APPENDIX E — *Long Form - Storm Water Data Report*

Caltrans Metric

Dist-County-Route 04-SF-101, 04-SF-001
Kilometer Post (Post Mile) Limits KP12.8-15.7 (PM 8.0-9.8)
KP10.9-11.4 (PM 6.8-7.1)

Project Type
EA: 163700
RU: 04242
Program Identification: HE 12
Phase: ☐ PID ☒ PA/ED ☐ PS&E

Regional Water Quality Control Board(s): San Francisco Bay

Is the project required to consider incorporating Treatment BMPs? Yes ☒ No ☐

If yes, can Treatment BMPs be incorporated into the project? Yes ☒ No ☐

If No, a Technical Data Report must be submitted to the RWQCB at least 30 days prior to Advertisement. List submittal date: _____

Total Disturbed Soil Area: Alternative 2: Replace and Widen = 13 ha (32 ac)
Alternative 5: Parkway = 17 ha (42 ac)

Estimated: Construction Start Date: 2009 Construction Completion Date: 2013

Notification of Construction (NOC) Date to be submitted: 30 Days Prior to Construction Start Date

Notification of ADL reuse (if Yes, provide date) Yes ☒ Date _____ No ☐
See SWDR Text Section 2.1 Regarding Possible Reuse

Separate Dewatering Permit (if Yes, permit number) Yes ☒ Permit # _____ No ☐
Permit no. not obtained yet. Type of permit required will depend on method of groundwater disposal during construction.

This Report has been prepared under the direction of the following Licensed Person. The Licensed Person attests to the technical information contained herein and the data upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E.

[Signature] 3/20/2006
[Name], Registered Project Engineer/Landscape Architect *Date*

I have reviewed the storm water quality design issues and find this report to be complete, current, and accurate:

[Signature] 3/21/06
Nidal Tuqan, Project Manager *Date*

Robert W. Bragg 3/24/06
Bob Bragg, Designated Maintenance Representative *Date*

Kathleen Forkner 4/6/06
Ofer Brender, Designated Erosion Control Representative *Date*

Analette Ochoa 4/6/06
Analette Ochoa, District/Regional SW Coordinator or Designee *Date*

STAMP
[Required for PS&E only]

APPENDIX E

Evaluation Documentation Form

DATE: Jan 2006

See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPS EA: 163700

NO.	CRITERIA	YES ✓	NO ✓	SUPPLEMENTAL INFORMATION FOR EXEMPTION
1.	Begin Project Evaluation regarding requirement for consideration of Treatment BMPs	√		Go to 2
2.	Is this an emergency or Safety project?		√	If **Yes**, go to 12. (Safety Projects must be funded from the 010 SHOPP Program). If **No**, continue to 3.
3.	Have TMDLs been established for surface waters within the project limits?		√	If **Yes**, contact the District/Regional NPDES coordinator to discuss the Department's participation in the TMDL (if Applicable), go to 11 or 4 (as determined by the NPDES Coordinator). _____ *(Dist./Reg. SW Coordinator initials)* If **No**, continue to 4.
4.	Is the project within an urban MS4?	√		If **Yes**, continue to 5. *San Francisco* If **No**, go to 12.
5.	Is the project directly or indirectly discharging to surface waters?	√		If **Yes**, continue to 6. If **No**, go to 12.
6.	Is it a new facility or major reconstruction?	√		If **Yes**, continue to 8. If **No**, go to 7.
7.	Will there be a change in line/grade or hydraulic capacity?	√		If **Yes**, continue to 8. If **No**, go to 10.
8.	Is the Disturbed Soil Area (DSA) created by the project greater than or equal to 1.2 hectares?	√		If **Yes**, continue to 11. If **No**, go to 9. *Alternative 2: 13 Hectares, Alternative 5: 17 Hectares*
9.	Is the project part of a Common Plan of Development?			If **Yes**, continue to 11. If **No**, go to 10.
10.	Are there any Pollution Control Requirements within the project limits? *(Contact your Dist./Reg. SW Coordinator)*			If **Yes**, continue to 11. If **No**, go to 12.
11.	Consider approved Treatment BMPs for the project.	√	See Sections 2.4 and either Section 5.5 or 6.5 for BMP Evaluation and Selection Process. Complete Checklist T-1 in this Appendix E.	
12.	Project is not required to consider Treatment BMPs. AV *(Dist./Reg. SW Coord. Initials)* _____ *(Project Engineer Initials)* 4/6/07 *(Date)*		Document for Project Files by completing this form, and attaching it to the SWDR.	
13	End of checklist	√		

1. Project Description

Project Background and Engineering Features

Doyle Drive is the southern approach of US 101 to the Golden Gate Bridge in San Francisco. It is 2.4 kilometers (1.5 miles) long with six traffic lanes. This project consists of Doyle Drive and the three San Francisco approach ramps which connect to Doyle Drive: one beginning at the intersection of Marina Boulevard and Lyon Street; one at the intersection of Richardson Avenue and Lyon Street; and one where Veterans Boulevard (State Route 1) merges into Doyle Drive approximately 1.6 kilometers (one mile) west of the Marina Boulevard approach.

It is proposed to construct a new roadway to replace the existing six-lane Doyle Drive portion of Route 101 in order to improve the seismic, structural, and traffic safety of the roadway within the setting and context of the Presidio of San Francisco and its purpose as a National Park. The new facility would include six through lanes and an auxiliary lane. The project limits are from Merchant Road, just south of the Golden Gate Bridge Toll Plaza, to the intersections of Richardson Avenue/Francisco Street and Marina Boulevard/Lyon Street. This project is currently in the planning and environmental study phase.

There are three alternatives under consideration, including a No-Build alternative. A brief description of each alternative is given below.

Alternative 1 – No-Build

The No-Build Alternative provides the baseline for existing environmental conditions and future travel conditions against which all other alternatives are compared. Doyle Drive would remain in its current configuration, with six traffic lanes ranging in width from 2.9 to 3.0 meters (9.5 to 10 feet) and an overall facility width of 20.4 meters (67 feet). There are no fixed median barriers or shoulders. The facility passes through the Presidio on a high steel truss viaduct and a low elevated concrete viaduct with lengths of 463 meters (1,519 feet) and 1,137 meters (3,730 feet), respectively. This alternative does not improve the seismic, structural, or traffic safety of the roadway.

Alternative 2 – Replace and Widen

The Replace and Widen Alternative would replace the 463-meter (1,519-foot) long high-viaduct and the 1,137-meter (3,730-foot) long low-viaduct with wider structures that meet the most current seismic and structural design standards. The height of the high-viaduct would vary from twenty to 35 meters (66 to 115 feet) above the ground surface. The low-viaduct would have an average height of approximately ten meters (33 feet) for the No Detour Option and approximately eight meters (26 feet) for the Detour Option. The new facility would be replaced on the existing alignment and widened to incorporate improvements for increased traffic safety. The new facility would have an overall width of 38.0 meters (124 feet). At the Park Presidio interchange, the two ramps connecting eastbound Doyle Drive to Veterans Boulevard and the ramp connecting westbound Doyle Drive to southbound Veterans Boulevard would be reconfigured to accommodate the wider facility. The Replace and Widen Alternative would operate similar to the existing facility except that there would be a median barrier and shoulders to accommodate disabled vehicles. The Replace and Widen Alternative includes two options for the construction staging:

No Detour Option – The widened portion of the new facility would be constructed on both sides and above the existing low-viaduct and would maintain traffic on the existing structure. Traffic would be incrementally shifted to the new facility as it is widened over the top of the existing structure. Once all traffic is on the new structure, the existing structure would be demolished and the new portions of the facility would be connected. To allow for the construction staging using the existing facility, the new low-viaduct would be constructed two meters (six feet) higher than the existing low-viaduct structure.

With Detour Option - A 20.4-meter (67-foot) wide temporary detour facility would be constructed to the north of the existing Doyle Drive to maintain traffic through the construction period. Access to Marina Boulevard during construction would be maintained on an elevated temporary structure south of Mason Street. On and off ramps for the mainline detour facility would connect to existing Marina Boulevard/Lyon Street intersection.

Alternative 5 – Presidio Parkway Alternative

The Presidio Parkway Alternative would replace the existing facility with a new six-lane facility and an eastbound auxiliary lane, between the Park Presidio interchange and the new Presidio access at Girard Road. The new facility would consist of two 3.3-meter (11 foot) lanes and one 3.6-meter (12 foot) outside lane in each direction with 3.0-meter outside shoulders and 1.2-meter inside shoulders. The width of the proposed landscaped median varies from 5.0 meters (16 feet) to 12.5 meters (41 feet). To minimize impacts to the park, the footprint of the new facility would include a large portion of the existing facility's footprint east of the Park Presidio interchange. A 450-meter (1,476-foot) long high-viaduct would be constructed between the Park Presidio interchange and the San Francisco National Cemetery. The height of the high-viaduct would vary from twenty to 35 meters (66 to 115 feet) above the ground surface. Shallow cut-and-cover tunnels would extend 240 meters (787 feet) past the cemetery to east of Battery Blaney. The facility would then continue towards the Main Post in an open depressed roadway with a wide heavily landscaped median. From Building 106 (Band Barracks) cut-and-cover tunnels up to 310 meters long (984 feet) would extend to east of Halleck Street. The expected minimum depth is two meters (6 feet). The facility would then rise slightly on a low level causeway 160 meters (525 feet) long over the site of the proposed Tennessee Hollow restoration and a depressed Girard Road. The low causeway would rise to approximately four meters (13 feet) above the surrounding ground surface at its highest point. East of Girard Road the facility would return to existing grade north of the Gorgas warehouses and connect to Richardson Avenue. The proposed facility would provide a transition zone starting from the Main Post tunnel to reduce vehicle speeds prior to entering city streets.

The Park Presidio interchange would be reconfigured due to the realignment of Doyle Drive to the south. The exit ramp from eastbound Doyle Drive to southbound Veterans Boulevard would be replaced with standard exit ramp geometry and widened to two lanes. The loop of the westbound Doyle Drive exit ramp to southbound Veterans Boulevard would be improved to provide standard exit ramp geometry. The northbound Veterans Boulevard connection to westbound Doyle Drive would be realigned to provide standard entrance ramp geometry. The two options for the northbound Veterans Boulevard ramp to an eastbound Doyle Drive connection are the Loop Ramp Option and the Hook Ramp Option. The two options for direct access to the Presidio and Marina Boulevard at the eastern end of the project include the Diamond Option and the Circle

Drive Option. In addition, the Merchant Road Option would include a slip ramp connecting westbound Doyle Drive to Merchant Road, just east of the toll plaza. The Draft Project Report (June 2005) provides more details on the various options.

Disturbed Soil Area (DSA)

The total disturbed soil area for Alternative 2 is 13 hectares. The total disturbed soil area for Alternative 5 is 17 hectares. These areas were calculated by taking the total footprint of the project and adding a 3m allowable construction envelope around its perimeter.

Urban MS4 Areas

This project is under the San Francisco MS4 area.

Project Cost

Attachment C – Project Cost shows the PA/ED level cost estimate for the different alternatives considered in this project.

2. Define Site Data and Storm Water Quality Design Issues (refer to Checklists SW-1, SW-2, and SW-3)

Receiving Water Bodies

The San Francisco Bay is the receiving water body for this project. The watershed that drains to the San Francisco Bay is known as the San Francisco Bay watershed. There are 14 drainage basins within this watershed and the Doyle Drive alignment either crosses or passes near each of the 14 drainage basins. The average distance between the Doyle Drive and the San Francisco Bay is approximately 300m.

The San Francisco Bay is on the 303(d) list of impaired water bodies. Pollutants of concern include: Chlordane, DDT, Diazinon, Dieldrin, Dioxin Compounds, Exotic Species, Furan Compounds, Mercury, PCBs, PCBs (dioxin-like), and Selenium. A Water Quality Certification (401) will be completed during the PS&E phase of the project.

Existing beneficial uses of the groundwater aquifer underlying the site (characterized as part of the San Francisco Sand Dune Area) include municipal and agricultural supply with industrial process and service water supply as potential beneficial uses.

Project Design Considerations

Climate

The climate of the San Francisco waterfront area is characterized as dry-summer subtropical (often referred to as Mediterranean). Two types of Mediterranean climate are recognized and are based primarily on summertime temperatures. San Francisco is an example of the "cool summer" type where cool temperatures on a windward coast are further cooled by cold ocean currents. Rainy season is from October 15th-April 15th.

Topography/Soil/Geology

Topography within the Presidio is variable, ranging from the relatively flat coastal plain near sea level along the western and northern shorelines to approximately 120 meters (400 feet) in the south-central hilly uplands. The western coastal area is characterized

by steep rocky bedrock slopes and outcrops of Franciscan Assemblage rocks, including sandstone, shale, chert, and serpentinite. The inland portions of the site consist mainly of gently sloping hills, with several relatively large flat areas in the eastern portion of the site where most of the Presidio buildings are located. Overburden soils include artificial fill, colluvium, beach and dune sand, bay mud, and sand/clay from the Colma Formation.

Groundwater

Groundwater occurs in the geologic materials underlying the site. The quantity and quality of groundwater are highly dependent on the type and thickness and configuration of the geologic materials present. In addition, the historic land uses within the Presidio (including placement of artificial fill and releases of hazardous substances) have affected groundwater quality in some areas. Groundwater occurs in both the bedrock and overlying unconsolidated sediments and fill. Groundwater also occurs in the overlying unconsolidated sediments, at depths ranging from near the surface (at El Polin spring) to greater than 15 meters (50 feet) below the surface in the hilly uplands. It is expected that the uppermost groundwater is unconfined, that is, the upper water table surface is free to move up or down and is not confined by a low permeability layer (e.g., clay or silt).

Slope Stabilization

The proposed alignment will focus on using retaining walls rather than cut/fill slopes to minimize right-of-way impacts. For Alternative 5, backfilled slopes above the tunnel box structures should not exceed a slope of 1 (vertical) on 2 (horizontal). To satisfy Caltrans standard, 1:4 slopes or flatter should be achieved where possible. The slopes should be constructed of compacted granular soils with clay contents not exceeding 10 percent – subsurface information indicates availability of suitable material onsite. The recommended slope is judged to be reasonable for the proposed fill material and with current standard practice. The slope surfaces should be at least one meter (3.3 feet) above the top of the tunnel and should be vegetated to blend in with the surroundings and irrigated. The vegetation, once mature, will further enhance the stability of the slopes. The steeper slopes along the project route and vicinity are all natural slopes, generally underlain by rock or competent soil.

Right-of-Way

The project is located on federal land in the Presidio of San Francisco within the GGNRA, and as such, Caltrans does not own the right of way associated with the facility. Caltrans owns and maintains Doyle Drive within a right of way permit originally granted by the Army that is now under the jurisdiction of the Trust. The right of way permit varies between 18.3 and 24.4 meters (60 and 80 feet). It is assumed that Caltrans would quit claim all rights under the existing permit and obtain a new right of way interest through FHWA, pursuant to FHWA's authority under 23 USC 317, as a Federal Land Transfer. The details of this transfer would be subject to negotiation with the Trust, the land managers of Area B, and Caltrans once a preferred alternative is selected. The existing easement for Doyle Drive occupies approximately 9.5 hectares (22 acres) within the Presidio. Alternative 2, Replace and Widen would replace the existing structures in a similar location and Alternative 5, Presidio Parkway would remove and replace the existing structures with a combination of new structures and tunnels. The land above the tunnels constructed with the Parkway Alternative, although part of the permanent easements, would become available for recreational purposes following construction.

Aerially Deposited Lead (ADL)

There is a potential for aerially-deposited lead from vehicle exhausts to be present in shallow soils near Doyle Drive. If present, soils near Doyle Drive could be classified as a hazardous waste, once excavated, and special soil management and disposal and/or construction worker health and safety measures may be required during project construction. Beneath and adjacent to the viaduct portions of Doyle Drive, lead in shallow soils is also present as a result of historic sandblasting of lead-based paint on the viaduct structures during maintenance procedures. The volume of lead-contaminated soils has not been determined, and will depend on the build alternative chosen as well as the reuse thresholds established for the project. Testing for ADL will be completed during the PS&E phase of the project and mitigation measures will be proposed as necessary. The ADL variance may be invoked. ADL contaminated soil may be reused outside the GGNRA (Golden Gate National Recreation Area) or other national parkland boundaries within another Caltrans project along the Route 101 corridor.

Right-of-Way Costs for BMPs

Proposed BMPs will be placed within project right-of-way and no additional right-of-way will be required for BMP purposes.

RWQCB Special Requirements/TDMLs and Effluent Limits

The Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, has a policy of no-net-loss of wetlands in effect and typically requires mitigation for all impacts to wetlands before it will issue a water quality certification. Dredging, filling, or excavation of isolated waters constitutes a discharge of waste to waters of the State, and prospective dischargers are required to submit a report of waste discharge to the RWQCB and comply with other requirements of the state's Porter-Cologne Act. There are no TDMLs or effluent limits.

Land Use

A number of buildings and complexes line Doyle Drive, primarily east of Park Presidio Blvd (State Hwy. 1). The San Francisco National Cemetery is located adjacent to Doyle Drive, as is the Commissary, the Post Exchange and a complex of residences once used by the military staff. The existing conditions represent an urban environment that is largely composed of roadways, parking areas, buildings, other paved areas and some open space that is vegetated with a composition of landscape and native vegetation.

Stormwater Impacts

Each build alternative would involve construction activities including the excavation, grading, and stockpiling of soil as well as the tunnel and bridge construction. These activities would expose soil that would be susceptible to erosion due to run-off generated during rainstorms, if not protected. Currently the majority of run-off generated in the project area flows directly to the Bay through storm water sewers throughout the Presidio or as overland flow. During construction, erosion control measures will be provided to prevent run-off from transporting and discharging sediment into the Bay, resulting in water quality degradation.

Since the project construction activities would result in a disturbance of more than one acre, the project would comply with the terms of the NPDES Statewide Storm Water Permit (Order No. 99-06-DWQ) issued by the State Water Resources Control Board to Caltrans resulting in the development and implementation of a SWPPP. Permanent collection and

treatment measures for run-off before discharge into the existing storm sewer system would be included in the final design of the project.

The proposed project alignment is in a similar location as the existing alignment. Therefore, the impact to receiving waters should not change significantly and the critical areas such as floodplains, wetlands, steep slopes, and areas with erosive or unstable soil conditions should be preserved wherever possible. There are also no live streams crossing the alignment.

3. Regional Water Quality Control Board Agreements

No negotiated understanding or agreements currently exist with the RWQCB pertaining to this project. A 401 permit will be required for this project and will be coordinated with Caltrans' Water Pollution Control unit during the design phase.

4. Describe Proposed Design Pollution Prevention BMPs to be used on the Project (Summarize responses to Checklist DPP-1, Parts 1-5)

Downstreams Effects Related to Potentially Increased Flow, Checklist DPP-1, Parts 1 and 2

Under both Alternatives 2 and 5 the amount of impervious area would increase, resulting in an increase in downstream flow volume. In addition, the degradation of runoff quality during construction may result in a higher sediment loading. While the project does not cross any live streams or unlined channels, under existing conditions, the majority of runoff generated from the project flows to the Bay (either directly or through Crissy Marsh) through storm water sewers or as overland flow. Soil stabilization (source control) should be the primary choice for controlling sediment deposition and erosion. As such, appropriate use of temporary soil stabilizers and covers should be applied and implemented in coordination with construction activities. Coordinated stabilization will minimize the amount of open disturbed areas at any one time and provide continuous stabilization throughout the winter season. If seeding is to be used, all seed mixes and placement methodologies must be approved by the Trust and/or NPS resources staff. Entry and egress from the construction site should be carefully controlled to minimize off-site tracking of sediment. Vehicle and equipment wash-down facilities should be designed to be accessible and functional during both dry and wet conditions.

The selected build alternative will incorporate, to the maximum extent practicable, the treatment of roadway pollutants in runoff prior to discharge to any surface water systems through BMPs.

Slope/Surface Protection Systems, Checklist DPP-1, Parts 1 and 3

Much of the project under both build alternatives proposes retaining walls rather than cut/fill slopes. Areas that will involve cut/fill include the portions of the Park Presidio Interchange and the bluff, from about station 13+00 to 15+00. Slopes in these areas would not be steeper than 1:2 (v:h).

Plant communities occurring in the Doyle Drive construction corridor include northern coastal scrub on sandy soils, northern coastal scrub on sandy soils with serpentine inclusions, and non-native vegetation. Project alternatives would disturb a larger proportion

of the coastal scrub on sandy soils than of the scrub on sandy soils with serpentine inclusions.

Erosion control measures would be necessary in any proposed open cut areas. The project would require that a Storm Water Pollution Prevention Plan (SWPPP) be developed and implemented during construction to reduce the potential for adverse effects of erosion and sedimentation.

Concentrated Flow Conveyance Systems, Checklist DPP-1, Parts 1 and 4

Under the Replace and Widen alternative, the new facility would be in a similar location as the existing facility. As a result, the existing drainage system would be maintained and essentially replaced "in-kind". The only potential impact to the storm sewer system would be minor relocations due to conflicts from proposed foundations. No major impact is anticipated. The existing system (which ties into the larger Presidio system and subsequently to the Bay) has sufficient capacity for the run-off from the widened roadway.

Under the Presidio Parkway alternative, the tunnel would be constructed using cut and cover construction methods. This would require the replacement of two sections of the storm water drainage system. The existing culvert for Tennessee Hollow would be realigned closer to Girard Road and then discharged to Crissy Marsh. However, the Presidio Trust is planning to restore Tennessee Hollow as a riparian corridor in conjunction with a future Crissy Marsh expansion and the Doyle Drive project is coordinating with the Trust to accommodate their future plans. At the Main Post a 48" pipe would be replaced to the east of the tunnel portal. The 24" storm drain along Lincoln Boulevard near the Park Presidio interchange would be relocated as part of the Lincoln Boulevard realignment. There would be an additional outfall constructed to provide an outfall for the tunnel drainage system. Storm water cut-off drains would be installed at the tunnel portals. Water collected in the tunnel from either tunnel washing operations or fire fighting would collect in a sump, pass through an oil/waste separator and then be pumped to the discharge point.

Preservation of Existing Vegetation Checklist DPP-1, Parts 1 and 5

The project will involve clearing and grubbing of approximately 17 hectares for Alternative 5 and 13 hectares for Alternative 2. Preservation areas will be identified and called out on the final project drawings. Steps will be taken to preserve existing vegetation and to minimize disturbed areas. All sensitive habitat and special-status plant species within or immediately adjacent to the Doyle Drive Project corridor, which are not temporarily or permanently affected by the project, will be designated as ESAs that will be off-limits to all construction activities. The ESAs will be clearly marked on the project plans, fenced on the project site and adjacent areas, and avoided by the Contractor. ESAs will be flagged in coordination with a Biological Monitor prior to construction activities. ESAs will be monitored by a Biological Monitor during construction to ensure that these sites are avoided. Removed vegetation, such as trees, will be clearly marked and identified on construction drawings during final design.

5. Describe Proposed Permanent Treatment BMPs to be used on the Project (Summarize responses to Checklist T-1, Parts 1-10)

Treatment BMP Strategy, Checklist T-1

If acceptable to the City of San Francisco, the preferred treatment strategy for the project is to discharge the first flush/low flow to the City's combined storm water and sanitary sewer system. It is preferable that 100% of the Water Quality Volume/Water Quality Flow (WQV/WQF) can be treated; however, due to possible capacity limitations of the combined storm water/ sanitary sewer system, 100% treatment may not be likely. Details such as the connection point will be further investigated and discussed during the PS&E phase with the San Francisco Public Utilities Commission (PUC). If discharge to the sanitary sewer system is infeasible, collection and transportation of this water for off-site treatment and disposal can also be considered.

For the project's secondary treatment BMP strategy, runoff discharges to the San Francisco Bay, Central region, which is a 303(d) listed water body. However, none of the pollutants listed for this portion of the Bay is considered a Targeted Design Constituent (TDC), thus the selection of treatment BMPs for this project would follow the General Purpose Pollution Removal criteria. Under this criteria, the order of treatment BMPs to be considered is

infiltration devices
biofiltration strips
wet basins
biofiltration swales
Austin sand filters
detention devices
Delaware filter
multi-chamber treatment trains.

Since litter/trash is not listed as a pollutant, gross solids removal devices were not considered. Traction sand traps were also not considered since sand is not regularly applied in the project area.

Caltrans shall coordinate with the Trust and NPS during the permanent treatment control (best management practices (BMP) selection process. This Project shall conform to the requirements of Caltrans SWMP to incorporate treatment controls and during the design phase will use Caltrans-approved BMPs to treat roadway runoff to the maximum extent practicable (MEP). The percentage of WQV/WQF to be treated will depend on which treatment BMPs are selected and where in the system specific devices are placed. Although the project is targeting to treat 100% of the project's WQV/WQF, until the preferred alternative is chosen and geometrics have been established, it is unknown if all the impervious area can be diverted into the proposed Treatment BMPs. Refer to attachment F for possible treatment BMP locations.

Due to the right-of-way constraints along the alignment, it will be challenging to identify feasible treatment controls that are effective in the removal of specific pollutants. Structural BMPs typically require less area for installation but are more maintenance intensive. While Caltrans does not recommend using BMPs with standing water such as wet basins, multi-chamber treatment trains, and Delaware sand filters in District 4 due to vector control issues, it may be possible to implement maintenance programs to address this issue should their

use be considered. In addition, these BMPs would need to be coordinated, reviewed, and approved by the local agencies, including the local vector control agency, the RWQCB, and Caltrans maintenance personnel during PS&E.

Doyle Drive stormwater runoff is currently discharged to existing drainage facilities without treatment. The build alternatives, with the inclusion of some form of treatment controls, are expected to provide a net benefit to stormwater runoff quality and the quality of receiving waters.

Infiltration Devices, Checklist T-1, Parts 1 and 4

Infiltration devices are not feasible because the soil type at the invert is classified as NRCS HSG D and the infiltration rate is less than 1.3 cm/hr (0.5 in/hr). In addition, the site is located over a previously identified groundwater plume.

Biofiltration Swale/Strips, Checklist T-1, Parts 1 and 2

Biofiltration swales/strips may be possible in areas such as the Park Presidio interchange, where space between the ramps and mainline may allow for this type of BMP. The treated WQV/WQF will be approximately 10% depending on the selected alternative. A wet basin is also being proposed as another option and will treat the same area and WQV/WQF as the biofiltration strips/ swales.

Media Filters, Checklist T-1, Parts 1 and 8

The two types of approved media filter devices are the Austin Sand Filter and the Delaware Filter. However, due to their large size they may need to be located beneath the bridge structures since right-of-way is limited.

The Austin sand filter is the preferred media filter. In the case of the Delaware filter, a maintenance program would need to be established to deal with vector control issues associated with standing water. Delaware filters will need to be coordinated, reviewed, and approved by local agencies including vector control, the RWQCB, and Caltrans maintenance personnel during PS&E.

Currently, three media filters are being proposed to treat approximately 40% of the total WQV, depending on the selected alternative.

Detention Devices, Checklist T-1, Parts 1 and 5

Detention Devices do not appear feasible for this project due to a high water table in the project location and insufficient head to prevent objectionable backwater conditions; however this will be further reviewed during design.

In addition, where detention devices are feasible, it is more likely that biofiltration strips and/or swales will be considered since these treatment BMPs will treat the same pollutants as detention devices, but at a lower cost.

Multi-Chambered Treatment Trains (MCTTs), Checklist T-1, Parts 1 and 9

Multi-Chambered Treatment Trains can only be used if maintenance programs are implemented to address vector control issues associated with standing water. In addition, MCTTs would need to be located within the shoulder due to right-of-way constraints. This

BMP will need to be coordinated, reviewed, and approved by local agencies including vector control, the RWQCB, and Caltrans maintenance personnel during PS&E.

Four MCTTs are being considered to treat approximately 50% of the WQV. However, since the MCTT is the last preferred treatment BMP under the General Purpose Pollutant Removal criteria, other treatment BMPs options will also be considered during PS&E.

Dry Weather Diversion, Checklist T-1, Parts 1 and 3

It is anticipated that dry weather flows will be persistent. It may be possible to divert flow to the City of San Francisco's combined storm water and sanitary sewer system for treatment. Washdown water (and any incidental stormwater runoff) collected from within the tunnels (Presidio Parkway alternative only) can also be discharged to the Presidio's sanitary sewer system since this lower rate of flow can be controlled. This will be further reviewed during PS&E.

Cost Estimate

At this phase of the project, the treatment BMPs are not defined enough to estimate individual BMP components (i.e., excavation, backfill, etc.). Instead, a lump sum amount was calculated based on cost per lane mile of the project. Caltrans Storm Water Quality Handbook (September 2002) gives a range of $100,000 to $250,000 per lane mile, with the high end being before projects that fall within urban areas, or are adjacent to 303(d) listed water bodies. For Doyle Drive, the estimated lump sum cost for treatment BMPs is $2,250,000 and applies to both Alternative 2 and 5. This cost also covers modifications to the local sanitary sewer system. Backup for this calculation is attached. If media filters such as the Austin Sand Filter is used, this would increase the cost by $600,000 per each filter installed based on Caltrans latest estimate for this type of device.

6. Describe Proposed Temporary Construction Site BMPs to be used on the Project

At this phase in the project various temporary construction site BMPs are still being evaluated. At a minimum, BMPs should include practices to minimize the contact of construction materials, equipment, and maintenance supplies (e.g., fuels, lubricants, paints, solvents, adhesives) with storm water. The SWPPP should specify properly designed storage areas that keep these materials protected from rain and run-off from adjacent drainage.

- An important component of the storm water quality protection effort is the knowledge of the site supervisors and workers. To educate on-site personnel and maintain awareness of the importance of storm water quality protection, site supervisors should conduct regular tailgate meetings to discuss pollution prevention. The frequency of the meetings and required personnel attendance list should be documented in the SWPPP.

- The SWPPP should specify a monitoring program to be implemented by the construction site supervisor, and must include both dry and wet weather inspections.

- BMPs designed to reduce erosion of exposed soil may include, but are not limited to: soil stabilization controls, watering for dust control, perimeter silt fences, placement of rice straw bales, and sediment basins. The potential for erosion is generally increased if grading and earth disturbance is performed during the rainy season as disturbed soil can be exposed to rainfall and storm runoff. If grading must be conducted during the rainy season, the primary BMPs selected should focus on erosion control, that is, keeping sediment on the site. End-of-pipe sediment control measures (e.g., basins and traps) should be used only as secondary measures. Soil stabilization (source control) should be the primary choice for controlling sediment deposition and erosion. As such, appropriate use of temporary soil stabilizers and covers should be applied and implemented in coordination with construction activities. Coordinated stabilization will minimize the amount of open disturbed areas at any one time and provide continuous stabilization throughout the winter season. If seeding is to be used, all seed mixes and placement methodologies must be approved by the Trust and/or NPS resources staff. Entry and egress from the construction site should be carefully controlled to minimize off-site tracking of sediment. Vehicle and equipment wash-down facilities should be designed to be accessible and functional during both dry and wet conditions.

The NPS and the Trust are responsible for managing numerous habitat resource issues within the Presidio and should be involved in the preparation and/or review of the SWPPP to ensure that the highest level of protection is provided for existing resources. No indirect effects associated with the control of runoff during construction of the build alternatives have been identified. No cumulative effects of construction phase runoff are expected if current regulations are enforced.

Construction of any of the build alternatives would require excavation below the groundwater level (e.g., tunnel construction, excavation for pile caps at bridge foundations). Typical construction practices require pumping of groundwater to dewater excavations below the groundwater level. The most substantial excavation would occur under the Presidio Parkway Alternative (Alternative 5) during excavation for the tunnel through the bluff area north of the cemetery. Based on groundwater level data collected during the preliminary geotechnical investigation, it is estimated that the groundwater table is approximately two to three meters (6 to 9 feet) above the bottom of the proposed tunnel excavation elevation (although seasonal variation is likely). This potential condition warrants the use of a shoring system that would minimize groundwater intrusion into the below ground work area. With an appropriate temporary shoring system in place, strip drains would be installed during excavation to permanently convey groundwater around the tunnel. Dewatering would occur for the duration of the excavation and tunnel construction process, approximately one to two years.

An effluent management plan would be coordinated with the project proponent that would characterize the quality of groundwater in the vicinity of the dewatering operations (prior to initiation of dewatering), address permitting of the discharge, include specific management measures to ensure that uncontrolled runoff (which could impact the environment) does not occur, and detail the means of coordination with the appropriate regulating agencies. The discharge of groundwater to the combined storm water and sanitary sewer would be required to comply with the San Francisco Public Utilities Commission (PUC) pretreatment standards and other requirements for discharge to the City's sewer system.

Cost Estimates

Temporary Construction Site BMP cost was estimated as a lump sum cost based on 1% of roadway and structures cost (see Draft Project Report, December 2005). This lump sum cost is intended to cover various practices to minimize the contact of construction materials, equipment, and maintenance supplies (e.g., fuels, lubricants, paints, solvents, adhesives) with storm water. Construction BMP costs for the different alternatives are as follows:

Alternative 2 (No-Detour):	$5,528,365
Alternative 2 (With-Detour):	$5,857,232
Alternative 5 (Loop Ramp w/ Diamond Option):	$7,009,730
Alternative 5 (Hook Ramp w/ Diamond Option):	$6,896,040
Alternative 5 (Loop Ramp w/ Circle Drive Option):	$7,009,730
Alternative 5 (Merchant Road Addition Option):	$86,120

Erosion control was estimated as a lump sum cost based on 1% of roadway and structures cost. Erosion Control costs for the different alternatives are as follows:

Alternative 2 (No-Detour):	$5,528,365
Alternative 2 (With-Detour):	$5,857,232
Alternative 5 (Loop Ramp w/ Diamond Option):	$7,009,730
Alternative 5 (Hook Ramp w/ Diamond Option):	$6,896,040
Alternative 5 (Loop Ramp w/ Circle Drive Option):	$7,009,730
Alternative 5 (Merchant Road Addition Option):	$86,120

7. Maintenance BMPs (Drain Inlet Stenciling)

It is anticipated that drain inlet stenciling will be used for this project. Details (i.e., location, type) will be determined during the PS&E phase of the project.

List of Attachments

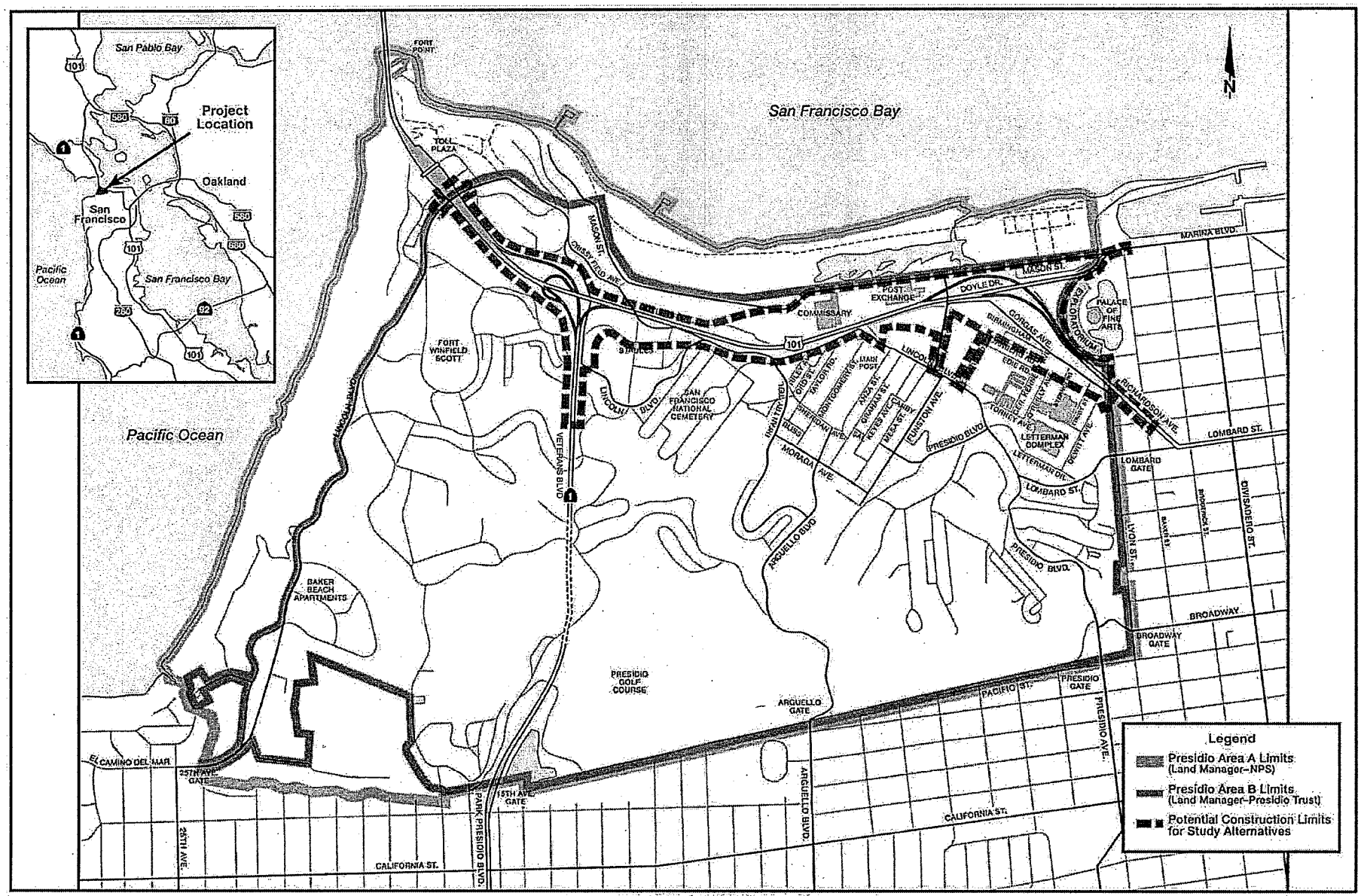
A. Vicinity Map
B. Evaluation Documentation Form (EDF)
C. Project Cost
D. Treatment BMP Cost Backup
E. Proposed Areas of Cut/Fill – Alternative 2
   Proposed Areas of Cut/Fill – Alternative 5
F. Proposed Treatment BMP Location Plans

Supplemental Attachments

G. Checklist SW-1, Site Data Sources
   Checklist SW-2, Storm Water Quality Issues Summary
   Checklist SW-3, Measures for Avoiding or Reducing Potential Storm Water BMPs
H. Checklists DPP-1, Parts 1-5 (Design Pollution Prevention BMPs)
I. Checklists T-1, Parts 1-10 (Treatment BMPs)
J. WQV/WQF Calculations
K. WQV/WQF Percent Treatment Calculations

ATTACHMENT A

Vicinity Map



Doyle Drive Project

FHWA Caltrans

Project Vicinity and Location

ATTACHMENT B

Evaluation Documentation Form

APPENDIX E

Evaluation Documentation Form

DATE: Jan 2006

See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPS EA: 163700

NO.	CRITERIA	YES ✓	NO ✓	SUPPLEMENTAL INFORMATION FOR EXEMPTION
1.	Begin Project Evaluation regarding requirement for consideration of Treatment BMPs	√		Go to 2
2.	Is this an emergency or Safety project?		√	If **Yes**, go to 12. (Safety Projects must be funded from the 010 SHOPP Program). If **No**, continue to 3.
3.	Have TMDLs been established for surface waters within the project limits?		√	If **Yes**, contact the District/Regional NPDES coordinator to discuss the Department's participation in the TMDL (if Applicable), go to 11 or 4 (as determined by the NPDES Coordinator). _____ *(Dist./Reg. SW Coordinator initials)* If **No**, continue to 4.
4.	Is the project within an urban MS4?	√		If **Yes**, continue to 5. *San Francisco* If **No**, go to 12.
5.	Is the project directly or indirectly discharging to surface waters?	√		If **Yes**, continue to 6. If **No**, go to 12.
6.	Is it a new facility or major reconstruction?	√		If **Yes**, continue to 8. If **No**, go to 7.
7.	Will there be a change in line/grade or hydraulic capacity?	√		If **Yes**, continue to 8. If **No**, go to 10.
8.	Is the Disturbed Soil Area (DSA) created by the project greater than or equal to 1.2 hectares?	√		If **Yes**, continue to 11. If **No**, go to 9. *Alternative 2: 13 Hectares, Alternative 5: 17 Hectares*
9.	Is the project part of a Common Plan of Development?			If **Yes**, continue to 11. If **No**, go to 10.
10.	Are there any Pollution Control Requirements within the project limits? *(Contact your Dist./Reg. SW Coordinator)*			If **Yes**, continue to 11. If **No**, go to 12.
11.	Consider approved Treatment BMPs for the project.	√	See Sections 2.4 and either Section 5.5 or 6.5 for BMP Evaluation and Selection Process. Complete Checklist T-1 in this Appendix E.	
12.	Project is not required to consider Treatment BMPs. _____*(Dist./Reg. SW Coord. Initials)* _____*(Project Engineer Initials)* _____ *(Date)*		Document for Project Files by completing this form, and attaching it to the SWDR.	
13	End of checklist	√		

ATTACHMENT C

Project Cost

Alternative		Option		Roadway		Structures		Right of Way		Total Project Capital Outlay	
				2005	2011[2]	2005	2011[2]	2008	2011[2]	2005	2011[2]
1	No Build			0	0	0	0	0	0	$0	$0
2	Replace & Widen	No Detour		86,300,000	115,700,000	466,600,000	625,300,000	4,400,000	5,100,000	$557,400,000	$746,100,000
		With Detour		94,800,000	127,000,000	490,700,000	657,600,000	58,900,000	68,200,000	$644,400,000	$852,800,000
5	Presidio Parkway	Diamond Option	Loop Ramp	142,600,000	191,100,000	560,000,000	750,400,000	36,800,000	42,600,000	$739,400,000	$984,100,000
			Hook Ramp	147,800,000	198,000,000	543,600,000	728,500,000	36,800,000	42,600,000	$728,200,000	$969,100,000
		Circle Option	Loop Ramp	142,600,000	191,100,000	560,000,000	750,400,000	37,900,000	43,800,000	$740,400,000	$985,300,000
			Hook Ramp	147,700,000	198,000,000	543,600,000	728,500,000	37,900,000	43,800,000	$729,200,000	$970,300,000
		Merchant Ramp		7,700,000	10,300,000	900,000	1,200,000	2,400,000	2,800,000	$11,100,000	$14,400,000

[1] 2005 Cost estimate is based on 2004 Caltrans Contract Cost Data escalated by 10% to reflect recent substantial increases in construction material prices
[2] 2011 Cost Estimate is derived from the 2005 values escalated at 5% per year to mid-year of construction 2011. 5% escalation is consistent with other major bridge projects in the Bay Area
[3] The Merchant Ramp Option is a stand alone option that can be incorporated into Alternative 5 if requested

ATTACHMENT D

Treatment BMP Cost Backup

PB PARSONS BRINCKERHOFF COMPUTATION SHEET

Page 1 of 1 | 13145

Made by K. CHANG

Date 6/7/2005

Checked by WG

Date 6-24-05

Subject SAGGB DOYLE DRIVE, ALT. 2 NO-DETOUR & WITH-DETOUR
COST ESTIMATE FOR TREATMENT BMP
(WATER POLLUTION CONTROL)

PURPOSE: CALCULATE LUMP SUM COST FOR TREATMENT BMP

REFERENCES: CALTRANS STORM WATER QUALITY HANDBOOK, SEPTEMBER 2002
APPENDIX F - "COST ESTIMATES"
COPY ATTACHED

ASSUMPTIONS: - ASSUME WATER POLLUTION CONTROL WILL BE THE TREATMENT BMP FOR THIS PROJECT
- ASSUME COST ESTIMATE WILL BE THE SAME FOR BOTH WITH-DETOUR AND NO-DETOUR OPTIONS.
- ASSUMED COST TO BE AT THE HIGH END OF THE RANGE GIVEN IN CALTRANS STANDARD DUE TO COMPLEXITY IN STAGING AND SENSITIVE LOCATION (K.C. 9/29/2005)

APPROXIMATE LENGTH OF DOYLE DRIVE = 2370m = 1.5 miles
TOTAL NO. OF LANES = 6 LANES

$(1.5 \text{ MILES})(6 \text{ LANES}) = 9 \text{ LANE-MILES}$

FROM ABOVE REFERENCE → $(\$250,000/\text{LANE MILE})(9 \text{ LANE-MILE}) = \$2,250,000$

Other cost criteria include the following:

- Costs for development and implementation of a SWPPP or WPCP;
  - For a planning-level estimate, assume the typical preparation cost of a SWPPP to be about $5,000 to $10,000 ($2,000 to $4,000 for a WPCP), plus $200 per each water pollution control sheet (the number of water pollution control sheets can be estimated by the using a number equal to the estimated number of drainage sheets in each construction staging plan set).
- Supplemental Funds
  - May be needed to give the contract enough contingency money to handle the need for additional BMPs over the estimated amount. This would usually occur on contracts that will be under construction during more than one winter season. In accordance with Section F.3.6, the Project Engineer should add 25% to the cost of the Construction Site BMPs for those projects anticipated to extend beyond a single construction season. Supplemental funds also cover the costs for the Sampling Analysis Plan (SAP) discussed in Section F.7.4.

As previously mentioned, the Design Pollution Prevention BMPs are normally covered under individual bid line items. The Treatment BMPs, however, are not normally defined enough at the PID stage to estimate as excavation, backfill, etc. For New Construction or Major Reconstruction Projects, an additional $100,000 to $250,000 per lane mile should be added to cover costs associated with incorporating Treatment BMPs. The lower end of this range would apply to projects in rural areas that are not adjacent to a 303(d) listed water body. Conversely, the higher end of this range would be for projects that fall within urban areas, or are adjacent to 303(d) listed water bodies. This price does not include right-of-way acquisition costs for constructing infiltration basins or for establishing drainage easements.

F.6.2 Option 2: Historical Project Method

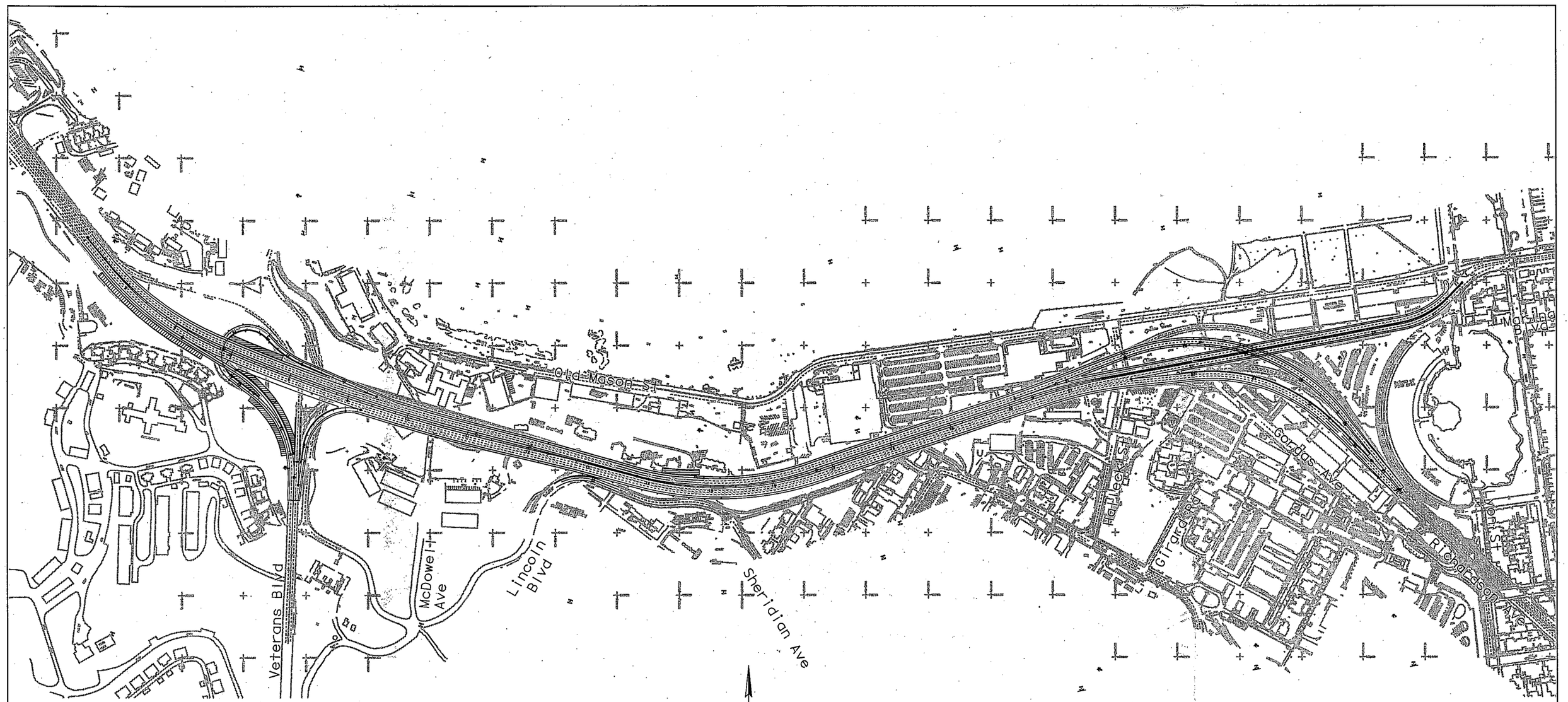
The Historical Project method uses historical project cost information and updates that information to present day costs using the cost indexes in the Engineering News Record. This method can be generally used during the PID and PA/ED processes.

The following guidelines apply when using Historical Project costs:

- Similar size projects should be used and quantities for individual items should be similar;
- Consider using the average of the five lowest bidders, or possibly applying an increase factor to the low bid;
- Previous bid prices should be revised by the projected change in the California Construction Cost Index between the date of the old bid and the date of the anticipated new bid;

ATTACHMENT E

Proposed Areas of Cut/Fill
Alternative 2
Alternative 5



PROPOSED AREAS OF CUT AND FILL

ALTERNATIVE 2 (NO-DETOUR & WITH-DETOUR)

LEGEND

- FILL
- CUT

DOYLE DRIVE STORMWATER DATA REPORT

JANUARY 2006

South Access to the Golden Gate Bridge

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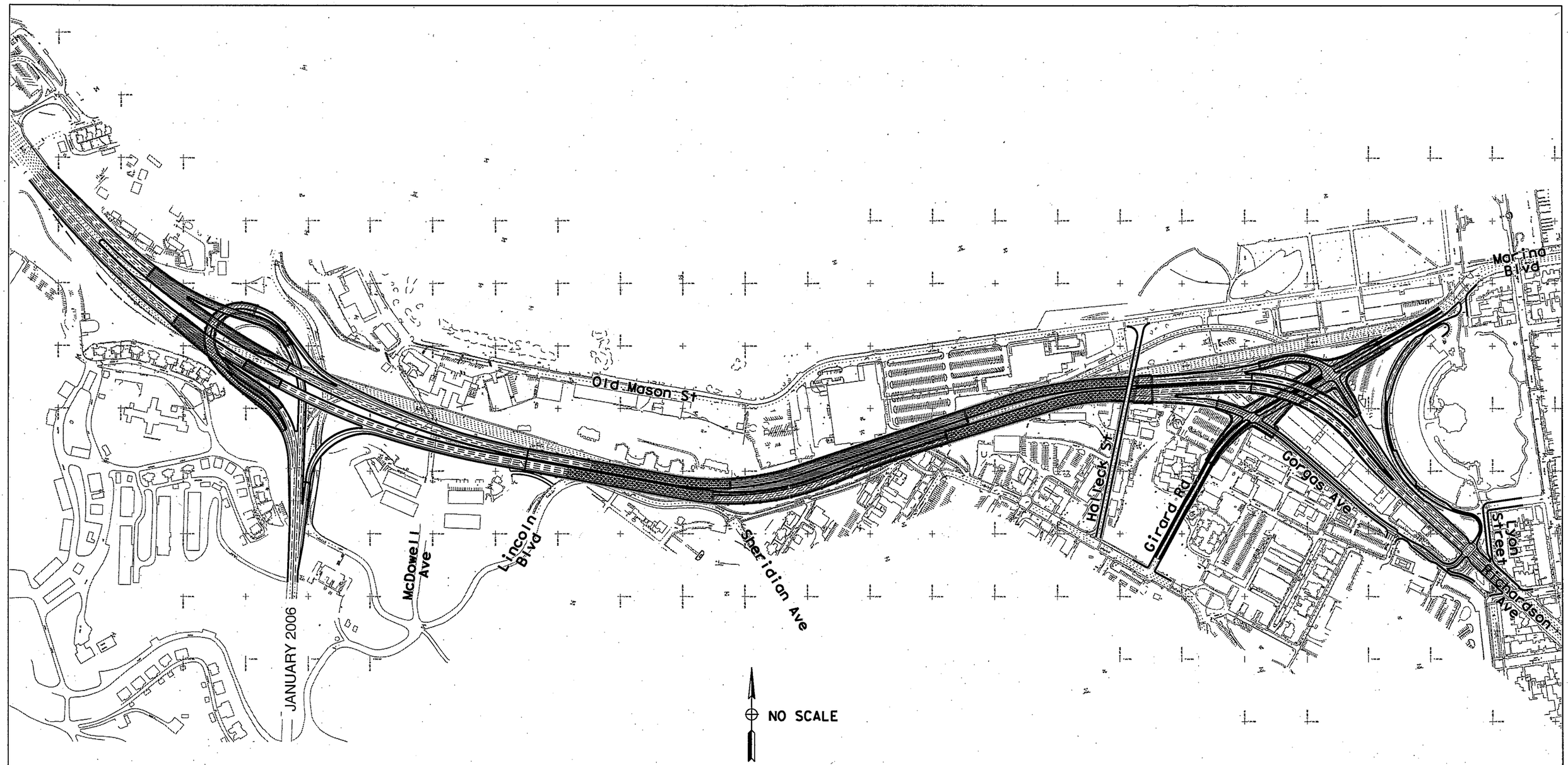

PROPOSED AREAS OF CUT AND FILL
ALTERNATIVE 5 - HOOK RAMP OPTION

LEGEND

- FILL
- CUT
- TUNNEL

DOYLE DRIVE STORMWATER DATA REPORT

JANUARY 2006

South Access to the Golden Gate Bridge

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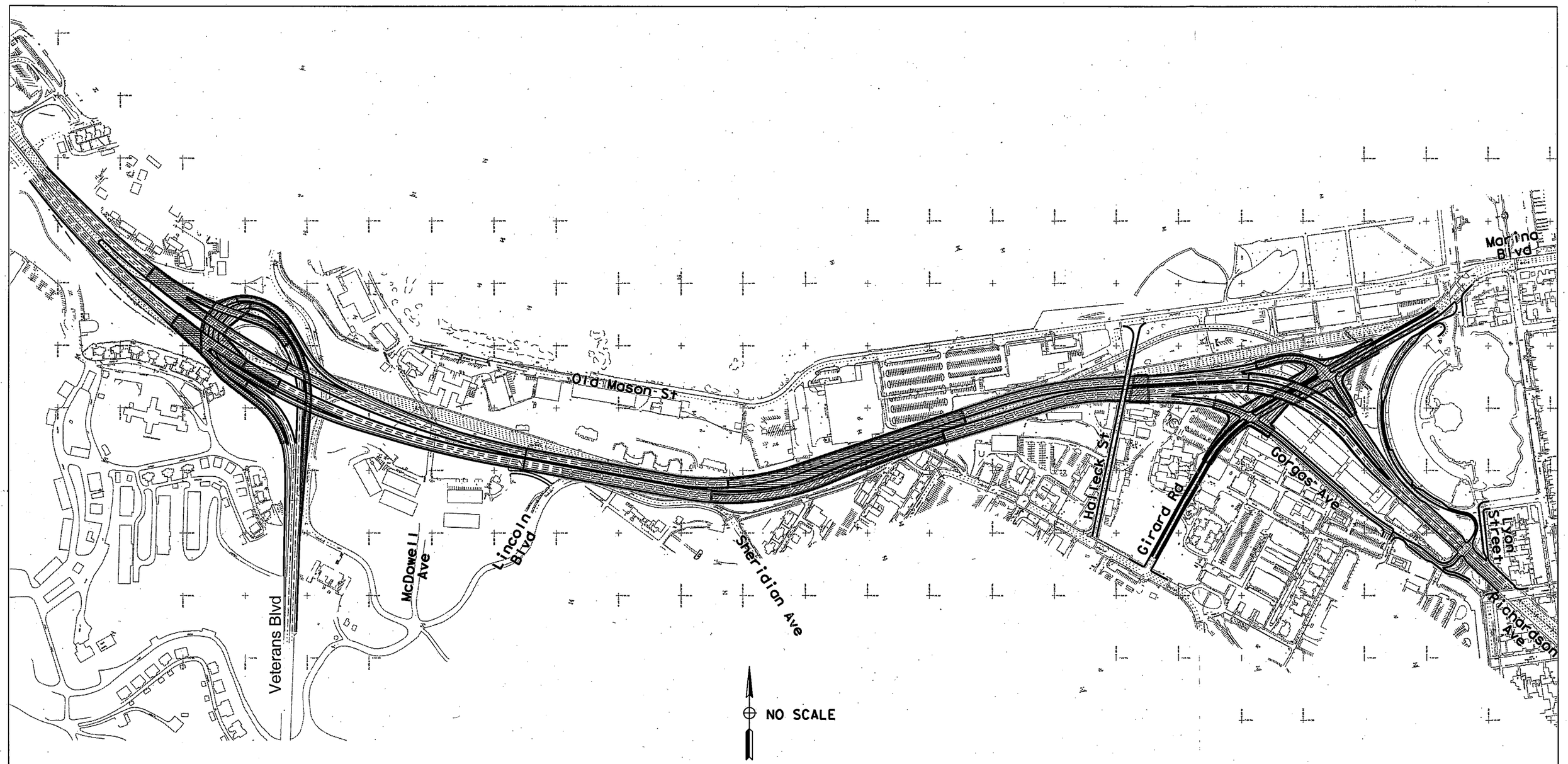

PROPOSED AREAS OF CUT AND FILL
ALTERNATIVE 5 - LOOP RAMP OPTION

LEGEND

- FILL
- CUT
- TUNNEL

DOYLE DRIVE STORMWATER DATA REPORT

JANUARY 2006

South Access to the Golden Gate Bridge

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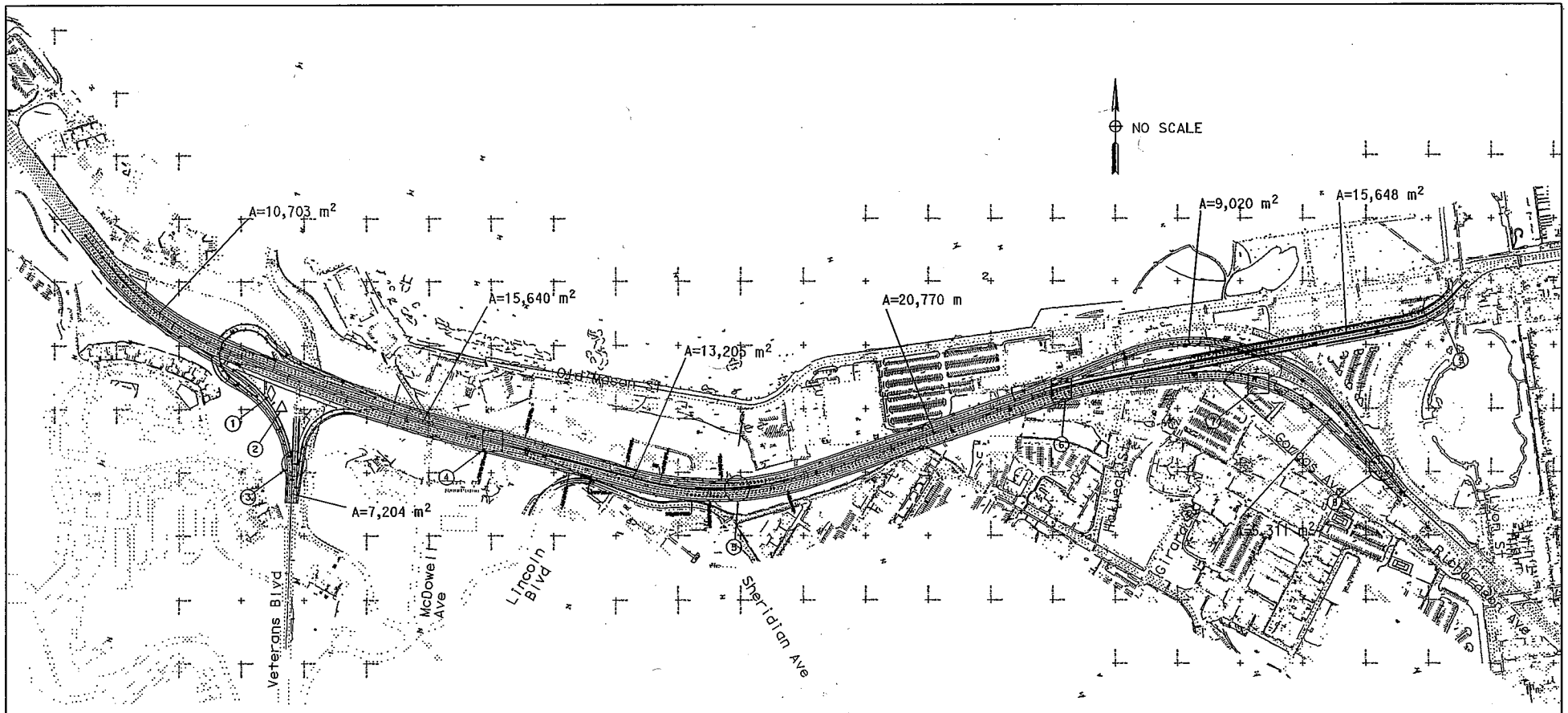
ATTACHMENT F

Proposed Treatment BMP Locations



PROPOSED TREATMENT BMP LOCATIONS

ALTERNATIVE 2 (NO-DETOUR & WITH-DETOUR)

LEGEND

- □ POSSIBLE LOCATION FOR MEDIA FILTER BENEATH BRIDGE STRUCTURE
- ○ POSSIBLE LOCATION FOR MCTT (MULTI-CHAMBER TREATMENT TRAIN) IN ROADWAY SHOULDER
- △ POSSIBLE LOCATION FOR BIOFILTRATION SWALE/STRIP
- ◊ POSSIBLE LOCATION FOR WET BASIN

NOTES:

1. The preferred treatment BMP is connection to the City of San Francisco's combined sanitary/storm water system (not shown).
2. Treatment BMP locations shown represent possible locations only. Actual locations will be determined during the PS&E phase.

DOYLE DRIVE STORMWATER DATA REPORT

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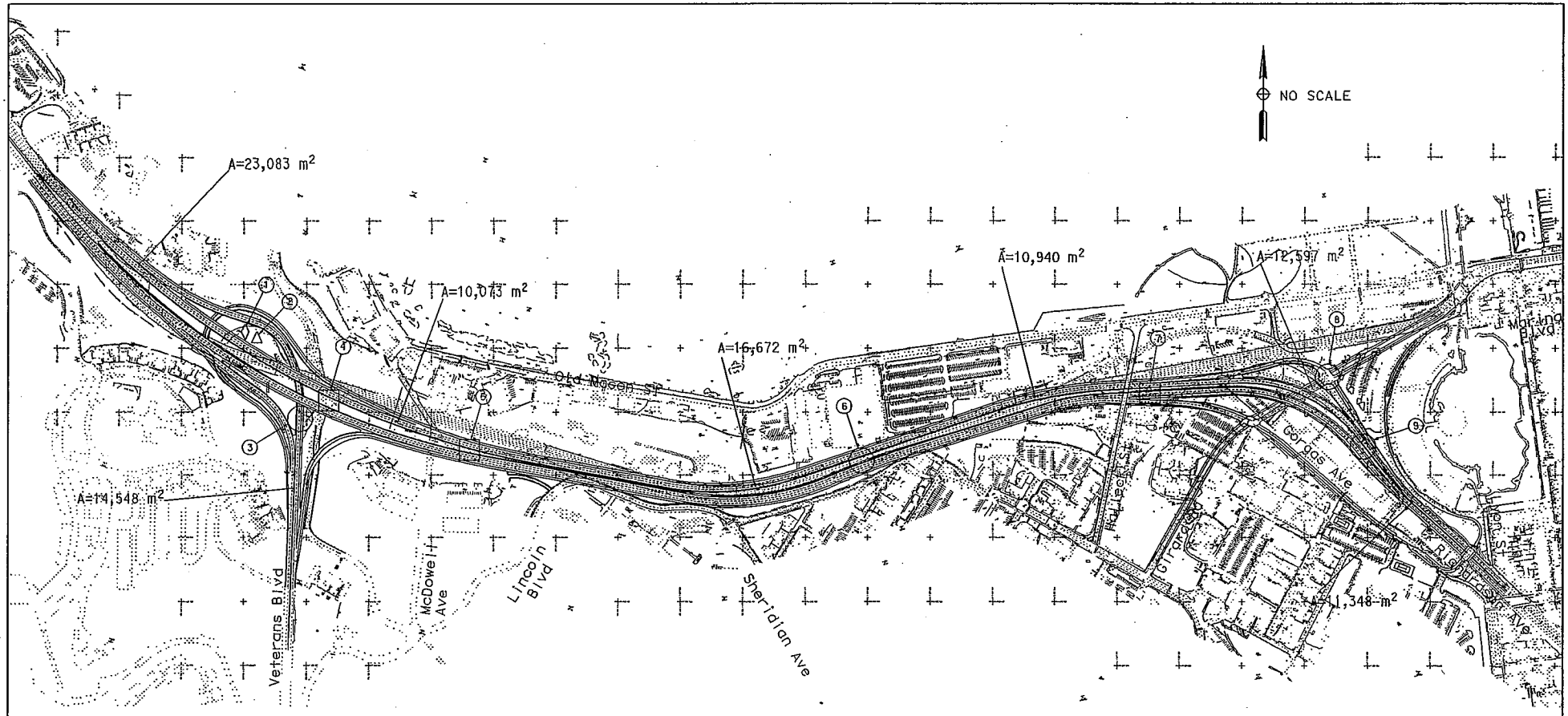

PROPOSED TREATMENT BMP LOCATIONS

ALTERNATIVE 5 - HOOK RAMP OPTION

LEGEND

- □ POSSIBLE LOCATION FOR MEDIA FILTER BENEATH BRIDGE STRUCTURE
- ○ POSSIBLE LOCATION FOR MCTT (MULTI-CHAMBER TREATMENT TRAIN) IN ROADWAY SHOULDER
- △ POSSIBLE LOCATION FOR BIOFILTRATION SWALE/STRIP
- ◊ POSSIBLE LOCATION FOR WET BASIN

NOTES:

1. The preferred treatment BMP is connection to the City of San Francisco's combined sanitary/storm water system (not shown).
2. Treatment BMP locations shown represent possible locations only. Actual locations will be determined during the PS&E phase.

DOYLE DRIVE STORMWATER DATA REPORT

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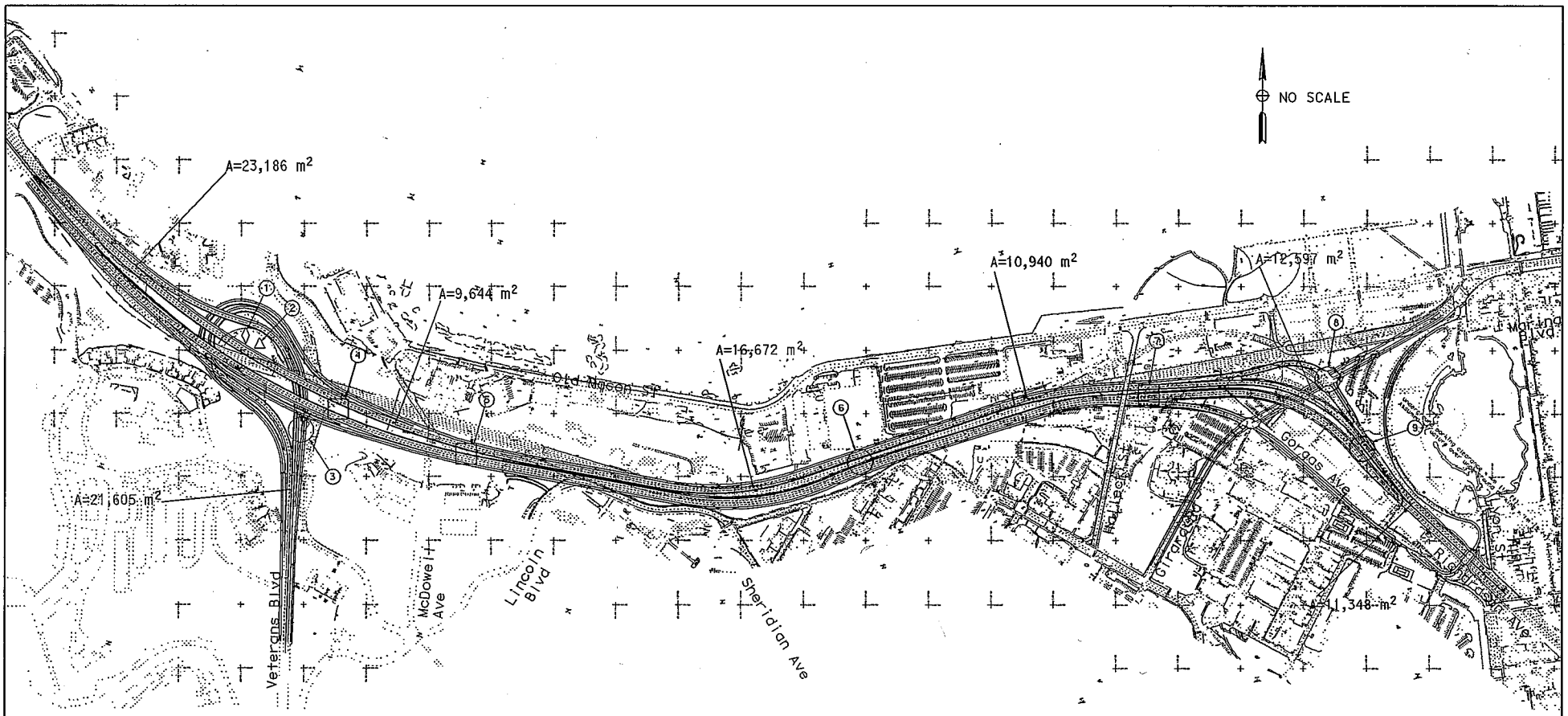

PROPOSED TREATMENT BMP LOCATIONS
ALTERNATIVE 5 - LOOP RAMP OPTION

LEGEND

- □ POSSIBLE LOCATION FOR MEDIA FILTER BENEATH BRIDGE STRUCTURE
- ○ POSSIBLE LOCATION FOR MCTT (MULTI-CHAMBER TREATMENT TRAIN) IN ROADWAY SHOULDER
- △ POSSIBLE LOCATION FOR BIOFILTRATION SWALE/STRIP
- ◊ POSSIBLE LOCATION FOR WET BASIN

NOTES:

1. The preferred treatment BMP is connection to the City of San Francisco's combined sanitary/storm water system (not shown).
2. Treatment BMP locations shown represent possible locations only. Actual locations will be determined during the PS&E phase.

DOYLE DRIVE STORMWATER DATA REPORT

JANUARY 2006

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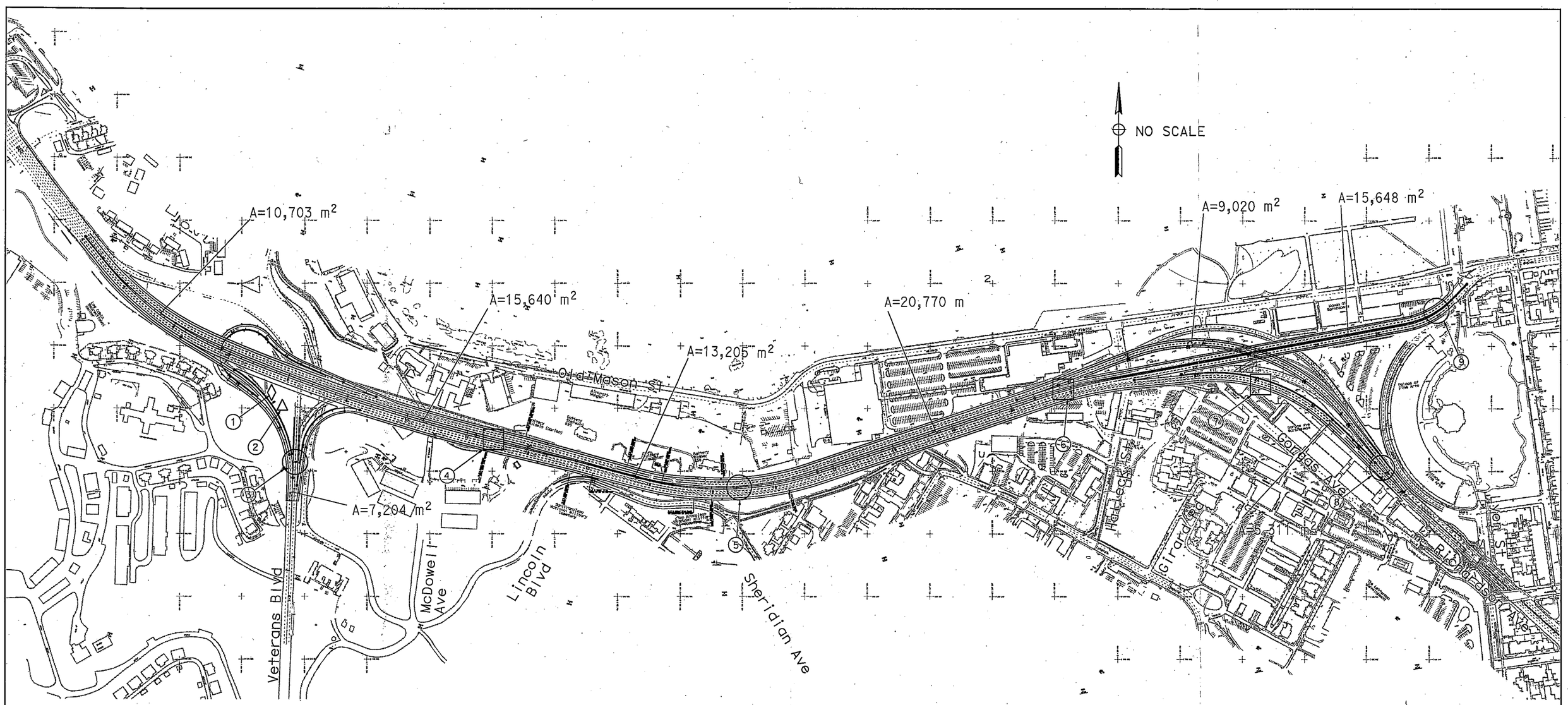

PROPOSED TREATMENT BMP LOCATIONS

ALTERNATIVE 2 (NO-DETOUR & WITH-DETOUR)

LEGEND

- □ POSSIBLE LOCATION FOR MEDIA FILTER BENEATH BRIDGE STRUCTURE
- ○ POSSIBLE LOCATION FOR MCTT (MULTI-CHAMBER TREATMENT TRAIN) IN ROADWAY SHOULDER
- △ POSSIBLE LOCATION FOR BIOFILTRATION SWALE/STRIP
- ◇ POSSIBLE LOCATION FOR WET BASIN

NOTES:

1. The preferred treatment BMP is connection to the City of San Francisco's combined sanitary/storm water system (not shown).
2. Treatment BMP locations shown represent possible locations only. Actual locations will be determined during the PS&E phase.

DOYLE DRIVE STORMWATER DATA REPORT

JANUARY 2006

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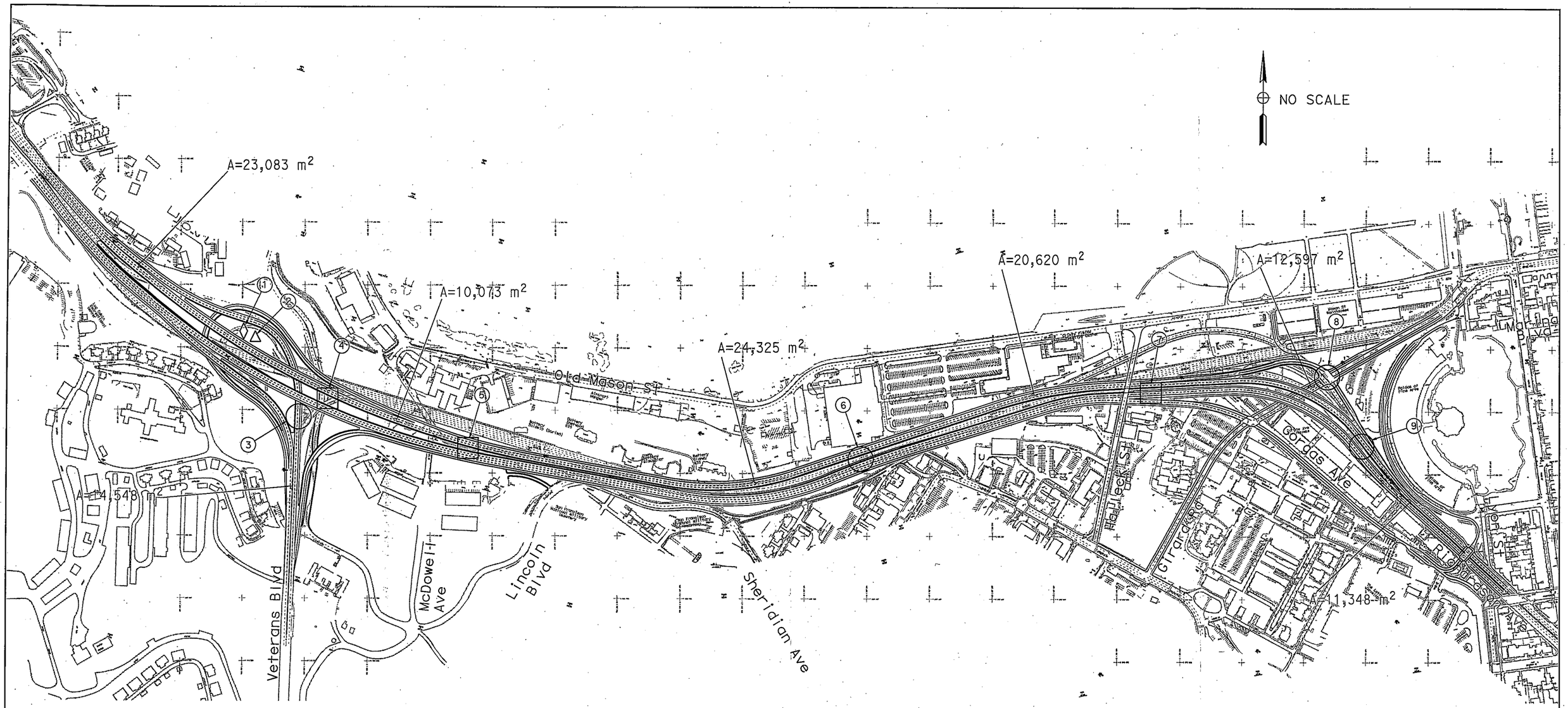

PROPOSED TREATMENT BMP LOCATIONS
ALTERNATIVE 5 - HOOK RAMP OPTION

LEGEND

- ☐ POSSIBLE LOCATION FOR MEDIA FILTER BENEATH BRIDGE STRUCTURE
- ○ POSSIBLE LOCATION FOR MCTT (MULTI-CHAMBER TREATMENT TRAIN) IN ROADWAY SHOULDER
- △ POSSIBLE LOCATION FOR BIOFILTRATION SWALE/STRIP
- ◇ POSSIBLE LOCATION FOR WET BASIN

NOTES:

1. The preferred treatment BMP is connection to the City of San Francisco's combined sanitary/storm water system (not shown).
2. Treatment BMP locations shown represent possible locations only. Actual locations will be determined during the PS&E phase.

DOYLE DRIVE STORMWATER DATA REPORT

JANUARY 2006

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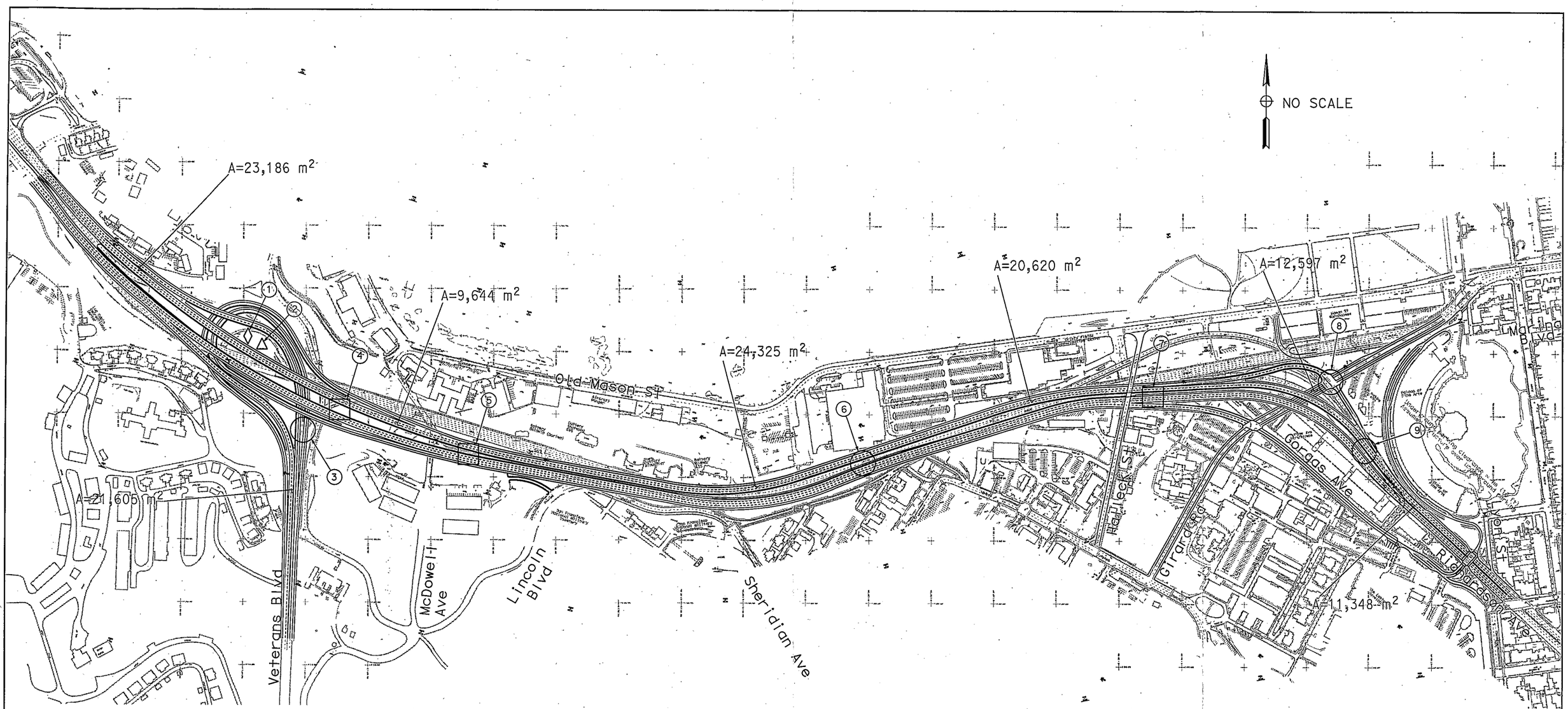

PROPOSED TREATMENT BMP LOCATIONS
ALTERNATIVE 5 - LOOP RAMP OPTION

LEGEND

- □ POSSIBLE LOCATION FOR MEDIA FILTER BENEATH BRIDGE STRUCTURE
- ○ POSSIBLE LOCATION FOR MCTT (MULTI-CHAMBER TREATMENT TRAIN) IN ROADWAY SHOULDER
- △ POSSIBLE LOCATION FOR BIOFILTRATION SWALE/STRIP
- ◇ POSSIBLE LOCATION FOR WET BASIN

NOTES:

1. The preferred treatment BMP is connection to the City of San Francisco's combined sanitary/storm water system (not shown).
2. Treatment BMP locations shown represent possible locations only. Actual locations will be determined during the PS&E phase.

DOYLE DRIVE STORMWATER DATA REPORT

JANUARY 2006

South Access to the Golden Gate Bridge

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ATTACHMENT G

Checklists SW-1, SW-2, SW-3

Checklist SW-1, Site Data Sources

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Information for the following data categories should be obtained, reviewed and referenced as necessary throughout the project planning phase. Collect any available documents pertaining to the category and list them and reference your data source. For specific examples of documents within these categories, refer to Section 5.5 of this document. Example categories have been listed below; add additional categories, as needed. Summarize pertinent information in Section 2 of the SWDR.

DATA CATEGORY/SOURCES	Date
Topographic	
• Final Preliminary Geotechnical Report	October 2004
Hydraulic	
• Final Hydrology And Water Resources Technical Report	October 2004
• Location Hydraulic Study	2001
Soils	
• Final Preliminary Geotechnical Report	October 2004
Climatic	
• Draft Final Natural Environmental Study	July 2005
Water Quality	
• Final Hydrology And Water Resources Technical Report	October 2004
• Draft Final Natural Environmental Study	July 2005
Other Data Categories	
• Draft Project Report	December 2005
• Revised Preliminary Site Investigation	October 2004

Checklist SW-2, Storm Water Quality Issues Summary

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

The following questions provide a guide to collecting critical information relevant to project storm water quality issues. Complete responses to applicable questions, consulting other Caltrans functional units (Environmental, Landscape Architecture, Maintenance, etc.) and the District/Regional NPDES Coordinator as necessary. Summarize pertinent responses in Section 2 of the SWDR.

1. Determine the receiving waters that may be affected by the project throughout the project life cycle (i.e., construction, maintenance and operation).	☒ Complete	☐ NA
2. For the project limits, list the 303(d) impaired receiving water bodies and their constituents of concern.	☒ Complete	☐ NA
3. Determine if there are any High Risk Areas (municipal or domestic water supply reservoirs or groundwater percolation facilities) within the project limits. Consider appropriate spill contamination and spill prevention control measures for these new areas.	☒ Complete	☐ NA
4. Determine the RWQCB special requirements, including TMDLs, effluent limits, etc.	☒ Complete	☐ NA
5. Determine regulatory agencies seasonal construction and construction exclusion dates or restrictions required by federal, state, or local agencies.	☒ Complete	☐ NA
6. Determine if a 401 certification will be required.	☒ Complete	☐ NA
7. List rainy season dates.	☒ Complete	☐ NA
8. Determine the general climate of the project area. Identify annual rainfall and rainfall intensity curves.	☒ Complete	☐ NA
9. If considering Treatment BMPs, determine the soil classification, permeability, erodibility, and depth to groundwater.	☒ Complete	☐ NA
10. Determine contaminated or hazardous soils within the project area.	☒ Complete	☐ NA
11. Determine the total disturbed soil area of the project.	☒ Complete	☐ NA
12. Describe the topography of the project site.	☒ Complete	☐ NA
13. List any areas outside of the Caltrans right-of-way that will be included in the project (e.g. contractor's staging yard, work from barges, easements for staging, etc.). ***To be determined during PS&E***	☐ Complete	☒ NA
14. Determine if additional right-of-way acquisition or easements and right-of-entry will be required for design, construction and maintenance of BMPs. If so, how much? ***To be determined during PS&E***	☐ Complete	☒ NA
15. Determine if a right-of-way certification is required.	☒ Complete	☐ NA
16. Determine the estimated unit costs for right-of-way should it be needed for Treatment BMPs, stabilized conveyance systems, lay-back slopes, or interception ditches. ***To be determined during PS&E***	☐ Complete	☒ NA
17. Determine if project area has any slope stabilization concerns.	☒ Complete	☐ NA
18. Describe the local land use within the project area and adjacent areas.	☒ Complete	☐ NA
19. Evaluate the presence of dry weather flow.	☒ Complete	☐ NA

Checklist SW-3, Measures for Avoiding or Reducing Potential Storm Water Impacts

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

The PE must confer with other functional units, such as Landscape Architecture, Hydraulics, Environmental, Materials, Construction and Maintenance, as needed to assess these issues. Summarize pertinent responses in Section 2 of the SWDR.

Options for avoiding or reducing potential impacts during project planning include the following:

1.	Can the project be relocated or realigned to avoid/reduce impacts to receiving waters or to increase the preservation of critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions?	☐ Yes	☒ No	☐ NA
2.	Can structures and bridges be designed or located to reduce work in live streams and minimize construction impacts? ***Project does not cross any live streams***	☐ Yes	☐ No	☒ NA
3.	Can any of the following methods be utilized to minimize erosion from slopes:			
	a. Disturbing existing slopes only when necessary?	☒ Yes	☐ No	☐ NA
	b. Minimizing cut and fill areas to reduce slope lengths?	☒ Yes	☐ No	☐ NA
	c. Incorporating retaining walls to reduce steepness of slopes or to shorten slopes?	☒ Yes	☐ No	☐ NA
	d. Acquiring right-of-way easements (such as grading easements) to reduce steepness of slopes?	☐ Yes	☐ No	☒ NA
	e. Avoiding soils or formations that will be particularly difficult to re-stabilize?	☒ Yes	☐ No	☐ NA
	f. Providing cut and fill slopes flat enough to allow re-vegetation and limit erosion to pre-construction rates?	☒ Yes	☐ No	☐ NA
	g. Providing benches or terraces on high cut and fill slopes to reduce concentration of flows?	☐ Yes	☐ No	☒ NA
	h. Rounding and shaping slopes to reduce concentrated flow? ***To be determined during PS&E***	☒ Yes	☐ No	☐ NA
	i. Collecting concentrated flows in stabilized drains and channels? ***To be determined during PS&E***	☒ Yes	☐ No	☐ NA
4.	Does the project design allow for the ease of maintaining all BMPs? ***To be determined during PS&E***	☐ Yes	☐ No	☒ NA
5.	Can the project be scheduled or phased to minimize soil-disturbing work during the rainy season? ***To be determined during PS&E***	☐ Yes	☐ No	☒ NA
6.	Can permanent storm water pollution controls such as paved slopes, vegetated slopes, basins, and conveyance systems be installed early in the construction process to provide additional protection and to possibly utilize them in addressing construction storm water impacts? ***To be determined during PS&E***	☐ Yes	☐ No	☒ NA

ATTACHMENT H

Checklists DPP-1, Parts 1-5

Design Pollution Prevention BMPs
Checklist DPP-1, Part 1

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Consideration of Design Pollution Prevention BMPs

1. Consideration of Downstream Effects Related to Potentially Increased Flow [to streams or channels]?

(a) Will project increase velocity or volume of downstream flow?	☒ Yes	☐ No	☐ NA
(b) Will the project discharge to unlined channels?	☐ Yes	☒ No	☐ NA
(c) Will project increase potential sediment load of downstream flow?	☒ Yes	☐ No	☐ NA
(d) Will project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect downstream channel stability?	☐ Yes	☒ No	☐ NA

If Yes was answered to any of the above questions, consider ***Downstream Effects Related to Potentially Increased Flow***, complete the DPP-1, Part 2 checklist.

2. Slope/Surface Protection Systems

(a) Will project create new slopes or modify existing slopes?	☒ Yes	☐ No	☐ NA

If Yes was answered to the above question, consider ***Slope/Surface Protection Systems***, complete the DPP-1, Part 3 checklist.

3. Concentrated Flow Conveyance Systems

(a) Will the project create or modify ditches, dikes, berms, or swales?	☒ Yes	☐ No	☐ NA
(b) Will project create new slopes or modify existing slopes?	☒ Yes	☐ No	☐ NA
(c) Will it be necessary to direct or intercept surface runoff?	☒ Yes	☐ No	☐ NA
(d) Will cross drains be modified?	☒ Yes	☐ No	☐ NA

If Yes was answered to any of the above questions, consider ***Concentrated Flow Conveyance Systems***; complete the DPP-1, Part 4 checklist.

4. Preservation of Existing Vegetation

a) It is the goal of the Storm Water Program to maximize the protection of desirable existing vegetation to provide erosion and sediment control benefits on all projects. ☒ Complete

Consider ***Preservation of Existing Vegetation***, complete the DPP-1, Part 5 checklist.

Design Pollution Prevention BMPs
Checklist DPP-1, Part 2

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Downstream Effects Related to Potentially Increased Flow

1. Review total paved area and reduce to the maximum extent possible. ☒ Completed
2. Review channel lining materials and design for stream bank erosion control. ☒ Completed
   (a) See Chapters 860 and 870 of the HDM. ☒ Completed
   (b) Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity. ☒ Completed
3. Include, where appropriate, energy dissipation devices at culvert outlets. ☒ Completed
4. Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour. ☒ Completed
5. Include, if appropriate, detention facilities to reduce peak discharges. ☒ Completed

Design Pollution Prevention BMPs
Checklist DPP-1, Part 3

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Slope / Surface Protection Systems

1. What are the proposed areas of cut and fill? (attach plan or map) — ☒ Complete
2. Were benches or terraces provided on high cut and fill slopes to reduce concentration of flows? — ☐ Yes ☒ No
   To be determined during PS&E
3. Were slopes rounded and/or shaped to reduce concentrated flow? — ☒ Yes ☐ No
   To be determined during PS&E
4. Were concentrated flows collected in stabilized drains or channels? — ☒ Yes ☐ No
   To be determined during PS&E
5. Are slopes > 1:4 vertical:horizontal (V:H))? — ☒ Yes ☐ No
   If Yes, an erosion control plan must be prepared or approved by the District Landscape Architect.
6. Are slopes > 1:2 (V:H)? — ☐ Yes ☒ No
   If Yes, Geotechnical Services must prepare a Geotechnical Design Report, and the District Landscape Architect should prepare or approve an erosion control plan. Concurrence must be obtained from the District Maintenance Storm Water Coordinator for slopes steeper than 1:2 (V:H).
7. Estimate the change to the impervious areas that will result from this project. — ☒ Complete
   2.42 ha (5.98 ac) Max ha (ac)
   existing: 4.18 ha
   Alt. 2: 6.60 ha
   Alt. 5: 4.52 ha

VEGETATED SURFACES

1. Identify existing vegetation. — ☒ Complete
2. Evaluate site to determine soil types, appropriate vegetation and planting strategies. — ☒ Complete
3. How long will it take for permanent vegetation to establish? — ☒ Complete
4. Minimize overland and concentrated flow depths and velocities. — ☒ Complete

HARD SURFACES

1. Are hard surfaces required? — ☐ Yes ☒ No
   If Yes, document purpose (safety, maintenance, soil stabilization, etc.), types, and general locations of the installations. — ☐ Complete

Review appropriate SSPs for Vegetated Surface and Hard Surface Protection Systems. — ☐ Complete
To be determined during PS&E

Design Pollution Prevention BMPs
Checklist DPP-1, Part 4

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Concentrated Flow Conveyance Systems

Ditches, Berms, Dikes and Swales (*To be determined during PS&E*)

1. Consider Ditches, Berms, Dikes, and Swales as per Chapters 813, 836, and 860 of the HDM. ❑ Complete
2. Evaluate risks due to erosion, overtopping, flow backups or washout. ❑ Complete
3. Consider outlet protection where localized scour is anticipated. ❑ Complete
4. Examine the site for run-on from off-site sources. ❑ Complete
5. Consider channel lining when velocities exceed scour velocity for soil. ❑ Complete

Overside Drains (*To be determined during PS&E*)

1. Consider downdrains, as per Index 834.4 of the HDM. ❑ Complete
2. Consider paved spillways for side slopes flatter than 1:4 V:H. ❑ Complete

Flared Culvert End Sections (*To be determined during PS&E*)

1. Consider flared end sections on culvert inlets and outlets as per Chapter 827 of the HDM. ❑ Complete

Outlet Protection/Velocity Dissipation Devices (*To be determined during PS&E*)

1. Consider outlet protection/velocity dissipation devices at outlets, including cross drains, as per Chapters 827 and 870 of the HDM. ❑ Complete

Review appropriate SSPs for Concentrated Flow Conveyance Systems. ❑ Complete

Design Pollution Prevention BMPs
Checklist DPP-1, Part 5

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Preservation of Existing Vegetation

1. Review Preservation of Property, Standard Specifications 16.1.01 and 16-1.02 (Clearing and Grubbing) to reduce clearing and grubbing and maximize preservation of existing vegetation. ☒ Complete

2. Has all vegetation to be retained been coordinated with Environmental, and identified and defined in the contract plans? ☐ Yes ☒ No
   To be determined during PS&E

3. Have steps been taken to minimize disturbed areas, such as locating temporary roadways to avoid stands of trees and shrubs and to follow existing contours to reduce cutting and filling? ☒ Complete

4. Have impacts to preserved vegetation been considered while work is occurring in disturbed areas? ☒ Yes ☐ No

5. Are all areas to be preserved delineated on the plans? ☐ Yes ☒ No
   To be determined during PS&E

ATTACHMENT I

Checklists T-1, Parts 1-10

Treatment BMPs
Checklist T-1, Part 1

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Consideration of Treatment BMPs

This checklist is used for projects that require the consideration of Approved Treatment BMPs, as determined from the process described in Section 4 (Project Treatment Consideration) and the Evaluation Documentation Form (EDF). This checklist will be used to determine which Treatment BMPs should be considered for each watershed and sub-watersheds within the project. Supplemental data will be needed to verify siting and design applicability for final incorporation into a project.

Complete this checklist for each phase of the project, when considering Treatment BMPs. Use the responses to the questions as the basis when developing the narrative in Section 5 of the Storm Water Data Report to document that Treatment BMPs have been appropriately considered.

Answer all questions, unless otherwise directed.

1. Dry Weather Flow Diversion
   - (a) Are dry weather flows generated by Caltrans anticipated to be persistent? ☒ Yes ☐ No
   - (b) Is a sanitary sewer located on or near the site? ☒ Yes ☐ No
   - (c) Is the domestic wastewater treatment authority willing to accept flow? ☒ Yes ☐ No

   If Yes was answered to all of these questions consider Dry Weather Flow Diversion, complete and attach Part 3 of this checklist

2. Is the receiving water on the 303(d) list for litter/trash or has a TMDL been issued for litter/trash? ☐ Yes ☒ No

   If Yes, consider Gross Solids Removal Devices (GSRDs), complete and attach Part 6 of this checklist. Note: Biofiltration Systems, Infiltration Basins, Detention Devices, Media Filters, MCTTs, and Wet Basins also can capture litter – consult with District/Regional NPDES if these devices should be considered to meet litter/trash TMDL. ***N/A***

3. Is project located in an area (e.g., mountain regions) where traction sand is applied more than twice a year? ☐ Yes ☒ No
   If Yes, consider ***Traction Sand Traps***, complete and attach **Part 7** of this checklist.

4. (a) Are there local influent limits for infiltration or Basin Plan restrictions or other local agency prohibitions that would restrict the use of the infiltration devices? ☐ Yes ☐ No
   To be determined during PS&E

   (b) Would infiltration pose a threat to local groundwater quality as determined by the District/Regional NPDES Storm Water Coordinator? ☐ Yes ☐ No
   To be determined during PS&E
   If the answer to either part of Question 4 is Yes, then Infiltration Devices are infeasible and the consideration of Infiltration Devices should not be made when completing Questions 5 through 17.

5. (a) Does the project discharge to any 303(d) listed water body? ☒ Yes ☐ No
If No, go to Question 17, General Purpose Pollutant Removal

(b) If Yes, is the identified pollutant(s) considered a Targeted Design Constituent (TDC) (check all that apply):
___ phosphorus, ___ nitrogen, ___ total copper, ___ dissolved copper,
___ total lead, ___ dissolved lead, ___ total zinc, ___ dissolved zinc,
___ sediments, ___ general metals [unspecified metals].

None of the identified pollutants are considered Targeted Design Constituents (TDC)

(c) If only one TDC is checked above, continue to Question 6. ***N/A*** ☒ Complete

(d) If more than one TDC is checked, contact your District/Regional NPDES Coordinator to determine priority before continuing with this checklist. ***N/A*** ☒ Complete

6. Consult with the District/Regional Storm Water Coordinator to determine whether Treatment BMP selection will be affected by any existing or future TMDL requirements. ***N/A*** ☒ Complete

The following questions show the approved Treatment BMPs in order of preference based on load reduction (performance) for the listed constituent and lifetime costs for the device, excluding right of way. Note that a line separates Treatment BMPs into groups of approximately equal effectiveness and within each grouping, any of the Treatment BMPs may be selected for placement if meeting site conditions. In the space provided next to the BMP, use Yes or a check mark to indicate a positive response.

For the SWDRs developed for the PID and PA/ED phases of a project: **Consider all approved Treatment BMPs listed that can be reasonably incorporated into the project for each TDC.**

For the SWDR developed for the PS&E phase: **Indicate (Yes or check mark) only those BMPs that will be incorporated into the project.**

7. Is phosphorus the TDC? [Use this constituent if "eutrophic" or "nutrients" is the TDC for the water body.] If Yes, consider: ☐ Yes ☒ No
____ Infiltration Devices
____ Austin Sand Filters

8. Is nitrogen the TDC? If Yes, consider: ☐ Yes ☒ No

____ Infiltration Devices
____ Austin Sand Filter
____ Delaware Filter
____ Detention Device
____ MCTT

9. Is copper (total) the TDC? If Yes for total Copper, consider: ☐ Yes ☒ No
   - ____ Infiltration Devices
   - ____ Wet Basins
   - ____ Biolfiltration Strips
   - ____ Detention Devices
   - ____ Biofiltration Swales
   - ____ Austin Sand Filter
   - ____ Delaware Filter
   - ____ MCTT

10. Is copper (dissolved) the TDC? If Yes for dissolved Copper, consider: ☐ Yes ☒ No
   - ____ Infiltration Devices
   - ____ Biofiltration Strips
   - ____ Wet Basin
   - ____ Biofiltration Swale

11. Is lead (total) the TDC? If Yes for total Lead, consider: ☐ Yes ☒ No
   - ____ Infiltration Devices
   - ____ Wet Basin
   - ____ Biofiltration Strips
   - ____ Austin Sand Filter
   - ____ Delaware Filter
   - ____ Detention Devices
   - ____ Biofiltration Swales
   - ____ MCTT

12. Is lead (dissolved) the TDC? If Yes for dissolved Lead, consider: ☐ Yes ☒ No
   - ____ Infiltration Devices
   - ____ Biofiltration Strips
   - ____ Wet Basin
   - ____ Detention Device
   - ____ Biofiltration Swales
   - ____ Austin Sand Filters

13. Is zinc (total) the TDC? If Yes for total Zinc, consider: ☐ Yes ☒ No
   - ____ Infiltration Devices
   - ____ Delaware Filter
   - ____ Wet Basin
   - ____ Biofiltration Strips
   - ____ Biofiltration Swales
   - ____ Austin Sand Filter
   - ____ MCTT
   - ____ Detention Devices

14. Is zinc (dissolved) the TDC? If Yes for dissolved Zinc, consider: ☐ Yes ☒ No
   - ____ Infiltration Devices
   - ____ Delaware Filter
   - ____ Biofiltration Strip
   - ____ Biofiltration Swale
   - ____ Austin Sand Filter
   - ____ MCTT

15. Is sediment (total suspended solids [TSS]) the TDC? If Yes for TSS, consider: ☐ Yes ☒ No

____ Infiltration Devices
____ Austin Sand Filter
____ Delaware Filter
____ Wet Basin
____ Detention Device
____ Biofiltration Strip
____ MCTT
____ Biofiltration Swale

16. Are "General Metals" or (unspecified) "Metals" the TDC? If Yes for General Metals, consider: ☐ Yes ☒ No

____ Infiltration Devices
____ Biofiltration Strips
____ Wet Basin
____ Biofiltration Swale
____ Austin Sand Filter
____ Delaware Filter
____ MCTT

17. General Purpose Pollutant Removal.: When it is determined that there are no TDCs, consider the Treatment BMPs in the order listed below. ☒ Yes ☐ No

__x__ Infiltration Devices
__x__ Biofiltration Strips
_____ Wet Basin
__x__ Biofiltration Swale
__x__ Austin Sand Filter
__x__ Detention Device
_____ Delaware Filter
_____ MCTT

18. Biofiltration

(a) Are site conditions and climate favorable to allow suitable vegetation to be established? ☒ Yes ☐ No

(b) Have Biofiltration strips and swales been considered to the extent practicable? Note: Biofiltration BMPs should be considered for all projects, even if other Treatment BMPs are placed. ☒ Yes ☐ No

If No to (a) or (b), document justification in Section 5 of the SWDR.

19. After completing the above, complete and attach the checklists shown below for every Treatment BMP under consideration ☒ Complete

__x__ Biofiltration Strips and Biofiltration Swales: Checklist T-1, Part 2
__x__ Dry Weather Diversion: Checklist T-1, Part 3
__x__ Infiltration Devices: Checklist T-1, Part 4
__x__ Detention Devices: Checklist T-1, Part 5
_____ GSRDs: Checklist T-1, Part 6
_____ Traction Sand Traps: Checklist T-1, Part 7
__x__ Media Filter [Austin Sand Filter and Delaware Filter]: Checklist T-1, Part 8
__x__ Multi-Chambered Treatment Train: Checklist T-1, Part 9
__x__ Wet Basins: Checklist T-1, Part 10

20. (a) Estimate what percentage of WQV/WQF will be treated by the preferred Treatment BMP(s): 100 %

Alternative 2 (No-Detour/With Detour):
WQV = 1424 m3
WQF = 0.111 m3/s

Alternative 5 (Hook Ramp):
WQV = 1702 m3
WQF = 0.132 m3/s

Alternative 5 (Loop Ramp):
WQV = 1801 m3
WQF = 0.140 m3/s

☒ Complete

The percentage of Water Quality Volume/Water Quality Flow (WQV/WQF) to be treated will depend on which treatment BMPs are selected and where in the system specific devices are placed. If it is determined during PS&E that it is possible to discharge all storm runoff to the City of San Francisco's combined storm water and sanitary sewer, then 100% of the WQV/WQF will be treated. Refer to attachments J. and K. for proposed treatment BMP locations and WQV/WQF percent treatment calculations.

(b) Have Treatment BMPs been considered for use in parallel or series to increase this percentage?

☐ Yes ☒ No

21. Prepare cost estimate, including right of way, for selected Treatment BMPs and include as supplemental information for SWDR approval.

☒ Complete

Current estimates are at the planning level only

Treatment BMPs
Checklist T-1, Part 2

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Biofiltration Swales / Biofiltration Strips

Right-of-way may exist in the Park Presidio Interchange area to accommodate this BMP

Feasibility

1. Do the climate and site conditions allow vegetation to be established? ☒ Yes ☐ No

2. Are flow velocities < 1.2 m/s (4 fps) (i.e. low enough to prevent scour of the vegetated bioswale as per HDM Table 873.3I)? ☒ Yes ☐ No
   Flow velocities will be designed to meet requirements during final design should this BMP be incorporated

   If No to either question above, Biofiltration Swales and Biofiltration Strips are not feasible.

3. Are Biofiltration Swales proposed at sites where known hazardous soils or contaminated groundwater plumes exist? ☐ Yes ☒ No
   If Yes, consult with District/Regional NPDES Coordinator about how to proceed.

   Does adequate area exist within the right-of-way to place biofiltration device(s)? ☒ Yes ☐ No
   If Yes, continue to the Design Elements section. If No, continue to Question 5.

   It may be possible to locate biofiltration swales/strips in the west end of the project

4. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site biofiltration devices and how much right-of way would be needed to treat WQF? _____ ha (ac) ☐ Yes ☒ No
   If Yes, continue to Design Elements section. If No, continue to Question 6.

5. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of these Treatment BMPs into the project. ☒ Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Has the District Landscape Architect provided vegetation mixes appropriate for climate and location? * ❑ Yes ❑ No

2. Can the bioswale be designed as a conveyance system under any expected flows > the WQF event, as per HDM Chapter 800? * (e.g. freeboard, minimum slope, etc.) ❑ Yes ❑ No

3. Can the bioswale be designed as a water quality treatment device under the WQF while meeting the required HRT, depth, and velocity criteria? * ❑ Yes ❑ No

4. Is the maximum length of a biostrip ≤ 91 m (300 ft)? * ❑ Yes ❑ No

5. Has the minimum width (in the direction of flow) of the invert of the bioswale received the concurrence of Maintenance? * ❑ Yes ❑ No

6. Can bioswales be located in natural or low cut sections to reduce maintenance problems caused by animals burrowing through the berm of the swale? ** ❑ Yes ❑ No

7. Is the biostrip sized as long as possible in the direction of flow (HRT ≥ 5 minutes)? ** ❑ Yes ❑ No

8. Has biofiltration been considered for locations upstream of other Treatment BMPs, as part of a treatment train? ** ❑ Yes ❑ No

Treatment BMPs
Checklist T-1, Part 3

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Dry Weather Flow Diversion

Feasibility

1. Is dry-weather flow diversion acceptable to a Publicly Owned Treatment Works (POTW)? ☒ Yes ☐ No
2. Would a connection require ordinary (i.e., not extraordinary) plumbing to implement? ☐ Yes ☐ No
   To be determined during PS&E
   If No to either question above, Dry Weather Flow Diversion is not feasible.
3. Does adequate area exist within the right-of-way to place Dry Weather Flow Diversion devices? ☒ Yes ☐ No
   If Yes, continue to Design Elements sections. If No, continue to Question 4.
4. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Dry Weather Flow Diversion devices and how much right-of way would be needed? _____ ha (ac) ☐ Yes ☒ No
   If Yes, continue to the Design Elements section.

   If No, continue to Question 5.
5. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☒ Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

Design elements will be further explored during PS&E

1. Does the existing sanitary sewer pipeline have adequate capacity to accept project dry weather flows, or can an upgrade be implemented to handle the anticipated dry weather flows within the project's budget and objectives? * ❑ Yes ❑ No
2. Can the connection be designed to allow for Maintenance vehicle access? * ❑ Yes ❑ No
3. Can gate, weir, or valve be designed to stop diversion during storm events? * ❑ Yes ❑ No
4. Can the inlet be designed to reduce chances of clogging the diversion pipe or channel? * ❑ Yes ❑ No
5. Can a back flow prevention device be designed to prevent sanitary sewage from entering storm drain? * ❑ Yes ❑ No

Treatment BMPs
Checklist T-1, Part 4

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Infiltration Devices

Infiltration devices are not feasible for this project due to the fact that the project site is located over a previously identified contaminated groundwater plume.

Feasibility

1.	Does local Basin Plan or other local ordinance provide influent limits on quality of water that can be infiltrated, and would infiltration pose a threat to groundwater quality as determined by the District/Regional NPDES Storm Water Coordinator?	☒ Yes	☐ No
2.	Does infiltration at the site compromise the integrity of any slopes in the area?	☐ Yes	☒ No
3.	Per survey data or U.S. Geological Survey (USGS) Quad Map, are existing slopes at the proposed device site >15%?	☐ Yes	☒ No
4.	At the invert, does the soil type classify as NRCS Hydrologic Soil Group (HSG) D, or does the soil have an infiltration rate < 1.3 cm/hr (0.5 inches/hr)?	☒ Yes	☐ No
5.	Is site located over a previously identified contaminated groundwater plume?	☒ Yes	☐ No
	If Yes to any question above, Infiltration Devices are not feasible; stop here and consider other approved Treatment BMPs.		
6.	(a) Does site have groundwater within 3 m (10 ft) of basin invert?	☐ Yes	☐ No
	(b) Does site investigation indicate that the infiltration rate is significantly greater than 6.4 cm/hr (2.5 inches/hr)?	☐ Yes	☐ No
	If Yes to either part of Question 6, the RWQCB must be consulted, and the RWQCB must conclude that the groundwater quality will not be compromised, before approving the site for infiltration.	☐ Yes	☐ No
7.	Does adequate area exist within the right-of-way to place infiltration device(s)? If Yes, continue to Design Elements sections. If No, continue to Question 8.	☐ Yes	☐ No
8.	If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site infiltration devices and how much right-of way would be needed to treat WQV? _____ ha (ac)	☐ Yes	☐ No
	If Yes, continue to Design Elements section.		
	If No, continue to Question 9.		
9.	If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project.	☐ Complete	

Design Elements – Infiltration Basin

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1.	Has a detailed investigation been conducted, including subsurface soil investigation, in-hole conductivity testing and groundwater elevation determination? (This report must be completed for PS&E level design.) *	❑ Yes	❑ No
2.	Has a flood control spillway with scour protection been provided? *	❑ Yes	❑ No
3.	Is the Infiltration Basin size sufficient to capture the WQV while maintaining a 40-48 hour drawdown time? (Note: the WQV must be ≥ 123m^3 [0.1 acre-feet]) *	❑ Yes	❑ No
4.	Can access be placed to the invert of the Infiltration Basin? *	❑ Yes	❑ No
5.	Can the Infiltration Basin be designed with adequate freeboard above the WQV elevation? *	❑ Yes	❑ No
6.	Can the Infiltration Basin be designed with interior side slopes no steeper than 1V:3H (with approval by District Maintenance, with 1:4 preferred)? *	❑ Yes	❑ No
7.	Can vegetation be established in the Infiltration Basin? **	❑ Yes	❑ No
8.	Can diversion be designed, constructed, and maintained to bypass flows exceeding the WQV? **	❑ Yes	❑ No
9.	Can a gravity-fed Maintenance/Emergency Drain be placed? **	❑ Yes	❑ No

Design Elements – Infiltration Trench

* **Required** Design Element – (see definition above)
** **Recommended** Design Element – (see definition above)

1.	Has a detailed investigation been conducted, including subsurface soil investigation, in-hole conductivity testing and groundwater elevation determination? (This report must be completed for PS&E level design.) *	❑ Yes	❑ No
2.	Is the surrounding soil within Hydrologic Soil Groups (HSG) Types A or B? *	❑ Yes	❑ No
3.	Is the volume of the Infiltration Trench equal to at least the 3x the WQV, while maintaining a drawdown time of ≤ 72 hours? (Note: the WQV must be ≥ 123m^3 [0.1 acre-feet], unless the District/Regional NPDES Coordinator will allow a volume between 80 m^3 and 123 m^3 to be considered.) *	❑ Yes	❑ No
4.	Is the depth of the Infiltration Trench ≤ 4 m, and is the depth < the width? *	❑ Yes	❑ No
5.	Can an observation well be placed in the trench? *	❑ Yes	❑ No
6.	Can access be provided to the Infiltration Trench? *	❑ Yes	❑ No
7.	Can pretreatment be provided to capture sediment in the runoff (such as using biofiltration)? *	❑ Yes	❑ No
8.	Can flow diversion be designed, constructed, and maintained to bypass flows exceeding the WQV? **	❑ Yes	❑ No
9.	Can a perimeter curb or similar device be provided (to limit wheel loads upon the trench)? **	❑ Yes	❑ No

Treatment BMPs
Checklist T-1, Part 5

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Detention Devices

Detention devices are not feasible for this project due to a high water table

Feasibility

1. Is there sufficient head to prevent objectionable backwater conditions in the upstream drainage systems? ☒ Yes ☐ No
   To be determined during PS&E

2. 2a) Is the volume of the detention device equal to at least the WQV? (Note: the WQV must be ≥ 123m^3 [0.1 acre-feet]) ☒ Yes ☐ No
   To be determined during PS&E

   Only answer (b) if the detention device is being used also to capture traction sand.

   2b) Is the total volume of the detention device at least equal to the WQV and the anticipated volume of traction sand, while maintaining a minimum 300 mm freeboard (1 ft)? ☐ Yes ☐ No

3. Is basin invert ≥ 3 m above seasonally high groundwater or can it be designed with an impermeable liner? (Note: If an impermeable liner is used, the seasonally high groundwater elevation must not encroach within 300 mm (12 inches) of the invert.) ☐ Yes ☒ No

If No to any question above, then Detention Devices are not feasible.

4. Does adequate area exist within the right-of-way to place Detention Device(s)? ☐ Yes ☐ No

   If Yes, continue to the Design Elements section. If No, continue to Question 5.

5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Detention Device(s) and how much right-of way would be needed to treat WQV? _____ ha (ac) ☐ Yes ☐ No

   If Yes, continue to the Design Elements section. If No, continue to Question 6.

6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐ Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Has the geotechnical integrity of the site been evaluated to determine potential impacts to surrounding slopes due to incidental infiltration? If incidental infiltration through the invert of an unlined detention device is a concern, consider using an impermeable liner. *	❑ Yes	❑ No
2. Has the location of the detention device been evaluated for any effects to the adjacent roadway and subgrade? *	❑ Yes	❑ No
3. Can a minimum freeboard of 300 mm (12 in) be provided above the WQV? *	❑ Yes	❑ No
4. Is an emergency outlet provided? *	❑ Yes	❑ No
5. Is the drawdown time of the detention basin within 24 to 72 hours? *	❑ Yes	❑ No
6. Is the basin outlet designed to minimize clogging (minimum outlet orifice diameter of 13 mm (0.5 inches)? *	❑ Yes	❑ No
7. Are the inlet and outlet structures designed to prevent scour and re-suspension of settled materials, and to enhance quiescent conditions? *	❑ Yes	❑ No
8. Can vegetation be established in an earthen basin at the invert and on the side slopes for erosion control and to minimize re-suspension? *	❑ Yes	❑ No
9. Has sufficient access for Maintenance been provided? *	❑ Yes	❑ No
10. Is the side slope ratio of earthen berms 1V:3H or flatter? ** (Note: If No, District Maintenance must approve.)	❑ Yes	❑ No
11. If significant sediment is expected from nearby slopes, can the detention device be designed with additional volume equal to the expected annual loading? **	❑ Yes	❑ No
12. Is flow path as long as possible (≥ 2:1 length to width ratio is recommended)? **	❑ Yes	❑ No

Treatment BMPs
Checklist T-1, Part 8

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Media Filters

Caltrans has approved two types of Media Filter: Austin Sand Filters and Delaware Filters. Austin Sand filters are typically designed for larger drainage areas, while Delaware Filters are typically designed for smaller drainage areas. The Austin Sand Filter is constructed with an open top and may have a concrete or earthen invert, while the Delaware is always constructed in as a vault. See Appendix B, Media Filters, for a further description of Media Filters.

Media filters may need to be located underneath structures since right-of-way is limited. In addition, using a Delaware filter will require maintenance programs for vector control

Feasibility – Austin Sand Filter

1. Is the volume of the Austin Sand Filter equal to at least the WQV using a 40 to 48 hour drawdown? (Note: the WQV must be ≥ 123m^3 [0.1 acre-feet]) ☒ Yes ☐ No

   Filter volumes will be designed to meet requirements during final design

2. Is there sufficient hydraulic head to operate the device (minimum 0.9 m [3 ft] between the inflow and outflow chambers)? ☒ Yes ☐ No
   Filter will be designed to meet requirements during final design
   If No to either question above, then an Austin Sand Filter is not feasible.

3. Does adequate area exist within the right-of-way to place an Austin Sand Filter(s)? ☒ Yes ☐ No
   If Yes, continue to Design Elements sections. If No, continue to Question 4.

4. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ ha (ac) ☐ Yes ☒ No
   If Yes, continue to the Design Elements section.

   If No, continue to Question 5.

5. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☒ Complete

   If an Austin Sand Filter meets these feasibility requirements, continue to the Design Elements – Austin Sand Filter below.

Feasibility- Delaware Filter

1. Is the volume of the Delaware Filter equal to at least the WQV using a 40 to 48 hour drawdown? (Note: the WQV must be ≥ 123m^3 [0.1 acre-feet], consult with District/Regional NPDES if a lesser volume is under consideration.) ☒ Yes ☐ No

   Filter volumes will be designed to meet requirements during final design

2. Is there sufficient hydraulic head to operate the device (minimum 0.9 m [3 ft] between the inflow and outflow chambers)? ☒ Yes ☐ No

   Filter will be designed to meet requirements during final design

3. Would a permanent pool of water be allowed by the local vector control agency? ☐ Yes ☒ No

   A maintenance program would need to be implemented to address standing water and vector control issues.

If No to any question, then a Delaware Filter is not feasible

4. Does adequate area exist within the right-of-way to place a Delaware Filter (s)? If Yes, continue to Design Elements sections. If No, continue to Question 5. ☒ Yes ☐ No

5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ ha (ac) ☐ Yes ☒ No
   If Yes, continue to the Design Elements section. If No, continue to Question 6.

6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☒ Complete

   If a Delaware Filter is still under consideration, continue to the Design Elements – Delaware Filter section.

Design Elements – Austin Sand Filter

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

Filter details will be evaluated during final design.

1. Is the drawdown time of the 2nd chamber between 40 and 48 hours? * ❑ Yes ❑ No
2. Is access for Maintenance vehicles provided to the Austin Sand Filter? * ❑ Yes ❑ No
3. Is a bypass/overflow provided for storms > WQV? * ❑ Yes ❑ No

4. Is the flow path length to width ratio for the sedimentation chamber of the "full" Austin Sand Filter ≥ 2:1? **

5. Can pretreatment be provided to capture sediment and litter in the runoff (such as using biofiltration)? ** ❑ Yes ❑ No

6. Can the Austin Sand Filter be placed using an earthen configuration? ** ❑ Yes ❑ No
   If No, go to Question 8.

7. Is the Austin Sand Filter invert separated from the seasonally high groundwater table by ≥ 3m? * ❑ Yes ❑ No
   If No, design with an impermeable liner.

8. Can the Austin Sand Filter be placed in an offline configuration? ** ❑ Yes ❑ No

Design Elements – Delaware Filter

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Can the first chamber be sized for the WQV? * ❑ Yes ❑ No

2. Is the drawdown time of the 2nd chamber between 40 and 48 hours? * ❑ Yes ❑ No

3. Is access for Maintenance vehicles provided to the Delaware Filter? * ❑ Yes ❑ No

4. Is a bypass/overflow provided for storms > WQV? ** ❑ Yes ❑ No

5. Can pretreatment be provided to capture sediment and litter in the runoff (such as using biofiltration)? ** ❑ Yes ❑ No

6. Can the Delaware Filter be placed in an offline configuration? ** ❑ Yes ❑ No

Treatment BMPs
Checklist T-1, Part 9

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

MCTT (Multi-chambered Treatment Train)

MCTTs can only be used if accompanied with a maintenance program to address vector control issues associated with standing water.

Feasibility

1. Is the proposed location for the MCTT located to serve a "critical source area" (i.e. vehicle service facility, parking area, paved storage area, or fueling station)? ☐ Yes ☐ No

   To be determined during PS&E

2. Is the WQV ≥123 m³? ☒ Yes ☐ No

3. Would a permanent pool of water be allowed by the local vector control agency?

   A maintenance program would need to be implemented to address vector control issues associated with standing water. ☐ Yes ☒ No

   If No to any question above, then an MCTT is not feasible.

4. Does adequate area exist within the right-of-way to place an MCTT(s)? ☒ Yes ☐ No
   If Yes, continue to Design Elements sections. If No, continue to Question 5.

5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ ha (ac) ☐ Yes ☒ No
   If Yes, continue to Design Elements section. If No, continue to Question 6.

6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☒ Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Is the maximum depth of the 3rd chamber ≤ 4 m below ground surface and has Maintenance accepted this depth? * ❑ Yes ❑ No
2. Is the drawdown time in the 3rd chamber between 40 and 48 hours? * ❑ Yes ❑ No
3. Is access for Maintenance vehicles provided to the MCTT? * ❑ Yes ❑ No
4. Is there sufficient hydraulic head to operate the device? * ❑ Yes ❑ No

5. Has a bypass/overflow been provided for storms > WQV? * ❑ Yes ❑ No

6. Can pretreatment be provided to capture sediment and litter in the runoff (such as using biofiltration)? ** ❑ Yes ❑ No

Treatment BMPs
Checklist T-1, Part 10

Prepared by: K. Chang Date: Jan. 2006 District-Co-Route: 04-SF-101, 04-SF-001
KP (PM): KP12.8-15.7 (PM 8.0-9.8), KP10.9-11.4 (PM 6.8-7.1) EA: 163700
RWQCB: San Francisco Bay

Wet Basin

Wet basins can be considered only if maintenance programs are implemented to address vector control issues.

Feasibility

1. Is the volume of the Wet Basin above the permanent pool equal to at least the WQV using a 40 to 48 hour drawdown? (Note: the WQV must be ≥ 123m^3 [0.1 acre-feet] and the permanent pool must be at least 3x the WQV.) ☒ Yes ☐ No

   Wet basin will be designed to meet requirements during final design

2. Is a permanent source of water available in sufficient quantities to maintain the permanent pool for the wet basin? ☒ Yes ☐ No

   Answer either question 3 or question 4:

3. For Wet Basins with a proposed invert above the seasonally high groundwater, Are NRCS Hydrologic Soil Groups [HSG] C and D at the proposed invert elevation, or can an impermeable liner be used? (Note: If an impermeable liner is used, the seasonally high groundwater elevation must not encroach within 300 mm (12 in) of the invert.) ☐ Yes ☐ No

   To be determined during PS&E

4. For Wet Basins with a proposed invert below the groundwater table: Can written approval from the local Regional Water Quality Control Board be obtained to place the wet basin in direct hydraulic connectivity to the groundwater? ☐ Yes ☐ No

5. Would a permanent pool of water be allowed by the local vector control agency? ☐ Yes ☒ No

   This BMP would require approval from local agencies, including vector control.

   If No to any question above, then a Wet Basin is not feasible.

6. Does adequate area exist within the right-of-way to place a Wet Basin? ☒ Yes ☐ No
   If Yes, continue to Design Elements sections.

   If No, continue to Question 7.

7. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ ha (ac) ☐ Yes ☒ No
   If Yes, continue to Design Elements section.

   If No, continue to Question 8.

8. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☒ Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Can a controlled outlet and an overflow structure be designed for storm events larger than the WQV? * ❑ Yes ❑ No
2. Is access for Maintenance vehicles provided? * ❑ Yes ❑ No
3. Is the drawdown time for WQV events between 24 and 72 hours? * ❑ Yes ❑ No
4. Has appropriate vegetation been selected for each hydrologic zone? * ❑ Yes ❑ No
5. Can all design elements required by the local vector control agency be incorporated? * ❑ Yes ❑ No
6. Has a minimum flow path length-to-width ration of at least 2:1 been provided? ** ❑ Yes ❑ No
7. Has an upstream bypass been provided for storms > WQV? ** ❑ Yes ❑ No
8. Can pretreatment be provided to capture sediment and litter in the runoff (such as using biofiltration, or a forebay)? ** ❑ Yes ❑ No
9. Can public access be restricted using a fence if proposed at locations accessible on foot by the public? ** ❑ Yes ❑ No

ATTACHMENT J

WQV/WQF Calculations

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Calculations

Prepared By: K. Chang Date: 1/11/2006
Checked By: M. Grodzki Date: 1/11/2006
Revised By: K. Chang Date: 6/5/2006

Purpose: To calculate Water Quality Volumes (WQV) and Water Quality Flows (WQF) for this project

Assumptions/ Methods:
-Basin Sizer version 1.3 was used for these calculations.
-WQV is Calculated as:
WQV = (Water Quality Event Depth x Runoff Coefficient) x Tributary Area
(Water Quality Event Depth x Runoff Coefficient) is taken from the Basin Sizer output data
-WQF is calculated using the Rational formula:
WQF = CiA
Where C=runoff coefficient, i=rainfall intensity (taken from Basin Sizer output data), and A = tributary area
-Runofff Coefficient for this project is **C=0.9**

References:
-Caltrans Storm Water Quality Handbooks - Project Planning and Design Guide September 2002
-Doyle Drive Draft Storm Water Data Report

Output Data from Basin Sizer:

Project: Untitled1

Latitude 37.80.21
Longitude 122.31.03

Stations

Name	Rainfall	Rainfall	Rainfall
SAN FRANCISCO DOWNTOWN	4.96	54	4.66

Water Quality Volumes

Maximized Volume Method (cm/area)*

Basin Drawdown Time (hr)	Runoff Coefficient							
	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
12	0.35	0.44	0.56	0.73	0.78	0.91	1.05	1.2
24	0.44	0.59	0.75	0.96	1.03	1.11	1.3	1.37
48	0.56	0.74	0.93	1.09	1.22	1.35	1.64	1.87
72	0.64	0.84	1.05	1.26	1.4	1.67	1.98	2.05

Water Quality Event Depth x Runoff Coefficient

85th Percentile 24-hr Storm

Rainfall
0.51 cm/0.2 in

rainfall intensity, i

Water Quality Flows

Region 2, all counties: 0.51 cm

* The 85th Percentile 24-hr storm is not the same as the 85th percentile 24-hour runoff event in the Caltrans State Wide Storm Water Management Plan. Caltrans should use the Maximized Volume method.

CSUS, Office of Water Programs

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Calculations

Prepared By: K. Chang Date: 1/11/2006
Checked By: M. Grodzki Date: 1/11/2006
Revised By: K. Chang Date: 6/5/2006

Alternative 2:

WQV Calculation

		Line
area =	97,501 m^2	1
Water Quality Event Depth x runoff coeff. =	1.64 cm	2
conversion (cm to m) =	0.01	3

WQV = Line 1 x Line 2 x Line 3
WQV = 1599 m^3

WQF Calculation

		Line
area =	97,501 m^2	1
runoff coeff. =	0.9	2
i =	0.51 cm/hr	3
conversion (cm to m) =	0.01	4
conversion (hr to sec) =	0.000278	5

WQF = Lines 1 x 2 x 3 x 4 x 5
WQV = 0.124 m^3/s

Alternative 5 (Hook Ramp Option):

WQV Calculation

		Line
area =	99,261 m^2	1
Water Quality Event Depth x runoff coeff. =	1.64 cm	2
conversion (cm to m) =	0.01	3

WQV = Line 1 x Line 2 x Line 3
WQV = 1628 m^3 *rev. KC 06/06/2006*

WQF Calculation

		Line
area =	99,261 m^2	1
runoff coeff. =	0.9	2
i =	0.51 cm/hr	3
conversion (cm to m) =	0.01	4
conversion (hr to sec) =	0.000278	5

WQF = Lines 1 x 2 x 3 x 4 x 5
WQV = 0.127 m^3/s *rev. KC 06/06/2006*

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Calculations

Prepared By: K. Chang Date: 1/11/2006
Checked By: M. Grodzki Date: 1/11/2006
Revised By: K. Chang Date: 6/5/2006

Alternative 5 (Loop Ramp Option):

WQV Calculation

		Line
area =	105,992 m^2	1
Water Quality Event Depth x runoff coeff. =	1.64 cm	2
conversion (cm to m) =	0.01	3

WQV = Line 1 x Line 2 x Line 3

WQV = 1738 m^3 *rev. KC 06/06/2006*

WQF Calculation

		Line
area =	105,992 m^2	1
runoff coeff. =	0.9	2
i =	0.51 cm/hr	3
conversion (cm to m) =	0.01	4
conversion (hr to sec) =	0.000278	5

WQF = Lines 1 x 2 x 3 x 4 x 5

WQV = 0.135 m^3/s *rev. KC 06/06/2006*

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Percent Treatment Calculations

Prepared By: K. Chang Date: 1/9/2006
Checked By: S. Heber Date: 1/10/2006
Revised By: K. Chang Date: 6/6/2006

Purpose: To estimate the percentage of WQV/WQF treated by each of the proposed treatment BMP units in this project

Assumptions:
-Percent of WQV/WQF treated For each BMP is calculated based on percent of total runoff area that that particular BMP is expected to treat.
-Treatment BMP locations shown in the Proposed Treatment BMP locations diagrams represent possible locations where Treatment BMPs may be located based on preliminary plans/profiles, etc.
-Actual Treatment BMP types/locations/sizing will be determined during PS&E phase.
-For Treatment BMP type selection refer to Draft Storm Water Data Report.
-Bioswale/strip design uses WQF criteria rather than WQV.

References:
-Caltrans Storm Water Quality Handbooks - Project Planning and Design Guide September 2002
-Doyle Drive Draft Storm Water Data Report

Alternative 2 - Replace & Widen (No-Detour & With-Detour)

Total Roadway Surface (Runoff Area)= 97,501 m^2
WQV= 1599 m^3
WQF= 0.124 m^3/s

BMP Unit*	Unit Type	Area Treated (m^2)	Percent WQV/WQF Treated (%)	Criteria Used
1**	Wet Basin	10,703	11%	WQV
2**	Bioswale/strip	10,703	11%	WQF
3	MCTT	7,204	7%	WQV
4	Media Filter	15,640	16%	WQV
5	MCTT	13,205	14%	WQV
6	Media Filter	20,770	21%	WQV
7	Media Filter	5,311	5%	WQV
8	MCTT	9,020	9%	WQV
9	MCTT	15,648	16%	WQV
		Total:	100%	

*refer to Treatment BMP plans for locations
**either wet basin or bioswale/strip can be considered in this location, but only one will be used.

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Percent Treatment Calculations

Prepared By: K. Chang Date: 1/9/2006
Checked By: S. Heber Date: 1/10/2006
Revised By: K. Chang Date: 6/6/2006

Alternative 5 - Presidio Parkway (Hook Ramp Option)

Total Roadway Surface (Runoff Area)= 99,261 m^2
WQV= 1628 m^3
WQF= 0.127 m^3/s

BMP Unit*	Unit Type	Area Treated (m^2)	Percent WQV/WQF Treated (%)	Criteria Used	
1**	Wet Basin	11,542	12%	WQV	
2**	Bioswale/strip	11,542	12%	WQF	
3	MCTT	14,548	15%	WQV	
4	Media Filter	11,542	12%	WQV	
5	Media Filter	10,073	10%	WQV	
6	MCTT	16,672	17%	WQV	*rev. KC 06/06/2006*
7	Media Filter	10,940	11%	WQV	*rev. KC 06/06/2006*
8	MCTT	12,597	13%	WQV	
9	MCTT	11,348	11%	WQV	
		Total:	100%		

*refer to Treatment BMP plans for locations
**either wet basin or bioswale/strip can be considered in this location, but only one will be used.

Alternative 5 - Presidio Parkway (Loop Ramp Option)

Total Roadway Surface (Runoff Area)= 105,992 m^2
WQV= 1738 m^3
WQF= 0.135 m^3/s

BMP Unit*	Unit Type	Area Treated (m^2)	Percent WQV/WQF Treated (%)	Criteria Used	
1**	Wet Basin	11,593	11%	WQV	
2**	Bioswale/strip	11,593	11%	WQF	
3	MCTT	21,605	20%	WQV	
4	Media Filter	11,593	11%	WQV	
5	Media Filter	9,644	9%	WQV	
6	MCTT	16,672	16%	WQV	*rev. KC 06/06/2006*
7	Media Filter	10,940	10%	WQV	*rev. KC 06/06/2006*
8	MCTT	12,597	12%	WQV	
9	MCTT	11,348	11%	WQV	
		Total:	100%		

*refer to Treatment BMP plans for locations
**either wet basin or bioswale/strip can be considered in this location, but only one will be used.

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Calculations

Prepared By: K. Chang Date: 1/11/2006
Checked By: M. Grodzki Date: 1/11/2006
Revised By: K. Chang Date: 3/10/2006

Purpose: To calculate Water Quality Volumes (WQV) and Water Quality Flows (WQF) for this project

Assumptions/ Methods:
-Basin Sizer version 1.3 was used for these calculations.
-WQV is Calculated as:
WQV = (Water Quality Event Depth x Runoff Coefficient) x Tributary Area
(Water Quality Event Depth x Runoff Coefficient) is taken from the Basin Sizer output data
-WQF is calculated using the Rational formula:
WQF = CiA
Where C=runoff coefficient, i=rainfall intensity (taken from Basin Sizer output data), and
A = tributary area
-Runofff Coefficient for this project is **C=0.9** ***(rev. KC 03/10/06)***

References:
-Caltrans Storm Water Quality Handbooks - Project Planning and Design Guide September 2002
-Doyle Drive Draft Storm Water Data Report

Output Data from Basin Sizer:

Project: Untitled1

Latitude	37.8021
Longitude	-122.4493

Stations

Name	Distance	Elevation	Years of Data
SAN FRANCISCO DOWNTOWN	4.98	53	4.98

Water Quality Volumes

Maximized Volume Method (cm/area)*

Basin Drainage Time (hrs)	Runoff Coefficient							
	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
12	0.35	0.44	0.58	0.69	0.79	0.91	1.02	1.13
24	0.44	0.59	0.75	0.88	1.03	1.19	1.3	1.45
48	0.56	0.74	0.93	1.09	1.27	1.46	1.64	1.67
72	0.64	0.84	1.05	1.25	1.47	1.67	1.89	2.09

Water Quality Event Depth x Runoff Coefficient

rev. KC 03/10/06

85th Percentile 24-hr Storm
1.55 (cm/area)

rainfall intensity, i

Water Quality Flows

Region 2, all counties 0.51 cm

* The 85th Percentile 24-hr storm is not the same as the 85th percentile 24-hour runoff event in the Caltrans State Wide Storm Water Management Plan. Caltrans should use the Maximized Volume method.
CSUS, Office of Water Programs

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Calculations

Prepared By: K. Chang Date: 1/11/2006
Checked By: M. Grodzki Date: 1/11/2006
Revised By: K. Chang Date: 3/10/2006

Alternative 2:

WQV Calculation

			Line	
area =	97,501	m^2	1	
Water Quality Event Depth x runoff coeff. =	1.64	cm	2	***rev. KC 03/10/06***
conversion (cm to m) =	0.01		3	

WQV = Line 1 x Line 2 x Line 3
WQV = 1599 m^3

WQF Calculation

			Line	
area =	97,501	m^2	1	
runoff coeff. =	0.9		2	***rev. KC 03/10/06***
i =	0.51	cm/hr	3	
conversion (cm to m) =	0.01		4	
conversion (hr to sec) =	0.000278		5	

WQF = Lines 1 x 2 x 3 x 4 x 5
WQV = 0.124 m^3/s

Alternative 5 (Hook Ramp Option):

WQV Calculation

			Line	
area =	116,594	m^2	1	
Water Quality Event Depth x runoff coeff. =	1.64	cm	2	***rev. KC 03/10/06***
conversion (cm to m) =	0.01		3	

WQV = Line 1 x Line 2 x Line 3
WQV = 1912 m^3

WQF Calculation

			Line	
area =	116,594	m^2	1	
runoff coeff. =	0.9		2	***rev. KC 03/10/06***
i =	0.51	cm/hr	3	
conversion (cm to m) =	0.01		4	
conversion (hr to sec) =	0.000278		5	

WQF = Lines 1 x 2 x 3 x 4 x 5
WQV = 0.149 m^3/s

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Calculations

Prepared By: K. Chang Date: 1/11/2006
Checked By: M. Grodzki Date: 1/11/2006
Revised By: K. Chang Date: 3/10/2006

Alternative 5 (Loop Ramp Option):

WQV Calculation

		Line	
area =	123,325 m^2	1	
Water Quality Event Depth x runoff coeff. =	1.64 cm	2	***rev. KC 03/10/06***
conversion (cm to m) =	0.01	3	

WQV = Line 1 x Line 2 x Line 3
WQV = 2023 m^3

WQF Calculation

		Line	
area =	123,325 m^2	1	
runoff coeff. =	0.9	2	***rev. KC 03/10/06***
i =	0.51 cm/hr	3	
conversion (cm to m) =	0.01	4	
conversion (hr to sec) =	0.000278	5	

WQF = Lines 1 x 2 x 3 x 4 x 5
WQV = 0.157 m^3/s

ATTACHMENT K

WQV/WQF Percent Treatment Calculations

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Percent Treatment Calculations

Prepared By: K. Chang Date: 1/9/2006
Checked By: S. Heber Date: 1/10/2006

Purpose: To estimate the percentage of WQV/WQF treated by each of the proposed treatment BMP units in this project

Assumptions:
-Percent of WQV/WQF treated For each BMP is calculated based on percent of total runoff area that that particular BMP is expected to treat.
-Treatment BMP locations shown in the Proposed Treatment BMP locations diagrams represent possible locations where Treatment BMPs may be located based on preliminary plans/profiles, etc.
-Actual Treatment BMP types/locations/sizing will be determined during PS&E phase.
-For Treatment BMP type selection refer to Draft Storm Water Data Report.
-Bioswale/strip design uses WQF criteria rather than WQV.

References:
-Caltrans Storm Water Quality Handbooks - Project Planning and Design Guide September 2002
-Doyle Drive Draft Storm Water Data Report

Alternative 2 - Replace & Widen (No-Detour & With-Detour)

Total Roadway Surface (Runoff Area)= 97,501 m^2
WQV= 1599 m^3
WQF= 0.124 m^3/s

BMP Unit*	Unit Type	Area Treated (m^2)	Percent WQV/WQF Treated (%)	Criteria Used
1**	Wet Basin	10,703	11%	WQV
2**	Bioswale/strip	10,703	11%	WQF
3	MCTT	7,204	7%	WQV
4	Media Filter	15,640	16%	WQV
5	MCTT	13,205	14%	WQV
6	Media Filter	20,770	21%	WQV
7	Media Filter	5,311	5%	WQV
8	MCTT	9,020	9%	WQV
9	MCTT	15,648	16%	WQV
		Total:	100%	

*refer to Treatment BMP plans for locations
**either wet basin or bioswale/strip can be considered in this location, but only one will be used.

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Percent Treatment Calculations

Prepared By: K. Chang Date: 1/9/2006
Checked By: S. Heber Date: 1/10/2006

Alternative 5 - Presidio Parkway (Hook Ramp Option)

Total Roadway Surface (Runoff Area)= 116,594 m^2
WQV= 1912 m^3
WQF= 0.149 m^3/s

BMP Unit*	Unit Type	Area Treated (m^2)	Percent WQV/WQF Treated (%)	Criteria Used
1**	Wet Basin	11,542	10%	WQV
2**	Bioswale/strip	11,542	10%	WQF
3	MCTT	14,548	12%	WQV
4	Media Filter	11,542	10%	WQV
5	Media Filter	10,073	9%	WQV
6	MCTT	24,325	21%	WQV
7	Media Filter	20,620	18%	WQV
8	MCTT	12,597	11%	WQV
9	MCTT	11,348	10%	WQV
		Total:	100%	

*refer to Treatment BMP plans for locations
**either wet basin or bioswale/strip can be considered in this location, but only one will be used.

Alternative 5 - Presidio Parkway (Loop Ramp Option)

Total Roadway Surface (Runoff Area)= 123,325 m^2
WQV= 2023 m^3
WQF= 0.157 m^3/s

BMP Unit*	Unit Type	Area Treated (m^2)	Percent WQV/WQF Treated (%)	Criteria Used
1**	Wet Basin	11,593	9%	WQV
2**	Bioswale/strip	11,593	9%	WQF
3	MCTT	21,605	18%	WQV
4	Media Filter	11,593	9%	WQV
5	Media Filter	9,644	8%	WQV
6	MCTT	24,325	20%	WQV
7	Media Filter	20,620	17%	WQV
8	MCTT	12,597	10%	WQV
9	MCTT	11,348	9%	WQV
		Total:	100%	

*refer to Treatment BMP plans for locations
**either wet basin or bioswale/strip can be considered in this location, but only one will be used.

Treatment BMP Consideration

PA/ED Phase Projects (Planning)
RWQCB 2, SF Bay

Dist-County-Route:	**04-SF-101, 04-SF-001**
Kilometer Post (Post Mile limit):	**KP12.8-15.7 (PM 8.0-9.8)**
	KP10.9-11.4 (PM 6.8-7.1)
Project Type:	**New Construction**
EA:	**163700**
PM:	**Gary Kennerley**
PE:	**Sissel Berntsen-Heber**

1. PROJECT DESCRIPTION

Doyle Drive is the southern approach of US 101 to the Golden Gate Bridge in San Francisco. It is 2.4 kilometers (1.5 miles) long with six traffic lanes. This project consists of Doyle Drive and the three San Francisco approach ramps which connect to Doyle Drive: one beginning at the intersection of Marina Boulevard and Lyon Street; one at the intersection of Richardson Avenue and Lyon Street; and one where Veterans Boulevard (State Route 1) merges into Doyle Drive approximately 1.6 kilometers (one mile) west of the Marina Boulevard approach.

It is proposed to construct a new roadway to replace the existing six-lane Doyle Drive portion of Route 101 in order to improve the seismic, structural, and traffic safety of the roadway within the setting and context of the Presidio of San Francisco and its purpose as a National Park. The new facility would include six through lanes and an auxiliary lane. The project limits are from Merchant Road, just south of the Golden Gate Bridge Toll Plaza, to the intersections of Richardson Avenue/Francisco Street and Marina Boulevard/Lyon Street.

There are three alternatives under consideration, including a No-Build alternative. A brief description of each alternative is given below.

Alternative 1 – No-Build

The No-Build Alternative provides the baseline for existing environmental conditions and future travel conditions against which all other alternatives are compared. Doyle Drive would remain in its current configuration, with six traffic lanes ranging in width from 2.9 to 3.0 meters (9.5 to 10 feet) and an overall facility width of 20.4 meters (67 feet). There are no fixed median barriers or shoulders. The facility passes through the Presidio on a high steel truss viaduct and a low elevated concrete viaduct with lengths of 463 meters (1,519 feet) and 1,137 meters (3,730 feet), respectively. This alternative does not improve the seismic, structural, or traffic safety of the roadway.

Alternative 2 – Replace and Widen

The Replace and Widen Alternative would replace the 463-meter (1,519-foot) long high-viaduct and the 1,137-meter (3,730-foot) long low-viaduct with wider structures that meet the most current seismic and structural design standards. The height of the high-viaduct would vary from twenty to 35 meters (66 to 115 feet) above the ground surface. The low-viaduct would have an average height of approximately ten meters (33 feet) for the No Detour Option and approximately eight meters (26 feet) for the Detour Option. The new facility would be replaced on the existing alignment and widened to incorporate improvements for increased traffic safety. The new facility would have an overall width of 38.0 meters (124 feet). At the Park Presidio interchange, the two ramps connecting eastbound Doyle Drive to Veterans Boulevard and the ramp connecting westbound Doyle Drive to southbound Veterans Boulevard would be reconfigured to accommodate the

wider facility. The Replace and Widen Alternative would operate similar to the existing facility except that there would be a median barrier and shoulders to accommodate disabled vehicles. The Replace and Widen Alternative includes two options for the construction staging:

No Detour Option – The widened portion of the new facility would be constructed on both sides and above the existing low-viaduct and would maintain traffic on the existing structure. Traffic would be incrementally shifted to the new facility as it is widened over the top of the existing structure. Once all traffic is on the new structure, the existing structure would be demolished and the new portions of the facility would be connected. To allow for the construction staging using the existing facility, the new low-viaduct would be constructed two meters (six feet) higher than the existing low-viaduct structure.

With Detour Option - A 20.4-meter (67-foot) wide temporary detour facility would be constructed to the north of the existing Doyle Drive to maintain traffic through the construction period. Access to Marina Boulevard during construction would be maintained on an elevated temporary structure south of Mason Street. On and off ramps for the mainline detour facility would connect to existing Marina Boulevard/Lyon Street intersection.

Alternative 5 – Presidio Parkway Alternative

The Presidio Parkway Alternative would replace the existing facility with a new six-lane facility and an eastbound auxiliary lane, between the Park Presidio interchange and the new Presidio access at Girard Road. The new facility would consist of two 3.3-meter (11 foot) lanes and one 3.6-meter (12 foot) outside lane in each direction with 3.0-meter outside shoulders and 1.2-meter inside shoulders. The width of the proposed landscaped median varies from 5.0 meters (16 feet) to 12.5 meters (41 feet). To minimize impacts to the park, the footprint of the new facility would include a large portion of the existing facility's footprint east of the Park Presidio interchange. A 450-meter (1,476-foot) long high-viaduct would be constructed between the Park Presidio interchange and the San Francisco National Cemetery. The height of the high-viaduct would vary from twenty to 35 meters (66 to 115 feet) above the ground surface. Shallow cut-and-cover tunnels would extend 240 meters (787 feet) past the cemetery to east of Battery Blaney. The facility would then continue towards the Main Post in an open depressed roadway with a wide heavily landscaped median. From Building 106 (Band Barracks) cut-and-cover tunnels up to 310 meters long (984 feet) would extend to east of Halleck Street. The expected minimum depth is two meters (6 feet). The facility would then rise slightly on a low level causeway 160 meters (525 feet) long over the site of the proposed Tennessee Hollow restoration and a depressed Girard Road. The low causeway would rise to approximately four meters (13 feet) above the surrounding ground surface at its highest point. East of Girard Road the facility would return to existing grade north of the Gorgas warehouses and connect to Richardson Avenue. The proposed facility would provide a transition zone starting from the Main Post tunnel to reduce vehicle speeds prior to entering city streets.

The Park Presidio interchange would be reconfigured due to the realignment of Doyle Drive to the south. The exit ramp from eastbound Doyle Drive to southbound Veterans Boulevard would be replaced with standard exit ramp geometry and widened to two lanes. The loop of the westbound Doyle Drive exit ramp to southbound Veterans Boulevard would be improved to provide standard exit ramp geometry. The northbound Veterans Boulevard connection to westbound Doyle Drive would be realigned to provide standard entrance ramp geometry. The two options for the northbound Veterans Boulevard ramp to an eastbound Doyle Drive connection are the Loop Ramp Option and the Hook Ramp Option. The two options for direct access to the Presidio and Marina Boulevard at the eastern end of the project include the Diamond Option and the Circle

Drive Option. In addition, the Merchant Road Option would include a slip ramp connecting westbound Doyle Drive to Merchant Road, just east of the toll plaza. The Draft Project Report (June 2005) provides more details on the various options.

2. RECEIVING WATER BODIES

The San Francisco Bay is the receiving water body for this project. The San Francisco Bay is on the 303(d) list of impaired water bodies. Pollutants of concern include: Chlordane, DDT, Diazinon, Dieldrin, Dioxin Compounds, Exotic Species, Furan Compounds, Mercury, PCBs, PCBs (dioxin-like), and Selenium.

3. IMPERVIOUS AREA

The existing impervious area for this project is 4.18 ha. The new impervious area will be 6.60 ha and 4.52 ha for Alternatives 2 and 5, respectively. This project will result in a maximum increase in impervious area of 2.42 ha (5.98 ac). The amount of impervious area is less under Alternative 5 because a portion of the alignment is within tunnels.

4. AMOUNT OF SOIL DISTURBANCE

Amount of soil disturbance:
Alternative 2: 13 ha (32 ac)
Alternative 5: 17 ha (42 ac)

5. TREATMENT BMPS CONSIDERED

If acceptable to the City of San Francisco, the preferred treatment strategy for the project is to discharge the first flush/low flow to the City's combined storm water and sanitary sewer system. It is preferable that 100% of the Water Quality Volume/Water Quality Flow (WQV/WQF) be treated; however, due to possible capacity limitations of the combined storm water/ sanitary sewer system, 100% treatment may not be likely. Details such as the connection point will be further investigated and discussed during the PS&E phase with the San Francisco Public Utilities Commission (PUC). If discharge to the sanitary sewer system is infeasible, collection and transportation of this water for off-site treatment and disposal can also be considered.

For the project's secondary treatment BMP strategy, runoff discharges to the San Francisco Bay, Central region, which is a 303(d) listed water body. However, none of the pollutants listed for this portion of the Bay is considered a Targeted Design Constituent (TDC), thus the selection of treatment BMPs for this project would follow the General Purpose Pollution Removal criteria. Under this criteria, the order of treatment BMPs to be considered is

infiltration devices
biofiltration strips
wet basins
biofiltration swales
Austin sand filters
detention devices
Delaware filter
multi-chamber treatment trains.

Since litter/trash is not listed as a pollutant, gross solids removal devices were not considered. Traction sand traps were also not considered since sand is not regularly applied in the project area.

Caltrans shall coordinate with the Trust and NPS during the permanent treatment control (best management practices (BMP) selection process. This Project shall conform to the requirements of Caltrans SWMP to incorporate treatment controls and during the design phase will use Caltrans-approved BMPs to treat roadway runoff to the maximum extent practicable (MEP). The percentage of WQV/WQF to be treated will depend on which treatment BMPs are selected and where in the system specific devices are placed. Although the project is targeting to treat 100% of the project's WQV/WQF, until the preferred alternative is chosen and geometrics have been established, it is unknown if all the impervious area can be diverted into the proposed Treatment BMPs.

Due to the right-of-way constraints along the alignment, it will be challenging to identify feasible treatment controls that are effective in the removal of specific pollutants. Structural BMPs typically require less area for installation but are more maintenance intensive. While Caltrans does not recommend using BMPs with standing water such as wet basins, multi-chamber treatment trains, and Delaware sand filters in District 4 due to vector control issues, it may be possible to implement maintenance programs to address this issue should their use be considered. In addition, these BMPs would need to be coordinated, reviewed, and approved by the local agencies, including the local vector control agency, the RWQCB, and Caltrans maintenance personnel during PS&E.

Doyle Drive stormwater runoff is currently discharged to existing drainage facilities without treatment. The build alternatives, with the inclusion of some form of treatment controls, are expected to provide a net benefit to stormwater runoff quality and the quality of receiving waters.

Infiltration Devices, Checklist T-1, Parts 1 and 4

Infiltration devices are not feasible because the soil type at the invert is classified as NRCS HSG D and the infiltration rate is less than 1.3 cm/hr (0.5 in/hr). In addition, the site is located over a previously identified groundwater plume.

Biofiltration Swale/Strips, Checklist T-1, Parts 1 and 2

Biofiltration swales/strips may be possible in areas such as the Park Presidio interchange, where space between the ramps and mainline may allow for this type of BMP. The treated WQV/WQF will be approximately 10% depending on the selected alternative. A wet basin is also being proposed as another option and will treat the same area and WQV/WQF as the biofiltration strips/ swales.

Media Filters, Checklist T-1, Parts 1 and 8

The two types of approved media filter devices are the Austin Sand Filter and the Delaware Filter. However, due to their large size they may need to be located beneath the bridge structures since right-of-way is limited.

The Austin sand filter is the preferred media filter. In the case of the Delaware filter, a maintenance program would need to be established to deal with vector control issues associated with standing water. Delaware filters will need to be coordinated, reviewed, and approved by local agencies including vector control, the RWQCB, and Caltrans maintenance personnel during PS&E.

Currently, three media filters are being proposed to treat approximately 40% of the total WQV, depending on the selected alternative.

Detention Devices, Checklist T-1, Parts 1 and 5

Detention Devices do not appear feasible for this project due to a high water table in the project location and insufficient head to prevent objectionable backwater conditions; however this will be further reviewed during design.

In addition, where detention devices are feasible, it is more likely that biofiltration strips and/or swales will be considered since these treatment BMPs will treat the same pollutants as detention devices, but at a lower cost.

Multi-Chambered Treatment Trains (MCTTs), Checklist T-1, Parts 1 and 9

Multi-Chambered Treatment Trains can only be used if maintenance programs are implemented to address vector control issues associated with standing water. In addition, MCTTs would need to be located within the shoulder due to right-of-way constraints. This BMP will need to be coordinated, reviewed, and approved by local agencies including vector control, the RWQCB, and Caltrans maintenance personnel during PS&E.

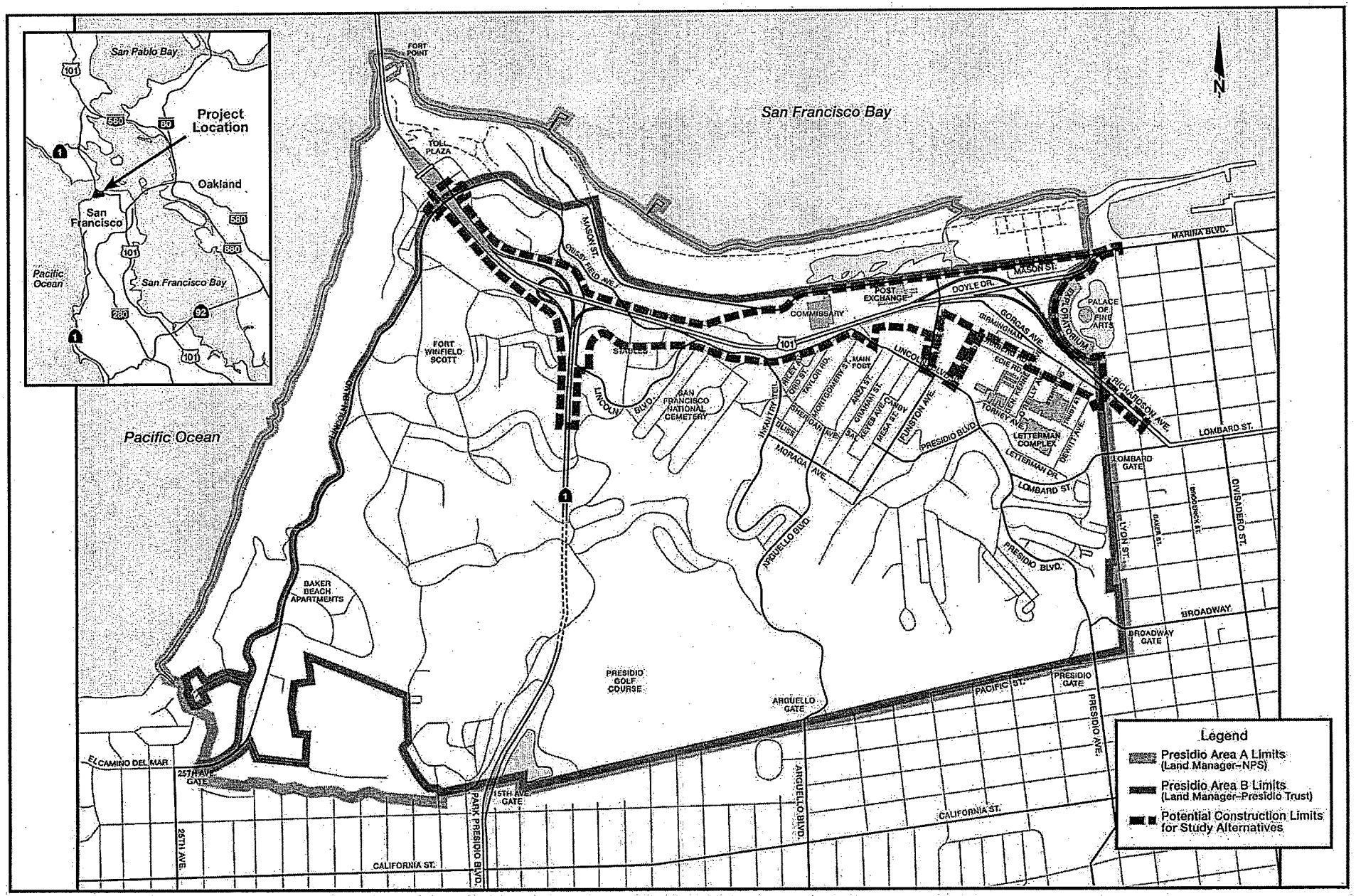
Four MCTTs are being considered to treat approximately 50% of the WQV. However, since the MCTT is the last preferred treatment BMP under the General Purpose Pollutant Removal criteria, other treatment BMPs options will also be considered during PS&E.

Dry Weather Diversion, Checklist T-1, Parts 1 and 3

It is anticipated that dry weather flows will be persistent. It may be possible to divert flow to the City of San Francisco's combined storm water and sanitary sewer system for treatment. Washdown water (and any incidental stormwater runoff) collected from within the tunnels (Presidio Parkway alternative only) can also be discharged to the Presidio's sanitary sewer system since this lower rate of flow can be controlled. This will be further reviewed during PS&E.

6. ATTACHMENTS

A vicinity map, plans showing proposed Treatment BMP types and possible locations, and preliminary typical cross-sections are attached.



SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY

FHWA Caltrans

Doyle Drive Project

Project Vicinity and Location

PBQ&D 7/19/02

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Calculations

Prepared By: K. Chang Date: 1/11/2006
Checked By: M. Grodzki Date: 1/11/2006
Revised By: K. Chang Date: 3/10/2006

Purpose: To calculate Water Quality Volumes (WQV) and Water Quality Flows (WQF) for this project

Assumptions/ Methods:
-Basin Sizer version 1.3 was used for these calculations.
-WQV is Calculated as:
WQV = (Water Quality Event Depth x Runoff Coefficient) x Tributary Area
(Water Quality Event Depth x Runoff Coefficient) is taken from the Basin Sizer output data
-WQF is calculated using the Rational formula:
WQF = CiA
Where C=runoff coefficient, i=rainfall intensity (taken from Basin Sizer output data), and
A = tributary area
-Runofff Coefficient for this project is **C=0.9** ***(rev. KC 03/10/06)***

References: -Caltrans Storm Water Quality Handbooks - Project Planning and Design Guide September 2002
-Doyle Drive Draft Storm Water Data Report

Output Data from Basin Sizer:

Project: Untitled1

Latitude	37.8021
Longitude	-122.4493

Stations

Name	Distance	Elevation	Years of Data
SAN FRANCISCO DOWNTOWN	4.98	53	4.98

Water Quality Volumes

Maximized Volume Method (cm/area)*

Basin Drainage Time (hrs)	Runoff Coefficient							
	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
12	0.35	0.44	0.58	0.69	0.79	0.91	1.02	1.13
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72	0.64	0.84	1.05	1.25	1.47	1.67	1.89	2.09

Water Quality Event Depth x Runoff Coefficient

rev. KC 03/10/06

85th Percentile 24-hr Storm
1.55 (cm/area)

rainfall intensity, i

Water Quality Flows

Region 2, all counties 0.51 cm

* The 85th Percentile 24-hr storm is not the same as the 85th percentile 24-hour runoff event in the Caltrans State Wide Storm Water Management Plan. Caltrans should use the Maximized Volume method.
CSUS, Office of Water Programs

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Alternative 2:

WQV Calculation

		Line	
area =	97,501 m^2	1	
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WQV = Line 1 x Line 2 x Line 3
WQV = 1599 m^3

WQF Calculation

		Line	
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runoff coeff. =	0.9	2	***rev. KC 03/10/06***
i =	0.51 cm/hr	3	
conversion (cm to m) =	0.01	4	
conversion (hr to sec) =	0.000278	5	

WQF = Lines 1 x 2 x 3 x 4 x 5
WQV = 0.124 m^3/s

Alternative 5 (Hook Ramp Option):

WQV Calculation

		Line	
area =	116,594 m^2	1	
Water Quality Event Depth x runoff coeff. =	1.64 cm	2	***rev. KC 03/10/06***
conversion (cm to m) =	0.01	3	

WQV = Line 1 x Line 2 x Line 3
WQV = 1912 m^3

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WQF = Lines 1 x 2 x 3 x 4 x 5
WQV = 0.149 m^3/s

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Calculations

Prepared By: K. Chang Date: 1/11/2006
Checked By: M. Grodzki Date: 1/11/2006
Revised By: K. Chang Date: 3/10/2006

Alternative 5 (Loop Ramp Option):

WQV Calculation

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area =	123,325 m^2	1	
Water Quality Event Depth x runoff coeff. =	1.64 cm	2	*rev. KC 03/10/06*
conversion (cm to m) =	0.01	3	

WQV = Line 1 x Line 2 x Line 3
WQV = 2023 m^3

WQF Calculation

		Line	
area =	123,325 m^2	1	
runoff coeff. =	0.9	2	*rev. KC 03/10/06*
i =	0.51 cm/hr	3	
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WQF = Lines 1 x 2 x 3 x 4 x 5
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SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Percent Treatment Calculations

Prepared By: K. Chang Date: 1/9/2006
Checked By: S. Heber Date: 1/10/2006

Purpose: To estimate the percentage of WQV/WQF treated by each of the proposed treatment BMP units in this project

Assumptions:
-Percent of WQV/WQF treated For each BMP is calculated based on percent of total runoff area that that particular BMP is expected to treat.
-Treatment BMP locations shown in the Proposed Treatment BMP locations diagrams represent possible locations where Treatment BMPs may be located based on preliminary plans/profiles, etc.
-Actual Treatment BMP types/locations/sizing will be determined during PS&E phase.
-For Treatment BMP type selection refer to Draft Storm Water Data Report.
-Bioswale/strip design uses WQF criteria rather than WQV.

References:
-Caltrans Storm Water Quality Handbooks - Project Planning and Design Guide September 2002
-Doyle Drive Draft Storm Water Data Report

Alternative 2 - Replace & Widen (No-Detour & With-Detour)

Total Roadway Surface (Runoff Area)= 97,501 m^2
WQV= 1599 m^3
WQF= 0.124 m^3/s

BMP Unit*	Unit Type	Area Treated (m^2)	Percent WQV/WQF Treated (%)	Criteria Used
1**	Wet Basin	10,703	11%	WQV
2**	Bioswale/strip	10,703	11%	WQF
3	MCTT	7,204	7%	WQV
4	Media Filter	15,640	16%	WQV
5	MCTT	13,205	14%	WQV
6	Media Filter	20,770	21%	WQV
7	Media Filter	5,311	5%	WQV
8	MCTT	9,020	9%	WQV
9	MCTT	15,648	16%	WQV
		Total:	100%	

*refer to Treatment BMP plans for locations
**either wet basin or bioswale/strip can be considered in this location, but only one will be used.

SAGGB Doyle Drive
Storm Water Data Report
WQV/WQF Percent Treatment Calculations

Prepared By: K. Chang Date: 1/9/2006
Checked By: S. Heber Date: 1/10/2006

Alternative 5 - Presidio Parkway (Hook Ramp Option)

Total Roadway Surface (Runoff Area)= 116,594 m^2
WQV= 1912 m^3
WQF= 0.149 m^3/s

BMP Unit*	Unit Type	Area Treated (m^2)	Percent WQV/WQF Treated (%)	Criteria Used
1**	Wet Basin	11,542	10%	WQV
2**	Bioswale/strip	11,542	10%	WQF
3	MCTT	14,548	12%	WQV
4	Media Filter	11,542	10%	WQV
5	Media Filter	10,073	9%	WQV
6	MCTT	24,325	21%	WQV
7	Media Filter	20,620	18%	WQV
8	MCTT	12,597	11%	WQV
9	MCTT	11,348	10%	WQV
		Total:	100%	

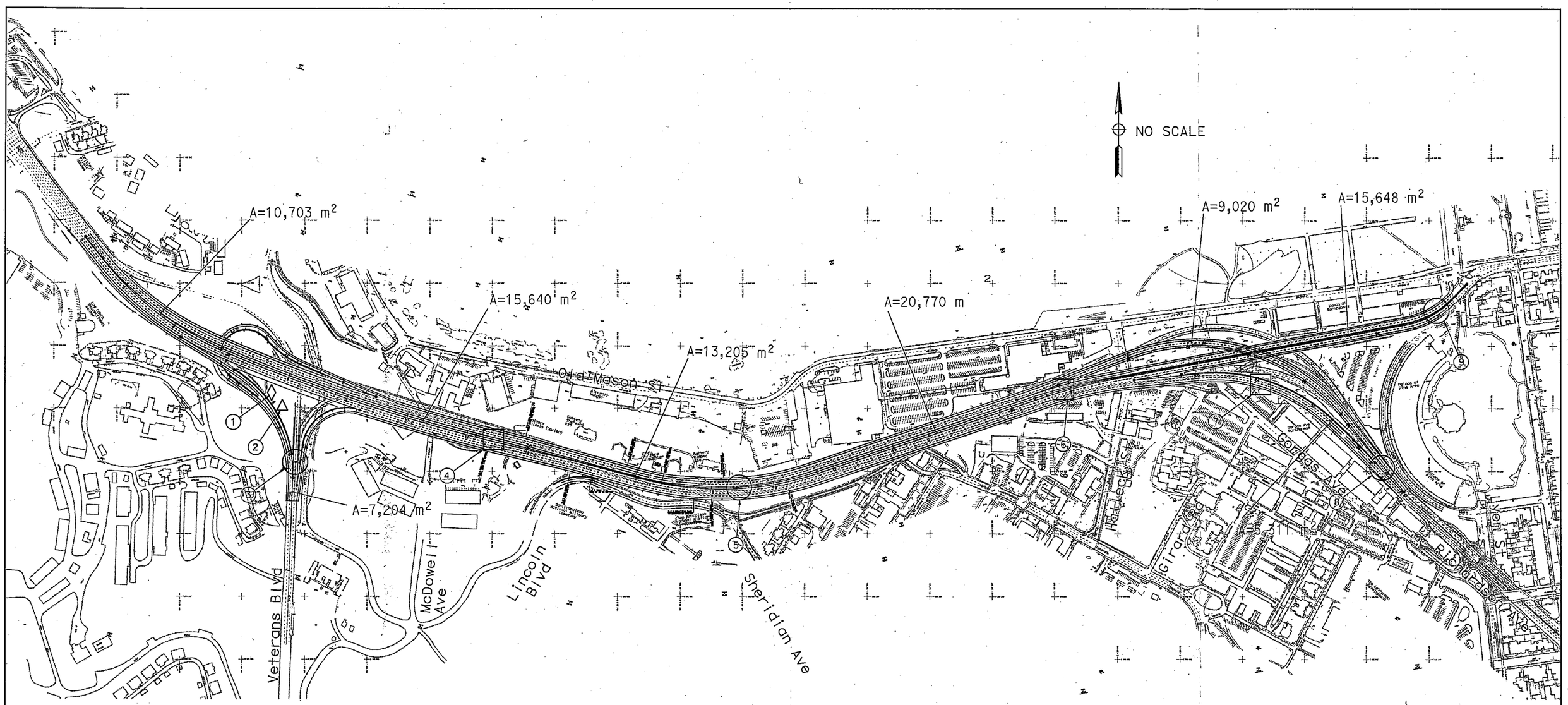
*refer to Treatment BMP plans for locations
**either wet basin or bioswale/strip can be considered in this location, but only one will be used.

Alternative 5 - Presidio Parkway (Loop Ramp Option)

Total Roadway Surface (Runoff Area)= 123,325 m^2
WQV= 2023 m^3
WQF= 0.157 m^3/s

BMP Unit*	Unit Type	Area Treated (m^2)	Percent WQV/WQF Treated (%)	Criteria Used
1**	Wet Basin	11,593	9%	WQV
2**	Bioswale/strip	11,593	9%	WQF
3	MCTT	21,605	18%	WQV
4	Media Filter	11,593	9%	WQV
5	Media Filter	9,644	8%	WQV
6	MCTT	24,325	20%	WQV
7	Media Filter	20,620	17%	WQV
8	MCTT	12,597	10%	WQV
9	MCTT	11,348	9%	WQV
		Total:	100%	

*refer to Treatment BMP plans for locations
**either wet basin or bioswale/strip can be considered in this location, but only one will be used.



PROPOSED TREATMENT BMP LOCATIONS

ALTERNATIVE 2 (NO-DETOUR & WITH-DETOUR)

LEGEND

- □ POSSIBLE LOCATION FOR MEDIA FILTER BENEATH BRIDGE STRUCTURE
- ○ POSSIBLE LOCATION FOR MCTT (MULTI-CHAMBER TREATMENT TRAIN) IN ROADWAY SHOULDER
- △ POSSIBLE LOCATION FOR BIOFILTRATION SWALE/STRIP
- ◇ POSSIBLE LOCATION FOR WET BASIN

NOTES:

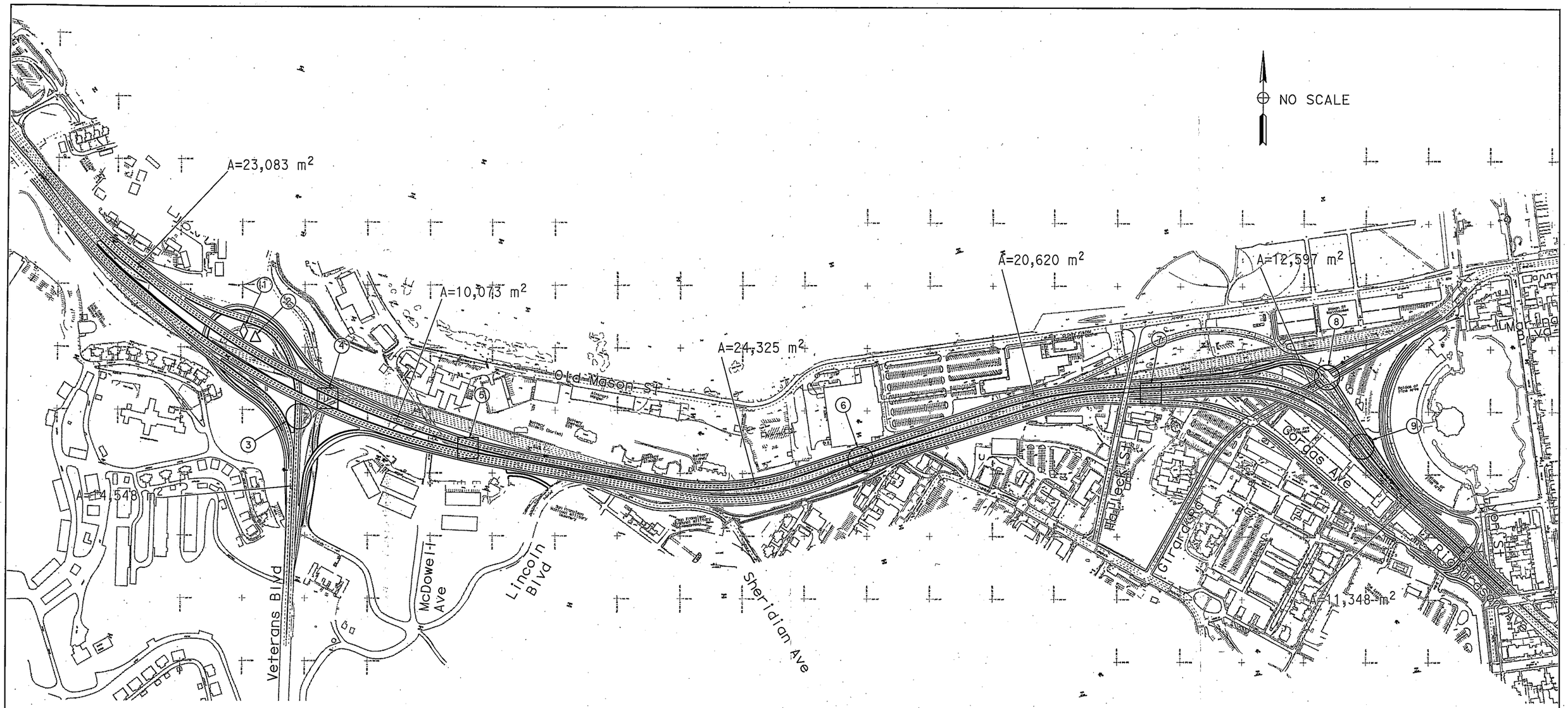
1. The preferred treatment BMP is connection to the City of San Francisco's combined sanitary/storm water system (not shown).
2. Treatment BMP locations shown represent possible locations only. Actual locations will be determined during the PS&E phase.

DOYLE DRIVE STORMWATER DATA REPORT

JANUARY 2006

South Access to the Golden Gate Bridge

$REQUEST



PROPOSED TREATMENT BMP LOCATIONS
ALTERNATIVE 5 - HOOK RAMP OPTION

LEGEND

- ☐ POSSIBLE LOCATION FOR MEDIA FILTER BENEATH BRIDGE STRUCTURE
- ○ POSSIBLE LOCATION FOR MCTT (MULTI-CHAMBER TREATMENT TRAIN) IN ROADWAY SHOULDER
- △ POSSIBLE LOCATION FOR BIOFILTRATION SWALE/STRIP
- ◇ POSSIBLE LOCATION FOR WET BASIN

NOTES:

1. The preferred treatment BMP is connection to the City of San Francisco's combined sanitary/storm water system (not shown).
2. Treatment BMP locations shown represent possible locations only. Actual locations will be determined during the PS&E phase.

DOYLE DRIVE STORMWATER DATA REPORT

JANUARY 2006

South Access to the Golden Gate Bridge

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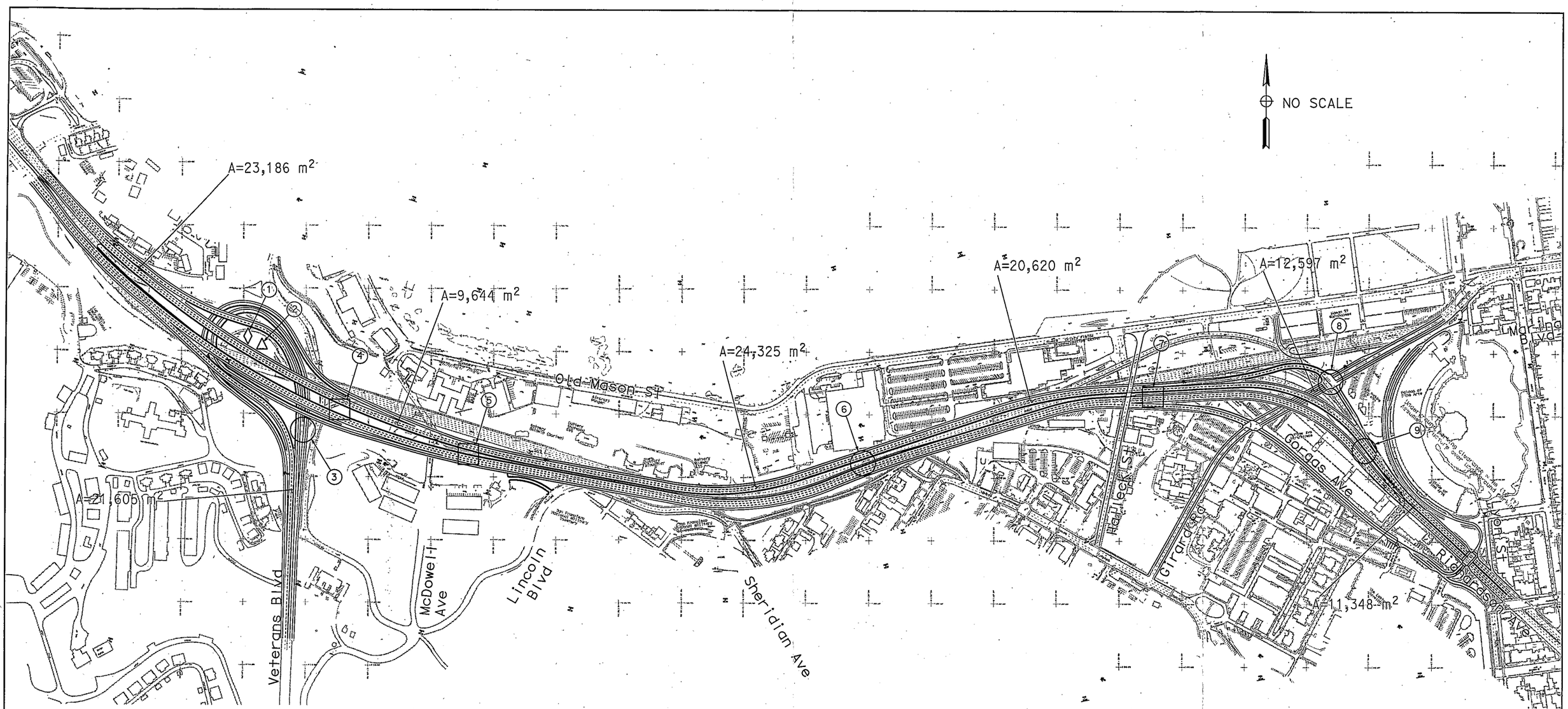

PROPOSED TREATMENT BMP LOCATIONS
ALTERNATIVE 5 - LOOP RAMP OPTION

LEGEND

- □ POSSIBLE LOCATION FOR MEDIA FILTER BENEATH BRIDGE STRUCTURE
- ○ POSSIBLE LOCATION FOR MCTT (MULTI-CHAMBER TREATMENT TRAIN) IN ROADWAY SHOULDER
- △ POSSIBLE LOCATION FOR BIOFILTRATION SWALE/STRIP
- ◇ POSSIBLE LOCATION FOR WET BASIN

NOTES:

1. The preferred treatment BMP is connection to the City of San Francisco's combined sanitary/storm water system (not shown).
2. Treatment BMP locations shown represent possible locations only. Actual locations will be determined during the PS&E phase.

DOYLE DRIVE STORMWATER DATA REPORT

JANUARY 2006

South Access to the Golden Gate Bridge

SREQUEST