Officer (ERO) for review and approval by an Environmental Planning Air Quality Specialist prior to the commencement of construction activities.

**Analysis of Mitigation Measure.** Mitigation Measure M-AQ-1 (Construction Emissions Minimization) would require on-site construction equipment to be powered primarily by electricity distributed from the grid, propane fuel, or the lowest-emitting engines found feasible, including engines retrofitted with diesel particulate filters. Use of an alternative fuel like propane, which is a consumer-quality gaseous fuel, would result in some TAC emissions; however, because emissions and health effects from alternative fuel use would be minor compared to the adverse effects of DPM, eliminating DPM emissions would be the primary risk management strategy.[17] By forcing equipment like cranes, excavators, forklifts, backhoes, and pumps to avoid diesel fuel use or use the lowest-emitting diesel powered engines available, this construction mitigation would avoid 65 % of the DPM and PM2.5 emissions that would other-

[17] For example, CARB exempts alternative-fueled (including propane) portable construction equipment from the rules regarding control of airborne toxics (17 CCR 93116). Also BAAQMD excludes non-diesel boilers, cooking, and space-heating equipment from CEQA review of toxics, as "minor, low-impact sources" (BAAQMD 2011b).

wise occur with a comparable baseline fleet of Tier 2/Tier 3 equipment (see detailed emissions before and after mitigation in Attachment A08).

Implementation of the mitigation measure would result in the maximum feasible emissions reductions, thereby reducing the cancer risk and PM2.5 concentrations to which sensitive receptors would be exposed. With the mix of diesel-powered construction equipment specified by this measure, the construction air quality impact would be reduced to a less-than-significant level.

## Results of Operation-Phase Risk and Hazards

***Proposed Project New Sources, Risk and Hazards***

**Table 18** shows the results of refined modeling for the proposed new standby generator engine. The proposed project would introduce new stationary sources, including a diesel-fueled compression-ignition internal combustion engine for use as a standby generator. The proposed project would also add natural gas–fired systems for heating, ventilation, and hot water, but the natural gas–fired systems would be "minor, low-impact sources" and unlikely to pose a significant community risk or hazard or adverse health impact. In addition, there would be some incremental risk associated with emissions from project-related traffic. However, project trip generation rates would be less than 1,200 vehicle trips per day, and because this level of traffic would be well below 10,000 vehicles per day (the level for a "minor, low-impact" road, as in BAAQMD 2011b), project traffic would not substantially contribute to incremental risk.

The location of the MEI for the proposed standby generator engine would be on the project site. For other existing residential receptors off-site in the project area, risk and hazards would be lower than those shown in **Table 18**. No existing or proposed receptors would experience increased cancer risk or hazards exceeding the BAAQMD thresholds for individual sources, and the threshold for incremental PM2.5 concentrations would not be exceeded at any receptor. The non-cancer hazards would be minor in comparison to the potential cancer risk with ASF. Therefore, no mitigation is required.

**Table 18. Summary of Risk and Hazards, Proposed Project New Sources**

| Project Source | Excess Cancer Risk with Age-Sensitivity Factors (per million) | Chronic Non-Cancer Hazard Index | Acute Non-Cancer Hazard Index | Incremental Annual Average PM2.5 ($\mu g/m^3$) |
|---|---|---|---|---|
| On-site Diesel Standby Generator (1,490 hp) | 5.6 | 0.0063 | 0.0010 | 0.0104 |
| **BAAQMD Individual Source Thresholds** | **10** | **1.0** | **1.0** | **0.3** |

Source: ISC modeling results; Attachment A09, pp. 8-11.

***Mitigation for Proposed Project New Sources, Risk and Hazards***

No mitigation measures would be required since the proposed new standby generator engine would not cause potentially significant levels of increased cancer risk, hazards, or PM2.5 concentrations.

***Proposed Project New Receptors, Risk and Hazards***

**Table 19** shows the results of refined modeling for sources affecting the proposed new receptors. The project would introduce new residential receptors to an area affected by major roadways, various existing permitted stationary sources, and the new proposed project sources. No individual source (roadway or stationary source) would expose the new residential receptors to an increased cancer risk over the project-

level BAAQMD threshold. Similarly, the new receptors would be exposed to incremental concentrations of PM2.5 from each source, but PM2.5 from each source would not exceed the project-level PM2.5 threshold. The non-cancer hazards would be minor in comparison to the potential cancer risk with ASF. Therefore, no mitigation is required.

**Table 19. Summary of Risk and Hazards, Proposed Project New Receptors**

| Individual Source | Excess Cancer Risk with Age-Sensitivity Factors (per million) | Chronic Non-Cancer Hazard Index | Acute Non-Cancer Hazard Index | Incremental Annual Average PM2.5 ($\mu g/m^3$) |
|---|---|---|---|---|
| On-site Diesel Standby Generator (1,490 hp) | 5.6 | 0.0063 | 0.0010 | 0.0104 |
| # 9310, Existing Permitted | 2.7 | 0.0030 | 0.0005 | 0.0050 |
| # 9341, Existing Permitted | 0.4 | 0.0005 | 0.0001 | 0.0008 |
| # 13346, Existing Permitted | 0.3 | 0.0004 | 0.0001 | 0.0006 |
| # 13843, Existing Permitted | 0.2 | 0.0002 | 0.0000 | 0.0004 |
| # 13989, Existing Permitted | 0.3 | 0.0003 | 0.0001 | 0.0006 |
| # 14119, Existing Permitted | 0.1 | 0.0001 | 0.0000 | 0.0002 |
| # 14222, Existing Permitted | 0.0 | 0.0000 | 0.0000 | 0.0000 |
| # 14223, Existing Permitted | 0.0 | 0.0000 | 0.0000 | 0.0001 |
| # 14427, Existing Permitted | 0.1 | 0.0001 | 0.0000 | 0.0002 |
| # 16526, Existing Permitted | 0.1 | 0.0001 | 0.0000 | 0.0001 |
| # 16708, Existing Permitted | 0.9 | 0.0010 | 0.0002 | 0.0016 |
| # 16743, Existing Permitted | 0.0 | 0.0000 | 0.0000 | 0.0001 |
| # 16795, Existing Permitted | 3.2 | 0.0035 | 0.0006 | 0.0058 |
| # 16798, Existing Permitted | 2.7 | 0.0030 | 0.0005 | 0.0049 |
| # 18763, Existing Permitted | 0.2 | 0.0002 | 0.0000 | 0.0003 |
| # 19153, Existing Permitted | 0.1 | 0.0001 | 0.0000 | 0.0001 |
| # 19929, Existing Permitted | 0.5 | 0.0006 | 0.0001 | 0.0010 |
| # 19990, Existing Permitted | 0.1 | 0.0001 | 0.0000 | 0.0001 |
| Third Street | 3.0 | 0.0035 | 0.0029 | 0.0373 |
| Mission Street | 2.2 | 0.0026 | 0.0022 | 0.0276 |
| Fourth Street | 2.2 | 0.0025 | 0.0021 | 0.0267 |
| Market Street | 6.1 | 0.0070 | 0.0058 | 0.0743 |
| Kearny Street | 0.2 | 0.0002 | 0.0002 | 0.0021 |
| Grant Avenue | 0.5 | 0.0005 | 0.0004 | 0.0057 |
| Howard Street | 1.5 | 0.0018 | 0.0015 | 0.0189 |
| New Montgomery Street | 0.8 | 0.0009 | 0.0008 | 0.0099 |
| O'Farrell Street | 1.1 | 0.0013 | 0.0011 | 0.0135 |
| Second Street | 0.6 | 0.0007 | 0.0006 | 0.0080 |
| **BAAQMD Individual Source Thresholds** | **10** | **1.0** | **1.0** | **0.3** |

Source: ISC modeling results; Attachment A09, pp. 4-11.

***Mitigation for Proposed Project New Receptors, Risk and Hazards***

No mitigation measures would be required since the new receptors would be exposed to increased cancer risk, hazards, or PM2.5 concentrations from nearby major roadways and stationary sources at levels that do not exceed the BAAQMD thresholds of significance.

## Cumulative Analysis of Risk and Hazards

BAAQMD recommends that cumulative impacts of new sources and new receptors be evaluated at the MEI to include the risk and hazards from the inventory of nearby individual stationary sources and roadways. For construction-phase, the risk and hazards due to construction equipment are summed with those due to cumulative construction projects, roadway impacts from tailpipe and evaporative losses from vehicles, and stationary sources to arrive at a cumulative result at the construction-phase MEI. The potential cancer risk and hazard indices for exposure of a new receptor to a cumulative scenario are the sum of the estimated risk and hazards from the various nearby source types (stationary and on-road mobile). The resulting risk and hazards are compared with the cumulative thresholds in the BAAQMD guidelines.

### Cumulative Scenario for Community Risk and Hazards

The cumulative scenario includes the new sources related to the proposed project, including the proposed standby diesel engine and project-related traffic, plus sources that are reasonably foreseeable, along with the existing sources including major roadways. Reasonably foreseeable projects for purposes of the cumulative air quality analysis are those that have filed formal applications and have construction schedules that may overlap with the construction of the proposed project. Several development projects near the project site have filed formal applications and/or have received their entitlements.

Construction of nearby projects would cause temporarily increased pollutant concentrations at the construction MEI (maximally exposed individual). For cumulative residential and commercial developments, the relative effects due to air toxics that could be emitted during construction of those projects can be described using a BAAQMD screening table (BAAQMD 2010a). The BAAQMD construction screening table gives a "minimum offset distance" that ensures a sensitive receptor would be located far enough away from the construction activities at the project site to experience a less-than-significant impact. Construction of a nearby project that is far enough away to be outside the minimum offset distance would not contribute more than 10 incremental cancer cases per million, a chronic non-cancer hazard index of 1.0, or an increased annual average PM2.5 concentration of 0.3 $\mu g/m^3$ at the MEI, and sufficiently distant projects would not substantially contribute to risk and hazards. These are conservative assumptions because the screening methodology is based on many worst-case assumptions and use of default equipment fleets (BAAQMD 2010a). The BAAQMD screening table applies to new residential and commercial developments that involve use of heavy-duty construction equipment.

The MEI for construction of the proposed project would be within the minimum offset distance of four nearby cumulative construction projects (see Attachment A08). Cumulative construction-related effects are a concern for the two cumulative projects nearest the MEI (the Palace Hotel Project and SFMOMA Expansion). The other two construction projects are the interior renovation of an existing building at 134-140 New Montgomery Street and the Central Subway Project along Fourth Street. The environmental review for these two projects was completed in 2008, and data regarding the quantified construction emissions for these two projects are not available.[18,19] The project at 134-140 New Montgomery Street

[18] San Francisco Planning Department and FTA, *Central Subway Final Supplemental Environmental Impact Statement/ Supplemental Environmental Impact Report*. Available at: http://www.sfmta.com/cms/mcsp/cspfseiseir.htm.

[19] San Francisco Planning Commission Motions No. 17780 and 17781, approved on December 11, 2008.

consists mainly of interior renovation of the existing building. As part of the project, there would be some repair to exterior terra cotta, but there would be no building expansion. Therefore, the project is not likely to contribute significantly to cumulative air quality construction impacts of the 706 Mission Street project. Utility relocation for the Central Subway Project has already occurred for the portion of Fourth Street closest to the project site. The subway tunnel construction would occur underground and may potentially overlap with construction of the proposed project. However, Central Subway Project is a linear project with emissions spread along the route alignment. The analysis below shows that the cumulative construction health risk for the proposed project, together with other cumulative construction sources within the zone of influence for which such information is known, would be below the cumulative threshold of 100 in a million excess cancer risk and are not likely to exceed the threshold even if construction emissions of the Central Subway Project were included. In addition, the proposed project would implement the construction emissions minimization mitigation measure (M-AQ-1) which would further reduce the proposed project's construction emissions. However, in the event that the Central Subway Project's construction emissions could result in a cumulatively significant construction air quality impact, the proposed project's contribution to cumulative construction cancer risk would be less than significant because the proposed project at 706 Mission Street would implement all feasible mitigation measures to reduce the project's contribution to the cancer risk and PM2.5 concentrations. The result would not be cumulatively considerable, and therefore, would not result in a significant cumulative construction air quality impact.

Environmental documentation is not yet available for the Palace Hotel Project.[20] For the SFMOMA Expansion,[21] which recently underwent environmental review and was approved, the EIR indicates that the SFMOMA Expansion construction-phase would cause less-than-significant impacts for existing residential receptors near the SFMOMA Expansion construction.[22]

The pollutants generated during construction of the Palace Hotel Project and SFMOMA Expansion projects would contribute to temporarily increased concentrations of air pollutants and adverse impacts on ambient air quality, concurrent with those of the proposed project if construction occurs at the same time. The results assume concurrent construction of the proposed project and these other two projects. This is a conservative assumption because the projects have different development schedules and concurrent construction may not occur.

To determine cumulative construction-phase impacts, the effects of project-level construction without mitigation are combined with the impacts of the construction of reasonably foreseeable nearby development projects (the cumulative projects) where such information exists or can be estimated and other individual and roadway sources in the area. The effects of each cumulative construction project are analyzed separately depending on the level of detail available about the project, as follows:

- **Palace Hotel Project at 2 New Montgomery Street.** Absent information on project-specific construction methods, equipment, or phasing, the present study compares the size and location of the Palace Hotel Project to that of the proposed project. The Palace Hotel Project would add no more than roughly half the increase in floor space of the proposed project, and it would be located generally downwind of the proposed project's construction health risk MEI. Therefore, it could reasonably be assumed to

[20] San Francisco Planning Department. Application filed, as on list of pipeline projects (March 3, 2011).

[21] San Francisco Planning Department, *San Francisco Museum of Modern Art Expansion / Fire Station Relocation and Housing Project*. *Draft Environmental Impact Report*, July 11, 2011.

[22] San Francisco Planning Department, *San Francisco Museum of Modern Art Expansion / Fire Station Relocation and Housing Project*, *Environmental Impact Report, Comments and Responses*, October 27, 2011.

cause construction-phase air quality impacts somewhat lower than those of the unmitigated proposed project, or up to a maximum of 20 incremental cancer cases per million, a chronic non-cancer hazard index of 0.1, and an increased annual average PM2.5 concentration of 0.1 μg/$m^3$. Actual impacts could be substantially less depending on control measures eventually implemented by the Palace Hotel Project.

- **SFMOMA Expansion at 151 Third Street.** The July 2011 Draft EIR for SFMOMA Expansion indicates[23] less-than-significant levels of emissions would occur during construction, with 0.4 incremental cancer cases per million, a chronic non-cancer hazard index of 0.0011, and 0.0003 μg/$m^3$ annual average PM2.5 impacts for existing residential receptors near the construction, approximately 300 feet north and west of the SFMOMA Expansion construction.

***Results of Cumulative Construction-Phase, Risk and Hazards***

**Table 20** shows the result of modeling for project-level construction impacts, with cumulative construction-phase sources, and shows the cancer risk with age-sensitivity factors (ASF) and hazards at the construction MEI (from **Table 17**). In conjunction with the impacts of construction of reasonably foreseeable nearby development projects and other stationary and mobile sources in the area (from **Table 19**), project construction would contribute to temporarily increased concentrations of air pollutants and adverse impacts on ambient air quality but would not exceed the cumulative thresholds for risk and hazards for the construction MEI.

**Table 20. Summary of Cumulative Risk and Hazards, Proposed Construction Sources**

| Sources During Construction | Excess Cancer Risk with Age-Sensitivity Factors (per million) | Chronic Non-Cancer Hazard Index | Incremental Annual Average PM2.5 (μg/$m^3$) |
|---|---|---|---|
| Project Construction at MEI, Unmitigated | 27.3 | 0.121 | 0.1998 |
| Project Construction at MEI, Mitigated | 9.7 | 0.121 | 0.071 |
| Palace Hotel Project, Cumulative Construction Project | Up to 20 | Up to 0.1 | Up to 0.1 |
| SFMOMA Expansion Project, Cumulative Construction Project | 0.4 | 0.001 | 0.0003 |
| Existing Permitted Sources | 11.8 | 0.013 | 0.0218 |
| Existing Major Roadway Sources | 18.3 | 0.021 | 0.2239 |
| **Total Sum, Project Unmitigated** | **77.8** | **0.256** | **0.55** |
| **Total Sum, Project Mitigated** | **60.2** | **0.256** | **0.42** |
| **BAAQMD Cumulative Thresholds** | **100** | **10.0** | **0.8** |

Source: ISC modeling results; Attachment A09, pp. 12-14.

***Mitigation for Cumulative Construction-Phase, Risk and Hazards***

No mitigation measures would be required for reducing cumulative construction-phase risk and hazards. However, implementation of the project-level Mitigation Measure M-AQ-1 (Construction Emissions Minimization) required for the project individually would reduce the cumulative construction-phase impacts

[23] San Francisco Planning Department, *San Francisco Museum of Modern Art Expansion / Fire Station Relocation and Housing Project*. *Draft Environmental Impact Report*, July 11, 2011.

and the proposed project's contribution to cumulative construction phase impacts. Because mitigation is required of the project to reduce project-level construction impacts, with full implementation of Mitigation Measure M-AQ-1, cumulative construction impacts would be further reduced to a level of cumulative excess cancer risk of 60 per million.

***Cumulative Operation-Phase Stationary Sources***

Stationary source configurations and emission rates are the same in the cumulative scenario as for the project-level. The presently proposed Palace Hotel Project could include additional emergency generators, but without a specific proposal, it would be speculative to assume the presence of new or modified stationary sources. Any new or modified stationary source associated with the Palace Hotel Project (or any other project) would be subject to BAAQMD permitting requirements, which would subject the source to a pre-construction review of toxic air contaminant impacts and would require the source to minimize and avoid substantial health risks. The SFMOMA Expansion would not include an additional emergency generator. However, the existing SFMOMA facility (# 16708) would remain. Once built, the SFMOMA Expansion would not be a significant source of operational emissions.[24]

***Cumulative Operation-Phase Roadway Sources***

Major roadway source configurations and emissions are the same in the cumulative scenario as for the project-level, with results for cancer risk over 70 years weighted for future traffic growth shown in **Table 19**. Information from the EMFAC model and BAAQMD guidelines (2011b) shows that the San Francisco County fleet average PM2.5 emission rate trends down from 0.0305 g/VMT (2015) in future years.

***Results of Cumulative Operation, Risk and Hazards***

**Table 21** shows the result of refined modeling for foreseeable cumulative sources as they would affect the proposed new receptors. The combined effects of the sources would not expose the new residential receptors to an increased cancer risk above the BAAQMD threshold for cumulative risk, and new receptors would not be exposed to incremental PM2.5 concentrations in excess of the cumulative-level PM2.5 threshold. The chronic non-cancer hazard would be minor in comparison to the potential cancer risk. Therefore, no mitigation is required.

**Table 21. Summary of Cumulative Risk and Hazards, Cumulative Impact to Proposed New Receptors**

| Sources During Operation | Excess Cancer Risk with Age-Sensitivity Factors (per million) | Chronic Non-Cancer Hazard Index | Incremental Annual Average PM2.5 ($\mu g/m^3$) |
|---|---|---|---|
| On-site Diesel Standby Generator (1,490 hp) | 5.6 | 0.0063 | 0.0104 |
| Existing Permitted Sources | 11.8 | 0.013 | 0.0218 |
| Existing Major Roadway Sources | 18.3 | 0.021 | 0.2239 |
| **Total Sum** | **35.7** | **0.041** | **0.256** |
| **BAAQMD Cumulative Thresholds** | **100** | **10.0** | **0.8** |

Source: ISC modeling results; Attachment A09, pp. 4-11.

[24] San Francisco Planning Department, *San Francisco Museum of Modern Art Expansion / Fire Station Relocation and Housing Project*. *Draft Environmental Impact Report*, July 11, 2011.

***Mitigation for Cumulative Operation, Risk and Hazards***

No mitigation measures would be required to reduce the cumulative impacts of operation-phase emissions or operation-phase exposure of receptors to cumulative impacts of major roadways and other sources.

## Summary for Community Risk and Hazards

Emission increases of toxic air contaminants during construction would result in potentially significant impacts by increasing the lifetime cancer risk experienced by the nearest off-site residential receptors. Mitigation of construction DPM and construction-equipment exhaust PM2.5 would reduce the cancer risk and PM2.5 impacts experienced by off-site receptors to a level that would not exceed the individual-project cancer risk threshold of 10 incremental cancer cases per million. The impacts of cumulative construction-phase increased cancer risk and increased PM2.5 concentrations would not be significant because the cumulative impacts would not exceed the cumulative cancer risk threshold of 100 incremental cancer cases per million or the incremental PM2.5 threshold for cumulative effects of 0.8 $\mu g/m^3$.

The proposed new standby generator engine would increase community risk, hazards, and PM2.5 concentrations, but not to levels that would exceed the thresholds for a new project source.

Existing roadways, other existing permitted sources, and the proposed project new sources would expose the proposed project new residential receptors to risk, hazards, and PM2.5 concentrations to levels that would not exceed the thresholds for individual sources or cumulative sources.

# 5. Conclusions

The analysis is divided into two primary discussions, to separately describe criteria air pollutants and community risk and hazards, and for each type of impact, construction and operation of the project are described separately. The analysis finds the following:

- Unmitigated emissions of criteria air pollutants during construction of the proposed project and during its subsequent operation would be below the applicable BAAQMD significance thresholds.
- Localized concentrations of criteria air pollutants would also be below the applicable thresholds.
- Fine particulate matter or PM2.5, although it is a criteria air pollutant, is also considered separately as part of community risk. Construction-related mass emissions of PM2.5 would be well below the criteria air pollutant threshold, and incremental concentrations of PM2.5 in the ambient air from construction-phase activity would be below the applicable BAAQMD project-level threshold for community risk related to annual average PM2.5 concentrations (0.3 $\mu g/m^3$).
- During construction, the maximum excess lifetime cancer risk, including age-sensitivity factors (ASF), would potentially exceed the project-level threshold (10 per million) for the nearest off-site sensitive receptors, residences across Third Street about 100 feet away to the northeast. Mitigation of diesel particulate matter (DPM) from construction equipment would be needed to reduce the cancer risk impact experienced by off-site receptors. Mitigation Measure M-AQ-1 (Construction Emissions Minimization) would reduce emissions of DPM from on-site construction by approximately 65 percent to reduce the impact to below the cancer risk threshold. By using electricity from the grid, propane fuel, or the lowest-emitting engines found feasible to power equipment, or by installing diesel particulate filters on engines, the project sponsor would be required to control DPM and PM2.5 emissions from equipment like cranes, excavators, forklifts, backhoes, and pumps. With achievement of the level of performance specified by Mitigation Measure M-AQ-1, the mitigated project impact would not exceed the cancer risk threshold of 10 incremental cancer cases per million.
- Cumulative construction projects would occur in conjunction with construction-phase impacts and emissions from existing roadways and existing permitted sources to temporarily increase concentrations of toxic air contaminants and PM2.5. Cumulative construction-phase risk and hazards would not exceed the cumulative cancer risk threshold of 100 per million or the cumulative PM2.5 threshold of 0.8 $\mu g/m^3$. Although no mitigation measures would be required for reducing cumulative construction-phase risk and hazards, the cumulative construction-phase impact would be further reduced with implementation of Mitigation Measure M-AQ-1 identified above for project construction emissions.
- The proposed new standby generator engine would increase community risk, hazards, and PM2.5 concentrations, but not to levels that would exceed the thresholds for a new project source.
- The existing roadways, other existing permitted sources, and the proposed project new sources would not expose the proposed project new residential receptors to risk, hazards, and PM2.5 concentrations that would exceed the thresholds for individual sources or cumulative sources.

# References

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_____. (BAAQMD 2011b). Recommended Methods for Screening and Modeling Local Risks and Hazards. May 2011.

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Sonoma Technology, Inc. (STI 2011). Technical Memorandum, Prepared for: Bay Area Air Quality Management District, Re: Default Modeling Parameters for Stationary Sources (Median Values, Table 1). April 1, 2011.

# Air Quality Technical Report Attachments

A01. *Figure: Project Site and Existing Stationary Sources* (5/4/2011, 1 pg PDF)

A02. *Approved Scope of Work: May 17, 2011* (15 pp PDF)

A03. *Project BAAQMD Risk & Hazard Stationary Source Inquiry Report* (3/15/2011, 3 pp PDF)

A04. *Permitted Sources Emission Inventory Report (by source), prepared by BAAQMD* (3/15/2011, 27 pp PDF)

A05. *Screening Results: Stationary Sources and Inquiry Form Results* (6/20/2011, 1 pg, 11x17 PDF)

A06. *Orientation of Roadway and Stationary Sources – New Residential Receptors* (10/2011, 1 pg PDF)

A07. *Orientation of Existing Residences and New Stationary Source* (10/2011, 1 pg PDF)

A08. *Construction Activity and Project Source Emissions* (1/25/2012, 19 pp PDF & URBEMIS output)

A09. *EMFAC Output and TAC-Risk Calculation Results* (10/6/2011, 14 pp PDF)

Zipped Folders:

*URBEMIS Output* (1/24/2012, 36 files PDF-format)

*ISC and BPIP Input-Output* *.LST, *.SUM, & *.TAB (10/6/2011, 13 files text-format)

# APPENDIX G: CONSTRUCTION EMISSIONS MINIMIZATION SPREADSHEET

**706 Mission**
**Construction Equipment Inventory**

| | | Provided by Applicant | | | | | Aspen_URBEMIS Input | | | Provided by Applicant | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Duration | | Site Equipment | | | | | | Transport Equipment | | |
| Phase | Description | Month Start | Month Finish | Peak Qty | Daily Ave | Type of Equipment | Type of Equipment | HP | Default Load Factor | Peak Qty | Daily Ave | Type of Equipment |
| 1 | Demolition | 1 | 8 | 3 | 1 | Hoe ram | Excavator | 450 | 0.57 | 18 | 6 | Dump trucks (high sides) |
| | (Aronson Bldg & Garage concurrent) | | | 2 | 1 | Claw excavator | Excavator | 450 | 0.57 | 2 | 0 | Flatbeds |
| | | | | 2 | 1 | High reach fork lift | Forklift | 125 | 0.3 | 2 | 0.5 | Debris box trucks |
| | | | | 8 | 4 | Bobcats | Backhoe | 85 | 0.55 | | | |
| | | | | 1 | 0.4 | Portable cranes | Crane | 475 | 0.43 | | | |
| | | | | 4 | 2 | Portable air compressors | Air Compressor | 106 | 0.48 | | | |
| 2 | Excavation & Shoring | 4 | 8 | 2 | 2 | Claw excavator | Excavator | 450 | 0.57 | 20 | 8 | Dump trucks (high sides) |
| | | | | 3 | 2 | High reach fork lift | Forklift | 125 | 0.3 | 2 | 0.5 | Flatbeds |
| | | | | 1 | 1 | Bulldozer | Ruber Tired Dozer | 275 | 0.59 | 2 | 0.5 | Debris box trucks |
| | | | | 2 | 1 | Bobcats | Backhoe | 85 | 0.55 | | | |
| | | | | 1 | 0.4 | Portable cranes | Crane | 475 | 0.43 | | | |
| | | | | 1 | 1 | Soil Mix rig | Bore/Drill Rig | 475 | 0.75 | | | |
| | | | | 1 | 1 | Grout plant for soil mix | Other Equipment | 475 | 0.62 | | | |
| | | | | 1 | 1 | Tie-back drill rig | Bore/Drill Rig | 475 | 0.75 | | | |
| | | | | 3 | 2 | Portable air compressors | Air Compressor | 106 | 0.48 | | | |
| | | | | 1 | 0.4 | Drill rig (dewatering wells) | Bore/Drill Rig | 475 | 0.75 | | | |
| 3 | Foundation/Below Grade Construction | 9 | 15 | 2 | 1 | Portable cranes | Crane | 475 | 0.43 | 25 | 6 | Concrete trucks (excl mat) |
| | | | | 3 | 2 | High reach fork lift | Forklift | 125 | 0.3 | 5 | 3 | Flatbeds |
| | | | | 4 | 1 | Concrete pumps | Pumps | 430 | 0.74 | 2 | 1 | Debris box trucks |
| | | | | 2 | 1 | Bobcats | Backhoe | 85 | 0.55 | | | |
| | | | | 3 | 2 | Portable air compressors | Air Compressor | 106 | 0.48 | | | |
| | | | | 1 | 1 | Tower crane | Crane | 475 | 0.43 | | | |
| | | | | 1 | 1 | Generator | Generator Set | 549 | 0.74 | | | |
| | | | | 3 | 1 | Portable welders | Welder | 45 | 0.45 | | | |
| 4 | Building Superstructure | 16 | 30 | 1 | 1 | Tower crane | Crane | 475 | 0.43 | 30 | 4 | Concrete trucks |
| | | | | 1 | 0.4 | Portable cranes | Crane | 475 | 0.43 | 12 | 7 | Flatbeds |
| | | | | 2 | 2 | Manlifts (doubles) | Forklift | 125 | 0.3 | 2 | 1 | Debris box trucks |
| | | | | 2 | 2 | High reach fork lift | Forklift | 125 | 0.3 | 3 | 1 | Bob tails |
| | | | | 2 | 1 | Concrete pumps | Pumps | 430 | 0.74 | | | |
| | | | | 4 | 3 | Portable air compressors | Air Compressor | 106 | 0.48 | | | |
| | | | | 1 | 1 | Generator | Generator Set | 549 | 0.74 | | | |
| | | | | 5 | 2 | Portable welders | Welder | 45 | 0.45 | | | |
| | | | | 2 | 1 | Bobcats | Backhoe | 85 | 0.55 | | | |
| 5 | Exterior Finishing | 24 | 34 | 1 | 1 | Tower crane | Crane | 475 | 0.43 | 5 | 0 | Concrete trucks |
| | | | | 1 | 0.4 | Portable cranes | Crane | 475 | 0.43 | 7 | 4 | Flatbeds |
| | | | | 2 | 2 | Manlifts (doubles) | Forklift | 125 | 0.3 | 2 | 1 | Debris box trucks |
| | | | | 2 | 2 | High reach fork lift | Forklift | 125 | 0.63 | 10 | 6 | Bob tails |
| | | | | 1 | 0.4 | Concrete pumps | Pumps | 430 | 0.74 | | | |
| | | | | 1 | 1 | Portable air compressors | Air Compressor | 106 | 0.48 | | | |
| | | | | 1 | 1 | Generator | Generator Set | 549 | 0.74 | | | |
| | | | | 2 | 1 | Portable welders | Welder | 45 | 0.45 | | | |
| | | | | 2 | 1 | Bobcats | Backhoe | 85 | 0.55 | | | |
| 6 | Interior Finishing | 30 | 42 | 1 | 0.4 | Portable cranes | Crane | 475 | 0.43 | 2 | 1 | Flatbeds |
| | | | | 2 | 2 | Manlifts (doubles) | Forklift | 125 | 0.3 | 3 | 1.5 | Debris box trucks |
| | | | | 2 | 2 | High reach fork lift | Forklift | 125 | 0.3 | 10 | 6 | Bob tails |
| | | | | 2 | 1 | Bobcats | Backhoe | 85 | 0.55 | | | |

**706 Mission**
**Construction Equipment Inventory**

**Develop Performance Standard for Mitigation Measure**

| URBEMIS Off-Road Total (ton) | 0.87 |
|---|---|

urbemis appx use 0.43 | 8 hr/day | 22 day/mo

| Target Reduction ( 1 - Control %) | 0.35 |
|---|---|

| | Phase | months active | Duration (hp-hr) | Tier 2/3 DPM (g/hp-hr) | Proj w/ Tier 2/3 (ton) | Miigated per 1/19 Plan? | 1/19 Plan | If Mitigated per 1/19 Plan (g/hp-hr) | Proj w/ Mit (ton) |
|---|---|---|---|---|---|---|---|---|---|
| Excavator | Demo | 8 | 155,295 | 0.15 | 0.0257 | n | Tier 2/3 | 0.15 | 0.0257 |
| Excavator | Demo | 8 | 155,295 | 0.15 | 0.0257 | n | Tier 2/3 | 0.15 | 0.0257 |
| Forklift | Demo | 8 | 22,704 | 0.22 | 0.0055 | propan | Zero Emiss | 0.00 | 0.0000 |
| Backhoe | Demo | 8 | 113,217 | 0.30 | 0.0374 | mit | Tier 4 | 0.01 | 0.0012 |
| Crane | Demo | 8 | 49,464 | 0.15 | 0.0082 | n | Tier 2/3 | 0.15 | 0.0082 |
| Air Compressor | Demo | 8 | 61,610 | 0.22 | 0.0149 | elec | Zero Emiss | 0.00 | 0.0000 |
| Excavator | Excav | 4 | 155,295 | 0.15 | 0.0257 | n | Tier 2/3 | 0.15 | 0.0257 |
| Forklift | Excav | 4 | 22,704 | 0.22 | 0.0055 | propan | Zero Emiss | 0.00 | 0.0000 |
| Ruber Tired Dozer | Excav | 4 | 49,116 | 0.15 | 0.0081 | mit | Tier 4 | 0.01 | 0.0005 |
| Backhoe | Excav | 4 | 14,152 | 0.30 | 0.0047 | mit | Tier 4 | 0.01 | 0.0002 |
| Crane | Excav | 4 | 24,732 | 0.15 | 0.0041 | n | Tier 2/3 | 0.15 | 0.0041 |
| Bore/Drill Rig | Excav | 4 | 107,844 | 0.15 | 0.0178 | n | Tier 2/3 | 0.15 | 0.0178 |
| Other Equipment | Excav | 4 | 89,151 | 0.15 | 0.0147 | n | Tier 2/3 | 0.15 | 0.0147 |
| Bore/Drill Rig | Excav | 4 | 107,844 | 0.15 | 0.0178 | n | Tier 2/3 | 0.15 | 0.0178 |
| Air Compressor | Excav | 4 | 30,805 | 0.22 | 0.0075 | elec | Zero Emiss | 0.00 | 0.0000 |
| Bore/Drill Rig | Excav | 4 | 43,138 | 0.15 | 0.0071 | n | Tier 2/3 | 0.15 | 0.0071 |
| Crane | Foundn | 6 | 92,746 | 0.15 | 0.0153 | n | Tier 2/3 | 0.15 | 0.0153 |
| Forklift | Foundn | 6 | 34,056 | 0.22 | 0.0083 | propan | Zero Emiss | 0.00 | 0.0000 |
| Pumps | Foundn | 6 | 144,488 | 0.15 | 0.0239 | n | Tier 2/3 | 0.15 | 0.0239 |
| Backhoe | Foundn | 6 | 21,228 | 0.30 | 0.0070 | mit | Tier 4 | 0.01 | 0.0002 |
| Air Compressor | Foundn | 6 | 46,207 | 0.22 | 0.0112 | elec | Zero Emiss | 0.00 | 0.0000 |
| Crane | Foundn | 6 | 92,746 | 0.15 | 0.0153 | **elec** | Zero Emiss | 0.00 | 0.0000 |
| Generator Set | Foundn | 6 | 184,475 | 0.15 | 0.0305 | elec | Zero Emiss | 0.00 | 0.0000 |
| Welder | Foundn | 6 | 9,195 | 0.45 | 0.0046 | elec | Zero Emiss | 0.00 | 0.0000 |
| Crane | Superst | 14 | 216,407 | 0.15 | 0.0358 | **elec** | Zero Emiss | 0.00 | 0.0000 |
| Crane | Superst | 14 | 86,563 | 0.15 | 0.0143 | n | Tier 2/3 | 0.15 | 0.0143 |
| Forklift | Superst | 14 | 79,464 | 0.22 | 0.0193 | elec | Zero Emiss | 0.00 | 0.0000 |
| Forklift | Superst | 14 | 79,464 | 0.22 | 0.0193 | propan | Zero Emiss | 0.00 | 0.0000 |
| Pumps | Superst | 14 | 337,139 | 0.15 | 0.0557 | n | Tier 2/3 | 0.15 | 0.0557 |
| Air Compressor | Superst | 14 | 161,725 | 0.22 | 0.0392 | elec | Zero Emiss | 0.00 | 0.0000 |
| Generator Set | Superst | 14 | 430,441 | 0.15 | 0.0712 | elec | Zero Emiss | 0.00 | 0.0000 |
| Welder | Superst | 14 | 42,911 | 0.45 | 0.0213 | elec | Zero Emiss | 0.00 | 0.0000 |
| Backhoe | Superst | 14 | 49,533 | 0.30 | 0.0164 | mit | Tier 4 | 0.01 | 0.0005 |
| Crane | Ex Fin | 10 | 154,576 | 0.15 | 0.0256 | **elec** | Zero Emiss | 0.00 | 0.0000 |
| Crane | Ex Fin | 10 | 61,831 | 0.15 | 0.0102 | n | Tier 2/3 | 0.15 | 0.0102 |
| Forklift | Ex Fin | 10 | 56,760 | 0.22 | 0.0138 | elec | Zero Emiss | 0.00 | 0.0000 |
| Forklift | Ex Fin | 10 | 119,196 | 0.22 | 0.0289 | propan | Zero Emiss | 0.00 | 0.0000 |
| Pumps | Ex Fin | 10 | 96,326 | 0.15 | 0.0159 | n | Tier 2/3 | 0.15 | 0.0159 |
| Air Compressor | Ex Fin | 10 | 38,506 | 0.22 | 0.0093 | elec | Zero Emiss | 0.00 | 0.0000 |
| Generator Set | Ex Fin | 10 | 307,458 | 0.15 | 0.0508 | elec | Zero Emiss | 0.00 | 0.0000 |
| Welder | Ex Fin | 10 | 15,325 | 0.45 | 0.0076 | elec | Zero Emiss | 0.00 | 0.0000 |
| Backhoe | Ex Fin | 10 | 35,380 | 0.30 | 0.0117 | mit | Tier 4 | 0.01 | 0.0004 |
| Crane | Int Fin | 12 | 74,197 | 0.15 | 0.0123 | n | Tier 2/3 | 0.15 | 0.0123 |
| Forklift | Int Fin | 12 | 68,112 | 0.22 | 0.0165 | elec | Zero Emiss | 0.00 | 0.0000 |
| Forklift | Int Fin | 12 | 68,112 | 0.22 | 0.0165 | propan | Zero Emiss | 0.00 | 0.0000 |
| Backhoe | Int Fin | 12 | 42,456 | 0.30 | 0.0140 | mit | Tier 4 | 0.01 | 0.0005 |
| | | Sum | 4,449,389 | Sum | 0.872 | | | Sum | 0.298 |

| Satisfy Target? | yes |
|---|---|
| ( 1 - Control %) | 0.34 |

# APPENDIX H: 706 MISSION STREET PEDESTRIAN WIND STUDY AND ABOVE-GRADE REPORT

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Rowan Williams Davies & Irwin Inc.
650 Woodlawn Road West
Guelph, Ontario, Canada
N1K 1B8

# 706 Mission Street

San Francisco, California

# Final Report

## Pedestrian Wind Study

RWDI # 1010989
February 23, 2012

**SUBMITTED TO:**

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## Tables



## Figures



## Appendices

# 1. INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by Turnstone Consulting to conduct a Pedestrian Wind Study for the proposed development at 706 Mission Street in San Francisco, California. The purpose of the study was to assess the wind environment around the development in terms of pedestrian comfort and hazard relative to wind metrics specified in San Francisco Planning Code Section 148. The study objective was achieved through wind tunnel testing of a (1" = 33') scale model for various building configurations. The results for the following five building configurations (Figures 1a through 1e) are presented in this report:

**A – Existing Conditions Configuration:**

Existing site and structures with existing surrounding buildings;

**B – Proposed Project Configuration:**

Proposed Project (red building in Figures 1b and 1c) with existing surrounding buildings;

**C – Proposed Project Plus Cumulative Configuration:**

Proposed Project with existing surrounding buildings and anticipated proposed/future buildings (green buildings in Figure 1c);

**D – Existing Zoning Alternative Configuration**

Existing Zoning Alternative (blue building in Figures 1d and 1e) with existing surrounding buildings; and

**E – Existing Zoning Alternative Plus Cumulative Configuration**

Existing Zoning Alternative with existing surrounding buildings, and anticipated proposed/future buildings (green buildings in Figure 1e).

The project site is located on the north side of Mission Street at the Third Street intersection, west of and adjacent to the existing 144' tall Aronson Building. The proposed building would be 550' tall, including an outdoor terrace at the fourth floor on the west side of the tower. The terrace is proposed to be sheltered by vertical exterior fins and glazing, as well as perforated freestanding panels as shown in Figures 1b and 1c. In addition, the building is proposed to have a chamfered southwest corner at the ground level and second floor. The test model was constructed using the design information and drawings listed in Appendix A.

This report summarizes the methodology of the wind tunnel studies for pedestrian wind conditions, describes the wind comfort and wind hazard criteria used in the current study, and presents the test results and recommendations of conceptual wind control measures, where necessary.

The placement of wind measurement locations was based on our experience and understanding of pedestrian usage for this site, was reviewed by the design team and the Planning Department prior to testing.

# 2. PRINCIPAL RESULTS

The results of the test are discussed in detail in Section 4 of this report and may be summarized as follows:

- Wind comfort conditions under the Proposed Project and Proposed Project Plus Cumulative Configurations were similar to the wind comfort conditions under the Existing Conditions Configuration.

- Wind comfort conditions under the Existing Zoning Alternative and Existing Zoning Alternative Plus Cumulative Configurations were similar to the wind comfort conditions under the Existing Conditions, Proposed Project, and Proposed Project Plus Cumulative Configurations.

- Under the Existing Conditions Configuration, 91 of 95 test locations comply with the wind hazard criterion. Under the Proposed Project, Proposed Project Plus Cumulative, and Existing Zoning Alternative configurations, 92 of 95 test locations would comply with the wind hazard criterion. Under the Existing Zoning Alternative Plus Cumulative Configuration, 93 of 95 test locations would comply with the wind hazard criterion.

- Under the Proposed Project Configuration, one existing hazard exceedance would be eliminated, and the total duration of hazardous wind would decrease about 90 hours per year. Under the Proposed Project Plus Cumulative Configuration, one existing hazard exceedance would be eliminated, and the total duration of hazardous wind would decrease about 101 hours per year. Under both of these scenarios, there would be an overall improvement in wind hazard conditions. For these reasons, the proposed project would not have a significant wind impact under CEQA, and no mitigation measures are necessary.

- Under the Existing Zoning Alternative Configuration, one existing hazard exceedance would be eliminated, and the total duration of hazardous wind would increase about 1 hour per year. Under the Existing Zoning Alternative Plus Cumulative Configuration, two existing hazard exceedances would be eliminated, and the total duration of hazardous wind would decrease about 69 hours per year. Under both of these scenarios, there would be an overall improvement in wind hazard conditions. For these reasons, the alternative would not have a significant wind impact under CEQA, and no mitigation measures are necessary.

# 3. METHODOLOGY

## 3.1 Wind Tunnel Testing

As shown in Figures 1a through 1e, the wind tunnel model included the project site and all relevant surrounding buildings and topography within a 1600' radius[1] of the project site. The mean speed profile and turbulence of the natural wind approaching the modeled project area were simulated in RWDI's boundary-layer wind tunnel. The model was instrumented with 109 (95 grade, 14 above grade) wind speed sensors to measure mean and gust wind speeds at a full-scale height of approximately 5 ft. These measurements were recorded for 36 equally incremented wind directions; however, as required by Planning Code Section 148, the analysis focused on the west-southwest, west, west-northwest and northwest wind directions.

## 3.2 Local Climate

Wind speeds in San Francisco are the highest in the summer and lowest in winter. However the strongest peak winds occur in winter. The highest average wind speeds occur in mid-afternoon and the lowest in the early morning. Westerly to northwesterly winds are the most frequent and strongest winds during the year. Of the primary wind directions, four have the greatest frequency of occurrence and consequently make up the majority of the strong winds that occur. These wind directions include the northwest, west-northwest, west and west-southwest winds[2].

## 3.3 San Francisco Planning Code Requirements

This project is located in an area that is subject to Planning Code Section 148, Reduction of Ground-level Wind Currents in C-3 Districts. The Planning Code specifically outlines wind reduction criteria for the C-3 District. This analysis is performed using the wind testing analysis and evaluation methods to determine conformity with the Code. These requirements are described in Planning Code Section 148 (see Appendix B).

[1] This radius is considerably larger than the minimum requirement of 820', as specified in the ASCE (American Society of Civil Engineers) Standard for Wind-Tunnel Studies of Buildings and Structures. In addition, wind profiles over the upwind terrain beyond the modeled area were simulated by using spires and roughness elements for winds from each direction, as shown in photos in Figures 1a through 1e.

[2] Data describing the speed, direction, and frequency of occurrence of winds were gathered at the old San Francisco Federal Building at 50 United Nations Plaza (at a height of 132 ft) during the period of 1945 to 1950. Measurements taken hourly and averaged over one minute have been tabulated in three-hour periods using seven classes of wind speed and 16 compass directions. Analysis of these data shows that during the hours from 6:00 a.m. to 8:00 p.m., about 70% of all winds blow from four of the 16 directions as follows: northwest (NW), 20%; west-northwest (WNW), 14%; west (W), 35%, west-southwest (WSW), 2% and all other winds, 28%. Calm conditions occur 2% of the time. More than 90% of the measured winds over 13 mph blow from the four prevailing directions.

The Planning Code requires buildings to be shaped so as not to cause ground-level wind currents to exceed defined comfort and hazard criteria. The comfort criteria are that wind speeds will not exceed, more than 10% of the time, 11 mph in substantial pedestrian use areas, and 7 mph in public seating areas. Similarly, the hazard criterion of the Code requires that buildings not cause equivalent wind speeds to reach or exceed the hazard level of 26 mph as averaged from a single full hour of the year. The hazard criterion is based on winds that are measured for one hour, which corresponds to a one-minute average of 36 mph.

The Planning Code defines these wind speeds in terms of equivalent wind speeds, and average wind speed (mean velocity), adjusted to include the level of gustiness and turbulence. The equivalent wind speeds were calculated according to the specifications in Planning Code Section 148, whereby the mean hourly wind speed is increased when the turbulence intensity is greater than 15% according to the following formula:

$$EWS = Vm(2*TI+0.7)$$

*Where*: *EWS* = equivalent wind speed
*Vm* = mean pedestrian-level wind speed
*TI* = turbulence intensity

# 4. TEST RESULTS

Table 1, located in the tables section of this report, presents the wind comfort results for the five configurations tested (i.e., existing, proposed project, alternative, and cumulative scenarios). For each measurement point, the measured 10% exceeded (90$^{th}$ percentile)[3] equivalent wind speed and the percentage of time that the wind speed exceeds 11 mph is shown for areas considered to be used primarily for walking. A lower speed criterion (7 mph exceeded 10% of the time) can also be considered, which applies to "seating" areas, and in most cases refers to publicly accessible (although often privately owned) open spaces with passive pedestrian activities intended.

Table 2 presents the wind hazard results, and lists the predicted wind speed that would be exceeded one hour per year for the five configurations tested (i.e., existing, proposed project, alternative and cumulative scenarios). The predicted number of hours per year that the Section 148 wind hazard criterion is exceeded is also provided.

In the following discussions, references to the building locations relate to the "Project North" shown in Figure 2, while the wind directions relate to "True North". These differ by approximately 45°. Figure 2 depicts the measurement locations on and around the project site.

[3] When the wind-tunnel measured wind speeds were combined with the statistic model of local wind data, the probability distribution of full-scale wind speeds at each measurement point could be determined. The calculated 10% exceeded speed is a value (in mph) that will be exceeded for 10% of the time. Statistically, this value is also called as 90$^{th}$ percentile, indicating 90% of wind speeds will be below such a wind speed.

Wind speed measurements were taken at 109 locations, including 14 locations (Locations12 through 25) on the podium and roofs of the proposed development and the roof garden of the existing Aronson Building to the east. Wind conditions at these above-grade locations are not subject to the provisions of Planning Code Section 148 and, hence, they are omitted from this report. Wind conditions at these above-grade locations are presented in a separate report.

## 4.1 Wind Comfort Conditions

**Existing Conditions Configuration**

For the Existing Conditions Configuration, wind speeds were generally higher than the pedestrian comfort criterion of 11 mph or the seating comfort criterion of 7 mph. The highest wind speeds occurred some distance from the project site at the north end of Third Street (Locations 90 and 91), along Yerba Buena Lane (Locations 108 and 109), as well as along Mission Street west of the project site (Locations 42 through 48), as shown in Table 1 and Figure 2. These areas of elevated wind speeds were caused by winds downwashing[4] off and channeling between the existing buildings (see Images 1 and 2 below). Under the existing conditions, wind speeds at 66 of the 95 ground-level test locations exceeded the Planning Code's 11 or 7 mph wind comfort criterion, with an average 90$^{th}$ percentile wind speed of 12.6 mph.

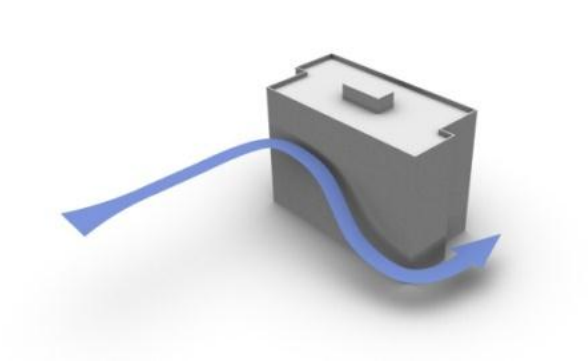


**Image 1:**Downwashing Flow

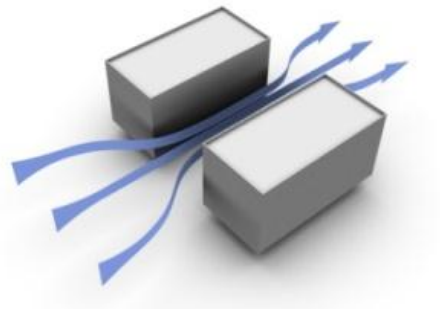


**Image 2:** Channeling Effect

Lower wind speeds that met the wind comfort criterion occurred in areas which were sheltered by the existing buildings from the prevailing westerly winds. These areas included the base of an existing tower to the north (Locations 27, 80 and 81), the west portion of Yerba Buena Gardens (Location 54) and the fountain and SF MOMA area (Locations 64 through 68, 102 and 103).

[4] Downwashing winds typically occur when tall buildings intercept stronger winds at higher elevations and deflect them down along building facade to the ground level, causing wind accelerations at the base of the buildings, especially around building corners.

**Proposed Project Configuration**

For the Proposed Project Configuration, wind speeds generally remained the same as the Existing Conditions Configuration, with the 90$^{th}$ percentile average wind speeds at 12.7 mph, as shown in Table 1. The number of comfort criterion exceedances was 69 of the 95 test locations. The highest wind speeds remained in the same areas described under the Existing Conditions Configuration.

At the test locations adjacent to the project (Locations 1 through 11), wind speeds at six locations met the wind comfort criterion in the Proposed Project Configuration, compared to only one in the Existing Conditions Configuration. The proposed chamfered southwest building corner is a beneficial design feature (versus a sharp corner) that reduces the potential wind impact at Location 3. The proposed exterior fins and glazing around the proposed building's fourth floor terrace are also beneficial in that they reduce the downwashing that would cause wind accelerations on the south side of Mission Street across from the project site (Location 50 in Figure 2). However, a slight increase in wind speeds was observed to the north of the proposed project (Locations 27 through 30 and 101 in Table 1). If desired, wind control measures in the form of landscaping, trellises and/or wind screens at these specific locations could be considered for the purpose of reducing wind speeds to an appropriate level.

**Proposed Project Plus Cumulative Configuration**

For the Proposed Project Plus Cumulative Configuration, wind conditions remained similar to those for the Existing Conditions and Proposed Project Configurations. The 90$^{th}$ percentile average wind speed for all test locations was 12.5 mph and a total of 65 out of 95 test locations exceeded the wind comfort criterion (Table 1).

In the vicinity of the proposed project (Locations 1 through 11), wind speeds ranged from 10 to 17 mph and six of 11 test locations met the wind comfort criterion. These are similar to the wind conditions under the Proposed Project Configuration, and are considered an improvement compared to the Existing Conditions Configuration.

**Existing Zoning Alternative and Existing Zoning Alternative Plus Cumulative Configurations**

These two configurations were tested for comparison to the Proposed Project and Proposed Project Plus Cumulative Configurations. As shown in Table 1, the overall wind conditions were similar to the other three configurations presented above. The average 90$^{th}$ percentile wind speeds were 12.8 and 12.4 mph for these two building configurations, respectively, and there were 67 and 64 test locations, respectively, that exceeded the wind comfort criterion.

In the vicinity of the project site (Locations 1 through 11), six test locations met the wind comfort criterion. These are similar to the wind conditions under the Proposed Project and Proposed Project Plus Cumulative Configurations, and are considered an improvement compared to the Existing Conditions Configuration.

**Summary of Wind Comfort**

Overall, wind conditions were similar for all five building configurations, as indicated by the similarity of the average 90th percentile wind speeds and the number of exceedance locations for all five building configurations shown in Table 1. The highest wind speeds occurred some distance from the project site, around existing buildings, for all configurations. The Proposed project and the Existing Zoning Alternative were predicted to reduce the wind activity in the area immediately around the site, but caused a slight increase in speeds in the area north of the project site. Wind control measures in the form of landscaping, trellises and/or wind screens could be considered for the purpose of reducing wind speeds at locations with comfort exceedances. Depending on the wind speeds at specific locations, implementation of these wind control measures could reduce wind speeds so that they would not exceed the pedestrian comfort criterion of 11 mph or the seating comfort criterion of 7 mph.

## 4.2 Wind Hazard Conditions

Four of the 95 test locations currently did not meet the Planning Code's wind hazard criterion[5] under the Existing Conditions Configuration. The locations exceeding the hazard criterion were some distance from the project site, at the northwest corner of Yerba Buena Gardens (Location 47), at the north end of Third Street (Locations 90 and 91) and in Yerba Buena Lane (Location 109). They were caused by the prevailing westerly winds downwashing off and channeling between existing buildings.

Under the Proposed Project Configuration, three of the 95 test locations would not comply with the wind hazard criterion. Compared to the Existing Conditions Configuration, the Proposed Project Configuration would result in a net reduction of one hazard exceedance. An existing hazard exceedance at Location 47 would be eliminated, but existing hazard exceedances at Locations 90, 91, and 109 would remain. At Location 90, the wind speed would increase 1 mph, and the duration of hazardous wind would increase about four hours per year. At Location 91, the wind speed would increase 1 mph, and the duration of hazardous wind would increase about three hours per year. At Location 109, the wind speed would decrease 8 mph, and the duration of hazardous wind would decrease about 92 hours per year. Overall, the total duration of hazardous wind would decrease about 90 hours per year.

Under the Proposed Project Plus Cumulative Configuration, three of the 95 test locations would not comply with the wind hazard criterion. Compared to the Existing Conditions Configuration, the Proposed Project Plus Cumulative Configuration would result in a net reduction of one hazard exceedance. An existing hazard exceedance at Location 47 would be eliminated, but existing hazard exceedances at Locations 90, 91, and 109 would remain. At Location 90, the wind speed would decrease 1 mph, and the duration of hazardous wind would decrease about two hours per year. At Location 91, the wind speed would decrease 1 mph, and the duration of hazardous wind would decrease about one hour per year. At Location 109, the wind speed would decrease 8 mph, and the duration of hazardous wind would decrease about 92 hours per year. Overall, the total duration of hazardous wind would decrease about 101 hours per year.

[5] Speeds reaching or exceeding the hazard level of 26 mph, as averaged for a single full hour of the year or 36 mph for one-minute average.

Under the Existing Zoning Alternative Configuration, three of the 95 test locations would not comply with the wind hazard criterion. Compared to the Existing Conditions Configuration, the Existing Zoning Alternative Configuration would result in a net reduction of one hazard exceedance. An existing hazard exceedance at Location 47 would be eliminated, but existing hazard exceedances at Locations 90, 91, and 109 would remain. At Location 90, the wind speed and the duration of hazardous wind would not change. At Location 91, the wind speed would increase 1 mph, and the duration of hazardous wind would increase about two hours per year. At Location 109, the wind speed would remain the same, and the duration of hazardous wind would increase about four hours per year. Overall, the total duration of hazardous wind would increase about 1 hour per year.

Under the Existing Zoning Alternative Plus Cumulative Configuration, two of the 95 test locations would not comply with the wind hazard criterion. Compared to the Existing Conditions Configuration, the Existing Zoning Alternative Plus Cumulative Configuration would result in a net reduction of two hazard exceedances. Existing hazard exceedances at Locations 47 and 91 would be eliminated, but existing hazard exceedances at Locations 90 and 109 would remain. At Location 90, the wind speed would decrease 2 mph, and the duration of hazardous wind would decrease about three hours per year. At Location 109, the wind speed would decrease 3 mph, and the duration of hazardous wind would decrease about 59 hours per year. Overall, the total duration of hazardous wind would decrease about 69 hours per year.

Some existing hazard exceedances would remain under each of the scenarios described above. The increases in wind speed and duration would be slight, and the decreases in wind speed and duration would be more substantial. These changes would result in an overall improvement in wind hazard conditions. For these reasons, the proposed project and the alternative would have less-than-significant wind impacts under CEQA, and no mitigation measures are necessary.

## 4.3 Recommendations

The proposed chamfered southwest building corner at the ground and second floors, and the exterior fins and glazing around the fourth floor terrace would be beneficial design features for wind control and they should be retained in the final project design.

If improved wind comfort is desired in the area north of the project site (Locations 27 through 30 and 101) or at other locations with comfort exceedances, wind control measures in the form of landscaping, trellises, and/or wind screens at these specific locations could be considered for providing localized protection from the wind (see Images 3 through 6). These types of control measures are typically capable of reducing wind speeds to an appropriate level. The model tested in the wind tunnel used the City of San Francisco's standard testing methodology, which does not account for the street furniture, landscaping, etc. present in the project area. Depending on the placement and density of such elements, the wind comfort conditions recorded could be improved to be suitable for the intended usage of these areas in at all but the most extreme cases.

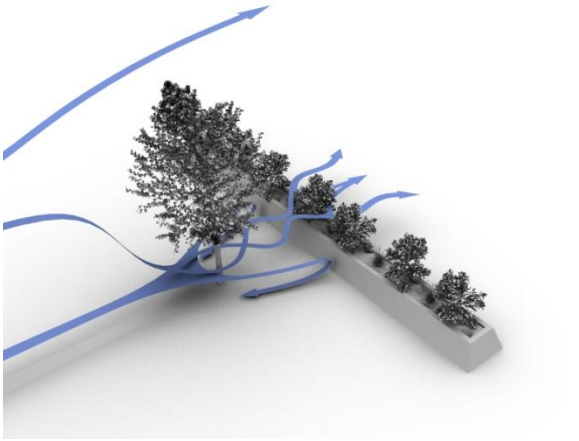


**Image 3** – Landscaping

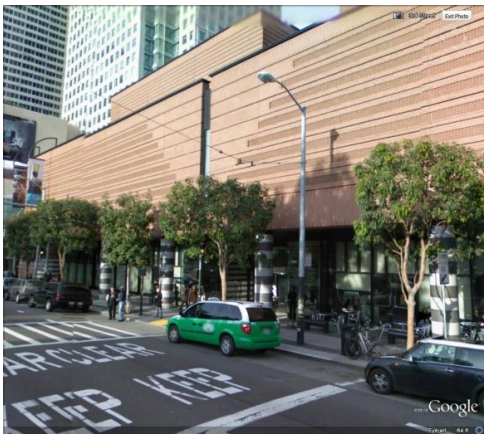


**Image 4 –** Landscaping at the front of the existing SFMOMA building(image courtesy of Google Earth [tm])

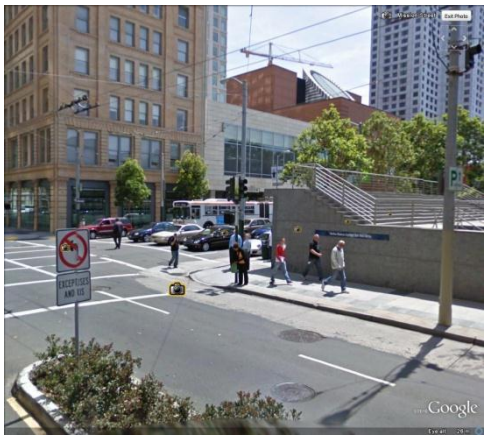


**Image 5** – Little Landscaping at the corner of Third & Mission Street
(image courtesy of Google Earth [tm])

**Image 6 –** Example Wind Screen / Shelter

## 5. APPLICABILITY OF RESULTS

The results presented in this report pertain to the model of the proposed 706 Mission Street Project constructed using the architectural design drawings listed in Appendix A. Should there be substantial design changes to the exterior dimensions/shape of the proposed building that deviate from this list of drawings, the results presented may change. Therefore, if substantial changes in the exterior dimensions/shape of the proposed building are made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

# TABLES

## Table 1: Wind Comfort Results - Grade

| Existing Conditions Configuration | | | | | Proposed Project Configuration | | | | Proposed Project Plus Cumulative Configuration | | | | Existing Zoning Alternative Configuration | | | | Existing Zoning Alternative Plus Cumulative Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Number | Comfort Criterion (mph) | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds |
| 1 | 11 | 13 | 18% | e | 11 | 10% | -2 | | 11 | 10% | -2 | | 16 | 29% | 3 | e | 15 | 26% | 2 | e |
| 2 | 11 | 14 | 21% | e | 11 | 10% | -3 | | 11 | 10% | -3 | | 9 | 4% | -5 | | 9 | 4% | -5 | |
| 3 | 11 | 14 | 21% | e | 15 | 23% | 1 | e | 16 | 27% | 2 | e | 15 | 25% | 1 | e | 14 | 21% | 0 | e |
| 4 | 11 | 15 | 25% | e | 9 | 2% | -6 | | 10 | 5% | -5 | | 9 | 3% | -6 | | 8 | 2% | -7 | |
| 5 | 11 | 14 | 22% | e | 11 | 10% | -3 | | 10 | 7% | -4 | | 8 | 3% | -6 | | 9 | 3% | -5 | |
| 6 | 11 | 10 | 5% | | 10 | 7% | 0 | | 10 | 6% | 0 | | 7 | 1% | -3 | | 7 | 1% | -3 | |
| 7 | 11 | 12 | 15% | e | 10 | 7% | -2 | | 10 | 8% | -2 | | 10 | 5% | -2 | | 9 | 5% | -3 | |
| 8 | 11 | 13 | 20% | e | 12 | 13% | -1 | e | 12 | 13% | -1 | e | 10 | 7% | -3 | | 10 | 8% | -3 | |
| 9 | 11 | 17 | 34% | e | 17 | 33% | 0 | e | 17 | 32% | 0 | e | 14 | 24% | -3 | e | 15 | 25% | -2 | e |
| 10 | 11 | 14 | 22% | e | 14 | 22% | 0 | e | 14 | 24% | 0 | e | 15 | 26% | 1 | e | 14 | 23% | 0 | e |
| 11 | 7 | 12 | 12% | e | 12 | 15% | 0 | e | 11 | 10% | -1 | e | 15 | 28% | 3 | e | 14 | 24% | 2 | e |

Note: Test points 12 through 25 are above-grade locations that appear in a separate report.

## Table 1: Wind Comfort Results - Grade

| Existing Conditions Configuration | | | | | Proposed Project Configuration | | | | Proposed Project Plus Cumulative Configuration | | | | Existing Zoning Alternative Configuration | | | | Existing Zoning Alternative Plus Cumulative Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Number | Comfort Criterion (mph) | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds |
| 26 | 11 | 14 | 23% | e | 14 | 24% | 0 | e | 13 | 20% | -1 | e | 16 | 29% | 2 | e | 15 | 25% | 1 | e |
| 27 | 11 | 10 | 7% | | 14 | 21% | 4 | e | 13 | 17% | 3 | e | 13 | 19% | 3 | e | 12 | 15% | 2 | e |
| 28 | 7 | 12 | 15% | e | 15 | 26% | 3 | e | 14 | 23% | 2 | e | 16 | 28% | 4 | e | 15 | 24% | 3 | e |
| 29 | 7 | 10 | 5% | e | 14 | 22% | 4 | e | 13 | 19% | 3 | e | 12 | 13% | 2 | e | 11 | 10% | 1 | e |
| 30 | 11 | 11 | 10% | | 15 | 25% | 4 | e | 14 | 23% | 3 | e | 16 | 29% | 5 | e | 15 | 26% | 4 | e |
| 31 | 7 | 13 | 18% | e | 15 | 27% | 2 | e | 15 | 25% | 2 | e | 16 | 30% | 3 | e | 15 | 26% | 2 | e |
| 32 | 7 | 14 | 21% | e | 15 | 24% | 1 | e | 14 | 21% | 0 | e | 14 | 23% | 0 | e | 14 | 20% | 0 | e |
| 33 | 11 | 11 | 10% | | 13 | 17% | 2 | e | 12 | 16% | 1 | e | 12 | 14% | 1 | e | 11 | 10% | 0 | |
| 34 | 11 | 12 | 12% | e | 12 | 16% | 0 | e | 12 | 14% | 0 | e | 12 | 13% | 0 | e | 11 | 10% | -1 | |
| 35 | 11 | 15 | 25% | e | 15 | 24% | 0 | e | 14 | 21% | -1 | e | 16 | 27% | 1 | e | 15 | 24% | 0 | e |
| 36 | 7 | 14 | 24% | e | 15 | 27% | 1 | e | 15 | 25% | 1 | e | 17 | 32% | 3 | e | 16 | 28% | 2 | e |
| 37 | 11 | 11 | 10% | | 9 | 4% | -2 | | 9 | 3% | -2 | | 10 | 7% | -1 | | 10 | 6% | -1 | |
| 38 | 7 | 14 | 21% | e | 13 | 19% | -1 | e | 13 | 17% | -1 | e | 16 | 30% | 2 | e | 15 | 26% | 1 | e |
| 39 | 11 | 15 | 26% | e | 14 | 23% | -1 | e | 14 | 20% | -1 | e | 16 | 27% | 1 | e | 15 | 24% | 0 | e |
| 40 | 7 | 16 | 30% | e | 13 | 20% | -3 | e | 13 | 18% | -3 | e | 15 | 25% | -1 | e | 14 | 23% | -2 | e |
| 41 | 7 | 15 | 26% | e | 15 | 25% | 0 | e | 14 | 23% | -1 | e | 16 | 28% | 1 | e | 15 | 25% | 0 | e |
| 42 | 11 | 18 | 39% | e | 17 | 37% | -1 | e | 17 | 36% | -1 | e | 17 | 38% | -1 | e | 17 | 35% | -1 | e |
| 43 | 11 | 19 | 39% | e | 17 | 34% | -2 | e | 17 | 34% | -2 | e | 18 | 36% | -1 | e | 17 | 35% | -2 | e |
| 44 | 11 | 20 | 39% | | 16 | 28% | -4 | e | 16 | 28% | -4 | e | 18 | 37% | -2 | e | 17 | 36% | -3 | e |
| 45 | 11 | 17 | 34% | e | 14 | 23% | -3 | e | 14 | 22% | -3 | e | 15 | 24% | -2 | e | 14 | 22% | -3 | e |
| 46 | 11 | 15 | 25% | e | 15 | 26% | 0 | e | 15 | 24% | 0 | e | 17 | 33% | 2 | e | 16 | 28% | 1 | e |
| 47 | 11 | 22 | 48% | e | 21 | 47% | -1 | e | 21 | 46% | -1 | e | 21 | 47% | -1 | e | 20 | 45% | -2 | e |
| 48 | 11 | 16 | 29% | e | 16 | 27% | 0 | e | 15 | 25% | -1 | e | 16 | 28% | 0 | e | 15 | 25% | -1 | e |
| 49 | 11 | 15 | 25% | e | 14 | 23% | -1 | e | 14 | 21% | -1 | e | 14 | 22% | -1 | e | 13 | 19% | -2 | e |
| 50 | 11 | 12 | 15% | e | 18 | 34% | 6 | e | 16 | 31% | 4 | e | 14 | 20% | 2 | e | 13 | 15% | 1 | e |

## Table 1: Wind Comfort Results - Grade

| Existing Conditions Configuration | | | | | Proposed Project Configuration | | | | Proposed Project Plus Cumulative Configuration | | | | Existing Zoning Alternative Configuration | | | | Existing Zoning Alternative Plus Cumulative Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Number | Comfort Criterion (mph) | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds |
| 51 | 11 | 15 | 27% | e | 11 | 10% | -4 | | 11 | 10% | -4 | | 11 | 10% | -4 | | 10 | 6% | -5 | |
| 52 | 7 | 11 | 10% | e | 12 | 15% | 1 | e | 12 | 13% | 1 | e | 12 | 12% | 1 | e | 11 | 10% | 0 | e |
| 53 | 7 | 11 | 10% | e | 12 | 16% | 1 | e | 12 | 16% | 1 | e | 13 | 19% | 2 | e | 13 | 18% | 2 | e |
| 54 | 7 | 7 | 0% | | 7 | 0% | 0 | | 7 | 0% | 0 | | 7 | 0% | 0 | | 7 | 0% | 0 | |
| 55 | 7 | 11 | 10% | e | 10 | 7% | -1 | e | 10 | 7% | -1 | e | 11 | 10% | 0 | e | 10 | 7% | -1 | e |
| 56 | 7 | 9 | 2% | e | 8 | 1% | -1 | e | 8 | 1% | -1 | e | 9 | 2% | 0 | e | 8 | 1% | -1 | e |
| 57 | 11 | 12 | 17% | e | 12 | 13% | 0 | e | 11 | 10% | -1 | | 12 | 15% | 0 | e | 12 | 14% | 0 | e |
| 58 | 7 | 12 | 17% | e | 12 | 15% | 0 | e | 12 | 14% | 0 | e | 13 | 18% | 1 | e | 12 | 15% | 0 | e |
| 59 | 7 | 13 | 17% | e | 13 | 15% | 0 | e | 12 | 14% | -1 | e | 13 | 16% | 0 | e | 12 | 15% | -1 | e |
| 60 | 11 | 12 | 15% | e | 12 | 12% | 0 | e | 11 | 10% | -1 | | 11 | 10% | -1 | | 12 | 13% | 0 | e |
| 61 | 7 | 15 | 27% | e | 14 | 19% | -1 | e | 13 | 17% | -2 | e | 15 | 24% | 0 | e | 14 | 21% | -1 | e |
| 62 | 11 | 14 | 22% | e | 14 | 19% | 0 | e | 13 | 16% | -1 | e | 14 | 19% | 0 | e | 13 | 17% | -1 | e |
| 63 | 7 | 9 | 3% | e | 9 | 4% | 0 | e | 9 | 3% | 0 | e | 9 | 2% | 0 | e | 9 | 2% | 0 | e |
| 64 | 11 | 8 | 2% | | 8 | 1% | 0 | | 8 | 1% | 0 | | 9 | 2% | 1 | | 10 | 5% | 2 | |
| 65 | 11 | 8 | 1% | | 8 | 1% | 0 | | 10 | 7% | 2 | | 8 | 1% | 0 | | 12 | 12% | 4 | e |
| 66 | 11 | 6 | 0% | | 6 | 0% | 0 | | 8 | 1% | 2 | | 7 | 0% | 1 | | 9 | 2% | 3 | |
| 67 | 11 | 8 | 2% | | 8 | 2% | 0 | | 9 | 3% | 1 | | 9 | 3% | 1 | | 9 | 2% | 1 | |
| 68 | 11 | 10 | 7% | | 9 | 2% | -1 | | 9 | 2% | -1 | | 10 | 6% | 0 | | 8 | 1% | -2 | |
| 69 | 11 | 12 | 14% | e | 10 | 5% | -2 | | 8 | 2% | -4 | | 12 | 15% | 0 | e | 10 | 5% | -2 | |
| 70 | 11 | 11 | 10% | | 11 | 10% | 0 | | 10 | 8% | -1 | | 11 | 10% | 0 | | 11 | 10% | 0 | |
| 71 | 11 | 11 | 10% | | 15 | 28% | 4 | e | 14 | 23% | 3 | e | 14 | 24% | 3 | e | 13 | 20% | 2 | e |
| 72 | 11 | 14 | 21% | e | 15 | 26% | 1 | e | 16 | 28% | 2 | e | 14 | 22% | 0 | e | 14 | 23% | 0 | e |
| 73 | 11 | 14 | 20% | e | 15 | 28% | 1 | e | 15 | 26% | 1 | e | 14 | 20% | 0 | e | 14 | 21% | 0 | e |
| 74 | 11 | 11 | 10% | | 11 | 10% | 0 | | 11 | 10% | 0 | | 11 | 10% | 0 | | 10 | 8% | -1 | |
| 75 | 11 | 16 | 32% | e | 19 | 41% | 3 | e | 18 | 39% | 2 | e | 20 | 42% | 4 | e | 19 | 39% | 3 | e |

## Table 1: Wind Comfort Results - Grade

| Existing Conditions Configuration | | | | | Proposed Project Configuration | | | | Proposed Project Plus Cumulative Configuration | | | | Existing Zoning Alternative Configuration | | | | Existing Zoning Alternative Plus Cumulative Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Number | Comfort Criterion (mph) | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds |
| 76 | 11 | 8 | 2% | | 9 | 4% | 1 | | 9 | 3% | 1 | | 9 | 4% | 1 | | 9 | 3% | 1 | |
| 77 | 11 | 12 | 11% | e | 14 | 16% | 2 | e | 12 | 11% | 0 | e | 13 | 14% | 1 | e | 12 | 13% | 0 | e |
| 78 | 11 | 11 | 10% | | 12 | 14% | 1 | e | 11 | 10% | 0 | | 12 | 16% | 1 | e | 11 | 10% | 0 | |
| 79 | 11 | 10 | 5% | | 10 | 6% | 0 | | 9 | 2% | -1 | | 10 | 6% | 0 | | 9 | 2% | -1 | |
| 80 | 11 | 7 | 1% | | 6 | 0% | -1 | | 7 | 1% | 0 | | 6 | 1% | -1 | | 7 | 1% | 0 | |
| 81 | 11 | 7 | 0% | | 7 | 0% | 0 | | 6 | 0% | -1 | | 6 | 0% | -1 | | 6 | 0% | -1 | |
| 82 | 11 | 11 | 10% | | 12 | 13% | 1 | e | 10 | 5% | -1 | | 11 | 10% | 0 | | 10 | 4% | -1 | |
| 83 | 11 | 13 | 20% | e | 13 | 19% | 0 | e | 13 | 16% | 0 | e | 13 | 20% | 0 | e | 12 | 15% | -1 | e |
| 84 | 11 | 13 | 17% | e | 13 | 16% | 0 | e | 12 | 13% | -1 | e | 12 | 13% | -1 | e | 10 | 7% | -3 | |
| 85 | 11 | 16 | 30% | e | 16 | 28% | 0 | e | 16 | 31% | 0 | e | 16 | 29% | 0 | e | 16 | 29% | 0 | e |
| 86 | 11 | 12 | 14% | e | 12 | 13% | 0 | e | 13 | 16% | 1 | e | 12 | 13% | 0 | e | 13 | 17% | 1 | e |
| 87 | 11 | 11 | 10% | | 14 | 23% | 3 | e | 14 | 22% | 3 | e | 13 | 16% | 2 | e | 12 | 13% | 1 | e |
| 88 | 11 | 5 | 0% | | 6 | 0% | 1 | | 5 | 0% | 0 | | 6 | 0% | 1 | | 6 | 0% | 1 | |
| 89 | 11 | 14 | 21% | e | 14 | 23% | 0 | e | 13 | 19% | -1 | e | 14 | 23% | 0 | e | 14 | 21% | 0 | e |
| 90 | 11 | 19 | 44% | e | 20 | 46% | 1 | e | 19 | 41% | 0 | e | 19 | 43% | 0 | e | 18 | 38% | -1 | e |
| 91 | 11 | 18 | 37% | e | 19 | 41% | 1 | e | 17 | 33% | -1 | e | 18 | 38% | 0 | e | 16 | 30% | -2 | e |
| 92 | 11 | 11 | 10% | | 12 | 14% | 1 | e | 11 | 10% | 0 | | 11 | 10% | 0 | | 11 | 10% | 0 | |
| 93 | 11 | 8 | 5% | | 8 | 2% | 0 | | 13 | 16% | 5 | e | 8 | 2% | 0 | | 13 | 18% | 5 | e |
| 94 | 11 | 13 | 21% | e | 13 | 17% | 0 | e | 10 | 6% | -3 | | 13 | 16% | 0 | e | 10 | 6% | -3 | |
| 95 | 11 | 12 | 15% | e | 12 | 16% | 0 | e | 15 | 27% | 3 | e | 12 | 13% | 0 | e | 15 | 26% | 3 | e |
| 96 | 11 | 10 | 7% | | 11 | 10% | 1 | | 18 | 39% | 8 | e | 10 | 7% | 0 | | 18 | 37% | 8 | e |
| 97 | 11 | 11 | 10% | | 12 | 14% | 1 | e | 15 | 27% | 4 | e | 11 | 10% | 0 | | 16 | 27% | 5 | e |
| 98 | 11 | 12 | 16% | e | 13 | 19% | 1 | e | 14 | 20% | 2 | e | 12 | 14% | 0 | e | 13 | 18% | 1 | e |
| 99 | 11 | 12 | 16% | e | 15 | 26% | 3 | e | 15 | 25% | 3 | e | 12 | 16% | 0 | e | 11 | 10% | -1 | |
| 100 | 7 | 12 | 13% | e | 14 | 23% | 2 | e | 14 | 22% | 2 | e | 13 | 19% | 1 | e | 12 | 18% | 0 | e |

## Table 1: Wind Comfort Results - Grade

| | Existing Conditions Configuration | | | | Proposed Project Configuration | | | | Proposed Project Plus Cumulative Configuration | | | | Existing Zoning Alternative Configuration | | | | Existing Zoning Alternative Plus Cumulative Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Number | Comfort Criterion (mph) | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds |
| 101 | 7 | 12 | 16% | e | 15 | 25% | 3 | e | 14 | 22% | 2 | e | 14 | 22% | 2 | e | 13 | 19% | 1 | e |
| 102 | 7 | 7 | 0% | | 7 | 0% | 0 | | 8 | 0% | 1 | e | 8 | 1% | 1 | e | 7 | 1% | 0 | |
| 103 | 7 | 5 | 0% | | 6 | 0% | 1 | | 6 | 0% | 1 | | 6 | 0% | 1 | | 6 | 0% | 1 | |
| 104 | 7 | 12 | 17% | e | 11 | 10% | -1 | e | 11 | 10% | -1 | e | 12 | 15% | 0 | e | 12 | 14% | 0 | e |
| 105 | 7 | 13 | 19% | e | 12 | 13% | -1 | e | 11 | 10% | -2 | e | 12 | 17% | -1 | e | 12 | 16% | -1 | e |
| 106 | 7 | 15 | 24% | e | 14 | 21% | -1 | e | 13 | 18% | -2 | e | 15 | 24% | 0 | e | 14 | 21% | -1 | e |
| 107 | 7 | 14 | 20% | e | 13 | 18% | -1 | e | 13 | 17% | -1 | e | 14 | 20% | 0 | e | 13 | 19% | -1 | e |
| 108 | 7 | 16 | 29% | e | 19 | 43% | 3 | e | 18 | 40% | 2 | e | 16 | 29% | 0 | e | 15 | 24% | -1 | e |
| 109 | 7 | 26 | 59% | e | 22 | 51% | -4 | e | 21 | 49% | -5 | e | 26 | 59% | 0 | e | 23 | 54% | -3 | e |
| Average mph and % | | 12.6 | 17% | | 12.7 | 17% | | | 12.5 | 17% | | | 12.8 | 18% | | | 12.4 | 16% | | |
| Exceedances | | | | 66 of 95 | | | | 69 of 95 | | | | 66 of 95 | | | | 67 of 95 | | | | 64 of 95 |

## Table 2: Wind Hazard Results - Grade

| Existing Conditions Configuration | | | | | Proposed Project Configuration | | | | Proposed Project Plus Cumulative Configuration | | | | Existing Zoning Alternative Configuration | | | | Existing Zoning Alternative Plus Cumulative Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Number | Hazard Criterion (mph) | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds |
| 1 | 36 | 26 | < 1 | | 21 | < 1 | 0 | | 20 | < 1 | 0 | | 30 | < 1 | 0 | | 29 | < 1 | 0 | |
| 2 | 36 | 27 | < 1 | | 19 | < 1 | 0 | | 20 | < 1 | 0 | | 19 | < 1 | 0 | | 18 | < 1 | 0 | |
| 3 | 36 | 26 | < 1 | | 27 | < 1 | 0 | | 28 | < 1 | 0 | | 31 | < 1 | 0 | | 30 | < 1 | 0 | |
| 4 | 36 | 29 | < 1 | | 16 | < 1 | 0 | | 17 | < 1 | 0 | | 18 | < 1 | 0 | | 17 | < 1 | 0 | |
| 5 | 36 | 29 | < 1 | | 20 | < 1 | 0 | | 18 | < 1 | 0 | | 18 | < 1 | 0 | | 18 | < 1 | 0 | |
| 6 | 36 | 18 | < 1 | | 20 | < 1 | 0 | | 19 | < 1 | 0 | | 15 | < 1 | 0 | | 15 | < 1 | 0 | |
| 7 | 36 | 21 | < 1 | | 20 | < 1 | 0 | | 21 | < 1 | 0 | | 20 | < 1 | 0 | | 20 | < 1 | 0 | |
| 8 | 36 | 23 | < 1 | | 23 | < 1 | 0 | | 24 | < 1 | 0 | | 19 | < 1 | 0 | | 19 | < 1 | 0 | |
| 9 | 36 | 30 | < 1 | | 33 | < 1 | 0 | | 32 | < 1 | 0 | | 26 | < 1 | 0 | | 29 | < 1 | 0 | |
| 10 | 36 | 27 | < 1 | | 27 | < 1 | 0 | | 25 | < 1 | 0 | | 30 | < 1 | 0 | | 29 | < 1 | 0 | |
| 11 | 36 | 24 | < 1 | | 21 | < 1 | 0 | | 20 | < 1 | 0 | | 30 | < 1 | 0 | | 29 | < 1 | 0 | |

Note: Test points 12 through 25 are above-grade locations that appear in a separate report.

## Table 2: Wind Hazard Results - Grade

| Existing Conditions Configuration | | | | | Proposed Project Configuration | | | | Proposed Project Plus Cumulative Configuration | | | | Existing Zoning Alternative Configuration | | | | Existing Zoning Alternative Plus Cumulative Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Number | Hazard Criterion (mph) | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds |
| 26 | 36 | 25 | < 1 | | 25 | < 1 | 0 | | 23 | < 1 | 0 | | 30 | < 1 | 0 | | 28 | < 1 | 0 | |
| 27 | 36 | 21 | < 1 | | 25 | < 1 | 0 | | 22 | < 1 | 0 | | 26 | < 1 | 0 | | 24 | < 1 | 0 | |
| 28 | 36 | 24 | < 1 | | 27 | < 1 | 0 | | 25 | < 1 | 0 | | 31 | < 1 | 0 | | 29 | < 1 | 0 | |
| 29 | 36 | 18 | < 1 | | 28 | < 1 | 0 | | 27 | < 1 | 0 | | 25 | < 1 | 0 | | 24 | < 1 | 0 | |
| 30 | 36 | 24 | < 1 | | 30 | < 1 | 0 | | 29 | < 1 | 0 | | 30 | < 1 | 0 | | 30 | < 1 | 0 | |
| 31 | 36 | 25 | < 1 | | 27 | < 1 | 0 | | 26 | < 1 | 0 | | 29 | < 1 | 0 | | 29 | < 1 | 0 | |
| 32 | 36 | 23 | < 1 | | 25 | < 1 | 0 | | 24 | < 1 | 0 | | 26 | < 1 | 0 | | 25 | < 1 | 0 | |
| 33 | 36 | 20 | < 1 | | 23 | < 1 | 0 | | 23 | < 1 | 0 | | 20 | < 1 | 0 | | 20 | < 1 | 0 | |
| 34 | 36 | 22 | < 1 | | 27 | < 1 | 0 | | 26 | < 1 | 0 | | 23 | < 1 | 0 | | 22 | < 1 | 0 | |
| 35 | 36 | 25 | < 1 | | 26 | < 1 | 0 | | 24 | < 1 | 0 | | 27 | < 1 | 0 | | 26 | < 1 | 0 | |
| 36 | 36 | 26 | < 1 | | 26 | < 1 | 0 | | 25 | < 1 | 0 | | 29 | < 1 | 0 | | 29 | < 1 | 0 | |
| 37 | 36 | 21 | < 1 | | 17 | < 1 | 0 | | 16 | < 1 | 0 | | 20 | < 1 | 0 | | 19 | < 1 | 0 | |
| 38 | 36 | 25 | < 1 | | 23 | < 1 | 0 | | 22 | < 1 | 0 | | 30 | < 1 | 0 | | 29 | < 1 | 0 | |
| 39 | 36 | 26 | < 1 | | 25 | < 1 | 0 | | 24 | < 1 | 0 | | 29 | < 1 | 0 | | 28 | < 1 | 0 | |
| 40 | 36 | 27 | < 1 | | 23 | < 1 | 0 | | 22 | < 1 | 0 | | 25 | < 1 | 0 | | 25 | < 1 | 0 | |
| 41 | 36 | 27 | < 1 | | 27 | < 1 | 0 | | 27 | < 1 | 0 | | 33 | < 1 | 0 | | 31 | < 1 | 0 | |
| 42 | 36 | 32 | < 1 | | 31 | < 1 | 0 | | 31 | < 1 | 0 | | 32 | < 1 | 0 | | 30 | < 1 | 0 | |
| 43 | 36 | 32 | < 1 | | 30 | < 1 | 0 | | 30 | < 1 | 0 | | 30 | < 1 | 0 | | 30 | < 1 | 0 | |
| 44 | 36 | 35 | < 1 | | 28 | < 1 | 0 | | 27 | < 1 | 0 | | 30 | < 1 | 0 | | 30 | < 1 | 0 | |
| 45 | 36 | 29 | < 1 | | 27 | < 1 | 0 | | 26 | < 1 | 0 | | 29 | < 1 | 0 | | 28 | < 1 | 0 | |
| 46 | 36 | 28 | < 1 | | 28 | < 1 | 0 | | 28 | < 1 | 0 | | 35 | < 1 | 0 | | 34 | < 1 | 0 | |
| 47 | 36 | 37 | 6 | e | 36 | < 1 | -6 | | 36 | < 1 | -6 | | 36 | < 1 | -6 | | 35 | < 1 | -6 | |
| 48 | 36 | 27 | < 1 | | 27 | < 1 | 0 | | 27 | < 1 | 0 | | 27 | < 1 | 0 | | 26 | < 1 | 0 | |
| 49 | 36 | 28 | < 1 | | 27 | < 1 | 0 | | 27 | < 1 | 0 | | 30 | < 1 | 0 | | 29 | < 1 | 0 | |
| 50 | 36 | 27 | < 1 | | 33 | < 1 | 0 | | 31 | < 1 | 0 | | 32 | < 1 | 0 | | 32 | < 1 | 0 | |

## Table 2: Wind Hazard Results - Grade

| Existing Conditions Configuration | | | | | Proposed Project Configuration | | | | Proposed Project Plus Cumulative Configuration | | | | Existing Zoning Alternative Configuration | | | | Existing Zoning Alternative Plus Cumulative Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Number | Hazard Criterion (mph) | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds |
| 51 | 36 | 33 | < 1 | | 22 | < 1 | 0 | | 20 | 0 | 0 | | 21 | < 1 | 0 | | 20 | < 1 | 0 | |
| 52 | 36 | 21 | < 1 | | 23 | < 1 | 0 | | 23 | 0 | 0 | | 21 | < 1 | 0 | | 21 | < 1 | 0 | |
| 53 | 36 | 22 | < 1 | | 25 | < 1 | 0 | | 25 | 0 | 0 | | 25 | < 1 | 0 | | 25 | < 1 | 0 | |
| 54 | 36 | 13 | < 1 | | 12 | < 1 | 0 | | 13 | 0 | 0 | | 13 | < 1 | 0 | | 14 | < 1 | 0 | |
| 55 | 36 | 19 | < 1 | | 18 | < 1 | 0 | | 19 | 0 | 0 | | 19 | < 1 | 0 | | 18 | < 1 | 0 | |
| 56 | 36 | 15 | < 1 | | 15 | < 1 | 0 | | 15 | 0 | 0 | | 15 | < 1 | 0 | | 15 | < 1 | 0 | |
| 57 | 36 | 22 | < 1 | | 21 | < 1 | 0 | | 20 | 0 | 0 | | 21 | < 1 | 0 | | 22 | < 1 | 0 | |
| 58 | 36 | 22 | < 1 | | 27 | < 1 | 0 | | 26 | 0 | 0 | | 28 | < 1 | 0 | | 26 | < 1 | 0 | |
| 59 | 36 | 22 | < 1 | | 21 | < 1 | 0 | | 21 | 0 | 0 | | 21 | < 1 | 0 | | 21 | < 1 | 0 | |
| 60 | 36 | 22 | < 1 | | 20 | < 1 | 0 | | 19 | 0 | 0 | | 21 | < 1 | 0 | | 20 | 0 | 0 | |
| 61 | 36 | 27 | < 1 | | 25 | < 1 | 0 | | 24 | 0 | 0 | | 27 | < 1 | 0 | | 25 | < 1 | 0 | |
| 62 | 36 | 26 | < 1 | | 24 | < 1 | 0 | | 23 | 0 | 0 | | 25 | < 1 | 0 | | 25 | < 1 | 0 | |
| 63 | 36 | 18 | < 1 | | 18 | < 1 | 0 | | 18 | 0 | 0 | | 19 | < 1 | 0 | | 18 | < 1 | 0 | |
| 64 | 36 | 17 | < 1 | | 15 | < 1 | 0 | | 15 | 0 | 0 | | 16 | < 1 | 0 | | 18 | < 1 | 0 | |
| 65 | 36 | 16 | < 1 | | 16 | < 1 | 0 | | 19 | 0 | 0 | | 16 | < 1 | 0 | | 22 | < 1 | 0 | |
| 66 | 36 | 12 | < 1 | | 12 | < 1 | 0 | | 14 | 0 | 0 | | 13 | < 1 | 0 | | 15 | < 1 | 0 | |
| 67 | 36 | 17 | < 1 | | 18 | < 1 | 0 | | 19 | 0 | 0 | | 19 | < 1 | 0 | | 19 | < 1 | 0 | |
| 68 | 36 | 19 | < 1 | | 17 | < 1 | 0 | | 17 | 0 | 0 | | 18 | < 1 | 0 | | 16 | < 1 | 0 | |
| 69 | 36 | 21 | < 1 | | 19 | < 1 | 0 | | 18 | 0 | 0 | | 21 | < 1 | 0 | | 19 | < 1 | 0 | |
| 70 | 36 | 25 | < 1 | | 26 | < 1 | 0 | | 22 | 0 | 0 | | 26 | < 1 | 0 | | 24 | < 1 | 0 | |
| 71 | 36 | 21 | < 1 | | 26 | < 1 | 0 | | 24 | 0 | 0 | | 26 | < 1 | 0 | | 26 | < 1 | 0 | |
| 72 | 36 | 23 | < 1 | | 25 | < 1 | 0 | | 27 | 0 | 0 | | 24 | < 1 | 0 | | 24 | < 1 | 0 | |
| 73 | 36 | 29 | < 1 | | 33 | < 1 | 0 | | 31 | 0 | 0 | | 31 | < 1 | 0 | | 32 | < 1 | 0 | |
| 74 | 36 | 23 | < 1 | | 26 | < 1 | 0 | | 21 | 0 | 0 | | 25 | < 1 | 0 | | 20 | < 1 | 0 | |
| 75 | 36 | 30 | < 1 | | 32 | < 1 | 0 | | 32 | 0 | 0 | | 36 | 1 | 1 | | 36 | 1 | 1 | |

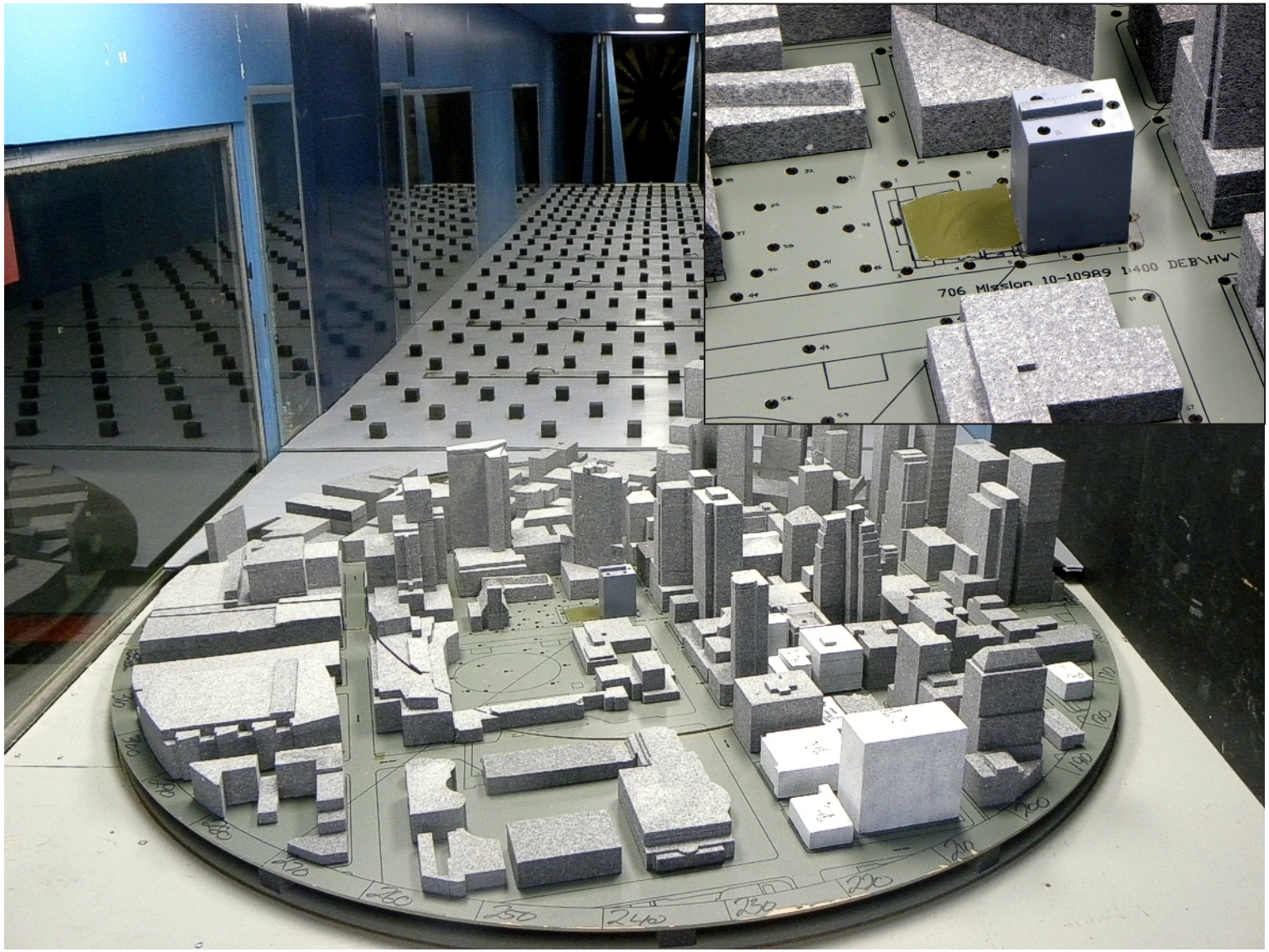
## Table 2: Wind Hazard Results - Grade

| Existing Conditions Configuration | | | | | Proposed Project Configuration | | | | Proposed Project Plus Cumulative Configuration | | | | Existing Zoning Alternative Configuration | | | | Existing Zoning Alternative Plus Cumulative Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Number | Hazard Criterion (mph) | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds |
| 76 | 36 | 16 | < 1 | | 18 | < 1 | 0 | | 18 | < 1 | 0 | | 18 | < 1 | 0 | | 18 | < 1 | 0 | |
| 77 | 36 | 25 | < 1 | | 32 | < 1 | 0 | | 26 | < 1 | 0 | | 32 | < 1 | 0 | | 30 | < 1 | 0 | |
| 78 | 36 | 22 | < 1 | | 20 | < 1 | 0 | | 20 | < 1 | 0 | | 22 | < 1 | 0 | | 20 | < 1 | 0 | |
| 79 | 36 | 17 | < 1 | | 17 | < 1 | 0 | | 15 | < 1 | 0 | | 18 | < 1 | 0 | | 15 | < 1 | 0 | |
| 80 | 36 | 15 | < 1 | | 13 | < 1 | 0 | | 14 | < 1 | 0 | | 15 | < 1 | 0 | | 15 | < 1 | 0 | |
| 81 | 36 | 13 | < 1 | | 13 | < 1 | 0 | | 12 | < 1 | 0 | | 12 | < 1 | 0 | | 12 | 0 | 0 | |
| 82 | 36 | 20 | < 1 | | 21 | < 1 | 0 | | 17 | < 1 | 0 | | 21 | < 1 | 0 | | 17 | < 1 | 0 | |
| 83 | 36 | 27 | < 1 | | 25 | < 1 | 0 | | 25 | < 1 | 0 | | 26 | < 1 | 0 | | 24 | < 1 | 0 | |
| 84 | 36 | 23 | < 1 | | 23 | < 1 | 0 | | 23 | < 1 | 0 | | 20 | < 1 | 0 | | 18 | < 1 | 0 | |
| 85 | 36 | 32 | < 1 | | 32 | < 1 | 0 | | 33 | < 1 | 0 | | 32 | < 1 | 0 | | 32 | < 1 | 0 | |
| 86 | 36 | 26 | < 1 | | 25 | < 1 | 0 | | 27 | < 1 | 0 | | 24 | < 1 | 0 | | 26 | < 1 | 0 | |
| 87 | 36 | 23 | < 1 | | 30 | < 1 | 0 | | 29 | < 1 | 0 | | 30 | < 1 | 0 | | 28 | < 1 | 0 | |
| 88 | 36 | 0 | < 1 | | 0 | < 1 | 0 | | 10 | < 1 | 0 | | 10 | < 1 | 0 | | 11 | < 1 | 0 | |
| 89 | 36 | 31 | < 1 | | 31 | < 1 | 0 | | 27 | < 1 | 0 | | 32 | < 1 | 0 | | 31 | < 1 | 0 | |
| 90 | 36 | 39 | 5 | e | 40 | 9 | 4 | e | 38 | 3 | -2 | e | 39 | 5 | 0 | e | 37 | 2 | -3 | e |
| 91 | 36 | 38 | 3 | e | 39 | 6 | 3 | e | 37 | 2 | -1 | e | 39 | 5 | 2 | e | 36 | 1 | -2 | |
| 92 | 36 | 20 | < 1 | | 22 | < 1 | 0 | | 21 | < 1 | 0 | | 21 | < 1 | 0 | | 20 | < 1 | 0 | |
| 93 | 36 | 20 | < 1 | | 16 | < 1 | 0 | | 22 | < 1 | 0 | | 16 | < 1 | 0 | | 22 | < 1 | 0 | |
| 94 | 36 | 30 | < 1 | | 30 | < 1 | 0 | | 17 | < 1 | 0 | | 29 | < 1 | 0 | | 17 | < 1 | 0 | |
| 95 | 36 | 22 | < 1 | | 23 | < 1 | 0 | | 26 | < 1 | 0 | | 22 | < 1 | 0 | | 26 | < 1 | 0 | |
| 96 | 36 | 20 | < 1 | | 21 | < 1 | 0 | | 31 | < 1 | 0 | | 20 | < 1 | 0 | | 30 | < 1 | 0 | |
| 97 | 36 | 23 | < 1 | | 23 | < 1 | 0 | | 26 | < 1 | 0 | | 22 | < 1 | 0 | | 26 | < 1 | 0 | |
| 98 | 36 | 25 | < 1 | | 25 | < 1 | 0 | | 25 | < 1 | 0 | | 24 | < 1 | 0 | | 24 | < 1 | 0 | |
| 99 | 36 | 24 | < 1 | | 28 | < 1 | 0 | | 28 | < 1 | 0 | | 24 | < 1 | 0 | | 23 | < 1 | 0 | |
| 100 | 36 | 22 | < 1 | | 27 | < 1 | 0 | | 27 | < 1 | 0 | | 23 | < 1 | 0 | | 23 | < 1 | 0 | |

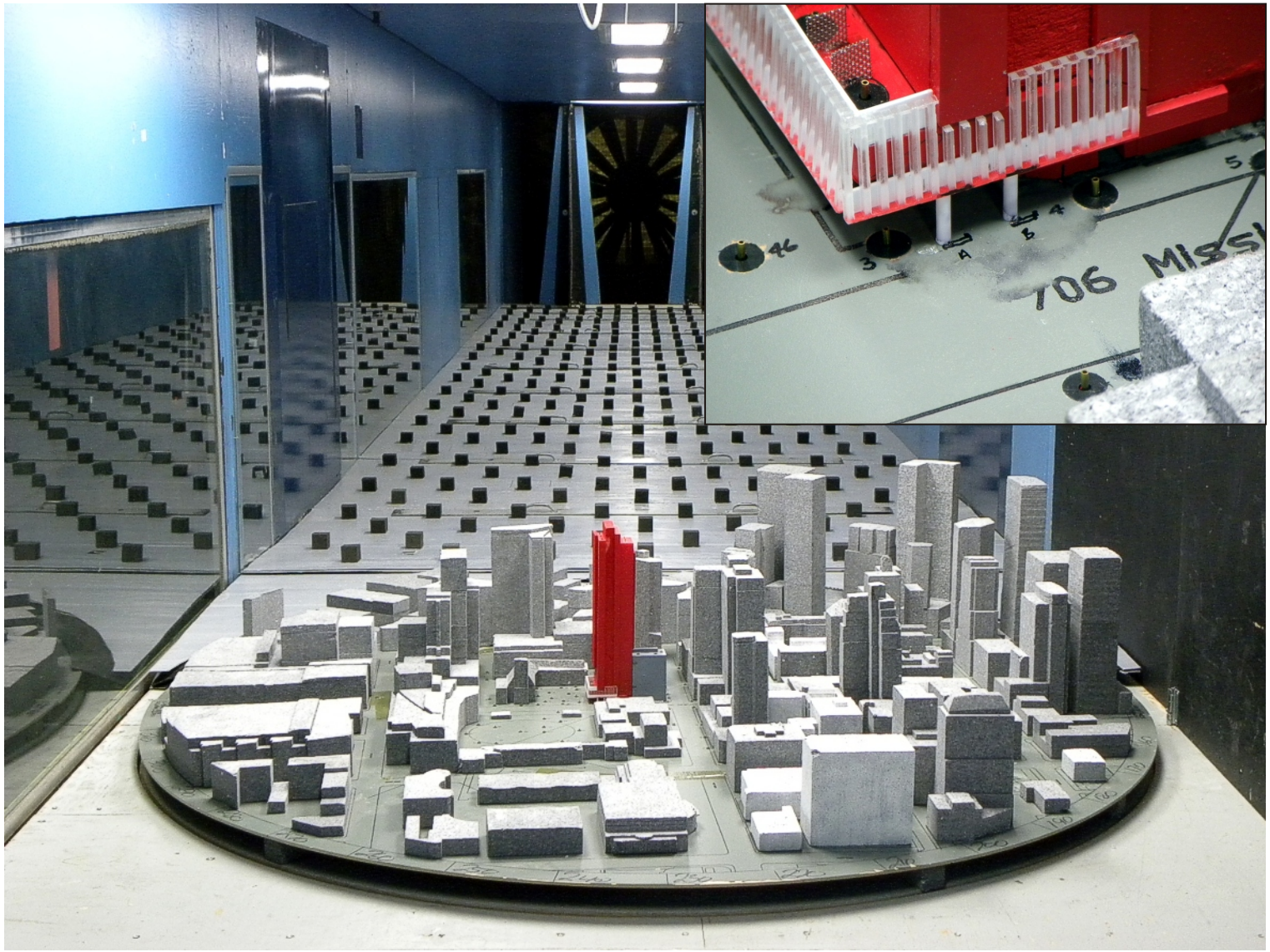
## Table 2: Wind Hazard Results - Grade

| Existing Conditions Configuration | | | | | Proposed Project Configuration | | | | Proposed Project Plus Cumulative Configuration | | | | Existing Zoning Alternative Configuration | | | | Existing Zoning Alternative Plus Cumulative Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Number | Hazard Criterion (mph) | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds |
| 101 | 36 | 23 | < 1 | | 25 | < 1 | 0 | | 24 | < 1 | 0 | | 26 | < 1 | 0 | | 24 | < 1 | 0 | |
| 102 | 36 | 14 | < 1 | | 14 | < 1 | 0 | | 15 | < 1 | 0 | | 15 | < 1 | 0 | | 14 | < 1 | 0 | |
| 103 | 36 | 11 | < 1 | | 11 | < 1 | 0 | | 12 | < 1 | 0 | | 12 | < 1 | 0 | | 12 | < 1 | 0 | |
| 104 | 36 | 22 | < 1 | | 21 | < 1 | 0 | | 21 | < 1 | 0 | | 22 | < 1 | 0 | | 22 | < 1 | 0 | |
| 105 | 36 | 22 | < 1 | | 20 | < 1 | 0 | | 20 | < 1 | 0 | | 22 | < 1 | 0 | | 21 | < 1 | 0 | |
| 106 | 36 | 25 | < 1 | | 25 | < 1 | 0 | | 24 | < 1 | 0 | | 26 | < 1 | 0 | | 24 | < 1 | 0 | |
| 107 | 36 | 23 | < 1 | | 23 | < 1 | 0 | | 22 | < 1 | 0 | | 23 | < 1 | 0 | | 22 | < 1 | 0 | |
| 108 | 36 | 32 | < 1 | | 36 | 1 | 1 | | 35 | < 1 | 0 | | 31 | < 1 | 0 | | 29 | < 1 | 0 | |
| 109 | 36 | 50 | 113 | e | 42 | 21 | -92 | e | 42 | 21 | -92 | e | 50 | 117 | 4 | e | 47 | 54 | -59 | e |
| Average mph and total hours | | 23.8 | 127 | | 23.8 | 37 | -90 | | 23.4 | 26 | -101 | | 24.6 | 129 | 1 | | 24.0 | 58 | -69 | |
| Exceedances | | | | 4 of 95 | | | | 3 of 95 | | | | 3 of 95 | | | | 3 of 95 | | | | 2 of 95 |

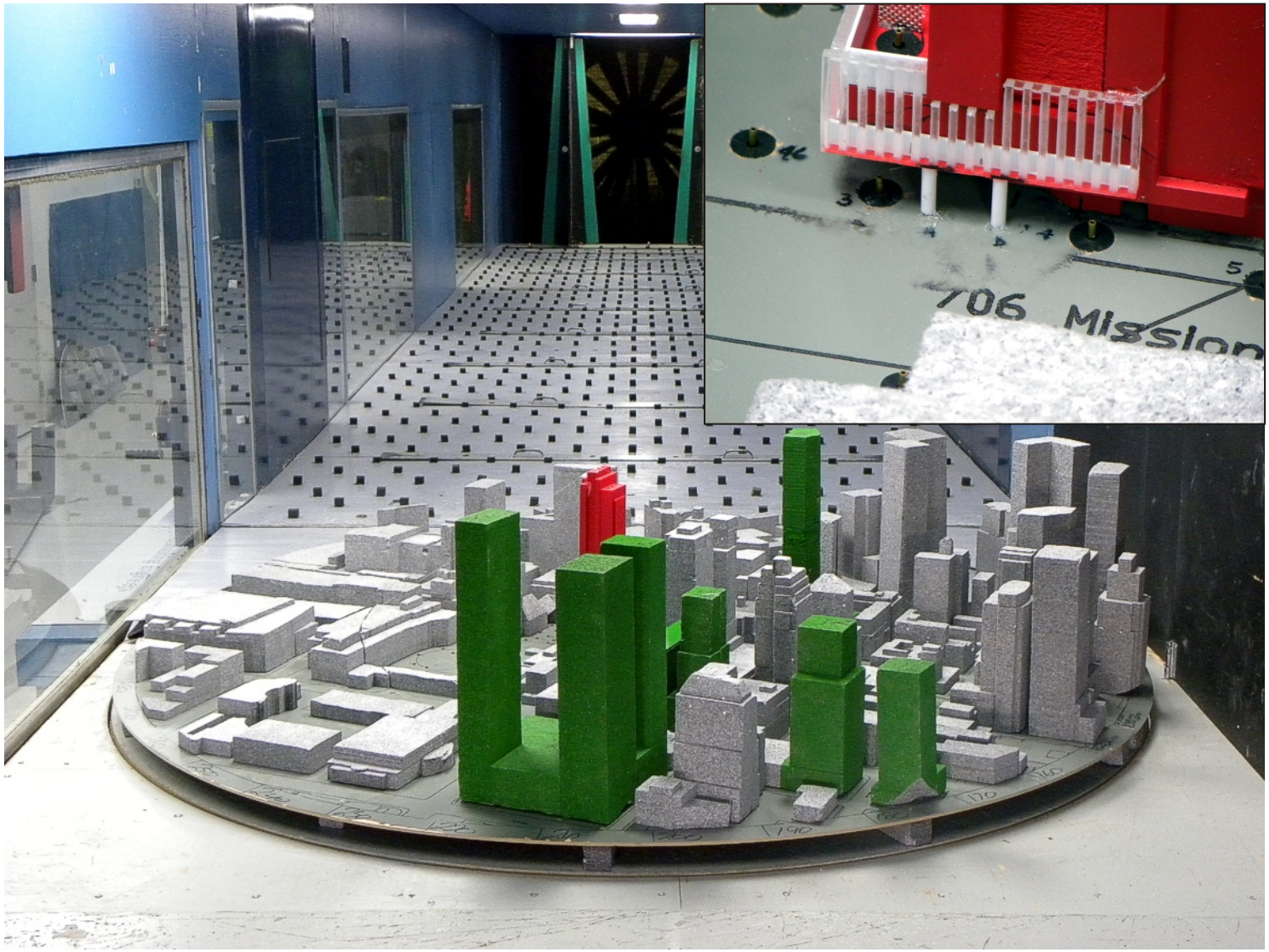
# FIGURES




| | | | |
|---|---|---|---|
| **Wind Tunnel Study Model**<br>**Existing Conditions Configuration**<br><br>706 Mission Street - San Francisco, California. Project #1010989 | Figure: 1a<br><br>Date: November 18, 2011 | RWDI |




| | | | |
|---|---|---|---|
| **Wind Tunnel Study Model**<br>**Proposed Project Configuration**<br><br>706 Mission Street - San Francisco, California. Project #1010989 | Figure: 1b<br>Date: November 18, 2011 | RWDI |



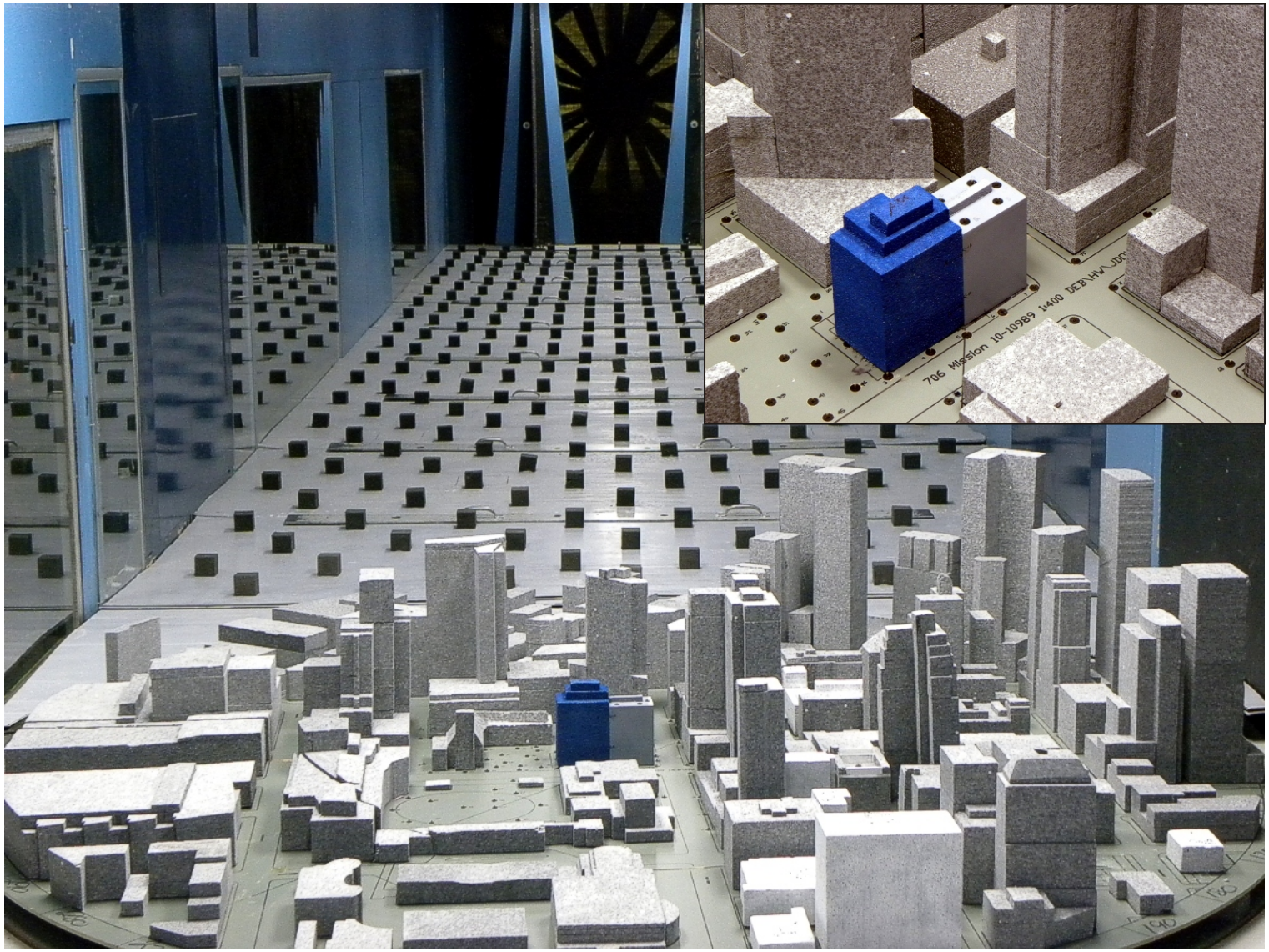

**Wind Tunnel Study Model**
**Proposed Project plus Cumulative Configuration**

706 Mission Street - San Francisco, California. Project #1010989

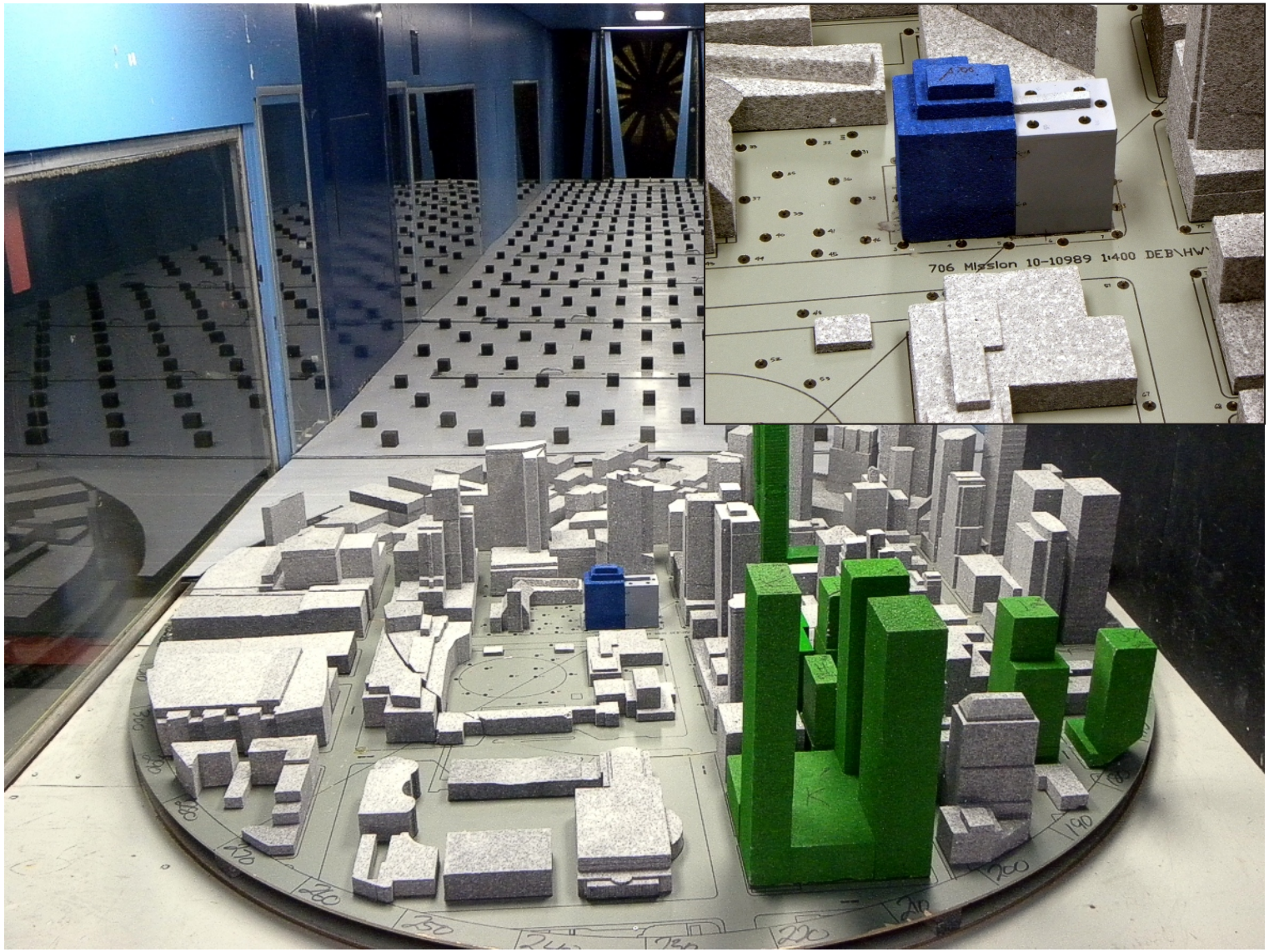
Figure: 1c

Date: November 18, 2011

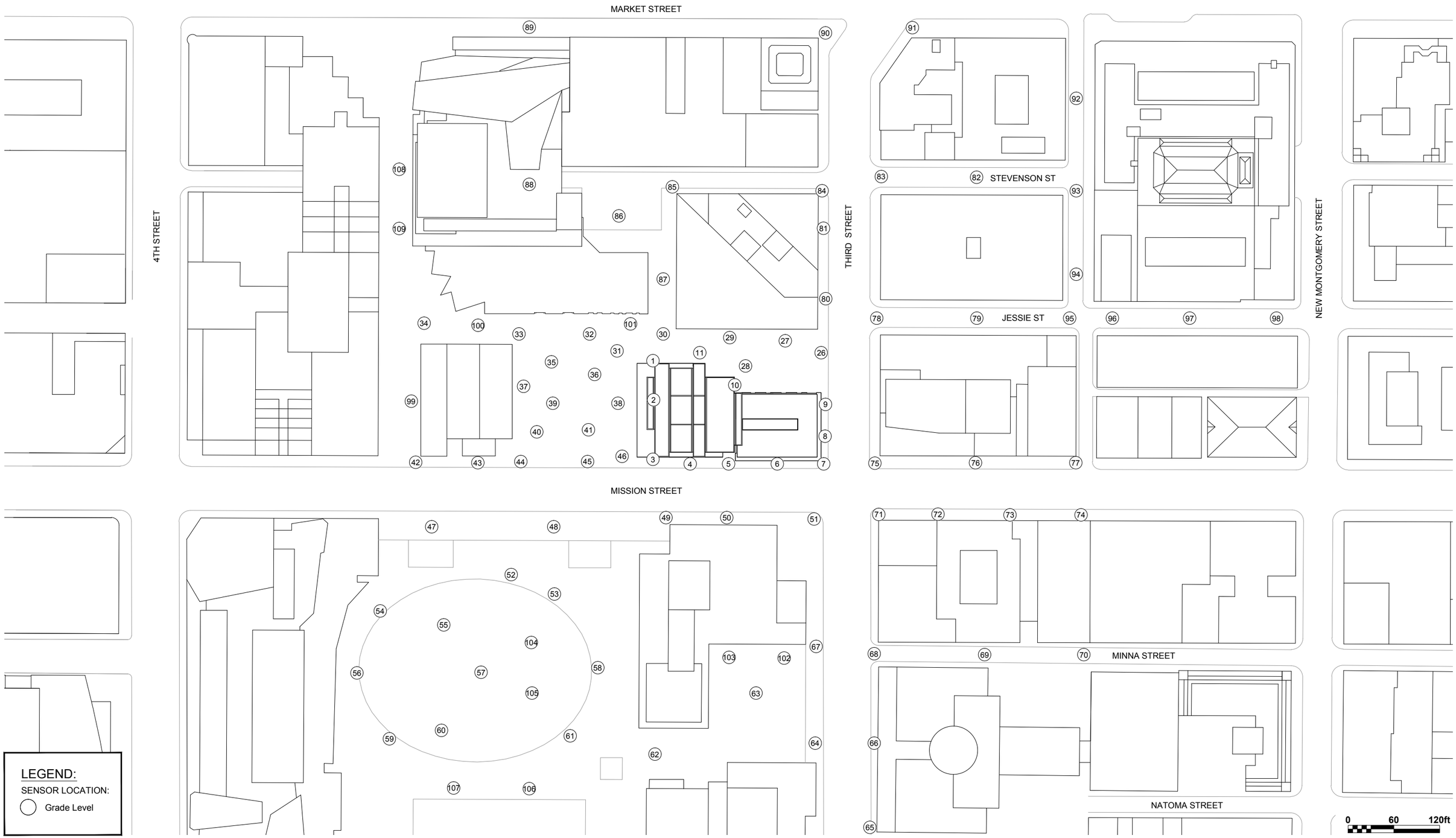
RWDI




| | | | |
|---|---|---|---|
| **Wind Tunnel Study Model**<br>**Existing Zoning Alternative Configuration**<br><br>706 Mission Street - San Francisco, California. Project #1010989 | Figure: 1d<br><br>Date: November 18, 2011 | RWDI |




| | | | |
|---|---|---|---|
| **Wind Tunnel Study Model**<br>**Existing Zoning Alternative Plus Cumulative Configuration**<br>706 Mission Street - San Francisco, California. Project #1010989 | Figure: 1e<br>Date: November 18, 2011 | RWDI |




Note: Test point 12 through 25 are above-grade locations that appear in a separate report.

**Location of Wind Speed Measurements**

706 Mission Street - San Francisco, California

Project North

True North

Project #1010989

| | | | |
|---|---|---|---|
| Drawn by: | DJM | Figure: | 2 |
| Approx. Scale: | 1"=120' | | |
| Date Revised: | Jan. 19, 2012 | | |

RWDI

# APPENDIX A

# APPENDIX A: DRAWING LIST FOR MODEL CONSTRUCTION

The conceptual drawings and information listed below were received from Handel Architects and were used to construct the scale model of the proposed 706 Mission Street project Should there be substantial design changes to the exterior dimensions/shape of the proposed building that deviate from this list of drawings, the results may change. Therefore, if changes in the exterior dimensions/shape of the proposed building are made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

| File Name | File Type | Date Received (dd/mm/yyyy) |
|---|---|---|
| 3d Model | AutoCAD drawing | 010311 |
| 3d Model | SketchUp | 010311 |
| Elevations | AutoCAD drawing | 010311 |
| Site Plan | AutoCAD drawing | 010311 |
| Building Section | AutoCAD drawing | 010311 |
| Floor Plans | AutoCAD drawing | 010311 |
| Roof Plans | AutoCAD drawing | 010311 |
| Jessie Square | AutoCAD drawing | 010311 |
| Jessie Square | AutoCAD drawing | 010311 |
| Jessie Square | AutoCAD drawing | 010311 |
| Conceptual Wind Reduction Options | Adobe Portable Document Format | 270411 |
| Conceptual Wind Reduction Options | Adobe Portable Document Format | 300211 |
| Conceptual Wind Reduction Options | Adobe Portable Document Format | 060211 |
| Conceptual Wind Reduction Options | Adobe Portable Document Format | 190811 |

# APPENDIX B

# APPENDIX B: SAN FRANCISCO PLANNING CODE SECTION 148

## Reduction of Ground-level Wind Currents in C-3 Districts

a) **Requirement and Exception.** In C-3 Districts, buildings and additions to existing buildings shall be shaped, or other wind-baffling measures shall be adopted, so that the developments will not cause ground-level wind currents to exceed, more than 10 percent of the time year round, between 7:00 a.m. and 6:00 p.m., the comfort level of 11 m.p.h. equivalent wind speed in areas of substantial pedestrian use and seven m.p.h. equivalent wind speed in public seating areas.

When preexisting ambient wind speeds exceed the comfort level, or when a proposed building or addition may cause ambient wind speeds to exceed the comfort level, the building shall be designed to reduce the ambient wind speeds to meet the requirements. An exception may be granted, in accordance with the provisions of Section 309, allowing the building or addition to add to the amount of time that the comfort level is exceed by the least practical amount if (1) it can be shown that a building or addition cannot be shaped and other wind-baffling measures cannot be adopted to meet the foregoing requirements without creating an unattractive and ungainly building form and without unduly restricting the development potential of the building site in question, and (2) it is concluded that, because of the limited amount by which the comfort level is exceeded, the limited location in which the comfort level is exceeded, or the limited time during which the comfort level is exceeded, the addition is insubstantial.

No exception shall be granted and no building or addition shall be permitted that causes equivalent wind speeds to reach or exceed the hazard level of 26 miles per hour for a single hour of the year.

b) **Definition.** The term "equivalent wind speed" shall mean and hourly mean wind speed adjusted to incorporate the effects of gustiness or turbulence on pedestrians.

c) **Guidelines.** Procedures and Methodologies for implementing this section shall be specified by the Office of Environmental Review of the Department of City Planning. (added by Ord. 414-85, App. 9/17/85)

CONSULTING ENGINEERS & SCIENTISTS

Tel: 519.823.1311
Fax: 519.823.1316

Rowan Williams Davies & Irwin Inc.
650 Woodlawn Road West
Guelph, Ontario, Canada
N1K 1B8

# 706 Mission Street

San Francisco, California

# Above Grade Wind Report

RWDI # 1010989
January 31, 2012

**SUBMITTED TO:**

**Michael Li**
**Turnstone consulting**
330 Townsend Street, Suite 216
San Francisco, California
USA 94107
mli@consultturnstone.com

**SUBMITTED BY**

**Dan Bacon**
Senior Project Manager/Associate
Dan.Bacon@rwdi.com

**Hanqing Wu., Ph.D., P.Eng.**
Technical Director/Principal
Hanqing.Wu@rwdi.com

# 1. INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by Turnstone Consulting to conduct a Pedestrian Wind Study for the proposed development at 706 Mission Street in San Francisco, California. The purpose of the study was to assess the wind environment around the development in terms of pedestrian comfort and hazard relative to wind metrics specified in San Francisco Planning Code Section 148. The study objective was achieved through wind tunnel testing of a 1:400 (1" = 33') scale model for five building configurations:

**A – Existing Conditions Configuration:**

Existing site and structures with existing surrounding buildings;

**B – Proposed Project Configuration:**

Proposed Project with existing surrounding buildings;

**C – Proposed Project Plus Cumulative Configuration:**

Proposed Project with existing surrounding buildings and anticipated proposed/future buildings;

**D – Existing Zoning Alternative Configuration**

Existing Zoning Alternative with existing surrounding buildings

**E – Existing Zoning Alternative Plus Cumulative Configuration**

Existing Zoning Alternative with existing surrounding buildings and anticipated proposed/future buildings.

Wind speeds were measured at 95 grade-level locations and 14 podium-level locations. The results for grade-level are presented in a separate report.[1]

Planning Code Section 148 does not apply to locations that are above grade. However, wind speeds were measured at 14 podium- and roof-level locations on the project site in order to provide the project sponsor with information regarding the wind conditions at the proposed podium- and roof-level open spaces. The wind speeds for the podium- and roof-level locations are presented in this report.

[1] RWDI, Pedestrian Wind Study - 706 Mission Street, San Francisco, CA, January 25, 2012.

The wind speeds for Test Locations 12 through 25 (the 14 podium- and roof-level locations) were measured at the same time as the wind speeds for Test Locations 1 through 11 and 26 through 109 (the 95 grade-level locations) for all five building configurations described above using the same 1:400 scale model. There was no difference in the methodology used to obtain the results for Test Locations 12 through 25.

# 2. TEST RESULTS

Although the pedestrian comfort, seating comfort, and wind hazard criteria set forth in Planning Code Section 148 are not applicable to Test Points 12 through 25, these criteria are used as points of reference.

Table 1A presents the wind comfort results for the five building configurations tested. For each measurement point, the measured 10% exceeded (90$^{th}$ percentile) equivalent wind speed and the percentage of time that the wind speed exceeds 11 mph are shown for all the podium- and roof-level areas. A lower speed criterion (7 mph) is ideal for "seating" areas at grade, but the 11 mph criterion was used in the current calculation as higher wind activity is anticipated in these elevated areas and access to these privately owned spaces can be controlled on windy days.

Table 2A presents the wind hazard results, and lists the predicted wind speed to be exceeded one hour per year. The predicted number of hours per year that the wind hazard criterion would be exceeded is also provided.

Figure 1A shows the test locations on the podium and roof of the proposed building as well as on the roof garden of the existing Aronson Building to the east. Sensors 12 through 20 were on the proposed building and therefore, data were not available at these locations for the Existing Conditions Configuration and the two Existing Zoning Alternative Configurations.

## 2.1 Proposed Building (Locations 12 through 20)

Locations 12, 13 and 14 are on the proposed fourth floor terrace. With the proposed fins, glazing and panels in place, the 10% wind speeds were in the range of 8 to 10 mph for both Proposed Project Configurations. These speeds satisfied the 11 mph criterion for walking, but were higher than the 7 mph seating criterion. If desired, additional wind control measures, such as landscaping and trellises, could be installed, as shown in the examples below.

Wind conditions on the roofs (Locations 15 through 20) exceeded the 11 mph comfort criterion due to elevation and overall exposure. Wind speeds at Location 15, 16 and 17 on the west side of the tower also exceeded the wind hazard criterion (Table 2A).

## 2.2 Existing Building (Locations 21 through 25)

Under the Existing Conditions Configuration, wind speeds on the roof of the existing Aronson Building to the east exceeded the wind comfort criterion at all test locations. Winds at Locations 21 and 22 were borderline hazardous, with Location 21 (36 mph) at the wind hazard criterion and Location 22 (37 mph) exceeding the wind hazard criterion (Table 2A).

With the proposed project or the zoning alternative in place, increased wind speeds were found on the north portion of the roof (Locations 21 and 22), but wind speeds decreased on the south portion of the roof (Locations 24 and 25). The number of wind hazard exceedances increased from one for the Existing Conditions Configuration to two (Locations 21 and 22) for all four other configurations. If desired, these wind speeds could be reduced by a tall parapet/screen and/or landscaping along the north roof edge of the existing building, as shown in the examples below.

**Examples of Wind Control Measures**

# TABLES

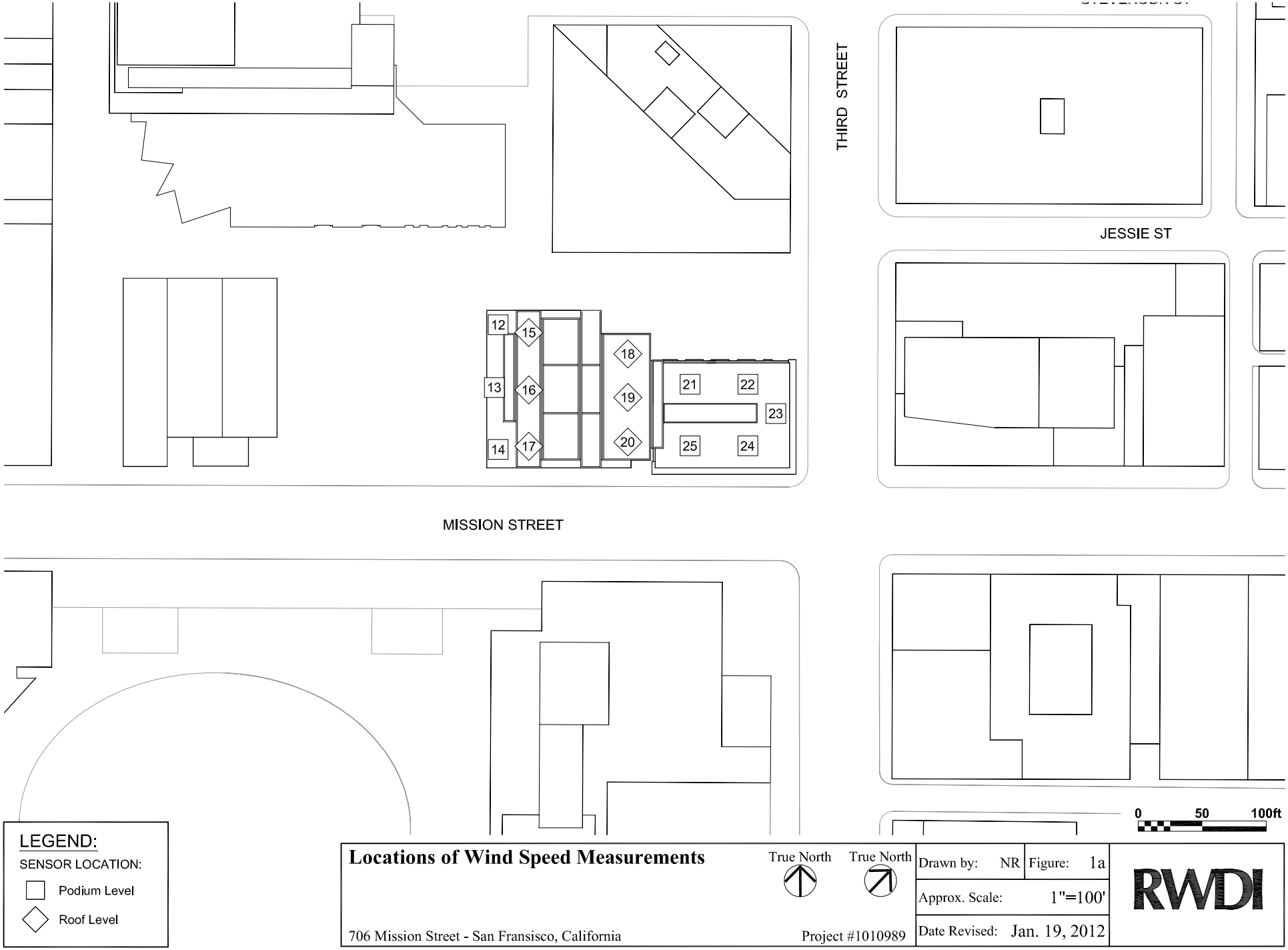
## Table 1A: Wind Comfort Results – Above Grade

| Existing Conditions Configuration | | | | | Proposed Project Configuration | | | | Proposed Project Plus Cumulative Configuration | | | | Existing Zoning Alternative Configuration | | | | Existing Zoning Alternative Plus Cumulative Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Number | Comfort Criterion (mph) | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | Percent of Time Wind Speed Exceeds 11 mph | Speed Change Relative to Existing (mph) | Exceeds |
| 12 | 11 | N/A | | | 10 | 7% | | | 10 | 6% | | | N/A | | | | N/A | | | |
| 13 | 11 | N/A | | | 8 | 1% | | | 8 | 1% | | | N/A | | | | N/A | | | |
| 14 | 11 | N/A | | | 9 | 3% | | | 10 | 5% | | | N/A | | | | N/A | | | |
| 15 | 11 | N/A | | | 27 | 59% | | e | 26 | 57% | | e | N/A | | | | N/A | | | |
| 16 | 11 | N/A | | | 26 | 58% | | e | 25 | 57% | | e | N/A | | | | N/A | | | |
| 17 | 11 | N/A | | | 29 | 60% | | e | 28 | 59% | | e | N/A | | | | N/A | | | |
| 18 | 11 | N/A | | | 16 | 30% | | e | 16 | 27% | | e | N/A | | | | N/A | | | |
| 19 | 11 | N/A | | | 16 | 31% | | e | 16 | 28% | | e | N/A | | | | N/A | | | |
| 20 | 11 | N/A | | | 15 | 28% | | e | 14 | 24% | | e | N/A | | | | N/A | | | |
| 21 | 11 | 19 | 45% | e | 21 | 49% | 2 | e | 21 | 46% | 2 | e | 18 | 38% | -1 | e | 17 | 34% | -2 | e |
| 22 | 11 | 20 | 47% | e | 21 | 47% | 1 | e | 20 | 45% | 0 | e | 21 | 48% | 1 | e | 20 | 45% | 0 | e |
| 23 | 11 | 13 | 18% | e | 16 | 33% | 3 | e | 16 | 32% | 3 | e | 13 | 19% | 0 | e | 13 | 16% | 0 | e |
| 24 | 11 | 15 | 28% | e | 14 | 24% | -1 | e | 14 | 23% | -1 | e | 13 | 17% | -2 | e | 12 | 14% | -3 | e |
| 25 | 11 | 14 | 21% | e | 10 | 5% | -4 | e | 10 | 5% | -4 | e | 9 | 4% | -5 | e | 9 | 3% | -5 | e |
| Average mph and % | | 16.2 | 32% | | 17.0 | 31% | | | 16.7 | 30% | | | 14.8 | 25% | | | 14.2 | 22% | | |
| Exceedances | | | | 5 of 5 | | | | 11 of 14 | | | | 11 of 14 | | | | 5 of 5 | | | | 5 of 5 |

## Table 2A: Wind Hazard Results – Above Grade

| Existing Conditions Configuration | | | | | Proposed Project Configuration | | | | Proposed Project Plus Cumulative Configuration | | | | Existing Zoning Alternative Configuration | | | | Existing Zoning Alternative Plus Cumulative Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Number | hazard Criterion (mph) | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1 Hour per Year (mph) | Hours per Year Wind Speed Exceeds Hazard Criterion | Hours Change Relative to Existing | Exceeds |
| 12 | 36 | N/A | | | 33 | 0 | | | 18 | 0 | | | N/A | N/A | | | N/A | N/A | | |
| 13 | 36 | N/A | | | 15 | 0 | | | 14 | 0 | | | N/A | N/A | | | N/A | N/A | | |
| 14 | 36 | N/A | | | 16 | 0 | | | 17 | 0 | | | N/A | N/A | | | N/A | N/A | | |
| 15 | 36 | N/A | | | 57 | 235 | | e | 56 | 213 | | e | N/A | N/A | | | N/A | N/A | | |
| 16 | 36 | N/A | | | 47 | 93 | | e | 45 | 73 | | e | N/A | N/A | | | N/A | N/A | | |
| 17 | 36 | N/A | | | 50 | 216 | | e | 48 | 166 | | e | N/A | N/A | | | N/A | N/A | | |
| 18 | 36 | N/A | | | 32 | 0 | | | 30 | 0 | | | N/A | N/A | | | N/A | N/A | | |
| 19 | 36 | N/A | | | 32 | 0 | | | 32 | 0 | | | N/A | N/A | | | N/A | N/A | | |
| 20 | 36 | N/A | | | 30 | 0 | | | 31 | 0 | | | N/A | N/A | | | N/A | N/A | | |
| 21 | 36 | 36 | 0 | | 45 | 34 | 34 | e | 43 | 27 | 27 | e | 39 | 5 | 5 | e | 38 | 3 | 3 | e |
| 22 | 36 | 37 | 2 | e | 43 | 24 | 22 | e | 41 | 13 | 11 | e | 43 | 25 | 23 | e | 42 | 20 | 18 | e |
| 23 | 36 | 30 | 0 | | 30 | 0 | 0 | | 30 | 0 | 0 | | 29 | 0 | 0 | | 28 | 0 | 0 | |
| 24 | 36 | 27 | 0 | | 27 | 0 | 0 | | 26 | 0 | 0 | | 24 | 0 | 0 | | 23 | 0 | 0 | |
| 25 | 36 | 24 | 0 | | 19 | 0 | 0 | | 18 | 0 | 0 | | 18 | 0 | 0 | | 18 | 0 | 0 | |
| Average mph and total hours | | 30.8 | 2 | | 34.0 | 602 | 56 | | 32.1 | 492 | 38 | | 30.6 | 30 | 28 | | 29.8 | 23 | 21 | |
| Exceedances | | | | 1 of 5 | | | | 5 of 14 | | | | 5 of 14 | | | | 2 of 5 | | | | 2 of 5 |

# FIGURES




LEGEND:

SENSOR LOCATION:

- Podium Level
- Roof Level

**Locations of Wind Speed Measurements**

True North

True North

706 Mission Street - San Fransisco, California

Project #1010989

| | | | |
|---|---|---|---|
| Drawn by: | NR | Figure: | 1a |
| Approx. Scale: | | | 1"=100' |
| Date Revised: | | | Jan. 19, 2012 |

RWDI

# APPENDIX I: SHADOW ANALYSIS SUMMARY LETTERS

TURNSTONE CONSULTING

February 22, 2011

Ms. Debra Dwyer
Planning Department
City and County of San Francisco
1650 Mission Street, Suite 400
San Francisco, CA 94103

**RE: Case No. 2008.1084E**
**706 Mission Street**
**Shadow Analysis**

Dear Ms. Dwyer:

I have enclosed the results of the shadow analysis that was conducted for the proposed tower at 706 Mission Street. The analysis addresses the proposed tower's potential shadow impacts on Boeddeker Park, Jessie Square, Union Square, and Yerba Buena Gardens. The following information has been included for your review:

- shadow fan
- shadow fan with aerial photograph
- standard shadow projections (10:00AM, noon, and 3:00PM on March 21, June 21, September 21, and December 21)
- shadow projections for 8:22AM, 8:30AM, 8:45AM, 9:00AM, 9:30AM, and 9:45AM on October 18
- shadow calculations for Boeddeker Park, Jessie Square, and Union Square

Boeddeker Park

An analysis of the 2008 design of the proposed tower indicated that the tower would not cast net new shadow on Boeddeker Park at any time during the year. The design of the tower has been revised since that analysis was conducted. The tower has been shifted to the southwest, and the height of the tower has been reduced from 630 feet to 550 feet. A computer analysis performed by CADP Associates confirmed that the shorter and relocated tower would not cast net new shadow on Boeddeker Park at any time during the year. Shadow from the project would be blocked by intervening buildings or masked by existing shadows cast by other buildings. The shadow calculation spreadsheet is enclosed for your review.

Jessie Square

The proposed tower would cast net new shadow on Jessie Square from the early morning until the early afternoon throughout the year. During the spring and autumn, the shadow would begin at sunrise and cover approximately one-quarter to one-third of the square, primarily the northeast corner, before receding as the day progresses. By early afternoon, the project would not cast any net new shadow on the square. During the summer, the shadow would begin at sunrise and cover most of the square before receding as the day progresses. By early afternoon, the project would not cast any net new shadow on the square. During the winter, the shadow would begin at sunrise and cover an area along the eastern edge of

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the square before receding as the day progresses. By late morning, the project would not cast any net new shadow on the square.

Jessie Square includes landscaping, a rectangular pool, seating areas, and walkways. These features would be shadowed by the project during the times specified above.

In terms of area, the maximum shadow would occur on June 21. At 9:15AM, the shadow would cover an area of approximately 17,795 square feet.

Table 1 shows the amount of annual net new shadow that the proposed tower would cast on Jessie Square.

**Table 1: Annual Net New Shadow on Jessie Square**

| Annual Net New Shadow (in sfh)[1] | Annual Post-8:00AM Net New Shadow (in sfh)[2] | Annual Post-9:00AM Net New Shadow (in sfh)[3] |
|---|---|---|
| 8,031,176 | 7,437,298 | 4,828,680 |

Union Square

The proposed tower would cast net new shadow on Union Square during the morning hours from early October through early November and from early February through early March. During the autumn, October 11 would be the first day on which the proposed tower would cast net new shadow on the park (between 8:30AM and 9:30AM), and November 8 would be the last day on which the project would cast net new shadow on the park (between 7:43AM and 8:15AM). During the late winter, the proposed tower would begin casting net new shadow on the park on or about February 2 (between 7:43AM and 8:15AM) and would stop casting net new shadow on the park on or about March 2 (between 8:30AM and 9:30AM). The proposed tower would not cast net new shadow on Union Square after 9:30AM on any day during the year.

The net new shadow from the proposed tower would fall on some of the pedestrian walkways and seating areas in Union Square. During the early morning, Union Square is not heavily used, although residents who live or work downtown and tourists may walk across the park to reach their destinations. The park, which is more suitable for passive recreation than active recreation, is most heavily used from late

[1] This total is derived from multiplying the number of square-foot-hours of net new shadow shown in the spreadsheets by the annualization factor of 13.5014. The total represents the net new shadow that would occur during the time period specified in Section 295(a)(2) of the Planning Code (from one hour after sunrise until one hour before sunset).

[2] This total is derived from multiplying the number of post-8:00AM square-foot-hours of net new shadow shown in the spreadsheet by the annualization factor of 13.5014.

[3] This total is derived from multiplying the number of post-9:00AM square-foot-hours of net new shadow shown in the spreadsheet by the annualization factor of 13.5014.

morning through early evening. In general, the net new shadow would begin near the western edge of the park and move east across the park. There is a café near the northeast corner of the park. The café has an outdoor seating area that is already shadowed for much of the morning by existing buildings in the vicinity of Union Square. Some net new shadow from the proposed tower would fall on part of the outdoor seating area for about 15 to 20 minutes before moving off the park.

In terms of area, the maximum shadow would occur on October 18. At 8:45AM, the shadow would cover an area of approximately 17,715 square feet.

Table 2 shows the amount annual of net new shadow that the proposed tower would cast on Union Square.

**Table 2: Annual Net New Shadow on Union Square**

| Annual Net New Shadow (in sfh) | Annual Post-8:00AM Net New Shadow (in sfh) | Annual Post-9:00AM Net New Shadow (in sfh) |
|---|---|---|
| 337,744 | 231,679 | 73,768 |

Yerba Buena Gardens

The city block south of the project site is occupied by Yerba Buena Gardens. As shown on the attached shadow fan, the proposed tower would not cast any shadow on the Esplanade at any time during the year.

On the east end of this block, there is a small plaza along Third Street directly across from the San Francisco Museum of Modern Art. The proposed tower would shadow this plaza toward the end of the day during the summer, when there are already shadows from existing buildings, including the Yerba Buena Center for the Arts gallery, on this plaza.

We would like to discuss whether a quantitative shadow analysis needs to be conducted for this plaza or if the shadow impacts on this plaza can be analyzed qualitatively in the EIR. This plaza is not under the jurisdiction of the Recreation and Park Commission.

If you need additional information or have any questions regarding this matter, please contact me at (415) 536-2883 or mli@consultturnstone.com.

Sincerely,

Michael Li

Michael Li

Enclosures

TURNSTONE CONSULTING

March 14, 2011

Ms. Debra Dwyer
Planning Department
City and County of San Francisco
1650 Mission Street, Suite 400
San Francisco, CA 94103

**RE: Case No. 2008.1084E**
**706 Mission Street**
**Shadow Analysis – Supplemental Information**

Dear Ms. Dwyer:

This letter supplements the shadow analysis that was submitted to you on February 22, 2011. In response to a request from Aaron Hollister, I have provided two tables that show the proposed project's shadow impacts on Jessie Square and Union Square. The tables show how much annual net new shadow the proposed project would cast on these two open spaces after 8:00AM, 8:15AM, 8:30AM, 8:45AM, and 9:00AM.

Table 1 shows the amount of annual net new shadow that the proposed project would cast on Jessie Square.

**Table 1: Annual Net New Shadow on Jessie Square**

| | |
|---|---|
| **Annual Net New Shadow (in sfh)** | 8,031,176 |
| **Annual Post-8:00AM Net New Shadow (in sfh)** | 7,437,298 |
| **Annual Post-8:15AM Net New Shadow (in sfh)** | 6,902,849 |
| **Annual Post-8:30AM Net New Shadow (in sfh)** | 6,281,014 |
| **Annual Post-8:45AM Net New Shadow (in sfh)** | 5,591,967 |
| **Annual Post-9:00AM Net New Shadow (in sfh)** | 4,828,680 |

Table 2 shows the amount of annual net new shadow that the proposed project would cast on Union Square.

**Table 2: Annual Net New Shadow on Union Square**

| | |
|---|---|
| **Annual Net New Shadow (in sfh)** | 337,744 |
| **Annual Post-8:00AM Net New Shadow (in sfh)** | 231,679 |
| **Annual Post-8:15AM Net New Shadow (in sfh)** | 170,304 |
| **Annual Post-8:30AM Net New Shadow (in sfh)** | 157,572 |
| **Annual Post-8:45AM Net New Shadow (in sfh)** | 149,523 |
| **Annual Post-9:00AM Net New Shadow (in sfh)** | 73,768 |

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In addition, I have provided eight more shadow projections:

- 8:30AM and 9:15AM on March 21
- 8:30AM and 9:15AM on June 21
- 8:30AM and 9:15AM on September 21
- 8:30AM and 9:15AM on December 21

These shadow projections show the proposed project's shadow impacts on Jessie Square during the early-morning hours.

If you need additional information or have any questions regarding this matter, please contact me at (415) 536-2883 or mli@consultturnstone.com.

Sincerely,

Michael Li

Michael Li

Enclosures

TURNSTONE CONSULTING

April 8, 2011

Ms. Debra Dwyer
Planning Department
City and County of San Francisco
1650 Mission Street, Suite 400
San Francisco, CA 94103

**RE: Case No. 2008.1084E**
**706 Mission Street**
**Shadow Analysis – Supplemental Information**

Dear Ms. Dwyer:

This letter supplements information that was submitted to you on February 22, 2011 and March 14, 2011. In response to a request from Aaron Hollister, I have provided additional shadow projections for the following days and times:

- 8:45AM and 9:00AM on September 21
- 8:22AM (one hour after sunrise), 8:30AM, 8:45AM, 9:00AM, and 9:15AM on October 18

The October 18 shadow projections zoom in on Union Square and show the approximate locations of seating areas throughout the park. We have not provided zoomed-in shadow projections for 9:30AM and 9:45AM on October 18, because the proposed project would not cast net new shadow on Union Square at these times.

Union Square receives about 392,663,521 square-foot-hours (sfh) of theoretical annual sunlight. The proposed project would add about 337,743 sfh of annual net new shadow on Union Square (about 0.08 percent of the theoretical annual sunlight).

Jessie Square receives about 126,611,206 sfh of theoretical annual sunlight. The proposed project would add about 8,031,176 sfh of annual net new shadow on Jessie Square (about 6.34 percent of the theoretical annual sunlight).

If you need additional information or have any questions regarding this matter, please contact me at (415) 536-2883 or mli@consultturnstone.com.

Sincerely,

Michael Li

Michael Li

Enclosures

330 TOWNSEND STREET, SUITE 216 SAN FRANCISCO, CA 94107 PH: (415) 536-2883 FAX: (415) 536-3902

June 9, 2011

Mr. Aaron Hollister
Planning Department
City and County of San Francisco
1650 Mission Street, Suite 400
San Francisco, CA 94103

**RE: Case No. 2008.1084K**
**706 Mission Street**
**Shadow Analysis – Update of Information Submitted on June 2, 2011**

Dear Mr. Hollister:

Based on our telephone conversation, I have revised the information that was contained in a letter dated June 2, 2011 regarding net new project shadow on Union Square. The information contained in this letter supersedes the information contained in the letter dated June 2, 2011.

As noted in an email from Kevin Guy dated June 2, 2011, Union Square currently has an existing shadow load of about 150,265,376 square-foot-hours (sfh). The proposed project would add about 337,744 sfh of net new shadow on Union Square, for a total shadow load of about 150,603,120 sfh. This would be an increase of about 0.22 percent.

In February 1989, the Planning Commission and the Recreation and Park Commission established a quantitative standard, or shadow budget, for allowing development projects to cast additional net new shadow on Union Square. The shadow budget was set at 392,663.5 sfh of net new shadow. Since the shadow budget for Union Square was established, two completed development projects have affected the shadow conditions on Union Square. The Macy's expansion project resulted in a net reduction of 194,293 sfh of existing shadow (with a corresponding increase in sunlight), and a project at 690 Market Street added 69,540 sfh of net new shadow on Union Square.

Although the Macy's expansion project reduced the amount of existing shadow and increased the amount of available sunlight on Union Square, the 1989 shadow budget has not been formally amended by the Planning Commission and the Recreation and Park Commission to account for these conditions. The current shadow budget for Union Square, which accounts for the 69,540 sfh of net new shadow that were added by the project at 690 Market Street, is 323,123.5 sfh.

As described above, the proposed project would add about 337,744 sfh of net new shadow on Union Square and exceed the current shadow budget by 14,620.5 sfh.[1] The project sponsor is proposing to amend the shadow budget for Union Square.

Summary of Union Square Shadow Information

| | |
|---|---|
| Theoretical Annual Sunlight: | 392,663,521 sfh |
| Shadow Load in February 1989: | 150,390,128 sfh |
| Shadow Budget in February 1989: | 392,663.5 sfh |
| Current Shadow Load (June 2011): | 150,265,376 sfh[2] |
| Current Shadow Budget (June 2011): | 323,123.5 sfh[3] |
| Net New Project Shadow: | 337,744 sfh |
| Percentage of Theoretical Annual Sunlight: | 0.09 percent |
| Percentage of Current Shadow Load: | 0.22 percent |
| Remaining Shadow Budget: | -14,620.5 sfh |

If you need additional information or have any questions regarding this matter, please contact me at (415) 536-2883 or mli@consultturnstone.com.

Sincerely,

Michael Li

Michael Li

cc: Debra Dwyer
Kevin Guy

[1] If the 1989 shadow budget were formally amended by the Planning Commission and the Recreation and Park Commission to account for the Macy's expansion project, the current shadow budget would be 517,416.5 sfh. Following implementation of the proposed project, Union Square would have a remaining shadow budget of 179,672.5 sfh.

[2] This number accounts for the Macy's expansion project and 690 Market Street.

[3] This number accounts for 690 Market Street.

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Debra Dwyer
San Francisco Planning Department
Environmental Planning Division
1650 Mission Street, Suite 400
San Francisco, CA 94103

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REQUEST FOR FINAL ENVIRONMENTAL IMPACT REPORT

Planning Department Case No. 2008.1084E, 760 Mission Street – The Mexican Museum and Residential Tower Project

*Check one box:* ☐ Please send me a copy of the Final EIR on CD-ROM.
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