

## 2.8.5 Long-Term Roadway Closures

The conceptual staging plans also identified the need for long-term closure (greater than one month) for ramps and local roads. **Exhibit 2-43** depicts the long-term closures and associated construction activities.

More information regarding anticipated roadway closures is provided in the *Draft Transportation Management Plan*, June 2007 (see **Appendix K**), developed for this project.

Exhibit 2-43  
Potential Long-Term Roadway Closures

LOCATION OF CLOSURE	PURPOSE OF CLOSURE	ALTERNATIVE 2 NO-DETOUR	ALTERNATIVE 2 WITH DETOUR	ALTERNATIVE 5 PARK PRESIDIO
NB Doyle Drive to SB Veterans Blvd	Ramp Reconstruction	X	X	
NB Veterans Blvd to SB Doyle Drive	Ramp Reconstruction	X	X	
Lincoln Blvd	Mainline Doyle Drive Construction	X		X
Halleck Street	Mainline Doyle Drive Construction and Road Reconstruction			X

## 2.9 Construction Activities for the Preferred Alternative

As part of this environmental analysis, a preliminary construction plan was developed for the Preferred Alternative. The following section provides an overview of the possible construction scenario that may be used for the Preferred Alternative.

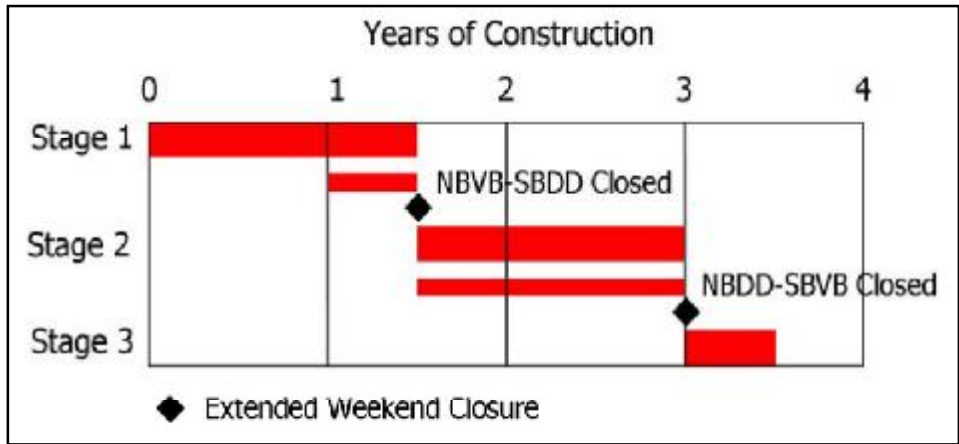
### 2.9.1 Construction Staging

The primary staging area for the Preferred Alternative will be the Post Exchange building site and parking lot. The secondary staging area will be located on the parking lot between Buildings 230 (Presidio Archeology Lab) and 1063 (Medical Supply warehouse) (see **Exhibit 2-44**). Access to the buildings adjacent to the staging areas and throughout the Presidio will be maintained throughout the construction period, which is estimated to last four years or less (see **Exhibit 2-45**).

Exhibit 2-44  
Construction Staging Areas – Preferred Alternative



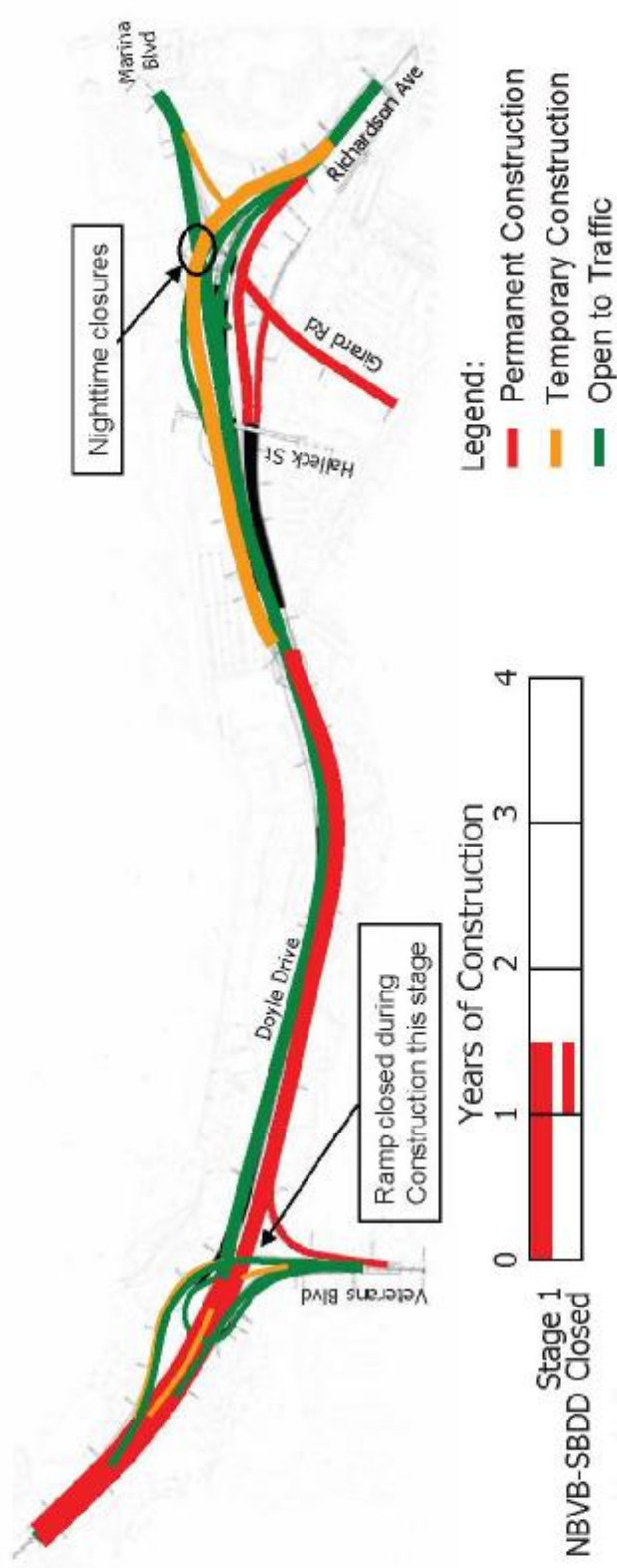
Exhibit 2-45  
 Construction Duration – Preferred Alternative



NBVD: Northbound Veterans Boulevard  
 SBDD Southbound Doyle Drive  
 NBDD: Northbound Doyle Drive  
 SBVB: Southbound Veterans Boulevard

To minimize ground disturbance, storage of equipment and materials on-site will be limited to the staging and construction areas. The majority of equipment and materials will be transported to the site using designated haul roads during daytime hours to minimize disturbance to the surrounding residential neighborhoods and to conform to the city of San Francisco construction noise ordinance. Access for construction vehicles and equipment will be via Lombard Street and Richardson Avenue from the east; Veterans Boulevard from the south; and the Golden Gate Bridge from the north. Mason Street and Lincoln Boulevard have been identified as haul roads within the Presidio. Additional haul roads, including completed detour roads, will be identified prior to the start of construction. Following construction, all haul roads will be restored to existing conditions, or as defined by the land managing agency. **Exhibits 2-46 through 2-50** on the following pages present schematic staging plans for the Preferred Alternative.

**Exhibit 2-46**  
**Preferred Alternative**  
**Construction Staging – Stage One, Phase One and Two**



Permanent Construction:

Construct off-line portions of permanent Doyle Drive (DD) including southbound (SB) Battery tunnel portion of SB DD east of Halleck St and portion of the Girard Rd Interchange. Construct permanent Girard Rd alignment south of DD to Lincoln Blvd. Realign portion of Lincoln Blvd at the Park Presidio Interchange. Construct retaining wall and cantilever roadway section adjacent to Building 106. Remove Post Exchange (PX) Building and Buildings 230 and 231. Shift DD traffic onto temporary widening west of Park Presidio Interchange. Construct portion of SB DD. Construct Park Presidio Interchange ramps.

Temporary Construction:

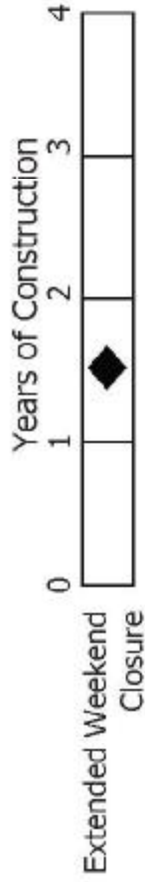
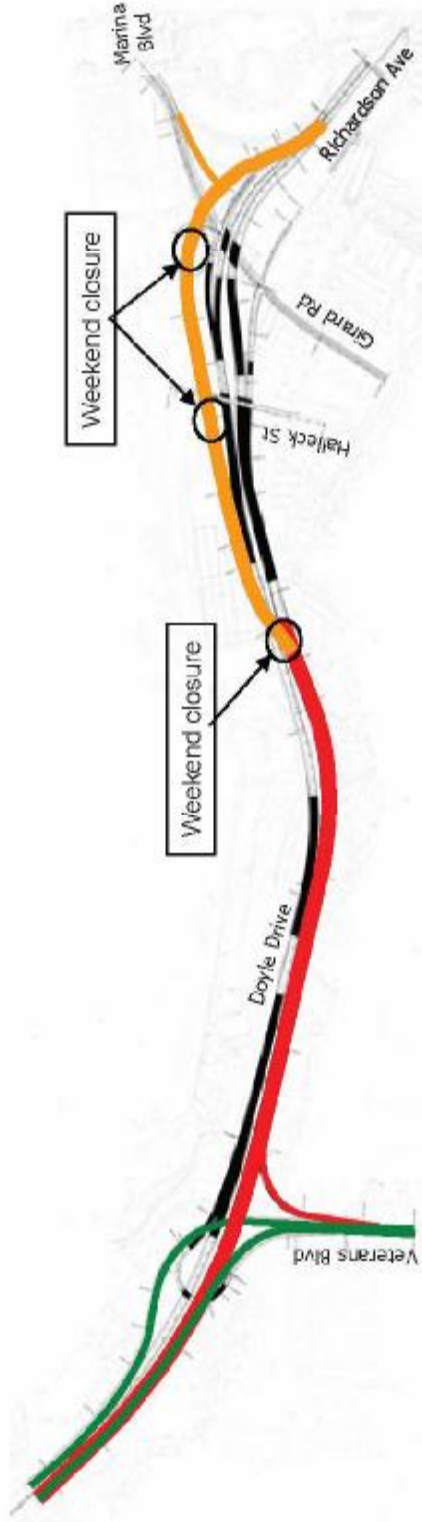
Construct off-line portions of northbound (NB) and SB DD at-grade alignment. Widen NB and SB DD at the Park Presidio Interchange. Construct ramp from existing NB Veterans Blvd (VB) to future NB DD. Construct ramp from existing SB Doyle Drive to SB VB. Construct at-grade connection to Marina Blvd with traffic signal. Widen SB DD east of National Cemetery to accommodate detour traffic.

Detours:

Close Lincoln Blvd from the National Cemetery to building 106 and divert traffic via Washington Ave. Close NB VB to SB DD ramp for a 6 month duration and divert traffic via Geary Blvd and Van Ness Ave.



**Exhibit 2-47**  
**Preferred Alternative**  
**Construction Staging – Stage One Transition, Full Weekend Closure**



- Legend:**
- █ Permanent Construction
  - █ Temporary Construction
  - █ Open to Traffic

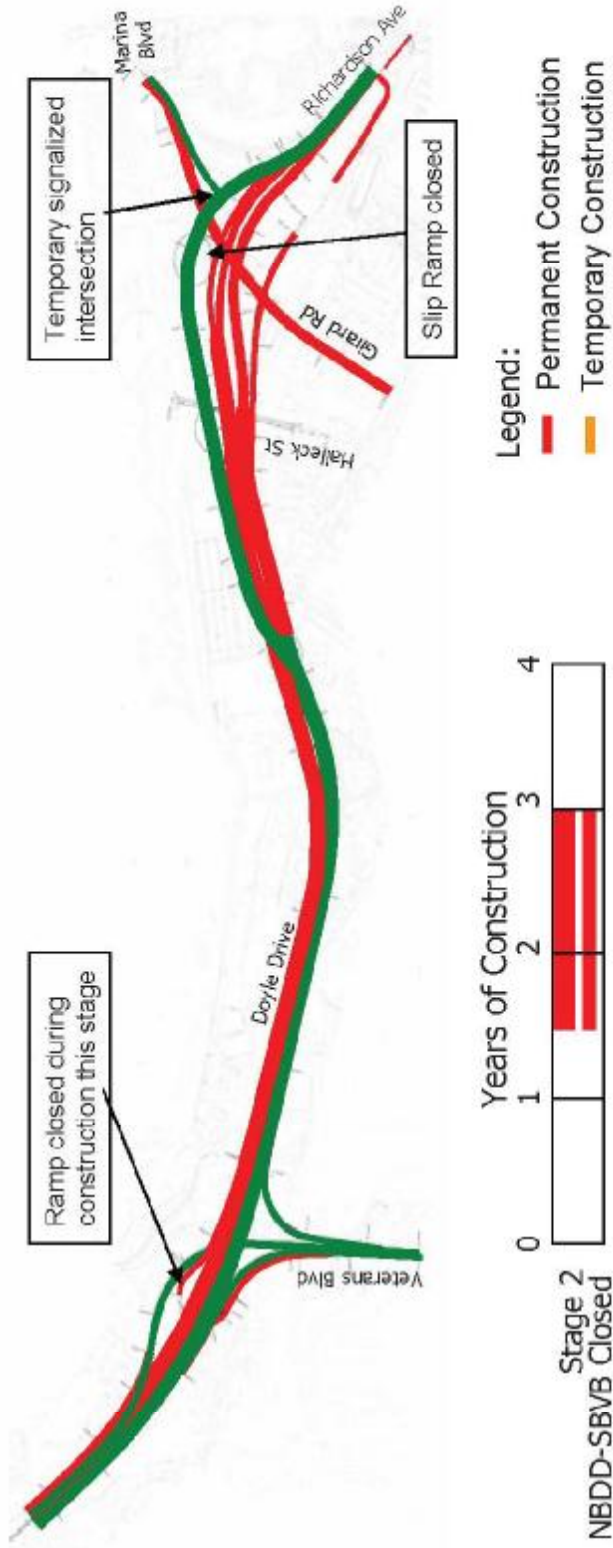
Permanent Construction:  
 Remove portion of existing DD and Richardson Ramps conflicting with at-grade temporary roadway. Construct portion of SB DD.

Temporary Construction:  
 Complete NB and SB DD at-grade temporary roadway and cross-over section.

Detours:  
 Close DD east of Park Presidio Interchange and detour traffic via SB and NB VB, Geary Blvd and Van Ness Ave.



**Exhibit 2-48**  
**Preferred Alternative**  
**Construction Staging – Stage Two**



Permanent Construction:

Remove remaining DD east of Park Presidio Interchange. Construct portion of NB DD west and east of the Park Presidio Interchange and NB Battery tunnel. Construct NB and SB DD Main Post. Tunnels. Construct Girard Rd to Marina Blvd connection. Complete construction of Girard Rd interchange. Complete construction of the NB DD to SB VB ramp. Remove temporary SB DD ramp to SB VB. Remove temporary ramp from existing NB VB to future NB DD. Remove temporary widening on DD west of Park Presidio Interchange. Shift traffic to permanent ramp from NB VB to NB DD and to permanent ramp from SB DD to SB VB.

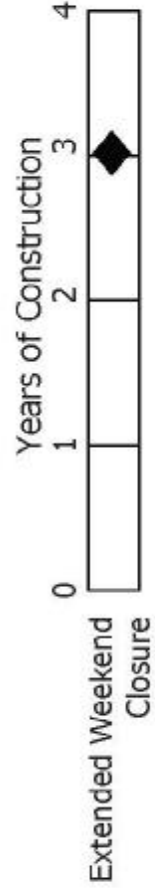
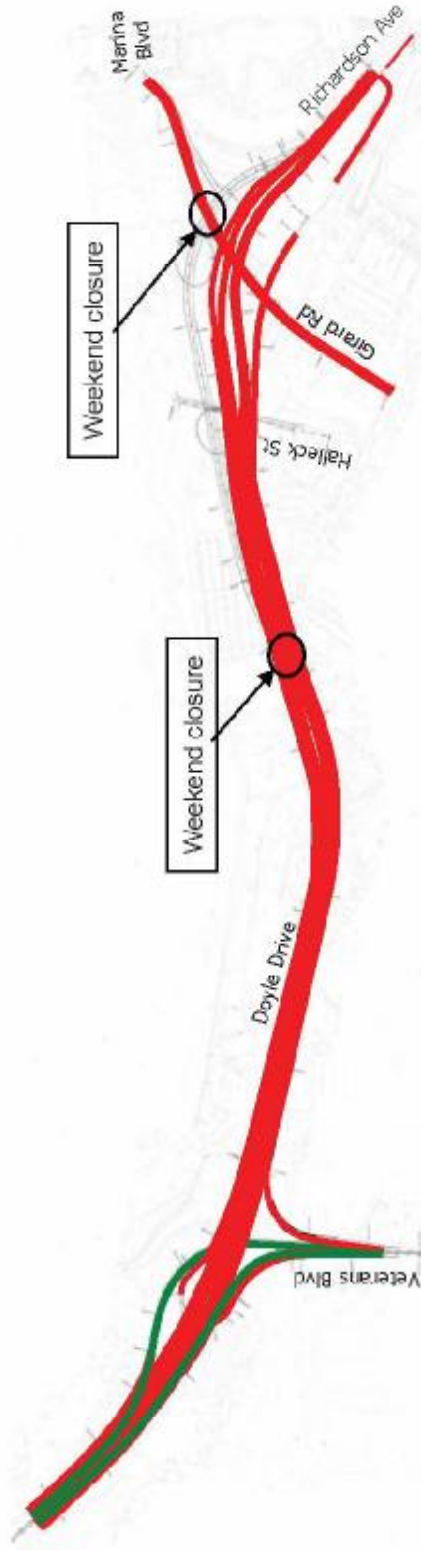
Detours:

Divert NB and SB DD traffic onto permanent SB DD and temporary at-grade roadway. Divert NB and SB Marina traffic onto temporary Marina connection. Divert Halleck St traffic via Lincoln Blvd, McDowell Ave and Mason St. Close existing NB DD to SB VB and detour traffic via Van Ness Ave and Geary Blvd.





**Exhibit 2-49**  
**Preferred Alternative**  
**Construction Staging – Stage Two Transition, Full Weekend Closure**

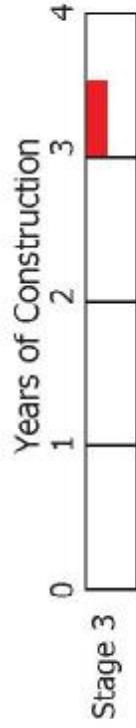
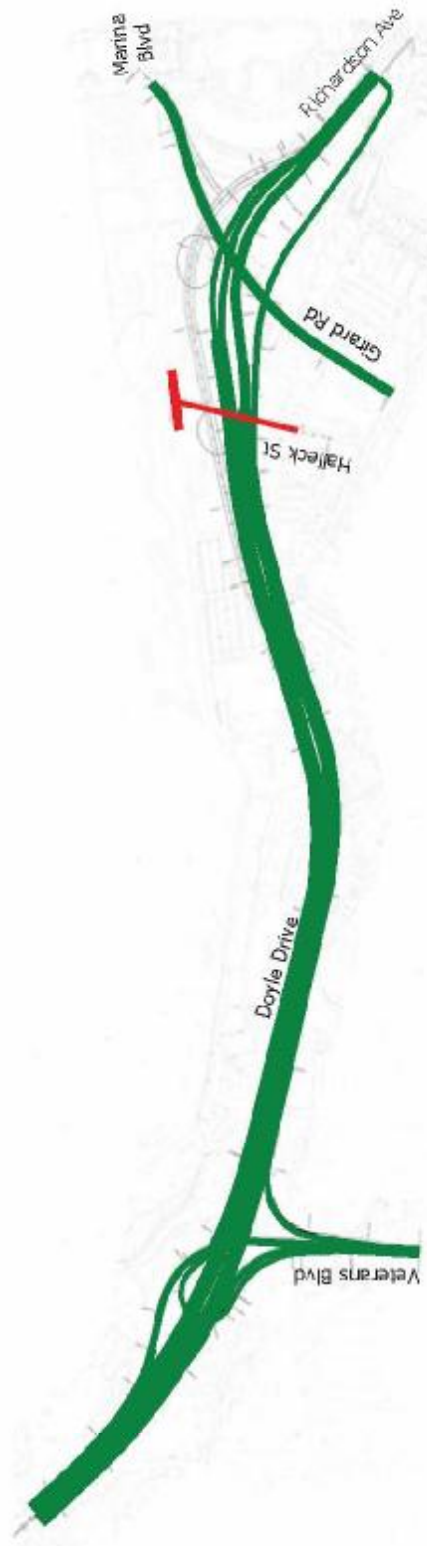


Permanent Construction:  
 Complete construction of permanent DD and Girard Rd connection to Marina Blvd.

Detours:  
 Close DD east of Park Presidio Interchange and detour traffic via SB and NB VB, Geary Blvd and Van Ness Ave.



**Exhibit 2-50  
Preferred Alternative  
Construction Staging – Stage Three**



**Legend:**

- █ Permanent Construction
- █ Temporary Construction
- █ Open to Traffic

Permanent Construction:

Remove SB DD temporary widening at Park Presidio Interchange and the temporary at-grade roadway. Remove temporary Marina connection. Construct Hallett St and complete grading over Main Post tunnels. Open permanent DD, NB DD to SB VB ramp and Grand Rd interchange to traffic. Construct parking area and access roads west of Palace of Fine Arts.

Detours:

Close Lincoln Blvd for bridge removal over roadway and detour traffic via McDowell to Crissy Field Ave to Lincoln and via Storey to Ruckman to Lincoln. Close NB Veterans Blvd for bridge removal over roadway and detour traffic via Geary Blvd to Van Ness Ave to Lombard St. to NB Doyle Drive.

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## 2.9.2 Construction Methods

The Preferred Alternative will involve standard construction techniques and require large-scale construction equipment and labor-intensive activities. General activities will include:

- mobilization, clearing of vegetation and removal of existing facilities;
- excavation, grading, stockpiling of rock and soil;
- installation of temporary works such as excavation shoring, temporary supports, falsework and formwork; and
- foundation installation, roadway construction, placement of reinforced concrete, erection of structural steel and precast concrete, fill placement and compaction, landscaping, and demobilization.

Equipment will include concrete saws, concrete breakers and impact hammers, pile drilling and driving rigs, pile hammers, vibratory hammers, bentonite mixing and processing equipment, earth moving equipment, cranes, hydraulic jacks, on-site concrete batching plant, concrete trucks, well-point pumps, and material delivery trucks. Driven piles will only be used in locations where there will be no potential damage to historic structures. Field vibration testing will be conducted during final design to determine the allowable proximity of pile driving to sensitive structures. Quieter operations are achievable by using technologies such as mufflers and other types of noise dampers attached to equipment. Moreover, quiet pile installation technologies were investigated, including the more common vibratory hammer and also a relatively new technology known as the “Silent-Piler”. The Silent-Piler uses the “press-in” method which proved to be very promising and may also be considered for use on the project.

Methods used to construct foundations, tunnels, depressed sections, and retaining walls will include the use of: sheet-piles, tie-back walls, soldier pile walls, cut-off walls (secant pile and diaphragm walls), cast-in-drilled-hole (CIDH) concrete piles, and the similar cast-in-steel-shell (CISS) concrete piles, which differ in that the steel shell that supports the hole will remain as part of the pile structure. Piling will be installed in rock and soil; some locations would require drilling, driving and a combination of the two.

General methods used to construct aerial structures will include the use of; cast-in-place post-tensioned (CIP/PS) concrete, structural steel erection, pre-cast pre-stressed concrete (PC/PS) erection. Specialized overhead construction techniques and special falsework were considered to minimize ground disturbance.

CIDH and slurry walls will use bentonite slurry to maintain the shape of excavations. Bentonite processing plants are typically self contained units located at excavation sites which produce low risk clay slurry (bentonite).

Selection of methods will depend on the type of structure selected during final design and will take into account cost, feasibility of construction, the

construction marketplace, natural environment, and avoidance of cultural resources.

### *Aerial Superstructures and Substructures*

There are several superstructure types under consideration for the aerial structures: the CIP/PS box girder, steel tubular deck truss, steel bolted deck truss steel plate girder and CIP/PS composite box-girder with truss laterals.

The CIP/PS conventional box-girder design is standard in California and requires shorter spans and therefore more support columns. The other structure types allow for longer spans of up to 80 meters (262 feet)

The structure types being considered at various locations along the facility are:

- *Park Presidio Interchange Area.* The structures in this area include a CIP/PS slab viaduct carrying Route 1 and a CIP concrete “U” section ramp that is a closed box passing under Doyle Drive.
- *Highb-Viaduct and Access Ramps.* The superstructure types being considered are: the CIP/PS box girder, steel tubular deck truss, steel bolted deck truss, steel plate girder and CIP/PS composite box-girder with truss laterals.
- *Eastern Bluff at the Battery.* Cut-and-cover CIP concrete tunnel.
- *Main Post Area.* Retaining wall and covered CIP concrete tunnel supported on piles.
- *Tennessee Hollow and Girard Road Area.* The structures in this area include a CIP/PS slab “causeway”, CIP concrete “U” section supported on piles and installed using cut-off walls, retaining walls and a simple span CIP/PS bridge.

Aerial structure foundations will most likely be CIDH or CISS piles approximately 20 meters (65 feet) long and 0.9 to 1.2 meters (3 to 4 feet) in diameter. The installation of piles will require either drilling a hole to a pre-determined depth or driving a casing and removing the soil. A rebar support cage will then be lowered into the center of the hole or casing and concrete poured in, forming the pile. Depending on groundwater levels, full-length casings may be required but if not, the hole will be filled with bentonite slurry to stabilize the walls. This will require a bentonite processing plant on-site to process displaced bentonite as concrete is poured. The slurry will be displaced from the hole as the concrete is placed from a concrete pump truck using concrete delivered from mix trucks or from an on-site plant.

### *Tunnels*

The tunnels will be constructed using the cut-and-cover method. The typical sequence for construction will include:

- excavation to the necessary length and depth;
- installation of required substructures and ground water conveyance systems, and if necessary, installation of waterproof membrane;
- pouring of concrete for the base slabs, walls, and the roof;

- covering the top and sides of the tunnel with a waterproofing membrane; and
- backfilling over the top of the tunnel to create the approved topography.

Because of potential hydrological and biological sensitivity at the eastern bluffs north of the San Francisco National Cemetery, between McDowell Avenue to the west and the eastern edge of the cemetery to the east, further hydrogeologic investigations will be conducted before final design to determine the hydrogeology and extent of groundwater flow. A water transfer concept has been developed that, if necessary, can transfer groundwater around the tunnel without allowing longitudinal flow along the exterior of the concrete walls to maintain wetland vegetation on the northern bluff face. The concept includes high-permeability strip drains to intercept groundwater on the upstream (south) side of the tunnel and transport it around the outside of the tunnel to locations on the downstream (north) side of the tunnel. As part of final design, careful evaluation of subsurface conditions will be undertaken for design and installation of a hydrologic conveyance system.

At the closest point at the National Cemetery, the limit of the tunnel structure will be one meter (three feet) north of the National Cemetery fence line. No tiebacks will be used in this area. However, if necessary a rigid shoring system will be incorporated into the final tunnel wall and designed to minimize any ground movement and avoid the cemetery.

### *Earthwork*

It is anticipated that material excavated during construction of the tunnels will be suitable for reuse as fill in the project corridor. Under the Preferred Alternative, approximately 211,000 cubic meters (276,000 cubic yards) will be excavated and returned as fill. It is estimated that there will be an excess of approximately 207,000 cubic meters (271,00 cubic yards) of material for off-site disposal (see **Exhibit 2-37** presented earlier in this chapter). For reuse of excavated soils in the project corridor, the Trust's thresholds for soil contaminants will be followed.

### *Bridge Removal*

The steel deck truss at the Presidio (High) Viaduct will be removed from the top down within its footprint. The reinforced concrete and steel stringer approaches will be removed similarly. The deck will be removed first, followed by removal of the steel pieces by flame cutting the steel into manageable pieces. Concrete substructures will be removed using breakers. Debris will be sorted and piled and then removed. Dust will be controlled using appropriate dust control measures.

The cast-in-place Marina (Low) Viaduct will generally be removed using breakers. In the areas where vibrations must be controlled, sections will be saw-cut into manageable pieces and lifted onto trucks for breakup in another location. The construction staging requires two extended weekend closures



which will accelerate removal activities in three locations and will require a greater number of equipment pieces and personnel to be employed. The spoils of this activity will be located adjacent to the detour route where final break-up and debris sorting and removal would take place.

### *Detours*

The Preferred Alternative will divert Doyle Drive traffic in the vicinity of the low-viaduct to the north of the existing facility by using an at-grade roadway. A crossover will be built in the vicinity of the Sports Basement (Building 610) and will connect the detour to the partially completed southbound Doyle Drive alignment. The new construction sequence will require two complete weekend shut downs of Doyle Drive. The connections between the Golden Gate Bridge and Veterans Boulevard will remain open during these weekends and additional bus and ferry service would be provided. The first closure will be required to build the crossover. The second closure will be required to demolish the crossover and switch the traffic onto the new Doyle Drive alignment. Prior to the weekend closure, extensive public outreach will be implemented to inform the public of the closure activities. During detailed design the *Transportation Management Plan* (TMP) will be developed in more detail and focus on:

- Disseminating project information to the public through press releases, telephone hotlines, and websites.
- Coordinating with transit agencies to increase service connecting Marin County with the Presidio and Marina District.
- Developing a contingency plan to address specific actions that will be taken to restore or minimize effects on traffic when congestion or delay exceeds original demand estimates due to unforeseen events.

There are typically six components of a TMP: Public Information, Motorist Information, Incident Management, Construction Strategies, Demand Management Strategies, and Alternate Route Strategies. The development of a detailed TMP for the Doyle Drive Project will investigate and consider all of these components. Doyle Drive is a major commuter route and also a popular scenic route. It is therefore critical to implement a TMP that minimizes disruption to commuter traffic, as well as to users of the Park and the Presidio. See **Appendix K** for the Draft TMP.

The proposed temporary roadway will accommodate a total of five lanes of traffic with a moveable barrier separating northbound and southbound Doyle Drive to accommodate peak direction traffic in the morning and in the afternoon. The new detour scheme will allow the entire Main Post tunnel to be constructed off-line and thereby maximize construction efficiency and minimize disruption to the traveling public.

### 2.9.3 Construction Timing

The preliminary construction staging assumes that a typical construction schedule will be used for the Doyle Drive Project. This will include the scheduling of some activities during hours of low traffic volumes. Low traffic volumes occur on Doyle Drive at night, and on local roads during the middle of the day as well as at night. The purpose of scheduling activities during these hours is to ensure that roadways (in the construction area) are open during the peak traffic times to minimize traffic disruption. The types of construction activities that will likely occur in the hours of low traffic volumes are:

- erection/removal of falsework to permit construction overhead;
- erection/removal of temporary shielding to permit demolition overhead; and
- demolition of structures over minor roads.

Construction activities will consider and mitigate impacts to wildlife within the corridor. Discussion of temporary impacts to wildlife is described in Section 3.4.4.

### 2.9.4 Temporary Roadway Closures

To accommodate the construction staging for the Preferred Alternative there will need to be planned, short duration closures of the mainline, ramps and local roads. These closures will occur during low traffic volume hours (short-term closure) to minimize impacts to traffic.

#### *Short-term Full Roadway Closure - Doyle Drive*

The construction of the Preferred Alternative requires the construction of a temporary at-grade roadway. To transfer traffic on to the at-grade roadway, a crossover would be built in the vicinity of the Sports Basement retail location (Building 610) and would connect the detour to the partially completed southbound Doyle Drive alignment. The construction sequence would require two complete weekend closures of Doyle Drive. The first closure, marking the end of Stage One of construction, would be required to build the crossover to maintain traffic in Stage Two. The second closure, occurring at the end of the second stage of construction, would be required to remove the crossover and switch traffic onto the new Doyle Drive alignment. The proposed temporary roadway would accommodate a total of five lanes of traffic, with a moveable barrier separating northbound and southbound traffic to accommodate peak direction southbound traffic in the morning and northbound in the afternoon. The planned detours would allow the entire Main Post tunnel and Girard Road Interchange to be constructed in one stage, thereby maximizing construction efficiency and minimizing disruption to the traveling public. During Stage Two of the construction of the Preferred Alternative, the Marina Boulevard access would be maintained by a temporary signalized intersection. This would allow southbound Doyle Drive traffic to cross the northbound Richardson Avenue roadway at an at-grade signalized intersection and connect to Marina Boulevard.

Southbound Doyle Drive traffic to Richardson Avenue and westbound Marina Boulevard traffic would be uninterrupted by the signal.

**Exhibit 2-51** depicts the anticipated short-term closures and associated construction activities based on the conceptual staging plans developed for this project. In addition, lane closures will be required to erect overhead signs needed for the project. The type and location of signs will be determined during the final design phase.

## 2.9.5 Long-Term Roadway Closures

The conceptual staging plans also identified the need for long-term closure (greater than one month) for some ramps and local roads. Early in the project, one traffic detour will involve the rerouting of internal Presidio traffic. During the initial stages of construction, Lincoln Boulevard near the National Cemetery is proposed for closure for a three month period. During this time, local traffic will be diverted to Halleck, Mason and McDowell Streets. Another traffic detour will be required when Halleck Street is closed for about a two year period. Halleck Street attracts less than 100 vehicles in each direction at peak hour, so congestion impacts are not anticipated. Impacts to bicyclists and pedestrians will be mitigated by a replacement path connecting Lincoln Boulevard and Mason Street. There will also be two ramps proposed for closure. These are the ramps that connect Veterans Boulevard northbound to Doyle Drive southbound, and Doyle Drive northbound to Veterans Boulevard southbound. It is anticipated that the closure of Veterans Boulevard northbound to Doyle Drive southbound will last between 6 and 12 months and Doyle Drive northbound to Veterans Boulevard southbound ramp will likely be closed for up to 18 months. Some drivers will make their trips on other local streets through the Richmond District, Laurel Heights area, Presidio Heights area, Cow Hollow District, and Marina District. Other drivers will travel up Veterans Boulevard and cut through the Golden Gate Bridge Toll Plaza Visitors' area to continue their trip. Traffic operations for the Toll Plaza area and other local streets will be monitored and maintained as described in the Draft TMP.

**Exhibit 2-52** on the following page depicts the long-term closures and associated construction activities. Long-term closures will be phased to maintain major regional movements at all times.

More information regarding anticipated roadway closures is provided in the Draft TMP developed for this Doyle Drive Project (see **Appendix K**).

**Exhibit 2-51**  
**Short-Term Roadway Closures During Construction:**  
**Low Traffic Volume Hours**

LOCATION OF CLOSURE	PURPOSE OF CLOSURE
Full Weekend Closure Doyle Drive	Construct Temporary Cross-over
Full Weekend Closure Doyle Drive	Remove Temporary Cross-over
Northbound Veterans Boulevard to Northbound Doyle Drive	Temporary Bridge Construction and Removal/Bridge Removal/Falsework
Northbound Doyle Drive to Southbound Veterans Boulevard	Bridge Removal/Falsework
Lincoln Boulevard. at Park Presidio Interchange	Falsework
Crissy Field Avenue	Bridge Removal/Falsework
McDowell Road	Falsework

**Exhibit 2-52**  
**Long-Term Roadway Closures**

LOCATION OF CLOSURE	PURPOSE OF CLOSURE	DURATION OF CLOSURE
Northbound Doyle Drive to Southbound Veterans Boulevard	Ramp Reconstruction	18 months
Northbound Veterans Boulevard to Southbound Doyle Drive	Ramp Reconstruction	6 – 12 months
Lincoln Boulevard	Mainline Doyle Drive Construction	6 months
Halleck Street	Mainline Doyle Drive Construction and Road Reconstruction	24 months
Javowitz Street	Located Within Detour Alignment	24 months

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