Hazard Mitigation Grant Program

PROJECT
SUB-APPLICATION

PART I- ACTIVITY INFORMATION

THIS PAGE FOR STATE USE ONLY

STATE PROJECT APPLICATION FORM

DR NO.: _4158_ **STATE**: CA **PROJECT NO.**: TBD

==========

SECTION I – STATE INFORMATION

STATE APPLICANT INFORMATION

APPLICANT: >California Governor's Office of Emergency Services

FIPS CODE: >000-92250

CONTACT:

NAME: >TBD

TITLE: >TBD

ORGANIZATION: >Hazard Mitigation Grants Division

ADDRESS: >3650 Schriever Avenue

CITY: >Mather

STATE: >CA **ZIP CODE:** >95655

LONGITUDE: >-121.30505W

LATITUDE: >38.57100N

TELEPHONE: >916-845-8150 **FAX NO:** >916-636-3780

PROJECT CONFORMS TO ITEM > #

In the State's Multihazard Mitigation Plan (if necessary also list which annex of the plan in the shaded text box.)

According to the State's Multihazard Mitigation Plan, Project is priority >#.

STATE LEGISLATIVE DISTRICT: >ALL

THIS FOR SUB-APPLICANT

SECTION II – SUB-APPLICANT INFORMATION

SUB-APPLICANT INFORMATION

1. SUB-APPLICANT: >**City and County of San Francisco**
2. FIPS #: >**000-UDE6N-00**
3. DUNS #: >**070384255**
4. COUNTY: >**Tuolumne County - location of project site**
5. TYPE: GOVERNMENT ☒ SPECIAL DISTRICT ☐ PRIVATE NON-PROFIT ☐
6. POLITICAL DISTRICT(S): CONGRESSIONAL **4th, 12th & 14th**
   STATE ASSEMBLY **5th, 17th & 19th**
   STATE LEGISLATIVE **8th, 11th & 14th**

7. CONTACT: NAME: Mr. / Ms. >**Mr.** First>**Jimmy** Last >**Leong**
   TITLE: >**Principal Engineer**
   ORGANIZATION: >**San Francisco Public Utilities Commission**
   ADDRESS: >**P.O. Box 160**
   CITY: >**Moccasin**
   STATE: >**CA** ZIP CODE: >**95347**
   TELEPHONE: >**209-989-2040**
   E-MAIL ADDRESS: >**jleong@sfwater.org**

8. NFIP PARTICIPATION ☒ YES ☐ NO LAST CAV DATE: N/A; project is not in 100-year floodplain

Tuolumne County participates in the NFIP; however, this project is not located within the 100-year floodplain – refer to Attachment 4.

9. ALTERNATE CONTACT:

NAME: Mr. / Ms.>**Ms.** First>**Cheryl** Last >**Taylor**

TITLE: >**Principal Administrative Analyst II**

ORGANIZATION: >**San Francisco Public Utilities Commission**

ADDRESS: >**525 Golden Gate Avenue, 4th Floor**

CITY: >**San Francisco**

STATE: >**CA**

ZIP CODE: >**94102**

TELEPHONE: >**415-487-5282**

E-MAIL ADDRESS: >**ctaylor@sfwater.org**

10. LOCAL HAZARD MITIGATION PLAN (LHMP) requirement: a FEMA approved and local agency adopted Multihazard mitigation plan is required at the time of the disaster declaration and at time of award:
These plans are also referenced as "LHMP' or Local Hazard Mitigation Plan:
LHMP's are either **Single Jurisdictional** or **Multi-Jurisdictional**

LOCAL **MULTI-JURISDICTIONAL** MULTIHAZARD PLAN:
2008 City and County of San Francisco Hazard Mitigation Plan
DATE APPROVED BY FEMA: January 9, 2009
DATE ADOPTED BY LOCAL AGENCY: December 9, 2008

OR

LOCAL **SINGLE JURISDICTIONAL** MULTIHAZARD MITIGATION PLAN:
SUBMITTED: APPROVED:
DATE APPROVED BY FEMA:
DATE ADOPTED BY LOCAL AGENCY:

Lead Agency: SF Department of Emergency Management
Name/Title of your PLAN: 2008 City and County of San Francisco Hazard Mitigation Plan
State where in the approved Plan your proposed project is in conformance with the Plan.
CHAPTER: **
PAGE: **
SECTION: **

** The 2008 SF Hazard Mitigation Plan did not address the vulnerability of City-owned assets located outside of the County limits, such as Hetch Hetchy Water & Power facility assets.

SECTION III – PROJECT INFORMATION

11. PROJECT TITLE**:** > Early Intake Switchyard Slope Stabilization Project

12. PROJECT LOCATION:
Detailed location (include the legal description, latitude and longitude coordinates):
Refer to Instructions Section III, #12 on page #5 for detailed requirements.

The ISY Slope Stabilization Project site is located in Tuolumne County, adjacent to the Intake Switchyard as short distance west of Cherry Lake Road, just south of the Cherry Lake Road bridge crossing of the Tuolumne River. Site location: latitude / longitude coordinates: 37.87477° N / 119.96601° W; T 1S; R 18E; NW¼of NW¼ of Sec 11.

Legal description: Amended Location of Electric Transmission Lines, Early Intake to Moccasin through T 1. N. R. 18 E., T. 1 S. R 15, R 16, R 17, & R 18 E. M.D.B. & M. Tuolumne County, California shown on drawing R-525 rev. 1, filed and approved with the United States Lands Office in Sacramento, California, Serial Number 017065, on December 6, 1957 under the Raker Act of December 19, 1913 (38 Stats. 242).

13. MAPPING REQUIREMENTS:
Attach or enclose maps (USGS, City plat maps, aerial photos) photographs and diagrams that clearly depict the exact project location. Maps should be oriented with a north arrow. Refer to Instructions Section III, #13, on page #6.

Maps and photographs showing the project location and site boundaries are included in Attachment 1.

14**.** DEED RESTRICTIONS THAT LIMIT FEDERAL FUNDING:

There are no restrictions that would preclude federal funding assistance.

15. PUBLIC ASSISTANCE PROGRAM FUNDING:

FEMA-4158-DR-CA Rim Fire; requested $505,914. No project worksheet(s) related to this project have been completed to date.

16. PROJECT DESCRIPTION: REQUIRED

A. PROJECT TYPE: Double Click the selected box. At least one must be selected.

EQ-Structural ☐ EQ-Non-structural ☐ EQ Structural & Non-Structural ☐

Flood-Elevation ☐ Flood-Acquisition ☐ Flood-Control ☒

Fire-Vegetation Management ☐ Fire-Resistant Bldg. Materials☐ Fire-Defensible Space☐

B. Describe the problem you are attempting to solve and the expected outcome.
(Either describe in 4,000 characters or less or attach/enclose separate MS-word document)

The Early Intake Switchyard (ISY) is a 230 kV switchyard located alongside the Tuolumne River, just downstream of the Kirkwood Powerhouse (see Figure 1 in Attachment 1). The switchyard is a critical HHWP asset that provides for the transmission of electrical power generated at Kirkwood and Holm Powerhouses to Moccasin as well as the local distribution of power to HHWP's upcountry facilities. A failure of any critical component within the switchyard represents a significant loss of power generation and transmission capability which accounts for 75% of the HHWP Project annual generation.

ISY consists of an extensive array of electrical circuit breakers and disconnect switches that are installed inside of a fenced area approximately 550 feet long by 125 feet wide, and includes a control building. It was initially put into service in 1960. The transmission line to Kirkwood Powerhouse, Line 11, was put into service in 1967. Intake Switchyard provides the main accumulation, switching and transmission point for hydroelectric power generated at the Holm and Kirkwood powerhouses.

As described in Attachment 1, the tall, steep slopes adjacent to Early Intake Switchyard were severely burned by the Rim Fire. Detailed field observations performed during and after the fire identified that several types of fire damage occurred in the area that resulted in both short-term safety concerns and long-term maintenance concerns, including:

1. Potential for slope raveling and rock falls.
2. Potential for slope instability.
3. Drainage issues affecting the slopes and roads.
4. Increased erosion and sedimentation susceptibility.

A site visit performed on May 2, 2014 at ISY and the surrounding slopes confirmed the presence of hazards that continue to present serious risks to the ISY facilities and to loss of HHWP operations as a result of current slope conditions. Referring to Figure 2-2 in Attachment 1, such conditions are summarized as follows:

* Work Area 1 (Attachment 1, Figures 2-4 & 2-5): This area exhibits active slope failure conditions at this over-steepened slope that is at the edge of a 150-foot long reach of the ISY south access road, located at the east end of ISY.

* Work Area 2 (Attachment 1, Figures 2-6 & 2-7): This area exhibits active slope raveling conditions at this tall, steep slope that is immediately adjacent to a 200-foot long reach of the ISY south access road located near the center of ISY; such conditions extend approximately 200 feet vertically up the slope.

Based on the consideration of hazards observed, there are several risks ranging from minor to significant that include health & safety concerns, potential damage to ISY facilities and/or loss of HHWP operations, including: 1) Unsafe working conditions; 2) Temporary blockage of ISY access road; 3) Permanent damage to ISY access road; 4) Damage to ISY perimeter security fencing; 5) Encroachment of ISY facility perimeter; 6) Damage to electrical equipment and support structures; 7) Damage to control building; and 8) Switchyard loss of operation.

The proposed project will be designed to mitigate the existing hazards such that the above risks are no longer a threat to health and safety, damage to property, or loss of HHWP operations.

C. Describe recent events that influenced the selection of the project (e.g. changes in the watershed, discovery of a new hazard, zoning requirements, inter-agency agreements). (Either describe in 4,000 characters or less or attach/enclose separate MS-word document)

The Rim Fire caused severe burning of the slopes adjacent to ISY which has increased the slope instability hazards, resulting in risks to health and safety, damage to property, and potential loss of HHWP operations. Section 1 of Attachment1 summarizes the fire damage to slopes surrounding Early Intake Switchyard.

D. Describe in detail how the project reduces hazard effects and risks: (Either describe in 4,000 characters or less or attach/enclose separate MS-word document)

As described in Section 3 of Attachment 1, the proposed project includes several hazard mitigation solutions that will address the effects of existing slope instability hazards. The hazard mitigation solutions include: 1) slope grading (flattening) with catchment walls; 2) catchment fences; 3) surface water diversions; and 4) vegetative surface stabilization.

E. Describe the full Scope of Work (SOW) of the project in detail:

If any document is attached, state its exact title.

The Project Scope of Work is described in Attachment 1 entitled **"**Hazard Mitigation Grant Program Sub-Application, Early Intake Switchyard Slope Stabilization Project," prepared by Black & Veatch Corporation, May 2014.

F. If the project involves ground disturbance, e.g., enlarging ditches or culverts, diversion ditches, detention basins, storm water improvements, etc., provide the following additional information:

a. Attach/enclose studies and preliminary engineering, including any hydrological data.
b. Attach/enclose original drawings or blueprints that show the footprint and elevations.

If any document is attached, state its exact title.

Proposed ground disturbance activities are described as part of the Project Scope of Work that is presented in Section 4 of Attachment 1 entitled **"**Hazard Mitigation Grant Program Sub-Application, Early Intake Switchyard Slope Stabilization Project," prepared by Black & Veatch Corporation, May 2014. The ground disturbance features are based on conceptual-level engineering assessments and project scoping; additional details of project elements will be developed during the Project's final design phase.

G. Describe any other projects or project components, whether or not funded by FEMA, which may be related to the proposed project, or are in or near the proposed project area. FEMA reviews all interrelated projects under NEPA regulations. Failure to disclose this information could jeopardize Federal funding. (Either describe in 4,000 characters or less or attach/enclose separate MS-word document)

Recent projects in the vicinity include rehabilitation of the Intake Switchyard (2013-2014), placement of coir logs, hydromulching and rock scaling work on the slope above the switchyard for erosion control after the Rim Fire, several small scale Rim Fire debris removal projects, and hazard tree removal in powerline corridors on the slope above the switchyard (all in late 2013). Work anticipated in the project vicinity in 2014-2015 includes reconstruction of two small structures burned in the fire and rehabilitation of the Lower Cherry Aqueduct system. The latter is located across the river from ISY but will use Cherry Lake Road for equipment and materials access. No other projects are currently foreseen in the vicinity in 2016.

17. HAZARD TYPE: Required (what hazard or hazards will this project protect against?)

Check all items that apply from the following list (more than one hazard can be checked)

BIOLOGICAL	☐	**CHEMICAL**	☐
CIVIL UNREST	☐	**COASTAL STORM**	☐
CROP LOSSES	☐	**DAM/LEVEE BREAK**	☐
DROUGHT	☐	**EARTHQUAKE**	☐
FIRE	☐	**FISHING LOSSES**	☐
FLOOD	☒	**FREEZING**	☐
HUMAN CAUSE	☐	**HURRICANE**	☐
LAND SUBSISTENCE	☐	**MUD/LANDSLIDE**	☒
NUCLEAR	☐	**SEVERE ICE STORM**	☐
SEVERE STORM(S)	☒	**SNOW**	☐
SPECIAL EVENTS	☐	**TERRORIST**	☐
TORNADO	☐	**TOXIC SUBSTANCES**	☐
VOLCANO	☐	**TSUNAMI**	☐

OTHER (SPECIFY IN COMMENTS BELOW)

not applicable

18. HAZARD AND RISK ANALYSIS

1. History: Describe the hazards and risks to life, safety and improved property at least during the last 25 years in the project area. (Describe in 4,000 characters or less or Attach/enclose/enclose a WORD document):

Since the RIM FIRE in 2013, the slopes behind the Intake Switchyard have proved to be hazardous due to potential flooding and rock fall. The rock fall and flooding hazards pose a significant risk to the operational capability of the improved property Intake Switchyard and may pose a risk to operation and maintenance personnel. Table 1 summarized the significant events related to the slopes behind Intake Switchyard after the Rim Fire.

Table 1. Summary of events related to the hazards identified at Intake Switchyard after the Rim Fire.

Approximate Date	
August 2013	Rim Fire burned through Early Intake Area.
	Professional Geotechnical Engineer identified presence of rock fall hazards above Intake Switchyard .
September 2013	SFPUC/HHWP proactively performed rock scaling operation to remove the hazardous rocks that were identified.
	Boulders damaged fencing and traveled into the Switchyard and access road (Figures 1 & 2).
February 2014	Relatively minor rain event (see Figure 3) caused significant flooding that extended to the control building and into the switchyard. Additionally, a significant amount of sediment and mud was mobilized onto the access road between the slopes and the Switchyard (Figures 4 through 8).

Figure 1. Boulder that traveled over or through two chain link fences and came to rest inside the Switchyard (9/9/2013).

Figure 2. Boulder that traveled over/through temporary safety fencing and came to rest on the access road behind the Switchyard (9/10/2013).

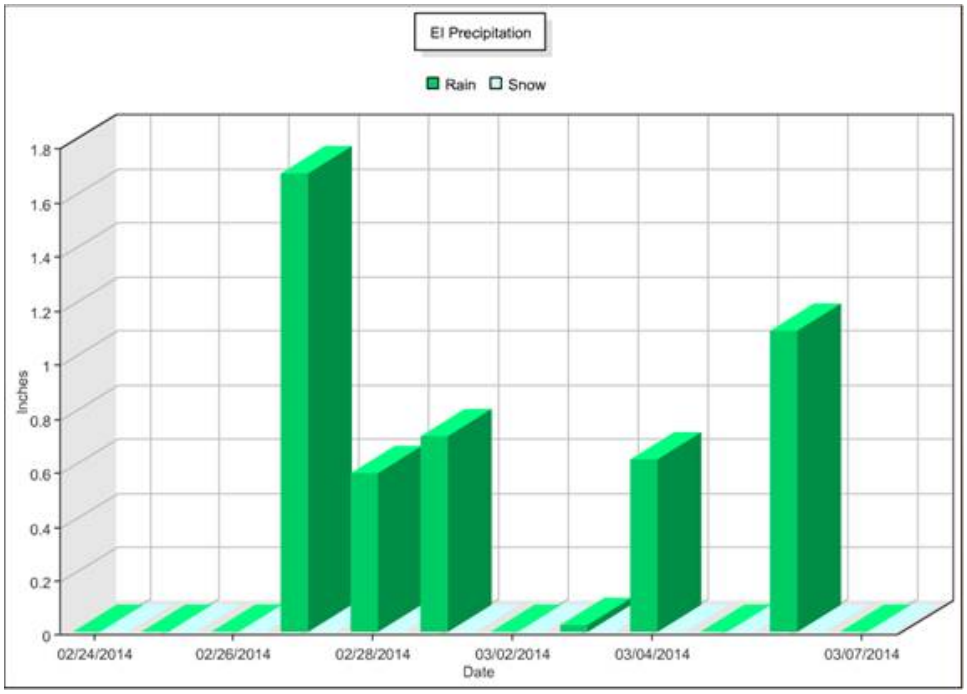


Figure 3. Rain event that caused flooding at the Intake Switchyard site.

Figure 4. Flooding inside the Switchyard after rain event (2/28/2014).

Figure 5. Flooding inside Switchyard near control building (2/28/2014).

Figure 6. Flooding inside Switchyard near control building (2/28/2014).

Figure 7. Mud and sediment build up after rain event (3/6/2014).

Figure 8. Mud and sediment build up after rain event (2/27/2014).

2. Alternatives: Briefly describe alternatives to your proposed project.
(Recommend returning to this question after completing PART 2 - ENVIRONMENTAL QUESTIONNAIRE)

WORK AREA 1: In Attachment 1, Section 2.2 for Work Area 1, the risks (due to active slope failure conditions at the over-steepened slope at the east end of ISY) were discussed to range from temporary road blockage to loss of switchyard operation. These risks would be affected by the alternatives as follows:

Catchment Fence: One or more catchment fences would reduce the risk of rockfall damage but would not stabilize the slope; i.e. not effective to reduce risk.

Catchment Wall: A catchment wall would collect rockfalls and slope debris but would not stabilize the slope; i.e., not effective to reduce risk.

Slope Flattening with Catchment Wall: Slope flattening would stabilize the slope, and the catchment wall would collect future rockfalls and slope debris. Effective to reduce the risk.

Retaining Wall: A retaining wall would stabilize the slope and protect the slope to eliminate future rockfalls and slope movement. Effective to reduce the risk.

WORK AREA 2: In Attachment 1, Section 2.2 for Work Area 2, the risks (due to active slope raveling conditions at the tall, steep slope located near the center of ISY) were discussed to range from temporary road blockage to loss of switchyard operation. These risks would be affected by the alternatives as follows:

Catchment Fence: One or more catchment fences would reduce the risk of rockfall damage. Effective to reduce the risk.

Catchment Wall: A catchment wall would collect rockfalls and slope debris. Effective to reduce the risk.

SURFACE WATER DIVERSIONS: For both work areas, a mitigation solution involving surface water diversions was also considered and is planned to be implemented. To the extent feasible, surface water diversion facilities would: 1) avoid the use of impervious materials (to avoid visual impacts and intrusion on the riparian belt) and 2) if possible, divert flow in each direction away from the tram cableway, which may be considered an historic property. Design details of such surface water diversions are to be developed further in a later design phase.

3. Proposed Action: Briefly describe your proposed project and why it was selected from the alternatives. (Recommend returning to this question after completing PART 2 - ENVIRONMENTAL QUESTIONNAIRE)

The four alternatives for Work Area 1 were compared in the following table. All four of the alternatives would include surface water diversions constructed uphill of the work area and the application of hydroseeded vegetative cover.

Alternative	Hazard Reduction Effectiveness	Relative Construction Cost	Relative Maintenance Cost
1A - Catchment Fences	Moderate	Moderate	Highest
1B - Catchment Wall	Moderate	Lowest	Moderate
1C - Slope Flattening with Catchment Wall	High	Moderate	Moderate
1D - Retaining Wall	Highest	Highest	Lowest

The two alternatives for Work Area 2 were compared in the following table. Both of the alternatives would include surface water diversions constructed uphill of the work area and the application of hydroseeded vegetative cover.

Alternative	Hazard Reduction Effectiveness	Relative Construction Cost	Relative Maintenance Cost
2A - Catchment Fences	Higher	Moderate	Moderate
2B - Catchment Wall	Lower	Lower	Lower

The proposed project was selected due to the reasons described more fully in Section 4 of Attachment 1 – essentially to construct the mitigation solutions offering the best hazard mitigation for the best value. The proposed project consists of the following work elements:

Mitigation Solution	Work Area 1 Mitigation	Work Area 2 Mitigation
Catchment Fences		√
Surface Water Diversion	√	√
Vegetative Surface Stabilization	√	√
Slope Flattening with Catchment Wall	√	

19. COMMUNITY INFORMATION: Please refer to Instructions, Section III, #19 for an explanation of this item.

A. Indicate if your community participates in any of the listed factors.
Select a column appropriate to your type of project: fire, flood, or earthquake.

FIRE	**FLOOD**	**EQ**
_____ CWPP/Fire Wise/Fire Safe	_____ CRS Plan	_____ Shakeout Drill Participation
_____ Current CEQA Activity	_____ Current CEQA Activity	_____ Current CEQA Activity
_____ Defensible Space	_____ Hydrology Study	_____ URM Participation

B. Provide a narrative description for any of the factors you have selected from the above list.

1. Fire and drought emergency projects in the area during 2013 and 2014 have been statutorily exempted from CEQA.
2. The project is located in a remote location away from any populated communities.

SECTION IV - WORK SCHEDULE

Describe each of the major work elements and how long they will take to complete.
Some project application examples are: construction, architectural, design, engineering, inspection, testing, permits, project management, mobilization and de-mobilization.

1.	Description: Design	Time Frame: 6 - 10 months
2.	Description: Bid and Award	Time Frame: 3 months
3.	Description: Mobilization / Office Engr'g	Time Frame: 4 months
4.	Description: On-Site Construction	Time Frame: 3 months
5.	Description: Demobilization	Time Frame: 3 Weeks
6.	Description: As-Built Drawings	Time Frame: 1 Month
7.	Description: Contract Closeout	Time Frame: 2 Months

Some or many of the above elements may overlap. Provide a Gantt chart to show any overlap in project work schedule.

Gantt chart provided: ☒ yes Not provided: ☐ no Refer to Attachment B of Attachment 1 for Gantt Chart

State the total amount of time you anticipate for this project. Total project time must not exceed a 36-month performance period. Performance period begins from the close of FEMA's application period.

MONTHS: 24

SECTION V – COST ESTIMATE

The cost estimate is a separate MS-Excel document (see instructions on page 8).

The MS-Excel file document is included as Attachment 3. The total project cost estimate is $1,311,000.

COST ESTIMATE NARRATIVE:

(This area to be used for narrative or justification to support cost estimates listed in Section V)
Failure to provide detailed information can significantly impede FEMA's approval of your project application.

Additional details justifying the development of line item costs shown in the project cost estimate spreadsheet are presented here.

Refer to next page

Item A – Work Area 1 Slope Grading by Earthwork Crew
This line item estimates 10 days of a large earthwork crew with equipment. The crew costs are:

EARTHWORK CREW-DAY UNIT COST	Unit	Qty	Unit Cost	Subtotal
Crew Foreman	$ / Day	1	$972	$972
Safety Officer	$ / Day	0.5	$972	$486
General Laborers (5)	$ / Day - Ea	5	$583	$2,916
Front-End Loader with Operator (2)	$ / Day - Ea	2	$2,268	$ 4,536
Backhoe with Operator (1)	$ / Day - Ea	1	$2,268	$2,268
Haul Trucks (3)	$ / Day - Ea	3	$1,296	$3,888
Compactor with Operator (1)	$ / Day - Ea	1	$2,268	$2,268
Total Crew-Day Unit Cost				**$17,334**

Item B – Work Area 1 Catchment Wall Construction
This line item estimates 100 feet of a catchment wall. The per-foot wall costs are:

Catchment Wall (100 ft long; 8 ft high):	Unit	Qty	Unit Cost	Subtotal
Excavate Foundations (13, drilled 24" x 96")	EA	13	$972	$12,636
Concrete Foundations (13, 1 CY each)	CY	13	$810	$10,530
Furnish & Install H-Piles (13, 40 plf)	LB	8320	$5	$40,435
Install Timber Lagging (800 sq. ft., 6" x 8")	SF	800	$41	$32,400
Subtotal				$96,000
Length				100
Per-Foot Wall Cost				$960.00

Item C – Work Area 2 Catchment Fence Construction
This line item estimates 800 feet of catchment fences. The per-foot fence costs are:

Catchment Fences at Work Area 2 (800 ft long; 8 ft high):		Qty	Unit Cost	Subtotal
Excavate Foundations (80, drilled piers)	EA	80	$972	$77,760
Concrete Foundations (80)	CY	80	$1,215	$97,200
Furnish & Install Fence Posts (80)	EA	80	$324	$25,920
Furnish & Install Fencing (6,400 sq. ft.)	SF	6400	$16	$103,680
Tie-Backs (80)	EA	80	$972	$77,760
Subtotal				$382,400
Length				800
Per-Foot Fence Cost				$478.00

Item D – Surface Water Diversion – V-Ditch Construction
This line item estimates 2000 feet of V-Ditch construction. The per-foot ditch costs are $133.65, as follows:

V-DITCH EXCAVATION UNIT COST	Unit	Qty	Unit Cost	Subtotal
Crew Foreman	$ / Day	1	$972	$972
General Laborers (6)	$ / Day - Ea	6	$583	$3,499
Backhoe with Operator (1)	$ / Day - Ea	1	$2,268	$2,268
Compactor with Operator (1)	$ / Day - Ea	1	$2,268	$2,268
Total Crew-Day Unit Cost		0		$9,007
Daily Excavation Production Rate	Ft/Day			400
V-Ditch Excavation Unit Cost	**$/Ft**			**$23**

V-DITCH LINING UNIT COST	Unit	Qty	Unit Cost	Subtotal
Crew Foreman	$ / Day	1	$972	$972
General Laborers (6)	$ / Day - Ea	6	$583	$3,499
Concrete Pumper Truck with Operator	$ / Day - Ea	1	$3,240	$3,240
Concrete Material & WWF	CY	6	$567	$3,402
Total Crew-Day Unit Cost				$11,113
Daily Lining Production Rate	Ft/Day			100
V-Ditch Lining Unit Cost	**$/Ft**			**$111**

The above cost items do not include contractor mobilization and demobilization.

Item E – Mobilization / Demobilization for Line Items A - E
The estimate includes 5% of the subtotal of Line Items A - E

SECTION VI – BENEFIT / COST EFFECTIVENESS

Complete the following information. Refer to Instructions Section VI on page #9 for detailed requirements.
Most Projects will utilize one Benefit Cost Analysis (BCA).

Enter Benefit Cost Ratio Number (BCR) > 2.08

Enter Net Present Value or Benefits > $3,642,972

Enter Total Project Cost Estimate > $1,750,280

Enter Benefit Cost Ratio >

A. Describe damage history:

1. Current\previous damage:
   Provide a description of the damage history below:

   Year Frequency of event Damages

Refer to discussion in Section III, Item 18.1

2. Potential for future damage:
   Is the structure/property within scope of project, e.g., buildings, crops, roads, facilities, etc. (Either describe in 4,000 characters or less or attach/enclose separate MS-word document).

Future damage will be significantly reduced after mitigation. Refer to Section 4.6 of Attachment 1 for further discussion.

B. Describe any project benefits not listed in your benefit cost analysis.

All of the benefits are described in Section 4.6 and Attachment D of Attachment 1

1. Describe the useful life of project:
   Refer to your DDT / Data Documentation Template
   (Either describe in 4,000 characters or less or attach/enclose separate MS-word document).

The project useful life is the estimated amount of time (in years) that the mitigation action will be effective. The Project Useful Life Summary Table located in the BCA software provides Standard Values and acceptable useful life limits for a variety of mitigation projects. For this project, the project useful life is selected to be 30 years, as the expected longevity of these facilities that are composed of wood, steel and fencing materials. This is similar to what would be the expected useful life of buildings.

2. If you are supplying a benefit cost ratio:
   Provide a detailed description of the method you utilized. (Either describe in 4,000 characters or less or attach/enclose separate MS-word document).

The method used to evaluate the project benefits and, therefore, the benefit-cost analysis is discussed in Attachment 1, Section 4.6. The BCR was calculated using FEMA BCA V4.8.

SECTION VII - MAINTENANCE ASSURANCE DESCRIPTION:

Identify any maintenance activities required to preserve the long-term mitigation effectiveness of the project. Attach or enclose maintenance schedule, estimated costs, and an identified entity responsible for completing maintenance. (see sample Maintenance letter on page 14 of instructions).

1. Annual cost of maintenance before mitigation and what the maintenance will include. (Not needed if project is not tied to an existing capital improvement) (Either describe in 4,000 characters or less or attach/enclose separate Word document).

The expected annual maintenance activities and associated estimated costs are described in Section 4.4 of Attachment 1 entitled **"**Hazard Mitigation Grant Program Sub-Application, Early Intake Switchyard Slope Stabilization Project," prepared by Black & Veatch Corporation, May 2014. A letter of assurance is included as Attachment 5.

SECTION VIII - NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

A. Is the jurisdiction/community where the project is located participating in the NFIP? If "YES", are they in good standing?
(Either describe in 4,000 characters or less or attach/enclose separate MS-word document)

Yes, local community in which project is located is Tuolumne County; they participate in the NFIP.

B. Is this project located in a floodplain or floodway designated on a FEMA Flood Insurance Rate Map (FIRM) or Flood Boundary/Floodway Map (FB/FWM)? If "YES", mark the project location on the FIRM or FB/FWM and attach/enclose to application. (Either describe in 4,000 characters or less or attach/enclose separate MS-word document)

No. The project work area is located outside of the FEMA Effective 100-year floodplain according to the California Department of Water Resources website (http://gis.bam.water.ca.gov/bam/). The project site is depicted on a FEMA FIRM, predominantly at the northern-most edge of Section 06109C1275C. The project work area is outside of the floodplain area indicated on the map at the following FEMA FIRM website: https://msc.fema.gov/webapp/wcs/stores/servlet/MapSearchResult?storeId=10001&catalogId=10001&langId=1&panelIDs=06109C0950C$06109C1275C$&Type=pbp&nonprinted=&unmapped=.

C**.** Provide the following:

1. FIRM (FB/FWM) panel number: > 06109C1275C
2. FIRM zone designations: >D
3. NFIP community id number: >060411# Tuolumne County

D. Public Notice Requirements, CFR 44, 9.8:
Has sub-applicant provide opportunity for early public involvement in the decision-making process.
Public Notice Provided: ☐ Yes Not provided: ☒ No

PART II – ENVIRONMENTAL QUESTIONNAIRE

SECTION I – REGULATIONS

The Environmental Questionnaire Part II must be completed and submitted with the project sub-application. Refer to instructions Part II, Section I on page #10 for Environment regulations.

Environmental data is required for project applications when submitting a project to the Cal OES for the FEMA Hazard Mitigation Grant Program. Environmental review is typically the most time consuming aspect of project funding approval.

Provide a detailed response to each question and attach supporting documentation in order to comply with FEMA's frontloading requirements discussed in Part II of the Hazard Mitigation Assistance Unified Guidance 2013.

SECTION II – ENVIRONMENTAL CHECKLIST

Environmental checklist
(1) Double click a box in the YES NO N/A columns
(2) Menu will appear
(3) √ Check box enabled,
(4) Use radio button for not checked or checked

YES	NO	N/A	NATIONAL HISTORIC PRESERVATION ACT
☐	☒	☐	Are any structures involved in the project? (If so, provide construction dates of all structures).
☐	☒	☐	Was consultation with the State Historic Preservation Officer (SHPO) conducted?
☐	☐	☒	If applicable, was consultation with the Tribal Historic Preservation Officer (THPO) conducted?
☒	☐	☐	Are comments attached?

Coordinating Agency: The State Historic Preservation Officer; the appropriate Tribal Historic Preservation Officer

YES	NO	N/A	ARCHEOLOGICAL RESOURCES PRESERVATION ACT
☒	☐	☐	Will there be any ground disturbance?
☒	☐	☐	Will there be any potential disturbance to cultural resources?
☐	☒	☐	Was consultation with SHPO/THPO conducted?
☒	☐	☐	Are comments attached?

Coordinating Agency: The State Historic Preservation Officer; the appropriate Tribal Historic Preservation Officer

YES	NO	N/A	ENDANGERED SPECIES ACT
☒	☐	☐	Will there be any disturbance to the physical environment?
☐	☒	☐	Are any threatened or endangered species present in the project area?
☐	☒	☐	Has critical habitat been identified in the project area?
☐	☒	☐	Was consultation with U.S. Fish and Wildlife Service (USFWS) and CA Department of Fish and Wildlife conducted?
☒	☐	☐	Are comments attached?

Coordinating Agencies: The National Marine Fisheries Service and U.S. Fish and Wildlife Service

YES	NO	N/A	FISH AND WILDLIFE COORDINATION ACT
☒	☐	☐	Is the project located in or near a waterway or body of water?
☐	☒	☐	Will the project cause any modification to the waterway or body of water?
☐	☒	☐	Was consultation with USFWS, National Marine Fisheries Service, and State Wildlife Agency conducted?
☒	☐	☐	Are comments attached?

Coordinating Agency: U.S. Fish and Wildlife Service and CA Department of Fish and Wildlife

YES	NO	N/A	FARMLANDS PROTECTION POLICY ACT
☐	☒	☐	Is the project located in or near designated prime and unique farmlands?
☐	☒	☐	Will the project convert any designated prime and or farmlands?
☐	☒	☐	Was consultation with Natural Resources Conservation Service (NRCS) conducted?
☒	☐	☐	Are comments attached?

Coordinating Agency: U.S. Dept. of Agriculture's Natural Resources Conservation Service, Dept. of Conservation (Division of Land Resource Protection)

YES	NO	N/A	CLEAN AIR ACT
☒	☐	☐	Will the project result in temporary or permanent air emissions?
☐	☒	☐	Was consultation conducted?
☒	☐	☐	Are comments attached?

Coordinating Agency: State Environmental Agency or State Health Department, CA/EPA Air Resources Board and Local Air Quality Mgmt. Districts

YES	NO	N/A	CLEAN WATER ACT (Section 404) RIVERS AND HARBORS ACT (Section 10)
☒	☐	☐	Will the project involve dredging or disposal of dredged material, excavation, adding fill material or result in any modification to "waters" of the U.S.?
☐	☒	☐	Will the project involve bank stabilization or installing transmission in "waters" of the U.S.?
☒	☐	☐	Will the project be near or in navigable waters?
☐	☒	☐	Was consultation with the U.S. Army Corps of Engineers (USACE) conducted?
☒	☐	☐	Are comments attached?
☒	☐	☐	Will a permit be required?
☐	☒	☐	Have you submitted an application to the USACE?
☐	☒	☐	Is a copy of the application attached?
☒	☐	☐	Does a nationwide permit apply?
☐	☒	☐	Does a general permit apply?

COMMENT: "waters" includes waters subject to ebb and flow of tide; wetlands; lakes, rivers, streams, mudflats, sloughs, prairie potholes, wet meadows, playa lakes, natural ponds, impoundments, tributaries, territorial seas, and wetlands adjacent to waters previously identified.

Coordinating Agency: U.S. Army Corps of Engineers

YES	NO	N/A	WILD AND SCENIC RIVERS ACT
☒	☐	☐	Is the project located near or in a designated wild or scenic river?
☐	☒	☐	Was consultation conducted?
☒	☐	☐	Are comments attached?

Coordinating Agency: U.S. Fish and Wildlife Service and the U.S. Forest Service within their jurisdiction.

YES	NO	N/A	WILDERNESS ACT
☐	☒	☐	Is the project located near or in a designated wilderness or coastal wildlife area?
☐	☒	☐	Was consultation conducted?
☒	☐	☐	Are comments attached?

Coordinating Agency: U.S. Fish and Wildlife Service, National Park Service and the Bureau of Land Management

YES	NO	N/A	OTHER RELEVANT LAWS AND ENVIRONMENTAL REGULATIONS
☒	☐	☐	Do any other laws and/or regulations apply to the project? If so, please reference the regulation and attach proper documentation.

Coordinating Agency: Applicable State Statutory Requirements, Executive and Administrative Orders and any local environmental requirements.

EXECUTIVE ORDERS

YES	NO	N/A	E.O. 11988 – FLOODPLAINS
☐	☒	☐	Is the project located in a FEMA-identified 100-year or 500-year floodplain?
☐	☒	☐	Is the project located in a FEMA-identified floodway?
☒	☐	☐	Is the project depicted on a FEMA FIRM (Flood Insurance Rate Map)?
☒	☐	☐	Is the map attached?
☐	☒	☐	Was consultation with local floodplain administrator and state water control agency conducted?
☒	☐	☐	Are comments attached?

Coordinating Agencies: Local community floodplain administrator and the state water control agency. Because the project work area is located outside of the 100-year floodplain, references to NFIP are not applicable.

YES	NO	N/A	E.O. 11990 – WETLANDS
☐	☒	☐	Is the project in an area that is inundated or saturated by surface or ground water (e.g. swamps, marshes, bogs, etc.) or in or near identified wetlands?
☐	☒	☐	Is the project depicted on a National Wetlands Inventory (NWI) map?
☐	☒	☐	Is the map attached?
☒	☐	☐	Are agency comments attached?

COMMENT: Wetlands are identified by obtaining a National Wetlands Inventory (NWI) map from the U.S. Fish and Wildlife Service, the Army Corps of Engineers, or their websites. The Natural Resource Conservation Service also has wetland maps for agricultural land.

Coordinating Agencies: U.S. Fish and Wildlife Service, Army Corps of Engineers, and Natural Resources Conservation Service

YES	NO	N/A	E.O. 12898 – ENVIRONMENTAL JUSTICE
☐	☒	☐	Is the project in an area of low income or minority populations?
☐	☒	☐	Will the project disproportionately impact any low income or minority populations?
☐	☒	☐	Is any socio-economic data attached?

COMMENT: If the project would disproportionately adversely affect low income or minority populations, or would disproportionately assist higher income populations at the exclusion of lower income or minority populations, then E.O. 12898 must be addressed.

Coordinating Agency: Local census office

EXTRAORDINARY CIRCUMSTANCES (FEMA 44 CFR §10.8 (d)(3))

If Extraordinary Circumstances exist within an area affected by an action, such that an action that is categorically excluded from NEPA compliance may have a significant adverse environmental impact, an environmental assessment shall be prepared. Please answer yes or no to the questions below:

YES	NO	
☐	☒	Greater scope or size than normally experienced for a particular category of action;
☐	☒	Actions with a high level of public controversy;
☐	☒	Potential for degradation, even though slight, of already existing poor environmental conditions;
☐	☒	Employment of unproven technology with the potential adverse effects or actions involving unique or unknown environmental risks;
☒	☐	Presence of endangered or threatened species or their critical habitat, or archaeological cultural, historical or other protected resources;
☐	☒	Presence of hazardous or toxic substances at levels which exceed Federal, state, or local regulations or standards requiring action or attention;
☐	☒	Actions with the potential to affect special status areas adversely or other critical resources such as wetlands, coastal zones, wildlife refuge and wilderness areas, wild and scenic rivers, sole or principal drinking water aquifers;
☐	☒	Potential for adverse effects on health or safety; and
☐	☒	Potential to violate a federal, state, local, or tribal law or requirement imposed for the protection of the environment.
☐	☒	Potential for significant cumulative impact when the proposed action is combined with other past, present and reasonably foreseeable future actions, even though the impacts of the proposed action may not be significant by themselves.

SECTION III - ALTERNATIVES

Identify at least 3 alternatives:

ALTERNATIVE #1 – the No Action alternative evaluates the consequences of taking no action and leaving conditions as they currently exist. (Either describe in 4,000 characters or less or attach separate MS-word document)

Section 2 of Attachment 1 provides a summary of the existing site hazards and a description of the risks that SFPUC will experience if the No Action alternative were to be considered. Such risks are the results of multiple hazards including potentially-extensive slope failure at the east end of ISY that would initiate localized and/or massive ground movement(s), and on-going, large-scale and extensive raveling of the steep slope located at the center of ISY, that would initiate rock falls of varying size (small rocks to large boulders) and velocity.

Depending on the degree of hazard severity, one or more of the following risks could result:

1. Unsafe working conditions.
2. Temporary blockage of ISY access road.
3. Permanent damage to ISY access road.
4. Damage to ISY perimeter security fencing.
5. Encroachment of ISY facility perimeter.
6. Damage to electrical equipment and support structures.
7. Damage to control building.
8. Switchyard loss of operation.

ALTERNATIVE #2 - (Proposed Action) – Is the Sub-applicant's proposed project to solve the problem. Explain why the proposed action is the preferred alternative. Identify how the preferred alternative would solve a problem, why the preferred alternative is the best solution for the community, why and how the alternative is environmentally preferred and why the project is the economically preferred alternative. (Either describe in 4,000 characters or less or attach separate MS-word document)

Section 3 of Attachment 1 provides a description of the hazard mitigation solutions that were identified to address the hazards observed at the site. Such mitigation solutions were then combined into a set of alternatives that were evaluated on the basis of hazard reduction effectiveness; relative construction cost; and relative maintenance cost.

The proposed project was selected due to the reasons described more fully in Section 4 of Attachment 1 – essentially to construct the mitigation solutions offering the best hazard mitigation for the best value. The proposed project consists of the following work elements:

Mitigation Solution	Work Area 1 Mitigation	Work Area 2 Mitigation
Catchment Fences		√
Surface Water Diversion	√	√
Vegetative Surface Stabilization	√	√
Slope Flattening with Catchment Wall	√	

ALTERNATIVE #3 – (List the Second Action alternative that would also solve the problem). It must be a viable project that could be substituted in the event the proposed action is not chosen. (Either describe in 4,000 characters or less or attach separate MS-word document)

Should the proposed project not be selected, the next best alternative, although it would be more expensive to construct, would consist of the following work elements:

Mitigation Solution	Work Area 1 Mitigation	Work Area 2 Mitigation
Catchment Fences		√
Surface Water Diversion	√	√
Vegetative Surface Stabilization	√	√
Retaining Wall	√	

Please print this page – original signatures are REQUIRED.

SECTION IV – PROJECT CONDITIONS

Indicate by checking each box below that you will adhere to these listed project conditions.

☒ If during implementation of the project, ground-disturbing activities occur and artifacts or human remains are uncovered, all work will cease and FEMA, Cal OES, and SHPO will be notified.

☒ If deviations from the approved scope of work result in design changes, the need for additional ground disturbance, additional removal of vegetation, or will result in any other unanticipated changes to the physical environment, FEMA will be contacted and a re-evaluation under NEPA and other applicable environmental laws will be conducted.

☒ If wetlands or waters of the U.S. are encountered during implementation of the project, not previously identified during project review, all work will cease and FEMA will be notified.

Name: Emilio Cruz Title: AGM Infrastructure
Sub-applicant Authorized Representative

Signature: _____ Date: 29 MAY 14
Sub-applicant Authorized Representative

SECTION V - AUTHORIZATION

The undersigned does hereby submit this sub-application for financial assistance in accordance with the Federal Emergency Management Agency's Hazard Mitigation Grant Program and the State Hazard Mitigation Administrative Plan and certifies that the sub-applicant (e.g., organization, city, or county) will fulfill all requirements of the program as contained in the program guidelines and that all information contained herein is true and correct to the best of our knowledge.

Name: Monique Zmuda Title: Deputy Controller
Sub-applicant Authorized Representative

Signature: _____ Date: 5/29/14
Sub-applicant Authorized Representative

Name of organization: City and County of San Francisco

TABLE OF CONTENTS - Attachments

Attachment 1. Report entitled "Hazard Mitigation Grant Program Sub-Application, Early Intake Switchyard Slope Stabilization Project," prepared by Black & Veatch Corporation, May 2014; authorized by SFPUC Agreement CS-340E, Task Order No. 15. File Name = "Cal OES Hazard Mitigation Grant Report 053014.PDF"

Attachment 1 provides answers to the following questions:

PART	Section	Question No.	Title
I	III	13	Mapping Requirements – see maps and photographs in Attachment 1.
I	III	16.B	Description of Problem – see also description of hazards and risks in Attachment 1, Section 2.
I	III	16.C	Recent events – see Section 1 of Attachment 1 for further description of damages caused by the Rim Fire to the slopes surrounding ISY.
I	III	16.D	Description of how project reduces hazard effects and risks – See Section 3 of Attachment 1 that describes the proposed hazard mitigation solutions that were evaluated.
I	III	16.E	Scope of Work – see Attachment 1, Section 4 for a complete description of the Scope of Work.
I	III	16.F	Additional information regarding round disturbance – see Attachment 1, Section 4, for a description of expected ground disturbance activities.
I	III	18.2	Section 2.2 of Attachment 1 discusses the risks present at the site and the effectiveness of the alternatives that were evaluated as part of the project development.
I	III	18.3	Sections 3.3, 3.4 and 3.5 of Attachment 1 discuss the reasons that the preferred alternative (proposed action) was selected.
I	IV	- -	Attachment 1, Section 4.2 summarizes the design and construction schedule, and a Gantt chart is included in Attachment B of Attachment 1.
I	V	- -	Attachment 1, Section 4.3 discusses assumptions used to develop the project cost estimate. A copy of the project cost estimate developed for the Project is included in Attachment C of Attachment 1. In addition, a separate "Project Cost Estimate Excel Spreadsheet" is included as Attachment 3 (see below).
I	VI	- -	Technical information that is found in Section 4 of Attachment 1 was utilized as part of responding
I	VII	- -	Section 4.4 of Attachment 1 addresses the estimated cost of annual maintenance that is expected to be needed after completion of construction of the mitigation project.

Attachment 2. Document entitled "Environmental Checklist, Early Intake Switchyard Slope Stabilization Project," prepared by San Francisco Public Utilities Commission, Bureau of Environmental Management, May 2014. File Name = "Attachment 2 Environmental Checklist.PDF"

Attachment 2 provides comments and additional clarifications to answers given in the Environmental Checklist in Part II, Section II.

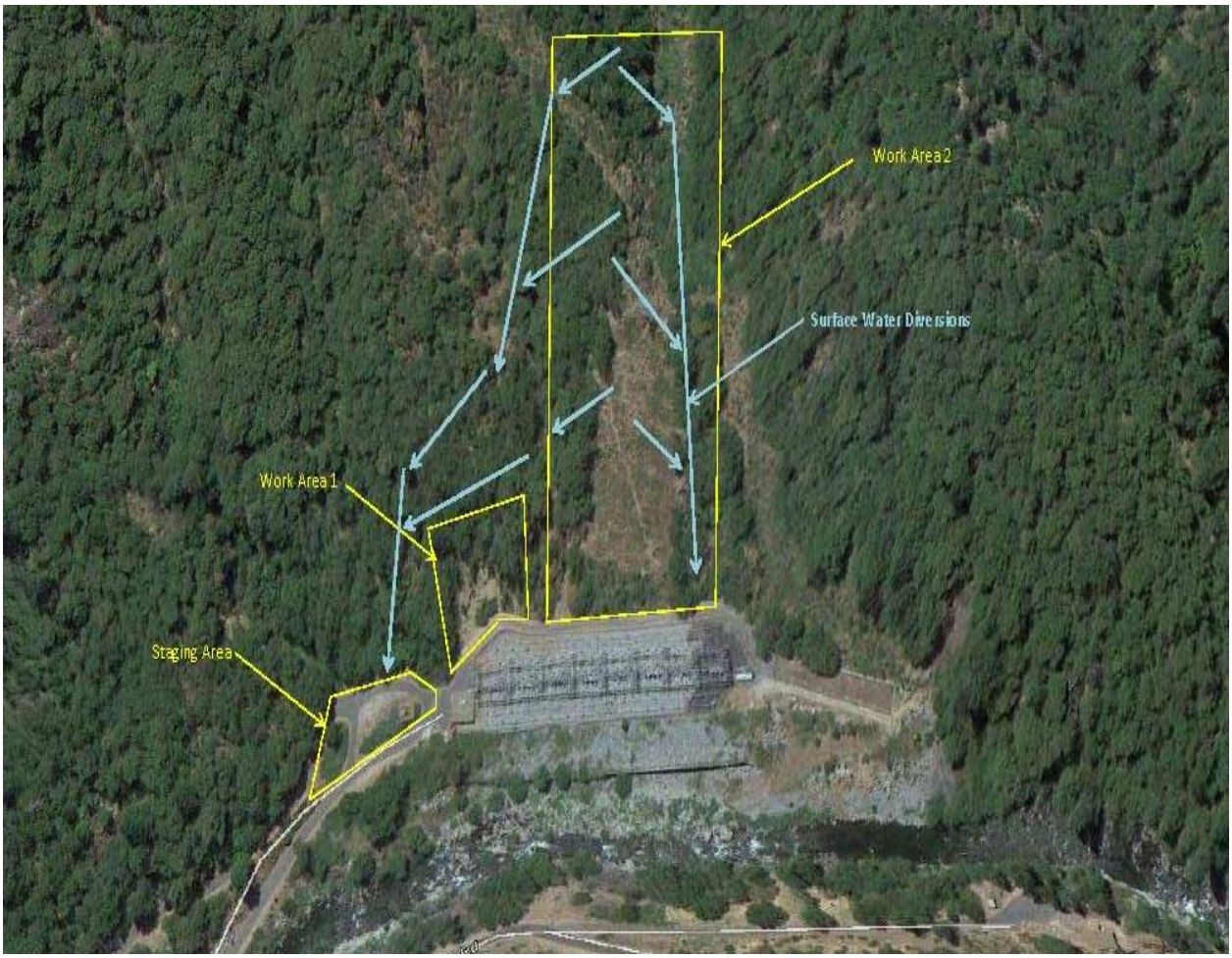
Attachment 3. Project Cost Estimate Excel Spreadsheet, prepared by Black & Veatch, May 2014. File Name = "ISY Project Cost Estimate Spreadsheet.xls"

Attachment 4. NFIP Flood Insurance Rate Map, Panel 1275C.

Attachment 5. Maintenance Letter, May 29, 2014.

Attachment 1

Report entitled “Hazard Mitigation Grant Program Sub-Application, Early Intake Switchyard Slope Stabilization Project,” prepared by Black & Veatch Corporation, May 2014



RIM FIRE EMERGENCY SERVICES CONTRACT
Hazard Mitigation Grant Program Sub-Application
Early Intake Switchyard Slope Stabilization Project

San Francisco Public Utilities Commission
Hetch Hetchy Water & Power

Agreement No. CS-340E
Task Order No. 15
30 May 2014

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Tables

Figures

ACKNOWLEDGEMENTS

This report has been prepared under the direction of the following Black & Veatch engineering professionals, licensed in the State of California:

Paul R. Kneitz, P.E.
B&V Project Manager

Scott R. Huntsman, Ph. D., P.E., G.E.
B&V Geotechnical Engineer

1.0 INTRODUCTION

The "Rim Fire" started on approximately August 16, 2013 in Tuolumne County, California and continued burning through September 2013 with only partial containment. The fire burned areas of the Stanislaus National Forest and Yosemite National Park in the vicinity of California State Highway 120 east of the town of Groveland. Numerous assets owned and operated by Hetch Hetchy Water & Power (HHWP) were affected by the fire.

In connection with Task Order No. 6 of San Francisco Public Utilities Commission (SFPUC) Contract CS-340E, Black & Veatch assisted HHWP to develop planning-level descriptions of fifty-eight (58) proposed recovery projects that would return HHWP assets to their pre-fire condition. Scope of work, budgeting and scheduling information for each of the proposed recovery projects was presented in the November 2013 document entitled "Asset Recovery Plan." The SFPUC & HHWP are using the Asset Recovery Plan to support fire recovery financial planning and to make decisions regarding the implementation of specific asset recovery projects.

Subsequently, SFPUC has indicated that it is eligible to prepare and submit a sub-application under the State of California Governor's Office of Emergency Services (Cal OES) "Hazard Mitigation Grant Program (HMGP)" for the Early Intake Switchyard Slope Stabilization Project. HHWP has requested Black & Veatch to provide management, coordination, and general technical services to assist with its HMGP sub-application.

1.1 Early Intake Switchyard (ISY)

The Early Intake Switchyard (ISY) is a 230 kV switchyard located alongside the Tuolumne River, just downstream of the Kirkwood Powerhouse (Figure 1). The switchyard is a critical HHWP asset that provides for the transmission of electrical power generated at Kirkwood and Holm Powerhouses to Moccasin as well as the local distribution of power to HHWP's upcountry facilities. A failure of any critical component within the switchyard represents a significant loss of power generation and transmission capability which accounts for 75% of the HHWP Project annual generation.

ISY consists of an extensive array of electrical circuit breakers and disconnect switches that are installed inside of a fenced area approximately 550 feet long by 125 feet wide, and includes a control building. It was initially put into service in 1960. The transmission line to Kirkwood Powerhouse, Line 11, was put into service in 1967. Intake Switchyard provides the main accumulation, switching and transmission point for hydroelectric power generated at the Holm and Kirkwood powerhouses.

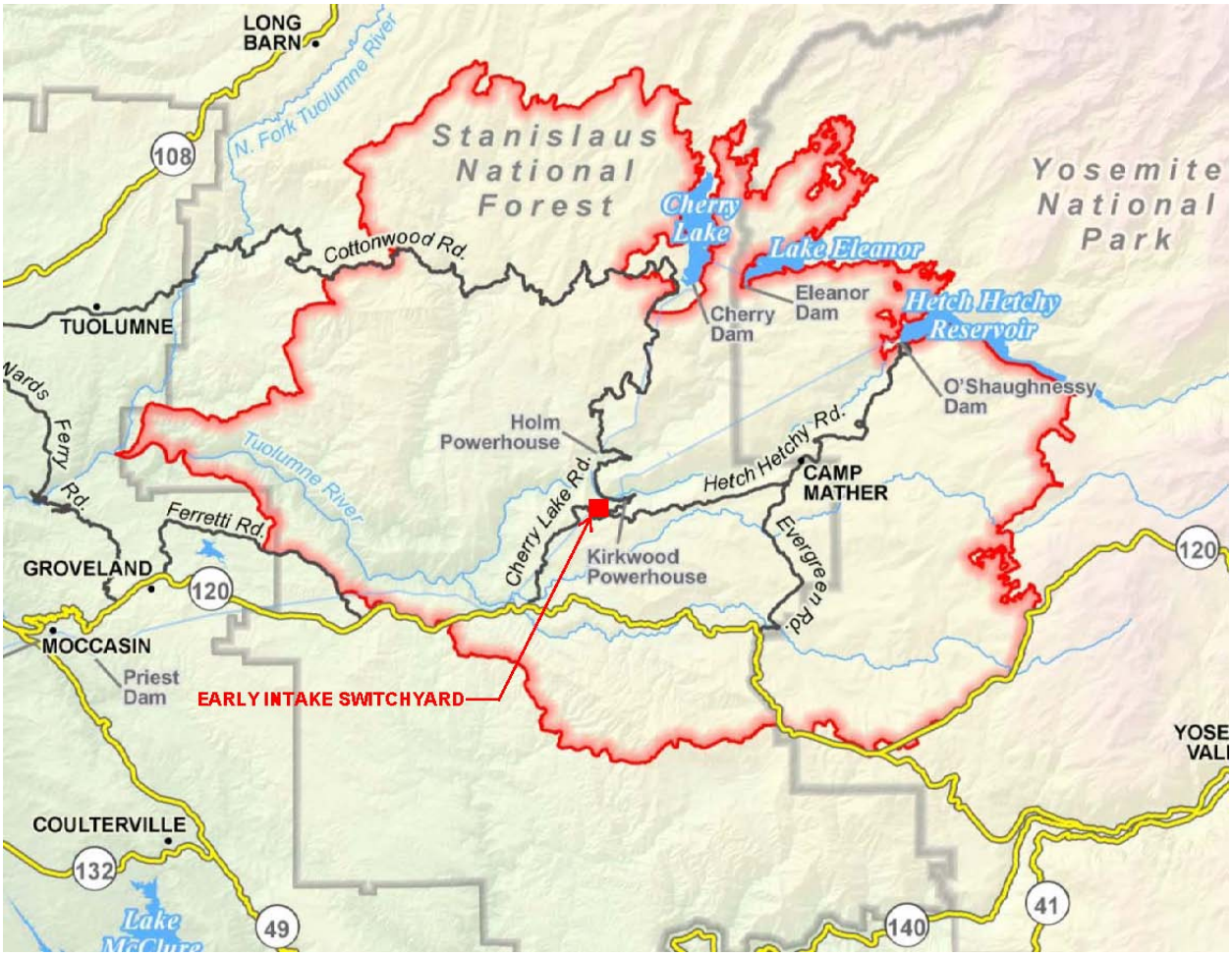


Figure 1-1: General Location of Early Intake Switchyard

1.2 Rim Fire Damage to Slopes Surrounding ISY and Related Effects

The tall, steep slopes adjacent to Early Intake Switchyard were severely burned by the Rim Fire. Detailed field observations performed during and after the fire identified that several types of fire damage occurred in the area that resulted in both short-term safety concerns and long-term maintenance concerns, including:

- Potential for slope raveling and rock falls.
- Potential for slope instability.
- Drainage issues affecting the slopes and roads.
- Increased erosion and sedimentation susceptibility.

In addition to ash contamination caused to the ISY facilities, there was collateral damage caused to items in the area. This included: 1) fire damage caused to insulators that were boxed and stored onsite as part of an ISY construction project just underway; 2) damage to disconnect switch parts that were in crates and burned, also part of the new project; 3) damage to the optical ground wire between ISY and Holm; and 4) destruction to a contractor's backhoe.

Field assessments of post-fire conditions at ISY and the surrounding area are documented in multiple reports prepared by Black & Veatch in 2013, including:

- Agreement CS-340E, Task Order No. 6, Rim Fire Emergency Planning Report; Asset Recovery Plan; Black & Veatch Corporation, November 2013.
- Agreement CS-340E, Task Order No. 2, Roads, Slopes and Bridges; Assessment of Roads, Slopes and Bridges - Overall Report; Black & Veatch Corporation, October 2013.
- Agreement CS-340E, Task Order No. 6, Rim Fire Emergency Planning Report; Memorandum – Intake Switchyard Assessment; Black & Veatch Corporation, October 8, 2013.

Figure 1-2: Rockfalls at Slope along South Edge of ISY (August 27, 2013)

Figure 1-3: Severely Burned Barren Slope above Intake Switchyard (August 27, 2013)

1.3 Purpose of This Report

The purpose of this report is to document the mitigation planning, project scoping (technical feasibility and cost-effectiveness), and environmental planning and compliance activities that were performed by SFPUC and Black & Veatch in developing the Early Intake Switchyard Slope Stabilization Project (Project), that will address the significant risk of damage to the ISY resulting from the Rim Fire's effects on the surrounding area. It is intended that this report become an attachment to the City's HMGP sub-application for the Project.

As an attachment to the City's HMGP sub-application, the report includes detailed documentation of the following activities for the Project:

- Early Intake Switchyard - Hazard & Risk Analysis.
- Alternatives for ISY Slope Stabilization Project.
  - Prospective Hazard Mitigation Solutions.
  - Identification of Project Alternatives.
  - Evaluation of Alternatives.
  - Selection of Preferred Project Alternative.
- Development of the Proposed Project:
  - Project Description / Scope of Work.
  - Project Design and Construction Schedule.
  - Project Cost Estimate.
  - Annual Maintenance Requirements.
  - Potential Impacts to HHWP Operations.
  - Benefit-Cost Effectiveness.

2.0 EARLY INTAKE SWITCHYARD – HAZARD & RISK ANALYSIS

This section summarizes the May 2014 field observations performed. As a first step in scoping the requirements for the ISY Slope Stabilization Project, Black & Veatch performed a field engineering review of the existing site conditions on May 2, 2014. The field assessment was performed by Scott Huntsman, Ph. D., P.E., G.E., B&V Geotechnical Engineer, and Tom Walker, P.E., B&V Civil Engineer. The area surveyed is generally indicated by the red border shown on Figure 2-1.

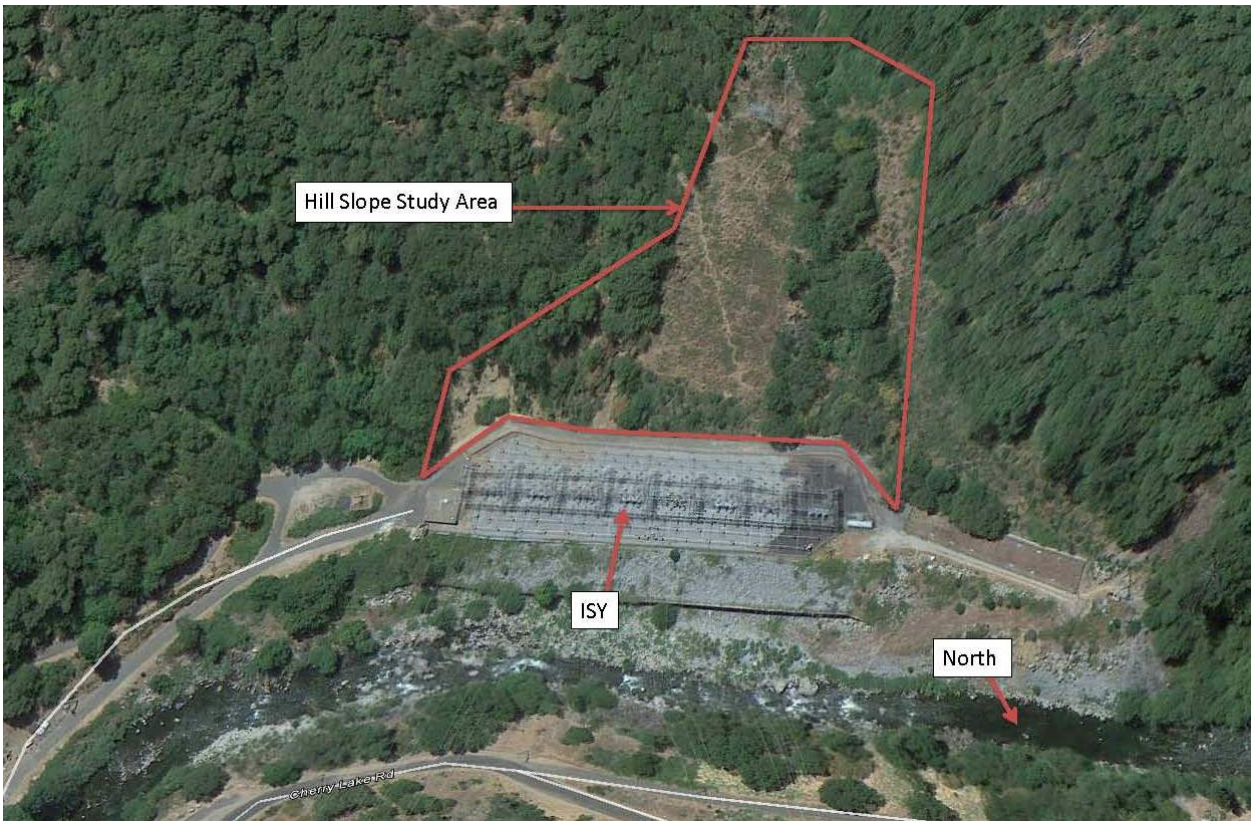


Figure 2-1: Initial Study Limits of ISY Slope Stabilization Project

2.1 ISY Site - Summary of Hazards (May 2014)

The site visit performed on May 2, 2014 at ISY and the surrounding slopes confirmed the presence of hazards that continue to present serious risks to the ISY facilities and to loss of HHWP operations as a result of current slope conditions. Referring to Figure 2-2, such conditions are summarized as follows:

- Work Area 1 (Figures 2-4 & 2-5): This area exhibits active slope failure conditions at this over-steepened slope that is at the edge of a 150-foot long reach of the ISY south access road, located at the east end of ISY.
- Work Area 2 (Figures 2-6 & 2-7): This area exhibits active slope raveling conditions at this tall, steep slope that is immediately adjacent to a 200-foot long reach of the ISY south access road located near the center of ISY; such conditions extend approximately 200 feet vertically up the slope.

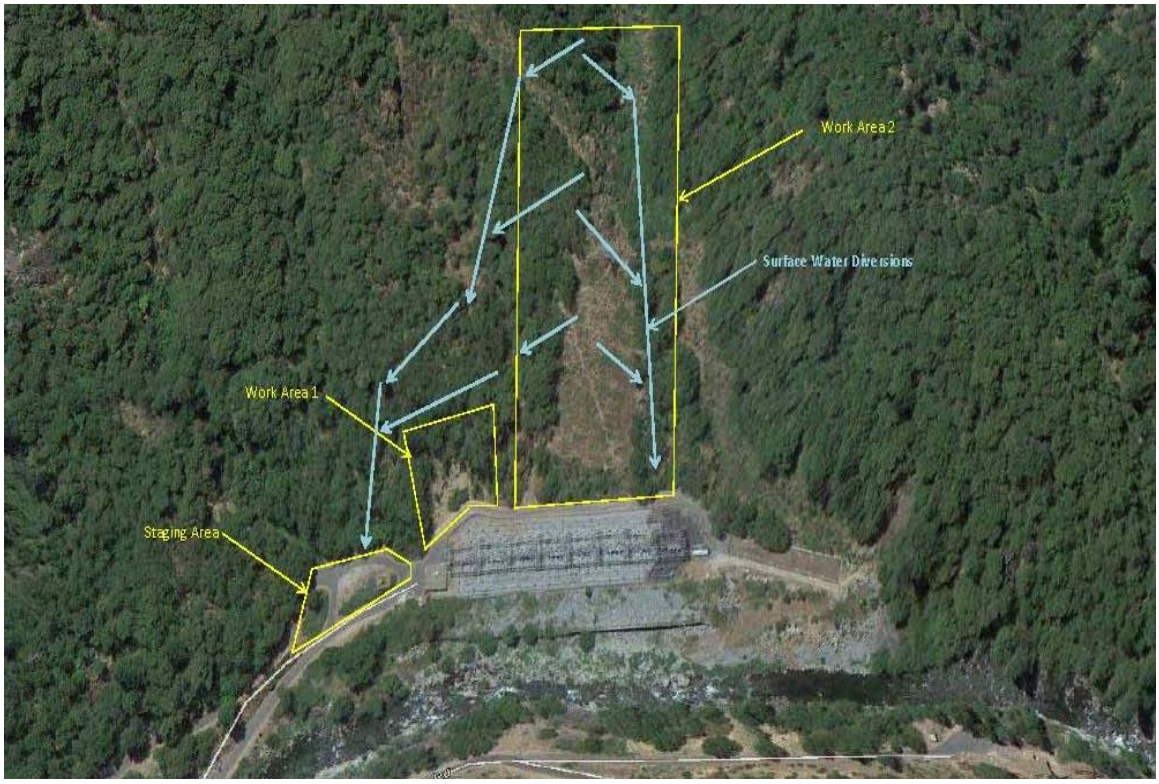


Figure 2-2: Overview of Slope Problems Observed South of ISY

Figure 2-3: Photograph of Slope to the South of ISY (May 2, 2014)

Figure 2-4: Work Area 1 – Active Slope Failure at East End of ISY (May 2, 2014)

Figure 2-5: Work Area 1 – Active Slope Failure at East End of ISY (May 2, 2014)

Figure 2-6: Work Area 2 - Steep Slope to the South of ISY Exhibiting Active Raveling Conditions (May 2, 2014)

Figure 2-7: Slope Debris from Raveling Slope alongside Access Road on South Edge of ISY (May 2, 2014)

2.2 ISY Site – Summary of Risks

Based on the site visit performed on May 2, 2014 at ISY and the surrounding slopes, and consideration of hazards observed, Black & Veatch identified a number of risks ranging from minor to significant that include health and safety concerns, potential damage to ISY facilities and/or loss of HHWP operations. Such risks are summarized as follows.

- Work Area 1. Potentially-extensive slope failure at the east end of ISY, initiating localized and/or massive ground movement(s). This could, depending on the degree of severity, result in one or more of the following risks:
  - Unsafe working conditions.
  - Temporary blockage of ISY access road.
  - Permanent damage to ISY access road.
  - Damage to ISY perimeter security fencing.
  - Encroachment of ISY facility perimeter.
  - Damage to electrical equipment and support structures.
  - Damage to control building.
  - Switchyard loss of operation.
- Work Area 2. On-going, large-scale and extensive raveling of the steep slope located at the center of ISY, initiating rock falls of varying size (small rocks to large boulders) and velocity. This could, depending on the degree of severity, result in one or more of the following risks:
  - Unsafe working conditions.
  - Temporary blockage of ISY access road.
  - Permanent damage to ISY access road.
  - Damage to ISY perimeter security fencing.
  - Encroachment of ISY facility perimeter.
  - Damage to electrical equipment and support structures.
  - Switchyard loss of operation.

3.0 ALTERNATIVES FOR ISY SLOPE STABILIZATION PROJECT

This section discusses prospective hazard mitigation solutions and presents the identification and evaluation of alternatives for the Project.

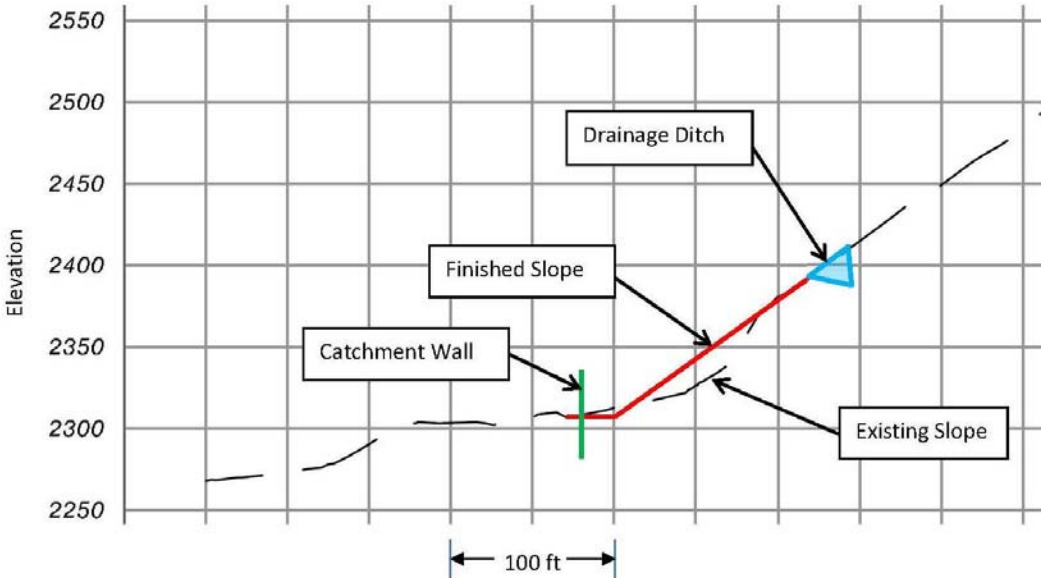
3.1 Prospective Hazard Mitigation Solutions

To address the slope stability risk hazards observed in May 2014, six (6) hazard mitigation "solutions" along with a "no action" option were developed for use in the subsequent *Evaluation of Project Alternatives* step. One or more of the hazard mitigation solutions could be applied to each location / situation. The hazard mitigation solutions are presented in Table 3-1, "Hazard Mitigation Solutions." Photos or illustrations of certain hazard mitigation solutions are presented in Figures 3-1 to Figure 3-4.

Table 3-1 Hazard Mitigation Solutions

No.	Title	Mitigation Description
1	No Action	Leave conditions as they currently exist.
2	Catchment Fences Only	As a sole mitigation, install a catchment fence along the base of the slope (at the edge of the access road) and additional rows of fences crossing the slope at locations upslope. Each fence would be between 8- to 12-feet tall and constructed using steel netting stretched between steel posts supported in drilled piers. The general concept is shown in Figure 3-1. Each catchment fence would be designed to stop the active down-the-slope movement of slope debris, but may require frequent debris removal to maintain its effectiveness. This solution is applicable to all work areas.  **Figure 3-1: Typical Rock Catchment Fence**

3	Catchment Wall	As an alternative to a catchment fence, the catchment wall would be constructed along the base of the slope, along the edge of the access road. The catchment wall would be between 4- to 6-feet tall, and constructed using steel I-beam posts with heavy timber lagging. The general concept is shown in Figure 3-2. The catchment wall would be designed to stop the active down-the-slope movement of slope debris with the ability to store the material for longer periods without frequent cleanings; however, some amount of periodic maintenance / cleaning would still be necessary. This solution is applicable to all work areas.  **Figure 3-2: Typical Catchment Wall**
4	Surface Water Diversion	This mitigation involves the construction of concrete-lined diversion ditches to create surface water diversions on the steep slopes. This will mitigate the contribution of soil saturation to slope instability and to the active movement of slope debris. This solution is considered applicable to all project alternatives evaluated herein.
5	Vegetative Surface Stabilization	This mitigation involves the placement of hydroseed mixtures to promote stabilized soil surfaces by holding moisture and protecting soil surfaces against erosion from wind and rain. This solution is considered applicable to all project alternatives evaluated herein.
6	Slope Flattening, with Catchment Wall at Base of Slope	This mitigation solution involves the "laying back" of existing steep slopes to make them shallower and therefore more stable. This solution applies only to the conditions observed at Work Area 1. The average slope gradient would be reduced to roughly 1.5H:1V and a catchment wall would be installed at the base of slope. The general concept is shown below in Figure 3-3.

6	Slope Flattening, with Catchment Wall at Base of Slope (continued)	 **Figure 3-3: Slope Flattening Concept at Work Area 1**
7	Retaining Wall	As an alternative to slope flattening, this mitigation solution involves stabilizing the existing steep slopes by constructing a retaining wall. This solution applies only to the conditions observed at Work Area 1. The retaining wall would be of either soldier pile with lagging construction or be of precast concrete crib wall construction. The general concepts are shown below in Figure 3-4.  Soldier Pile and Lagging Retaining Wall Construction

7	Retaining Wall (continued)	 Precast Concrete Crib Wall Construction **Figure 3-4: Retaining Wall Concepts**

3.2 Identification of Project Alternatives

Given the above list of prospective hazard mitigation solutions, Black & Veatch performed a pre-screening of prospective hazard solutions as a way of developing project alternatives that appear suitable for further evaluation for each work area. The results of the pre-screening exercise are presented in Table 3-2 below.

Table 3-2 Development of Project Alternatives

Mitigation Solution		**Work Area 1 Mitigation** [2]	**Work Area 2 Mitigation** [3]
1	No Action	Not considered [1]	
2	Catchment Fences (Only)	Alternative 1A	Alternative 2A
3	Catchment Wall (Only)	Alternative 1B	Alternative 2B
4	Surface Water Diversion	Included	Included
5	Vegetative Surface Stabilization	Included	Included
6	Slope Flattening with Catchment Wall	Alternative 1C	Not considered
7	Retaining Wall	Alternative 1D	Not considered

The project alternatives development resulted in four (4) alternatives for Work Area 1 and two (2) alternatives for Work Area 2. Commenting on the above screening of alternatives:

[1] The No Action alternative does not meet the objective of mitigating the risk of slope hazards and therefore was not considered further.

[2] Work Area 1 options include solutions that would provide similar degrees of hazard reduction / protection, but would have different construction and maintenance costs. These four solutions were compared at a high level, on the basis of their hazard reduction effectiveness, relative construction cost, and relative maintenance cost, as described more fully below.

[3] Work Area 2 options include solutions that would provide similar degrees of hazard reduction / protection, but would have different construction and maintenance costs. These two solutions were compared at a high level, on the basis of their hazard reduction effectiveness, relative construction cost, and relative maintenance cost, as described more fully below.

3.3 Evaluation of Work Area 1 Alternatives

Alternative 1A – Catchment Fences

This alternative consists of the construction of two catchment fences; one at the base of the slope just south of the ISY access road, and one approximately 80 feet higher, above the scarp left by previous slope failures. Each fence would be approximately 400 feet long and 8 feet in height. The fences would serve to catch falling debris that reduces the risk of blocking the access road or damaging the ISY fence or equipment. Periodic maintenance would be required to clear fallen debris from behind the fences and to repair the fences after rock falls. If the over-steepened slope continues to degrade, the upper fence could suffer severe damage and require replacement.

Alternative 1B – Catchment Wall

This alternative consists of the construction of an approximately 8-foot high debris catchment wall at the base of the slope. The approximately 100-foot long wall would be built of vertical steel I-beams set into cast-in-place drilled concrete piers with heavy timber lagging between the I-beams. The wall would serve to catch falling debris that reduces the risk of blocking the access road or damaging the ISY fence or equipment. Periodic maintenance would be required to clear fallen debris from behind the wall and to repair the wall if it becomes damaged. This alternative should cost less to install than Alternative 1A because the construction would take place at the base of the slope only.

Alternative 1C – Slope Flattening with Catchment Wall

This alternative uses the catchment wall described in Alternative 1B in combination with area grading of the existing over-steepened slope to an approximate average slope of 1.5 : 1 (horizontal : vertical). The grading activity will serve to remove loose materials and clean-up the slope making it less likely to produce falling debris materials, even though such debris will collect behind the catchment wall. This alternative will cost more to construct than Alternative 1B, but would offer a higher degree of protection and lower maintenance costs.

Alternative 1D – Retaining Wall

This alternative involves the construction of a structurally-sound retaining wall at the base of the slope that will stabilize the slope and prevent future movement, thus reducing the risk of blocking the access road or damaging the ISY fence or equipment. The retaining wall would be at least 50-feet tall and approximately 100 feet long. This alternative offers the highest degree of protection, but would be the most costly of the alternatives to construct.

The four alternatives for Work Area 1 were then compared in the following table. All four of the alternatives would include surface water diversions constructed uphill of the work area and the application of hydroseeded vegetative cover.

Table 3-3 Evaluation of Alternatives for Work Area 1

Alternative	Hazard Reduction Effectiveness	Relative Construction Cost	Relative Maintenance Cost
1A - Catchment Fences	Moderate	Moderate	Highest
1B - Catchment Wall	Moderate	Lowest	Moderate
1C - Slope Flattening with Catchment Wall	High	Moderate	Moderate
1D - Retaining Wall	Highest	Highest	Lowest

Preferred Alternative

On the basis of the relative comparison of hazard reduction and cost factors, Alternative 1C appears to offer the best-valued solution for Work Area 1 since it would provide a relatively "high" degree of hazard protection for the ISY facility at a relatively "moderate" construction and maintenance cost.

3.4 Evaluation of Work Area 2 Alternatives

Alternative 2A – Catchment Fences

This alternative consists of the construction of two catchment fences; one at the base of the slope just south of the ISY access road, and one more approximately 120 feet higher. Each fence would be approximately 400 feet long and 8 feet in height. The fences would serve to catch falling debris that reduces the risk of blocking the access road or damaging the ISY fence or equipment. Periodic maintenance would be required to clear fallen debris from behind the fences and to repair the fences after rock falls.

Alternative 2B – Catchment Wall

This alternative consists of the construction of an approximately 10-foot high debris catchment wall at the base of the slope. The approximately 400-foot long wall would be built of vertical steel I-beams set into cast-in-place drilled concrete piers with heavy timber lagging between the I-beams. The wall would serve to catch falling debris that reduces the risk of blocking the access road or damaging the ISY fence or equipment. Periodic maintenance would be required to clear fallen

debris from behind the wall and to repair the wall if it becomes damaged. A risk would still exist that falling debris could travel over the top of the wall and into the ISY facility. This alternative should cost less to install than Alternative 2A because the construction would take place at the base of the slope only.

The two alternatives for Work Area 2 were then compared in the following table. Both of the alternatives would include surface water diversions constructed uphill of the work area and the application of hydroseeded vegetative cover.

Table 3-4 Evaluation of Alternatives for Work Area 2

Alternative	Hazard Reduction Effectiveness	Relative Construction Cost	Relative Maintenance Cost
2A - Catchment Fences	Higher	Moderate	Moderate
2B - Catchment Wall	Lower	Lower	Lower

Preferred Alternative

On the basis of the relative comparison of hazard reduction and cost factors, Alternative 2A appears to offer the best-valued solution for Work Area 2 since it would provide a relatively "higher" degree of hazard protection for the ISY facility at a relatively "moderate" construction and maintenance cost.

3.5 Selection of Preferred Project Alternative

Based on the above comparison of alternatives for the two work areas, the following mitigation project configuration is hereby proposed for further development in Section 4.0 below, as follows:

Table 3-5 Preferred Project Alternative

Mitigation Solution		Work Area 1 Mitigation	Work Area 2 Mitigation
2	Catchment Fences		√
4	Surface Water Diversion	√	√
5	Vegetative Surface Stabilization	√	√
6	Slope Flattening with Catchment Wall	√	

4.0 DEVELOPMENT OF PROPOSED PROJECT

This section summarizes the development of the proposed project that includes the following key components of construction work: 1) Slope Flattening at Work Area 1; 2) Catchment Wall at Work Area 1; 3) Catchment Fences at Work Area 2; 4) Surface Water Diversions; and 5) Vegetative Surface Stabilization.

4.1 Project Description / Scope of Work

The ISY Slope Stabilization Project is therefore described by the following conceptual-engineering scope of work, as shown in Figure 4-1, "ISY Slope Stabilization Project Concept".

- Site Mobilization.
- Perform Slope Flattening at Work Area 1:
  - Grade over-steepened slope to an approximate uniform 1.5:1 (H:V) slope.
- Install 100-foot long Catchment Wall at Work Area 1:
  - At base of slope, drill thirteen (13) vertical pier holes approximately 24-inch diameter, 8 feet deep at 8-foot spacing.
  - Install 16-foot long steel I-Beams in drilled pier holes with reinforcing steel bar cage.
  - Fill pier holes with concrete securing I-Beams in place.
  - Install 8-foot long heavy timber lagging (6" x 8" timbers, or larger) between I-Beams to a height of 8 feet.
- Construct Catchment Fences at Work Area 2:
  - At the base of slope, and at one higher elevation on the slope above, drill approximately 80 pier holes at 10-foot spacing, 8-feet deep, to support fence posts.
  - Install 16-foot long steel fence posts in drilled pier holes.
  - Install steel netting on poles.
  - Drill 80 anchor holes and install anchors and cable tiebacks.
- Install Surface Water Diversion System:
  - At the approximate locations shown in Figure 4-1, install approximately 2000 linear feet of shallow V-ditches, either concrete-lined or lined with an erosion-resistant concrete revetment block system, on the slope to divert surface drainage laterally away from both work areas and towards existing drainages to the west and east of the work areas.
- Apply Vegetative Surface Stabilization:
  - Apply approved hydromulch (or hydroseed mixture if acceptable) to approximately 5 acres of disturbed areas of both work area sites to aid in the establishment of vegetative cover.
- Site Demobilization.

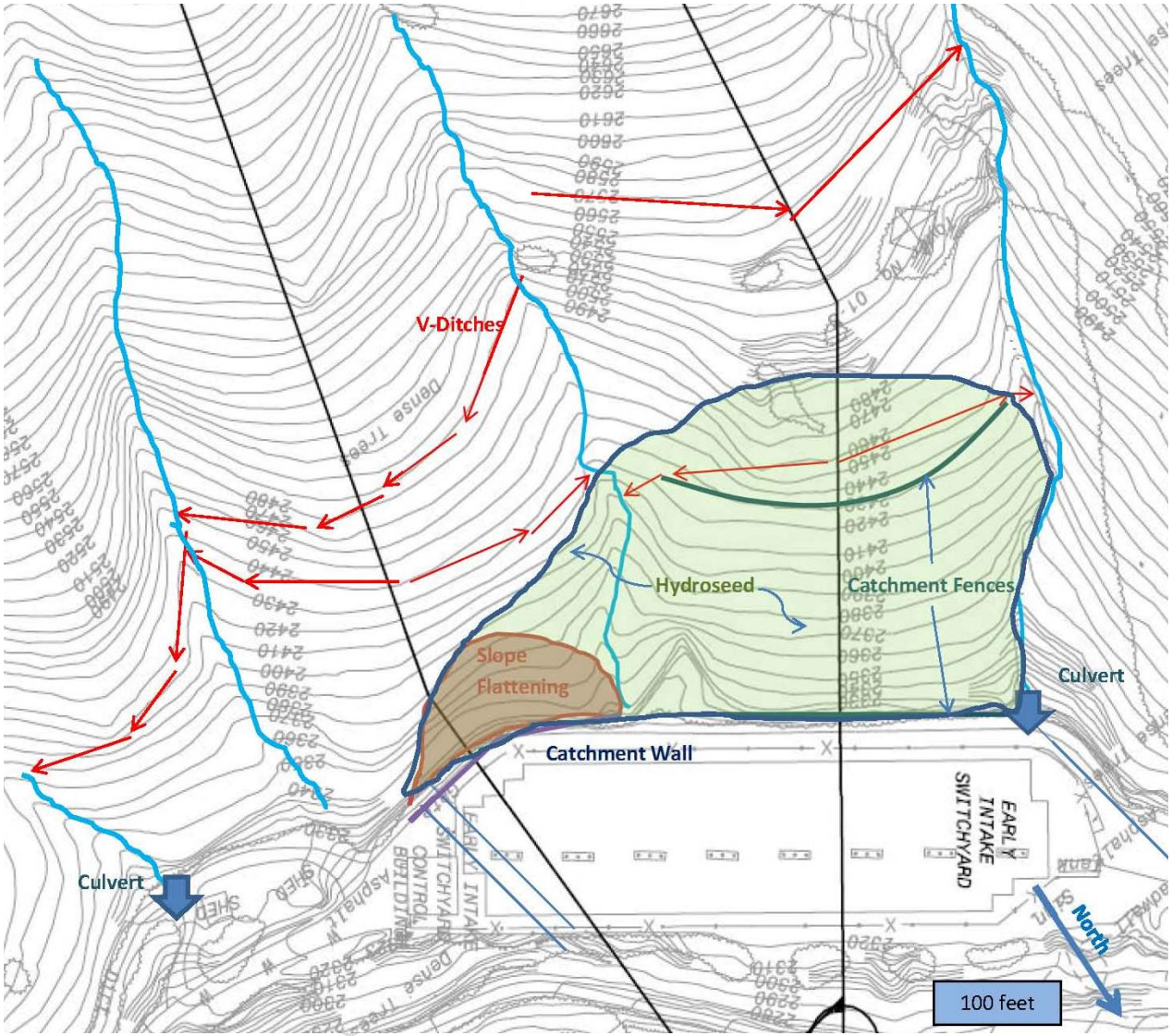


Figure 4-1: ISY Slope Stabilization Project Concept

Conceptual design drawings were prepared by Black & Veatch to further describe the engineering concepts and planned construction details associated with the proposed project. The project drawings are included in this report as Attachment A – Project Drawings. The attached drawings are printed as tabloid 11" x 17" size. In addition, full-sized 22" x 34" drawings in PDF file format are available to be submitted with the grant sub-application.

4.2 Project Design & Construction Schedule

Black & Veatch prepared a proposed design and construction schedule for implementing the Project which is presented in Attachment B, "Project Schedule." As shown, the Project is estimated to take approximately 24 months to complete following the City's receipt of a Hazard Mitigation Grant Award. Ideally, the award would take place in the fall of 2014 which will allow for the design and construction bidding phases to be completed in 2015, and for construction to be completed in 2016. All Project work is expected to be completed on or before the end of 2016.

4.3 Project Cost Estimate

Estimated costs of construction for the ISY Slope Stabilization Project were prepared by Black & Veatch in accordance with the procedures and guidelines of the *Cost Estimate Classification System* published by the Association for the Advancement of Cost Estimating International (AACEI). For purposes of this report, the estimated cost of construction is an AACEI Class 4 estimate which is generally prepared based on limited information and subsequently has fairly wide accuracy ranges as shown in Table 4-1. Class 4 estimates are prepared for a number of purposes such as, but not limited to, detailed strategic planning, business development, project screening, alternatives scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage.

Table 4-1 Definition of AACEI Class 4 Estimated Costs for Construction

Estimate Class	4
Completion Level of Project Definition Documents	1% to 15%
End Usage (Typical Purpose)	Study or Feasibility
Expected Accuracy Range (low and high)	L: -15% to -30% H: +20% to +50%
Design Contingency	15% to 20%

Table 4-2 shows how the overall estimated project cost is assembled when adding the estimated costs of construction as defined above to the estimates of cost amounts designated for other SFPUC project phases.

Table 4-2 Cost Elements by SFPUC Project Phase

Cost Elements by SFPUC Phase		Overview of Cost Estimating Approach
A	Assessment / Engr'g Support for HMGP Sub-Application	Based on value of B&V Task Order 15 for CS-340E
B	Design, Permitting & Environmental Documentation	Taken as 13% of Estimated Construction Cost, plus manhour estimates for environment coordination
C	Construction Management	Taken as 10% of Estimated Construction Cost
D	Construction	Estimated per AACEI Class 4 Method
E	Project Closeout	Estimated Based on Requirements of SFPUC Infrastructure Division Procedures Manual PM3.14
F	City Administration	10% of Subtotal for Rows A – E (above)
G	Project Contingency	10% of Subtotal for Rows A – F (above)
Total Project Estimate		Total of Rows A – G (above)

The total project cost is estimated to be $1,630,000. A copy of the detailed AACEI Class 4 project cost estimate prepared by Black & Veatch is included as Attachment C – Estimated Project Cost. Table 4-3 provides a summary of the estimated project cost by cost element, and indicates which cost element is eligible to be requested for reimbursement as part of the hazard mitigation grant.

Table 4-3 Estimated Project Costs

Cost Elements by SFPUC Phase		Estimated Cost ($1,000s)
A	Assessment / Engr'g Support *	$54
B	Design, Permitting & Environ. Documentation*	$165
C	Construction Management *	$99
D	Construction *	$993
	Subtotal Grant-Eligible Project Costs	**$1,311**
E	Project Closeout	$36
F	City Administration	$135
G	Project Contingency	$148
	Subtotal Non-Eligible Project Costs	**$319**
Total Project Estimate		**$1,630**

* Cost element is eligible for reimbursement under hazard mitigation grant.

4.4 Annual Maintenance Requirements

Implementing the project will **increase** the average annual maintenance cost. The expected annual maintenance requirements associated with each work area were calculated and made a part of the Benefit-Cost Analysis discussed further in Section 4.6 below. The estimated annual maintenance costs are as follows:

- Work Area 1 – Catchment Wall: On an average annual basis, HHWP maintenance crews would be assigned to clean out debris that has collected behind the catchment wall, and to repair any damage to the wall, as it occurs.
  - Labor = 2 Crew Days (at $4,000/day)
  - Equipment = Backhoe with Operator – 2 Days (at $1,400/day)
  - Equipment = Haul Trucks – 2 Days (at ($800/day)
  - Material Allowance = $1,500
- Work Area 2 – Catchment Fences: On an average annual basis, HHWP maintenance crews would be assigned to remove debris that has collected behind the catchment fences, and to repair any damage to the fences, as it occurs.
  - Labor = 2 Crew Days (at $4,000/day)
  - Material Allowance = $1,500
- All Areas – Drainage System: On an average annual basis, HHWP maintenance crews would be assigned to inspect and clean out the V-ditch drainage channels and culverts and perform minor repairs resulting from any damage, as it occurs.
  - Labor = 3 Crew Days (at $4,000/day)

The estimated annual maintenance budget is tabulated on Table 4-4.

Table 4-4 Estimated Annual Maintenance Budget

Maintenance Activity	Labor / Crew	Equipment	Materials	Subtotals
Work Area 1 Wall	$8,000	$4,400	$1,500	$13,900
Work Area 2 Fence	$8,000	Incl'd Above	$1,500	$9,500
Drainage System	$12,000	$0	$0	$12,000
Total Annual Maintenance Budget				**$35,400**

4.5 SFPUC Cost to Replace Lost Generation During ISY Outage

Seventy-five percent (75%) of the HHWP Project annual generation is transmitted through Early Intake Switchyard. This power generation provides 100 percent of the electricity to power San Francisco's municipal buildings, including the airport; a failure of any critical component within the switchyard represents a significant loss of power generation and transmission capability. During planned and unplanned outages of ISY, the City purchases energy on the open power market to make up for the loss.

One of the significant benefits of the ISY Slope Stabilization Project will be to reduce the hazards that could damage the switchyard and its equipment, reducing the City's requirement to purchase replacement energy. The Benefit-Cost Analysis accounts for this benefit by calculating the cost of replacement energy in terms of "outage-days," where an outage-day represents a 24-hour period during which ISY is out of service.

For purposes of this report, the outage-day energy replacement cost is estimated to be $135,000. This value is based on information developed by HHWP and conveyed to Black & Veatch by email dated May 29, 2014. A post processing model was used to evaluate the impact of losing ISY. The criteria included:

- Current electrical demand.
- No PG&E deferred bank.
- Evaluates all water years 1921-2002.
- May 5, 2014 TFS forward prices.
- Compute net revenues for two scenarios (purchases for muni/apt/n, Districts Class 1 and excess, Third Party sales).
  - Base: Assume all hydro units in operation.
  - Loss of ISY: No generation at Kirkwood PH or Holm PH.
  - Impact in net revenues: Average loss is $49 million
  - On average, the impact is $135,000 per day.

4.6 Benefit-Cost Effectiveness

FEMA and Cal OES require that applicants and sub-applicants use FEMA-approved methodologies and software to demonstrate the cost-effectiveness of their proposed projects. FEMA has developed the Benefit-Cost Analysis (BCA) software to facilitate the process of preparing a BCA. For purposes of the City's mitigation grant application, Black & Veatch has utilized Benefit-Cost Analysis Version 4.8 for determining the Benefit/Cost Ratio (BCR) for the Project. Projects with a BCR of less than 1.0 will not be considered.

There are two basic groups of information required for completing the BCA – project cost and project benefit.

4.6.1 Project Cost

The project cost is taken as eligible components of the total project cost plus the increased cost of annual maintenance resulting from implementing the project. Values are provided in current day (May 2014) costs. The BCA software calculates the present worth Project Cost based on this information. For this project, the Project Cost is computed from the following values:

- Grant-Eligible Project Costs (Table 4-3): $1,311,000
- Increased Annual Maintenance Costs: $35,400

4.6.2 Project Benefit

The project benefit is taken as the City's cost to recover from damage caused by the existing hazards prior to mitigation, less the cost to recover from damage caused by hazards remaining after mitigation – the net benefit.

To estimate the values of "before mitigation" and "after mitigation" damage, and applying engineering judgment to assess the risks that were summarized in Section 2.0, Black & Veatch developed a series of damage scenarios based on the type and magnitude of historical slope hazard events at ISY as described and documented by SFPUC. Each damage scenario includes an estimated construction cost needed to respond. In addition, to satisfy the data input requirements of the BCA, it was necessary to estimate the recurrence interval of the risks and damage scenarios so that BCA could calculate the present worth of recurring damage, before and after mitigation.

For purposes of this report, the damage scenarios and resulting construction costs were estimated to be as indicated in Table 4-5; detailed cost estimates are presented in the damage calculations that are included as Attachment D, and damage scenarios are summarized below:

Table 4-5 Summary of Damage Scenarios and Estimated Construction Costs

Damage Scenario	Estimated Construction Cost to Repair	ISY Outage-Days	Recurrence Interval – Before Mitigation	Recurrence Interval – After Mitigation
ISY Temporary Access Road Blockage	$47,000	0	10 years	25 years
Damage to ISY Access Road	$28,000	0	10 years	25 years
Damage to ISY Perimeter Fencing	$30,000	2	10 years	25 years
Debris Encroaches ISY Yard	$31,000	2	10 years	n/a
Damage to ISY Electrical Equipment and Structures	2,150,000	20	25 years	n/a
Damage to ISY Control Building	$328,000			

- ISY Temporary Access Road Blockage: The over-steepened slope at the east end of ISY site has experienced a slide, blocking the access road temporarily; a contractor crew hired by the City is dispatched to the site to remove the slope debris and to re-open access road. This is assumed to be a three day cleanup project. Dispose of debris materials locally. No damage caused to access road pavement. ISY remains in operation (Outage-Days = 0).

- Damage to ISY Access Road: The ISY access road pavement was damaged by slope movement. It is assumed that pavement replacement is required for a 100-foot long length of the entire access road width of 15 feet = 1500 sq. ft. A contractor crew hired by the City is dispatched to the site to repair the road. This is assumed to be a two day project. Dispose of debris materials locally. ISY remains in operation (Outage-Days = 0).

- Damage to ISY Perimeter Fencing: The slope movement or large rockfalls damage the ISY fencing. It is assumed that fence replacement is required for a 200-foot long length of fence. A contractor crew hired by the City is dispatched to the site to repair the fence. This is assumed to be a two day project. For safety reasons, ISY is taken out of operation during the construction activity (Outage-Days = 2).

- Debris Encroaches ISY Yard: The slope movement or large rockfalls encroach the ISY yard - representing major slide or rockfall. A contractor crew hired by the City is dispatched to the site to cleanup the yard during repair of the fence. This is assumed to be an additional two day project. For safety reasons, ISY is taken out of operation during this construction activity (Outage-Days = 2 additional).

- Damage to ISY Electrical Equipment and Structures: A major slope failure or significant rockfall event occurs, encroaching ISY yard and damaging one bay of switchyard equipment. In response, the City performs temporary re-configuring of the electrical bus system (a shoo-fly) which is assumed to take 20 days. The switchyard is placed back in operation until the damaged equipment is replaced on an emergency basis, which takes 12 months to perform. It is assumed that the project involves: replacement of 1 - 230kV circuit breaker; 3 - 230kV disconnect switches; and supporting structures. (Outage-Days = 20).

- Damage to ISY Control Building: The same slope hazard that damaged the ISY equipment also damages the control building. The control building repair is assumed to be exterior, structural only and is completed in parallel with the equipment replacement. The same 20-day outage described above applies to this damage scenario as well.

4.6.3 Project Useful Life

The project useful life is the estimated amount of time (in years) that the mitigation action will be effective. The Project Useful Life Summary Table located in the BCA software provides Standard Values and acceptable useful life limits for a variety of mitigation projects. For this project, the project useful life is selected to be 30 years, as the expected longevity of these facilities that are composed of wood, steel and fencing materials. This is similar to what would be the expected useful life of buildings.

4.6.4 Project Benefit/Cost Ratio

A copy of the BCA Summary Report is included as Attachment E. As shown, the BCR for the project is calculated to be 2.08.

ATTACHMENT A Project Drawings

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1" = 100'-0"

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Black & Veatch Corporation
Kansas City, Missouri

SFPUC - HHWP
EARLY INTAKE SWITCHYARD
SLOPE STABILIZATION

TUOLUMNE COUNTY, CALIFORNIA

DESIGNED: S. HUNTSMAN
DETAILED: AJJ
CHECKED: P. KNEITZ
APPROVED:
DATE:

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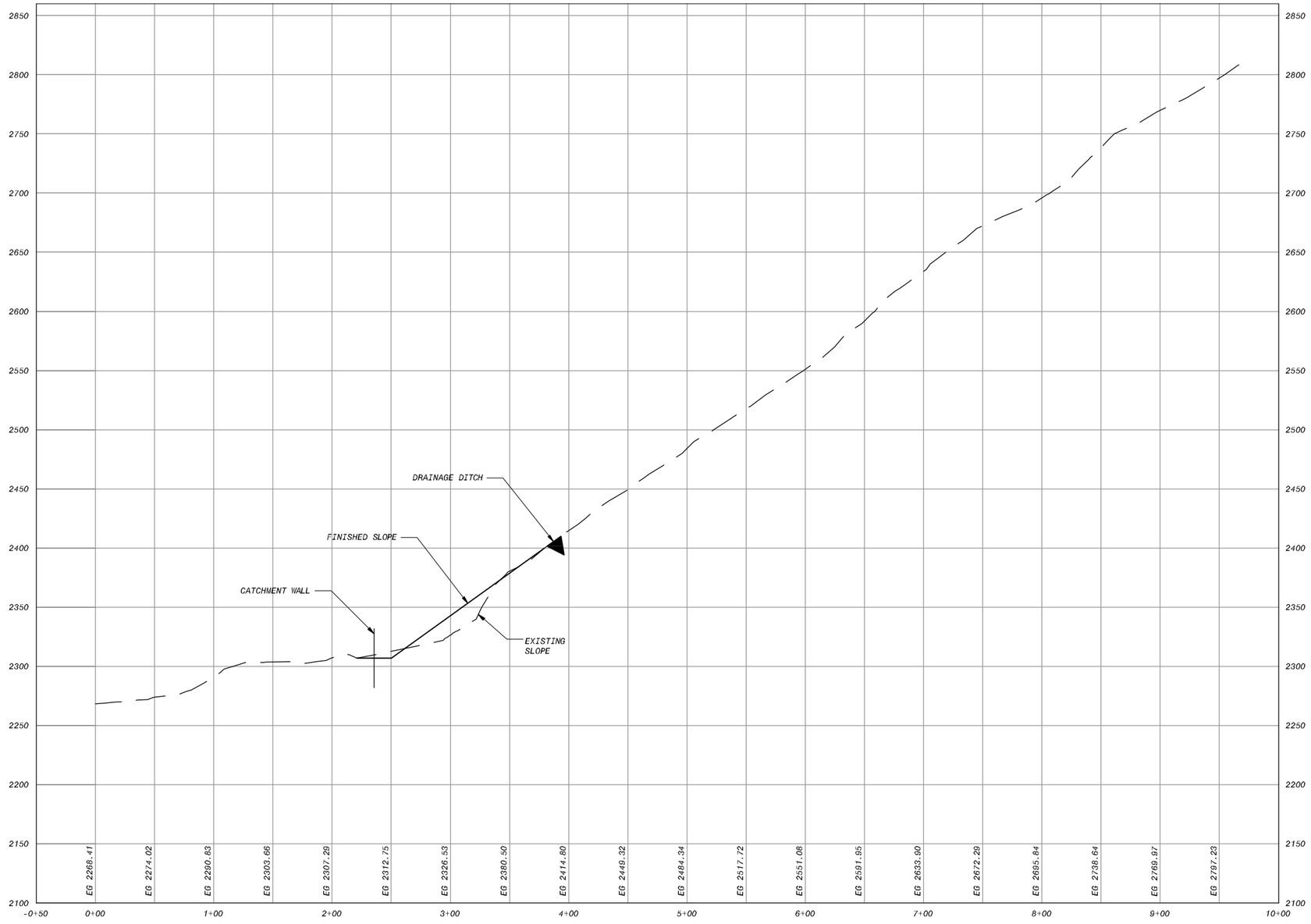

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EARLY INTAKE SWITCHYARD
SLOPE STABILIZATION

TUOLUMNE COUNTY, CALIFORNIA

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DETAILED: AJJ
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APPROVED:
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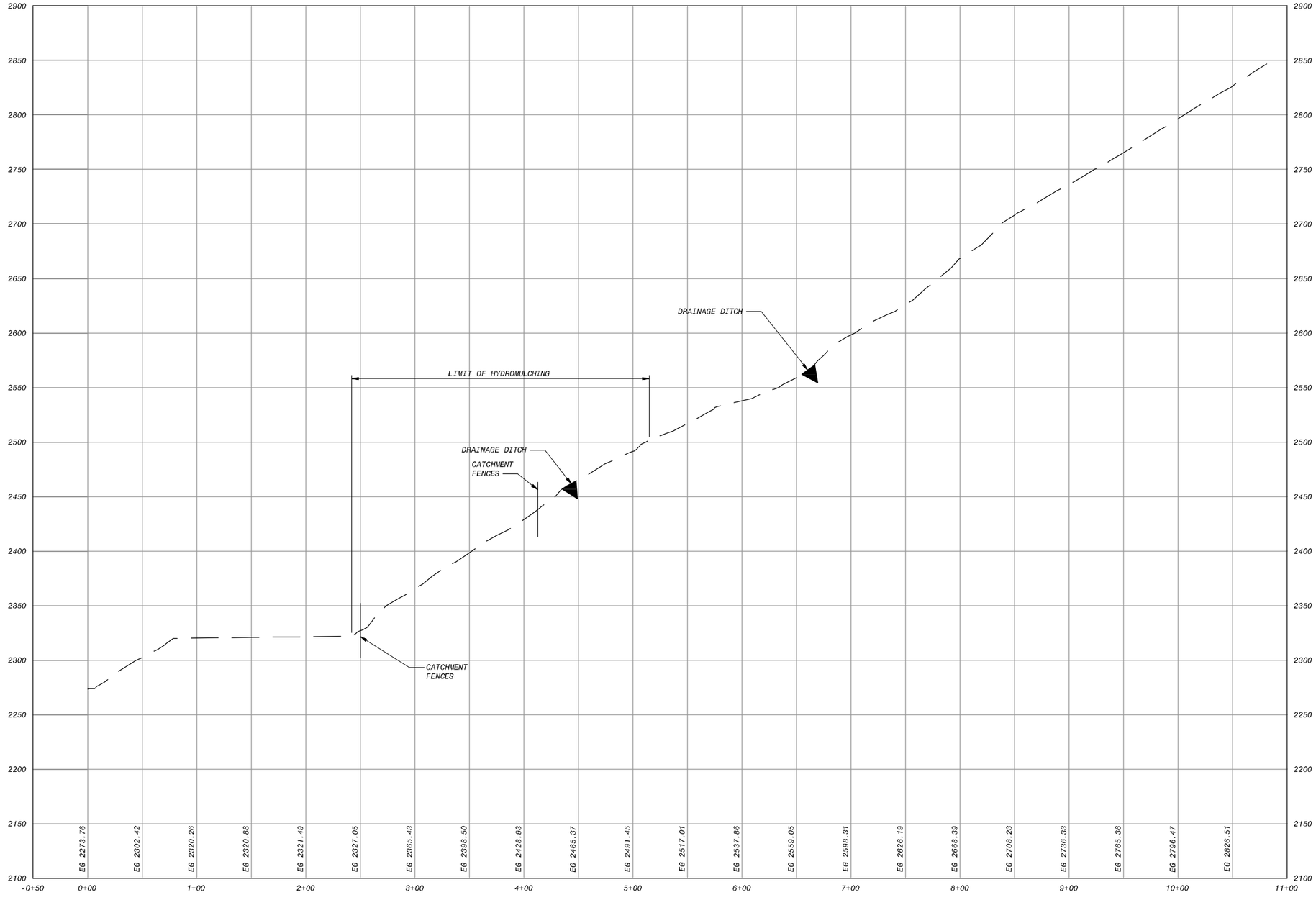

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HORIZONTAL SCALE 1"=100'

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EARLY INTAKE SWITCHYARD
SLOPE STABILIZATION

TUOLUMNE COUNTY, CALIFORNIA

DESIGNED: S. HUNTSMAN
DETAILED: AJJ
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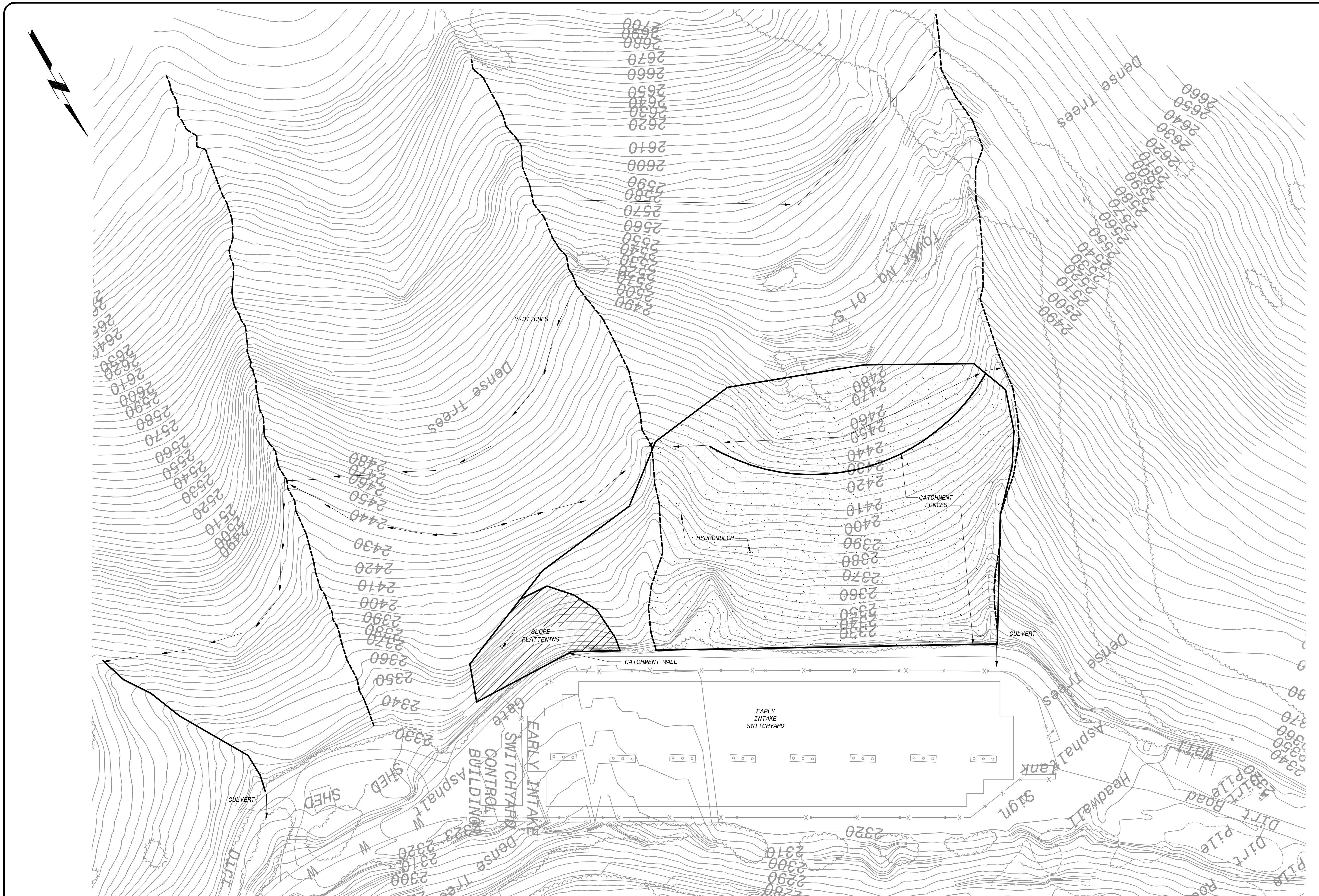

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SFPUC - HHWP
EARLY INTAKE SWITCHYARD SLOPE STABILIZATION

TUOLUMNE COUNTY, CALIFORNIA

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DETAILED: AJJ
CHECKED: P. KNEITZ
APPROVED:
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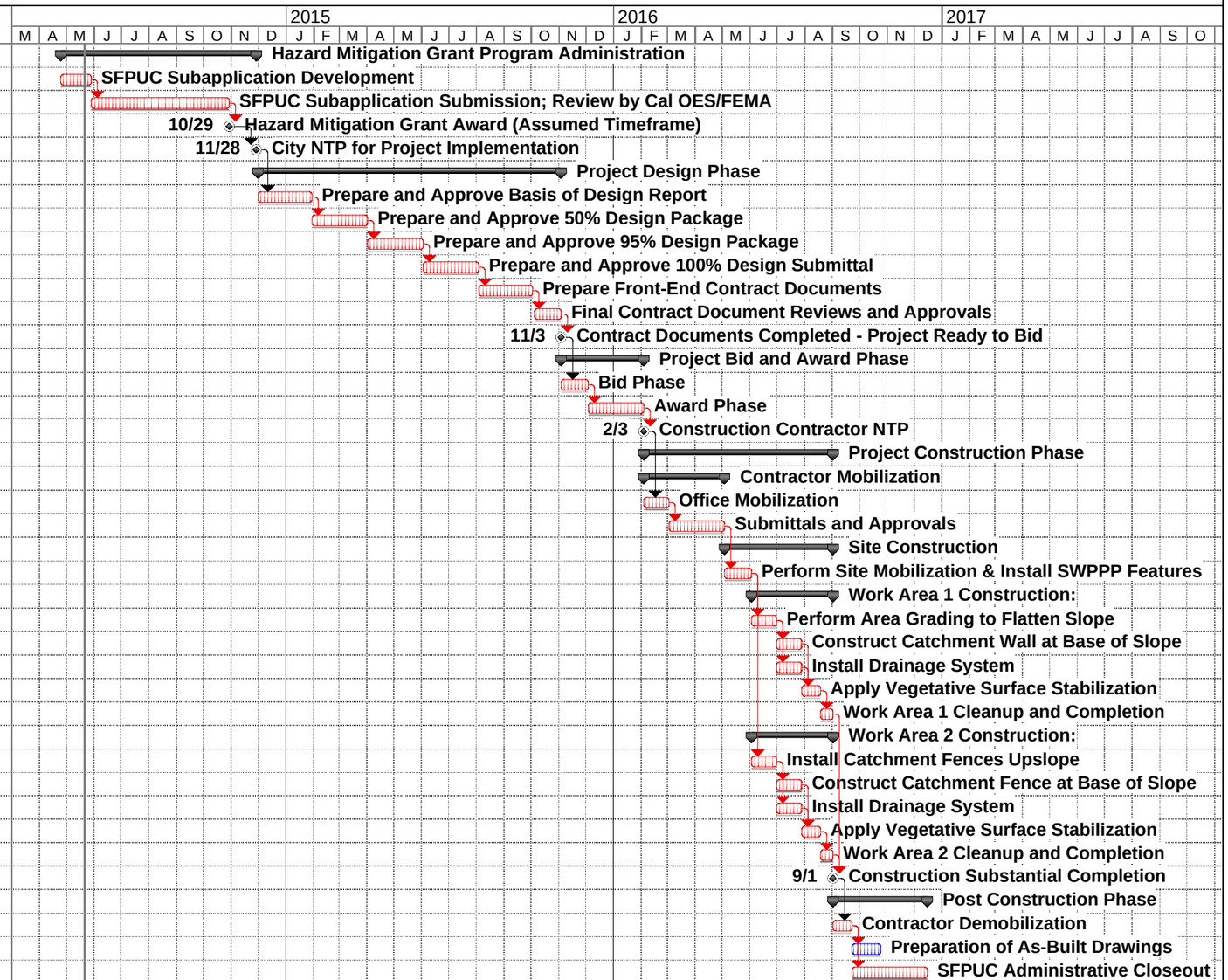
ATTACHMENT B Project Schedule

5/21/14

San Francisco Public Utilities Commission
Early Intake Switchyard Slope Stabilization Project
Schedule for Design & Construction

ID	Task Name	Duration	Start	Finish
1	**Hazard Mitigation Grant Program Administration**	**156 d**	**4/25/14**	**11/28/14**
2	SFPUC Subapplication Development	24 d	4/25/14	5/28/14
3	SFPUC Subapplication Submission; Review by Cal OES/FEMA	110 d	5/29/14	10/29/14
4	Hazard Mitigation Grant Award (Assumed Timeframe)	0 d	10/29/14	10/29/14
5	City NTP for Project Implementation	0 d	11/28/14	11/28/14
6	**Project Design Phase**	**242 d**	**12/1/14**	**11/3/15**
7	Prepare and Approve Basis of Design Report	44 d	12/1/14	1/29/15
8	Prepare and Approve 50% Design Package	44 d	1/30/15	4/1/15
9	Prepare and Approve 95% Design Package	44 d	4/2/15	6/2/15
10	Prepare and Approve 100% Design Submittal	44 d	6/3/15	8/3/15
11	Prepare Front-End Contract Documents	44 d	8/4/15	10/2/15
12	Final Contract Document Reviews and Approvals	22 d	10/5/15	11/3/15
13	Contract Documents Completed - Project Ready to Bid	0 d	11/3/15	11/3/15
14	**Project Bid and Award Phase**	**66 d**	**11/4/15**	**2/3/16**
15	Bid Phase	22 d	11/4/15	12/3/15
16	Award Phase	44 d	12/4/15	2/3/16
17	Construction Contractor NTP	0 d	2/3/16	2/3/16
18	**Project Construction Phase**	**151 d**	**2/4/16**	**9/1/16**
19	**Contractor Mobilization**	**64 d**	**2/4/16**	**5/3/16**
20	Office Mobilization	20 d	2/4/16	3/2/16
21	Submittals and Approvals	44 d	3/3/16	5/3/16
22	**Site Construction**	**87 d**	**5/4/16**	**9/1/16**
23	Perform Site Mobilization & Install SWPPP Features	22 d	5/4/16	6/2/16
24	**Work Area 1 Construction:**	**65 d**	**6/3/16**	**9/1/16**
25	Perform Area Grading to Flatten Slope	20 d	6/3/16	6/30/16
26	Construct Catchment Wall at Base of Slope	20 d	7/1/16	7/28/16
27	Install Drainage System	20 d	7/1/16	7/28/16
28	Apply Vegetative Surface Stabilization	15 d	7/29/16	8/18/16
29	Work Area 1 Cleanup and Completion	10 d	8/19/16	9/1/16
30	**Work Area 2 Construction:**	**65 d**	**6/3/16**	**9/1/16**
31	Install Catchment Fences Upslope	20 d	6/3/16	6/30/16
32	Construct Catchment Fence at Base of Slope	20 d	7/1/16	7/28/16
33	Install Drainage System	20 d	7/1/16	7/28/16
34	Apply Vegetative Surface Stabilization	15 d	7/29/16	8/18/16
35	Work Area 2 Cleanup and Completion	10 d	8/19/16	9/1/16
36	Construction Substantial Completion	0 d	9/1/16	9/1/16
37	**Post Construction Phase**	**75 d**	**9/2/16**	**12/15/16**
38	Contractor Demobilization	15 d	9/2/16	9/22/16
39	Preparation of As-Built Drawings	22 d	9/23/16	10/24/16
40	SFPUC Administrative Closeout	60 d	9/23/16	12/15/16



Date: 5/21/14

Critical Task
Noncritical Task
Noncritical Task Progress
Critical Task Progress
Milestone
Summary

BLACK & VEATCH CORPORATION

ATTACHMENT C Estimated Project Cost

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

CLASS 4 COST ESTIMATE SUMMARY

BLACK & VEATCH
Building a world of difference.

Project Description Name: Early Intake Switchyard Slope Stabilization Project

Finance Reference: not applicable

Line Item Number	Description	Unit	Unit Price	Quantity	Sub Total
*A - ASSESSMENT & ENGINEERING SUPPORT FOR HAZARD GRANT APPLICATION (Pre-Award Costs) ****					
1	CS-340E Task Order 15 Scope of Services	LS	$54,327	1	$54,327
				Assessment & Engr'g Support for Application Total	**$54,327**
*B - DESIGN, PERMITTING & ENVIRONMENTAL DOCUMENTATION ****					
2	Final Design / Contract Documents (10%)	%	$993,259	10%	$99,326
3a	Historical and Biological/Water Quality Work by SFPUC	MHs	$150	120	$18,000
3b	Environmental Coordination with USFS and Cal-OES	MHs	$150	120	$18,000
3c	Permitting (3%)	%	$993,259	3%	$29,798
				Design Total	**$165,124**
*C - CONSTRUCTION MANAGEMENT ****					
4	Construction Management (10%)	%	$993,259	10%	$99,326
				Construction Management Total	**$99,326**
*D - CONSTRUCTION (Refer to Cost Backup on Pages 2 & 3) ****					
5	Slope Flattening & Catchment Wall at Work Area 1	LS	$282,808	1	$282,808
6	Catchment Fences at Work Area 2	LS	$401,436	1	$401,436
7	Surface Water Diversion System	LS	$280,665	1	$280,665
8	Vegetative Surface Stabilization	LS	$28,350	1	$28,350
9			$0	0	$0
10			$0	0%	$0
				Construction Total	**$993,259**
*E - PROJECT CLOSEOUT ** *					
11	SFPUC Project Closeout Costs	HR	$180	200	$36,000
				Project Close Out Total	**$36,000**
*F - CITY ADMINISTRATION ** *					
12	10% of Project Subtotal (A-E)	%	$1,348,036	0.10	$134,804
				City Administration Total	**$134,804**
*G - PROJECT CONTINGENCY ** *					
13	10% of Project Subtotal (A-F)	%	$1,482,839	0.10	$148,284
				Contingency Total	**$148,284**
				TOTAL ESTIMATE	**$1,631,123**

* - This cost is eligible to be included in the mitigation grant project cost estimate worksheet.

** - This is a City cost that is not eligible to be included in the mitigation grant project cost estimate worksheet.

ESTIMATED PROJECT COST - BACKUP INFORMATION

		Unit	Qty	Unit Cost	Subtotal	Total
5	**Slope Flattening & Catchment Wall at Work Area 1**					**$ 282,808**
	Slope Grading - Cost by Earthwork Crew Day	Crew-Day	10	$17,334	$173,340	
	Catchment Wall (100 ft long; 8 ft high):					
	Excavate Foundations (13, drilled 24" x 96")	EA	13	$972	$12,636	
	Concrete Foundations (13, 1 CY each)	CY	13	$810	$10,530	
	Furnish & Install H-Piles (13, 40 plf)	LB	8320	$5	$40,435	
	Install Timber Lagging (800 sq. ft., 6" x 8")	SF	800	$41	$32,400	
	Mobilization & Demobilization (5%)	%	5%	$269,341	$13,467	
6	**Catchment Fences at Work Area 2**					**$ 401,436**
	Catchment Fences at Work Area 2 (800 ft long; 8 ft high):					
	Excavate Foundations (80, drilled piers)	EA	80	$972	$77,760	
	Concrete Foundations (80)	CY	80	$1,215	$97,200	
	Furnish & Install Fence Posts (80)	EA	80	$324	$25,920	
	Furnish & Install Fencing (6,400 sq. ft.)	SF	6400	$16	$103,680	
	Tie-Backs (80)	EA	80	$972	$77,760	
	Mobilization & Demobilization (5%)	%	5%	$382,320	$19,116	
7	**Surface Water Diversion System**					**$ 280,665**
	V-Ditch Construction (2000 LF):					
	Ditch Excavation (Unit Price Item 2)	FT	2000	$23	$45,036	
	Concrete-Lining for Ditch (Unit Price Item 3)	FT	2000	$111	$222,264	
			0	$0	$0	
	Mobilization & Demobilization (5%)	%	5%	$267,300	$13,365	
8	**Vegetative Surface Stabilization**					**$ 28,350**
	Hydroseeding Operations (Acres)	Acre	5	$5,400	$27,000	
			0	$0	$0	
	Mobilization & Demobilization (5%)	%	5%	$27,000	$1,350	

Additional Calculations

EARTHWORK CREW-DAY UNIT COST	Unit	Qty	Unit Cost	Subtotal
Crew Foreman	$ / Day	1	$972	$ 972
Safety Officer	$ / Day	0.5	$972	$ 486
General Laborers (5)	$ / Day - Ea	5	$583	$ 2,916
Front-End Loader with Operator (2)	$ / Day - Ea	2	$2,268	$ 4,536
Backhoe with Operator (1)	$ / Day - Ea	1	$2,268	$ 2,268
Haul Trucks (3)	$ / Day - Ea	3	$1,296	$ 3,888
Compactor with Operator (1)	$ / Day - Ea	1	$2,268	$ 2,268
Total Crew-Day Unit Cost				**$ 17,334**

V-DITCH EXCAVATION UNIT COST	Unit	Qty	Unit Cost	Subtotal
Crew Foreman	$ / Day	1	$972	$ 972
General Laborers (6)	$ / Day - Ea	6	$583	$ 3,499
Backhoe with Operator (1)	$ / Day - Ea	1	$2,268	$ 2,268
Compactor with Operator (1)	$ / Day - Ea	1	$2,268	$ 2,268
Total Crew-Day Unit Cost		0	$ -	$ 9,007
Daily Excavation Production Rate	Ft/Day			400
V-Ditch Excavation Unit Cost	**$/Ft**			**$ 23**

V-DITCH LINING UNIT COST	Unit	Qty	Unit Cost	Subtotal
Crew Foreman	$ / Day	1	$972	$ 972
General Laborers (6)	$ / Day - Ea	6	$583	$ 3,499
Concrete Pumper Truck with Operator	$ / Day - Ea	1	$3,240	$ 3,240
Concrete Material & WWF	CY	6	$567	$ 3,402
Total Crew-Day Unit Cost		0	$ -	$ 11,113
Daily Lining Production Rate	Ft/Day			100
V-Ditch Lining Unit Cost	**$/Ft**			**$ 111**

ATTACHMENT D Estimate of Avoided Damages

ISY Slope Stabilization Project - Expected Cost to Respond to Damage Caused by ISY Slope Hazards

For purposes of the grant sub-application, these are considered to be the "benefits" of the mitigation project.
Costs are calculated for 2014 cost basis; the BCA software accounts for present worth evaluation of the values

Item	Description	Cost	Frequency (Recurrence Interval) Before Mitigation	After Mitigation
1	Clean-Up Temporary Blockage of ISY Access Road	$ 46,611	10 years	25 years
2	Repair Damage to Access Road	$ 28,268	10 years	25 years
3	Repair Damage to ISY Perimeter Fencing	$ 30,392	10 years	25 years
4	Cleanup Debris Encroaching ISY Yard	$ 31,074	10 years	not expected
5	Address Damage to Electrical Equipment & Structures	$ 2,150,793	25 Years	not expected
6	Address Damage to Control Building	$ 328,355	25 Years	not expected
	SFPUC Cost to Replace Lost Generation During ISY Outage (per day)	$ 135,000		

Damage Scenario		Unit	Qty	Unit Cost	Subtotal	Total
1	**Clean-Up Temporary Blockage of ISY Access Road**					**$ 46,611**
	The over-steepened slope at the east end of ISY site has experienced a slide, blocking the access road temporarily; a contractor crew hired by the City is dispatched to the site to remove the slope debris and to re-open access road. This is assumed to be a three day cleanup project. Dispose of debris materials locally. No damage caused to access road pavement. ISY remains in operation (Outage-Days = 0).					
	Clean-up Cost (Earthwork Cleanup Crew)	Crew-Day	3	$12,797	$38,391	
	Mobilization & Demobilization (5%)	%	5%	$38,391	$1,920	
	HHWP PM/CM Support - Minor Project	Day	3	$2,100	$6,300	

		Unit	Qty	Unit Cost	Subtotal	Total
2	**Repair Damage to Access Road**					**$ 28,268**
	The ISY access road pavement was damaged by slope movement. It is assumed that pavement replacement is required for a 100-foot long length of the entire access road width of 15 feet = 1500 sq. ft. A contractor crew hired by the City is dispatched to the site to repair the road. This is assumed to be a two day project. Dispose of debris materials locally. ISY remains in operation (Outage-Days = 0).					
	Remove Damaged Pavement (Earthwork Crew)	Crew-Day	1	$12,797	$12,797	
	Place New Asphalt Pavement (Paving Crew & Materials)	SF	1500	$7	$10,125	
	Mobilization & Demobilization (5%)	%	5%	$22,922	$1,146	
	HHWP PM/CM Support - Minor Project	Day	2	$2,100	$4,200	

		Unit	Qty	Unit Cost	Subtotal	Total
3	**Repair Damage to ISY Perimeter Fencing**					**$ 30,392**
	The slope movement or large rockfalls damage the ISY fencing. It is assumed that fence replacement is required for a 200-foot long length of fence. A contractor crew hired by the City is dispatched to the site to repair the fence. This is assumed to be a two day project. For safety reasons, ISY is taken out of operation during the construction activity (Outage-Days = 2).					
	Remove Damaged Fence	Crew-Day	1	$4,989	$4,989	
	Replace Damaged Fence Posts	Crew-Day	2	$4,989	$9,978	
	Replace Damaged Fence Fabric	Crew-Day	2	$4,989	$9,978	
	Mobilization & Demobilization (5%)	%	5%	$24,945	$1,247	
	HHWP PM/CM Support - Minor Project	Day	2	$2,100	$4,200	

		Unit	Qty	Unit Cost	Subtotal	Total
4	**Cleanup Debris Encroaching ISY Yard**					**$ 31,074**
	The slope movement or large rockfalls encroach the ISY yard - representing major slide or rockfall. A contractor crew hired by the City is dispatched to the site to cleanup the yard during repair of the fence. This is assumed to be an additional two day project. For safety reasons, ISY is taken out of operation during this construction activity (Outage-Days = 2 additional).					
	Clean-up Cost (Earthwork Cleanup Crew)	Crew-Day	2	$12,797	$25,594	
	Mobilization & Demobilization (5%)	%	5%	$25,594	$1,280	
	HHWP PM/CM Support - Minor Project	Day	2	$2,100	$4,200	

		Unit	Qty	Unit Cost	Subtotal	Total
5	**Address Damage to Electrical Equipment & Structures**					**$ 2,150,793**
	A major slope failure or significant rockfall event occurs, encroaching ISY yard and damaging one bay of switchyard equipment. In response, the City performs temporary re-configuring of the electrical bus system (a shoo-fly) which is assumed to take 20 days. The switchyard is placed back in operation until the damaged equipment is replaced on an emergency basis, which takes 12 months to perform. It is assumed that the project involves: replacement of 1 - 230kV circuit breaker; 3 - 230kV disconnect switches; and supporting structures. (Outage-Days = 20).					
	Remove Damaged Switchyard Equipment	Crew-Day	10	$4,989	$49,890	
	Crane Onsite for Equipment Removal	Day	10	$800	$8,000	
	Yard Cleanup Prior to Re-Construction	Crew-Day	3	$12,797	$38,391	
	Furnish & Install New 230 kV Breaker	Ea	1	$750,000	$750,000	
	Furnish & Install New 230 kV Disconnect	Ea	3	$150,000	$450,000	
	Repair or Replace Damage Supporting Structures	LS	1	$150,000	$150,000	
	Mobilization & Demobilization (5%)	%	5%	$1,446,281	$72,314	
	Contractor GC's, OH&P, M/U on Subs (35%)	%	35%	$1,446,281	$506,198	
	HHWP PM/CM Support - Major Project	Day	60	$2,100	$126,000	

		Unit	Qty	Unit Cost	Subtotal	Total
6	**Address Damage to Control Building**					**$ 328,355**
	The same slope hazard that damaged the ISY equipment under Scenario 5 also damages the control building. The control building repair is assumed to be exterior, structural only and is completed in parallel with the Scenario 5 equipment replacement. The same 20-day outage described above applies to this damage scenario as well.					
	Remove Damaged Portions of Building	Crew-Day	5	$4,989	$24,945	
	Crane Onsite for Equipment Removal	Day	5	$800	$4,000	
	Yard Cleanup Prior to Re-Construction	Crew-Day	2	$12,797	$25,594	
	Control Building Rehab	LS	1	$150,000	$150,000	
	Mobilization & Demobilization (5%)	%	5%	$204,539	$10,227	
	Contractor GC's, OH&P, M/U on Subs (35%)	%	35%	$204,539	$71,589	
	HHWP PM/CM Support - Major Project	Day	20	$2,100	$42,000	

Additional Calculations of Costs for Recovery Cost Items

	Unit	Qty	Unit Cost	Subtotal
1. EARTHWORK CLEANUP CREW - UNIT COST PER DAY (JOC CONTRACT BASIS)				
Crew Foreman	$ / Day	1	$ 972	$ 972
Safety Officer	$ / Day	0.5	$ 972	$ 486
General Laborers (5)	$ / Day - Ea	5	$ 583	$ 2,915
Front-End Loader with Operator (2)	$ / Day - Ea	2	$ 2,268	$ 4,536
Haul Trucks (3)	$ / Day - Ea	3	$ 1,296	$ 3,888
Total Earthwork Cleanup Crew - Unit Cost per Day				**$ 12,797**
2. HHWP PROJECT & CONSTRUCTION MANAGEMENT SUPPORT - MINOR PROJECT				
HHWP Site Inspector (F/T)	Day	1	$ 800	$ 800
HHWP Construction Manager P/T	Day	0.25	$ 1,200	$ 300
HHWP Project Manager Involvement P/T	Day	0.25	$ 1,200	$ 300
HHWP Admin / JOC Support P/T	Day	0.25	$ 800	$ 200
HHWP Safety Oversight	Day	0.25	$ 1,200	$ 300
Vehicles	Day	2	$ 100	$ 200
Total PM/CM Support - Unit Cost per Day				**$ 2,100**
3. LIGHT-DUTY LABOR CREW FOR MINOR CLEAN-UP ASSIGNMENTS				
Crew Foreman	$ / Day	1	$ 972	$ 972
General Laborers (3)	$ / Day - Ea	3	$ 583	$ 1,749
Haul Trucks (1)	$ / Day - Ea	1	$ 1,296	$ 1,296
Project Field Supervisor	$ / Day	1	$ 972	$ 972
Total Light-Duty Labor Crew - Unit Cost per Day				**$ 4,989**
4. HHWP PROJECT & CONSTRUCTION MANAGEMENT SUPPORT - MAJOR PROJECT				
HHWP Site Inspector (F/T)	Day	2	$ 800	$ 1,600
HHWP Construction Manager P/T	Day	1	$ 1,200	$ 1,200
HHWP Project Manager Involvement P/T	Day	0.25	$ 1,200	$ 300
HHWP Admin / JOC Support P/T	Day	0.25	$ 800	$ 200
HHWP Safety Oversight	Day	0.25	$ 1,200	$ 300
Vehicles	Day	3	$ 100	$ 300
Total PM/CM Support - Unit Cost per Day				**$ 3,900**

ATTACHMENT E Benefit-Cost Report

BCA V4.8 Summary Report

Total Benefits: **$3,642,972** Total Costs: **$1,750,280** BCR: **2.08**

Project Number: Disaster #: DR-4158 Program: HMGP Agency: **San Francisco Public Utilities Commission**

State: **California** Point of Contact: Jimmy Leong Analyst: Black & Veatch Corporation Walnut Creek,

Project Summary:

Project Number:		Disaster #:	DR-4158
Program:	HMGP	Agency:	San Francisco Public Utilities Commission
Analyst:	Black & Veatch Corporation Walnut Creek, CA		
Point of Contact:	Jimmy Leong	Phone Number:	209-989-2040
Address:	P.O. Box 160, Moccasin, California, 95347		
Email:	jleong@sfwater.org		
Comments:	Early Intake Switchyard		

Structure Summary For:

HHWP Early Intake Switchyard, P.O. Box 160, Moccasin, California, 95347, Tuolumne

Structure Type:	Utility	Historic Building:	No	Contact:	Jimmy Leong
Benefits:	$3,642,972	Costs:	$1,750,280	BCR:	2.08

Mitigation	Hazard	BCR	Benefits	Costs
TBD	Damage-Frequency Assessment	2.08	$3,642,972	$1,750,280

Total Benefits: **$3,642,972** Total Costs: **$1,750,280** BCR: **2.08**

Project Number: Disaster #: DR-4158 Program: HMGP Agency: **San Francisco Public Utilities Commission**

State: **California** Point of Contact: Jimmy Leong Analyst: Black & Veatch Corporation Walnut Creek,

Structure and Mitigation Details For: HHWP Early Intake Switchyard, P.O. Box 160, Moccasin, California, 95347, Tuolumne

Benefits: $3,642,972 Costs: $1,750,280 BCR: 2.08

Hazard: **Damage-Frequency Assessment - Other**

Mitigation Option: TBD

Latitude: Longitude: Project Useful Life: 30

Mitigation Information

Basis of Damages: Expected Damages

Number of Damage Events: 2

Number of Events with Know Recurrence Intervals: 2

Utilities

Type of Service: Electrical

Other:

Number of Customers: Served: 1

Value per Unit of Service: 135,000.00

Total Value of Service per Day: $135,000

Facility Description:

Early Intake Switchyard

Expected Damages Before and After Mitigation

Analysis Year: 2014 Analysis Duration: 55 Utilities ($/day): $135,000.00

Year Built: 1960 User Input Analysis Duration: Buildings ($/day):

Roads/Bridges ($/day):

Total Benefits: **$3,642,972** Total Costs: **$1,750,280** BCR: **2.08**

Project Number: Disaster #: DR-4158 Program: HMGP Agency: **San Francisco Public Utilities Commission**

State: **California** Point of Contact: Jimmy Leong Analyst: Black & Veatch Corporation Walnut Creek,

Damages Before Mitigation

Damage Year:
RI: 25.00
Are Damages In Current Dollars? Yes

Buildings (Days):
Utilities (Days): 20.0
Roads (Days):

Repair Damage to Control Building ($)	$328,000
Replace Damaged Equipment ($)	$2,150,000
Cleanup Debris Encroaching ISY Yard ($)	$0
Repair Damage to ISY Perimeter Fencing ($)	$0
Repair Damage to Access Road ($)	$0
Cleanup Temp Closure of Access Road ($)	$0
Total	$5,178,000
Total Inflated	

Damages After Mitigation

RI: 25.00
Are Damages In Current Dollars? Yes

Buildings (Days):
Utilities (Days): 4.0
Roads (Days):

Repair Damage to Control Building ($)	$0
Replace Damaged Equipment ($)	$0
Cleanup Debris Encroaching ISY Yard ($)	$0
Repair Damage to ISY Perimeter Fencing ($)	$30,000
Repair Damage to Access Road ($)	$28,000
Cleanup Temp Closure of Access Road ($)	$47,000
Total	$645,000

Damage Year:
RI: 10.00
Are Damages In Current Dollars? Yes

Buildings (Days):
Utilities (Days): 4.0
Roads (Days):

Repair Damage to Control Building ($)	$0
Replace Damaged Equipment ($)	$0
Cleanup Debris Encroaching ISY Yard ($)	$31,000
Repair Damage to ISY Perimeter Fencing ($)	$30,000
Repair Damage to Access Road ($)	$28,000

RI: 10.00
Are Damages In Current Dollars? Yes

Buildings (Days):
Utilities (Days): 0.0
Roads (Days):

Repair Damage to Control Building ($)	$0
Replace Damaged Equipment ($)	$0
Cleanup Debris Encroaching ISY Yard ($)	$0
Repair Damage to ISY Perimeter Fencing ($)	$0
Repair Damage to Access Road ($)	$0

Total Benefits: **$3,642,972** Total Costs: **$1,750,280** BCR: **2.08**

Project Number: Disaster #: DR-4158 Program: HMGP Agency: **San Francisco Public Utilities Commission**

State: **California** Point of Contact: Jimmy Leong Analyst: Black & Veatch Corporation Walnut Creek,

Cleanup Temp Closure of Access Road ($)	$47,000
Total	$676,000
Total Inflated	

Cleanup Temp Closure of Access Road ($)	$0
Total	$0

Damage Year:
RI:
Are Damages In Current Dollars? Yes

Buildings (Days):
Utilities (Days): 0.0
Roads (Days):

Total	$0
Total Inflated	

RI:
Are Damages In Current Dollars? Yes

Buildings (Days):
Utilities (Days):
Roads (Days):

Total	$0

Damage Year:
RI:
Are Damages In Current Dollars? Yes

Buildings (Days):
Utilities (Days): 0.0
Roads (Days):

Total	$0
Total Inflated	

RI:
Are Damages In Current Dollars? Yes

Buildings (Days):
Utilities (Days):
Roads (Days):

Total	$0

Damage Year:
RI:
Are Damages In Current Dollars? Yes

Buildings (Days):
Utilities (Days): 0.0
Roads (Days):

Total	$0
Total Inflated	

RI:
Are Damages In Current Dollars? Yes

Buildings (Days):
Utilities (Days):
Roads (Days):

Total	$0

Total Benefits: **$3,642,972** Total Costs: **$1,750,280** BCR: **2.08**

Project Number: Disaster #: DR-4158 Program: HMGP Agency: **San Francisco Public Utilities Commission**

State: **California** Point of Contact: Jimmy Leong Analyst: Black & Veatch Corporation Walnut Creek,

Damage Year:
RI:
Are Damages In Current Dollars? Yes

Buildings (Days):
Utilities (Days): 0.0
Roads (Days):

Total	$0
Total Inflated	

RI:
Are Damages In Current Dollars? Yes

Buildings (Days):
Utilities (Days):
Roads (Days):

Total	$0

Summary Of Benefits

Expected Annual Damages Before Mitigation		Expected Annual Damages After Mitigation		Expected Avoided Damages After Mitigation (Benefits)	
Annual:	$319,374	Annual:	$25,800	Annual:	$293,574
Present Value:	$3,963,125	Present Value:	$320,153	Present Value:	$3,642,972

Mitigation Benefits: $3,642,972 Mitigation Costs: $1,750,280

Benefits Minus Costs: $1,892,692 Benefit-Cost Ratio: 2.08

Cost Estimate

Project Useful Life (years):	30	Construction Type:	
Mitigation Project Cost:	$1,311,000	Detailed Scope of Work:	Yes
Annual Project Maintenance Cost:	$35,400	Detailed Estimate for Entire Project:	Yes
Final Mitigation Project Cost:	$1,750,280	Years of Maintenance:	30
Cost Basis Year:		Present Worth of Annual Maintenance Costs:	$439,280
Construction Start Year:		Estimate Reflects Current Prices:	Yes
Construction End Year:		Project Escalation:	

Total Benefits: **$3,642,972** Total Costs: **$1,750,280** BCR: **2.08**

Project Number: Disaster #: DR-4158 Program: HMGP Agency: **San Francisco Public Utilities Commission**

State: **California** Point of Contact: Jimmy Leong Analyst: Black & Veatch Corporation Walnut Creek,

Justification/Attachments

Field	Description	Attachments
Analysis Year	Current year.	
Expected damages before mitigation	Refer to Section 4 of Black & Veatch Report dated May 30, 2014, and file "Benefit Estimate 053014.pdf" for more information.	Benefit Estimate 053014.pdf
Mitigation Project Cost	see attached file	ISY Project Cost Estimate Spreadsheet 052814.xls
Number of Customers Served	Refer to summary of analysis in Section 4.5 of Black & Veatch report dated May 30,2014.	
Project useful life	Based on FEMA guidance, project useful life is selected to be 30 years, as the expected longevity of these facilities that are composed of wood, steel and fencing materials. This is similar to what would be the expected useful life of buildings.	
Unknown Frequency - Damages after Mitigation	Refer to Section 4 of Black & Veatch Report dated May 30, 2014, and file "Benefit Estimate 053014.pdf" for more information.	Benefit Estimate 053014.pdf
Value per Unit of Service	Refer to summary of analysis in Section 4.5 of Black & Veatch report dated May 30,2014.	
Year Built	According to SFPUC records, ISY was placed into service in 1960.	

Attachment 2

Document entitled “Environmental Checklist, Early Intake Switchyard Slope Stabilization Project,” prepared by San Francisco Public Utilities Commission, Bureau of Environmental Management, May 2014

Attachment 2
Environmental Checklist
Early Intake Switchyard Slope Stabilization Project

HAZARD MITIGATION GRANT PROGRAM
PROJECT SUB-APPLICATION

SECTION II - ENVIRONMENTAL CHECKLIST ADDITIONAL COMMENTS

National Historic Preservation Act

The National Historic Preservation Act (NHPA) applies to all federal undertaking, including projects that receive federal funding, are subject to federal regulation, or are located on federal land. The NHPA requires that the lead federal agency make appropriate efforts to identify cultural resources on its lands, assess the historical significance of any such resources under the eligibility criteria of the National Register of Historic Places (NRHP), and take into account the effects of its undertakings on historic properties—that is any archaeological or built environment resource determined to meet the eligibility criteria of the NRHP. Except in extraordinary circumstances structures that are less than 45 years old are not considered eligible to the NRHP.

The only structures in the vicinity of the proposed project are the utilitarian facilities of the Intake Switchyard. The facility was originally constructed in 1958, but has been altered multiple times since that date, most recently in 2013-2014, with the replacement of substantial parts of the equipment. This facility appears very unlikely to meet any of the criteria for eligibility to the NRHP.

The lower part of the slope immediately above the switchyard was cut in 1958 to provide fill for the artificial terrace that underlies the switchyard. There therefore is no potential for archaeological resources to be present in the central part of the lower slope adjacent to the switchyard. The steepness of the remainder of the slope makes the presence of prehistoric or historic deposits unlikely. Archaeological survey of the slope in April 2014 by an archaeologist who meets the Secretary of the Interior's Professional Qualifications (36 CFR 61). Three historic features were identified within the project area, as described below:

Mountain Tunnel adit: An adit for the Mountain Tunnel, constructed between 1920 and 1924 is present at base of the slope between Work Area 1 and Work Area 2. No project activities are proposed that would directly affect this adit, although the proposed catchment walls would abut it on either side. The adit could potentially be eligible to the National Register of Historic Places, as an element of the Mountain Tunnel, which is a critical element in the conveyance of Hetch Hetchy water. Assessment of the historical significance of this feature would be undertaken during project design.

Tram hoist cableway: Hetch Hetchy Water and Power constructed and operated a tram hoist cableway that extended down the slope through the project area to supply personnel and materials to projects under construction in the Tuolumne canyon, starting in 1917. This consisted of about 3,000 linear feet of cableway that ran from the Hetch Hetchy Railroad, at the top of the slope, down to Intake Camp facilities located at what is now the location of the Intake Switchyard. Trams, powered by a cable hoist mechanism located at the top of the slope, ran on rails that were

supported on a raised earthen berm or in some stretches on concrete saddles and wooden trestles. The Intake Camp facilities were demolished or moved to the current location of Intake Camp in the 1940s. The tram hoist cableway was partially dismantled in 1956, with the removal of rails and some supports, but substantial evidence of the system remains, including a concrete cableway section at the top of the slope, pipe saddles that still survive at Cherry Lake Road and in a few segments of the alignment, and the remnants of the berm, which can be traced fro most of the length of the system 3,000 feet. Railroad ties reportedly were present in 2001, but most apparently burned in the Rim Fire of 2013, as did the structure that housed the tram hoist mechanism. Foundations and the hoist mechanisms are still present at Hetchy Hetchy Road.

Archaeological survey in 2014 revealed that the berm and associated wire cables are intact within the project area except for the lowest 20 feet of the slope, where the berm was disrupted by past grading and the cable has been dragged out of alignment. The Intake Tram Hoist may be eligible to the NRHP under Criterion A for its important role in the development of the early HHWP water and power facilities in the Tuolumne Canyon, but the system has not been assessed by a historian/ architectural historian. It also has not been determined whether the cableway retains sufficient physical integrity to be eligible for the NRHP, since rail, ties and some of the concrete stanchions have been removed or destroyed and the berm has been disrupted in some areas. The drainage channels and catchment fences proposed for installation in Area 2 would disrupt the berm alignment and therefore further impair the integrity of the berm. Further documentation and analysis and consultation between the lead federal agency and the SHPO will be required. .

Water tank: Foundations and remains of a wood-slat water tank are present on a small cut-bench on the upper slope of the project area, just west of the tram cable way. These likely are the remains of the water tank that supplied the Intake Camp facilities established at the site of the switchyard in 1917 in in support of the construction of the Lower Cherry Aqueduct, Early Intake Dam and Mountain and Canyon tunnels. These facilities were removed in the 1940s. It is unknown how long the water tank remained in place, but any wooden remnants burned in the Rim Fire in 2013. As a minor utilitarian support facility for Intake Camp, the water tank does not appear to meet any of the criteria of eligibility for the NRHP. Further, the tank site lacks integrity of association, since the facilities it supported were removed many decades ago, and it also lacks physical integrity, since most elements have been destroyed; therefore, it does not appear to be eligible for the NRHP. In any case, it is not anticipated that the proposed project would affect this location

The proposed staging area is graveled and paved. A garage that dates to the historic period was located adjacent to the staging area but burned to its foundations during the Rim Fire. Staging would be confined to the graveled and paved areas adjacent to this structure. The foundations would not be affected.

Further assessment of historic features by a qualified historian/ architectural historian will be required. Conclusions will be subject to review by the Lead Federal Agency (LFA) under Section 106 of the NHPA and to the concurrence of the State Historic Preservation Officer (SHPO). It is assumed that the LFA for the project will conduct SHPO consultation for this project, with technical support provided by SFPUC as needed. SFPUC will provide copies of archaeological site records for the sites described above if requested. In addition, it is anticipated that the LFA will conduct the public outreach required by Section 106, including circulation of letters to Native American tribes, local historical societies and other interested parties. SFPUC will provide draft public consultation letters for the use of the LFA if desired. If the historic features within the

project area are determined to be eligible to the NRHP, SFPUC will work with the LFA to minimize adverse effects through design adjustments to the extent feasible..

Archeological Resource Preservation Act

The Archaeological Resources Protection Act applies to projects located on federal land. As the proposed project is within the SFPUC's Raker Act rights of way across Forest Service land, it is unclear whether the Raker Act is applicable. Irrespective, the cultural resources identification and assessment conducted for compliance with the NHPA also would fulfill ARPA archaeological identification and protection requirements.

Endangered Species Act

A biological assessment was conducted for a project in the area surrounding the proposed project site in April 2014. The assessment included field surveys and background research (e.g. CNDDB and USFWS species listings) of species that may occur in the area. No threatened or endangered FESA species are known to occur in the area. A state fully-protected species, ringtail, may occur in areas surrounding the project site but it is not expected in the immediate project area. In addition, a state candidate species, Townsend's big-eared bat, has been documented in other areas (and the SFPUC is in the process of coordinating with CDFW for this species for a different project) but it is also not expected to occur in the immediate project area.

A preconstruction biological survey would be conducted in advance of work activities to confirm no sensitive species or nesting birds (depending on the time of year of implementation) are impacted by the project. If nesting birds are found, a buffer will be established around the nest in order to avoid impacts to the birds.

Fish and Wildlife Coordination Act

There are two drainages, one on the east side and one on the west side of the project area. Each drainage leads to a culvert which then drains to the Tuolumne River. Alterations to the flow of water down the slope would direct water into these drainages at several points along the slope. Directing the flow into the drainages may require the placement of rip rap or similar material along an edge of the drainage to direct water flow. If final design indicates impacts to one or both drainages, permits will be obtained from the necessary agencies.

Farmlands Protection Policy Act

According to data available at the website listed below, the project area is located within non-irrigated farmland.
http://maps.conservation.ca.gov/ciff/ciff.html

Clean Air Act

Project construction would include SFPUC's standard construction measures for control of dust and air pollutants during Project construction. The majority of grading and associated site work requiring heavy equipment and generating dust would be completed within a period of approximately three months. The project is not anticipated to generate substantial air emissions based on the inclusion in the project of standard dust controls, the small size of the area to be graded, the limited number of pieces of construction equipment that would be needed, and the short duration of grading and excavation. The project would not generate any operational emissions. The project site is located in the Tuolumne County Air Pollution Control District (TCAPCD). TCAPCD regulates dust emissions through its review of grading permits issued by agencies within the county, but does not regulate criteria pollutant construction emissions, as

from construction equipment and vehicles. There are no residences or other sensitive receptors within 1,000 feet of the project site; therefore, the project would not result in exposure of sensitive receptors to significant pollutant concentrations.

Adverse effects to air quality therefore are not anticipated and no agency consultation would appear to be required.

Clean Water Act (Section 404) & Rivers and Harbors Act (Section 10)

Work will occur adjacent to two drainages which drain to the Tuolumne River approximately 200-300 feet from the project areaAs noted above, if rip rap or similar material is needed at an edge of the drainage to direct flow from the slope, permits will be obtained from the necessary regulatory agencies, which may include the U.S. Army Corps of Engineers, the Regional Water Quality Control Board, and the California Department of Fish and Wildlife. Flagging will be installed along the perimeter of drainages to ensure they are not impacted during construction and best management practices will be in place to avoid indirect impacts to the drainages or the Tuolumne River.

Wild and Scenic Rivers Act

The project is adjacent to the Tuolumne River (approximately 200-300 feet away), with a large power switchyard between the project and river. The portion of the Tuolumne River adjacent to the project is excluded from the Wild and Scenic Rivers designation. The Wild and Scenic Rivers exclusion area extends from approximately one mile upstream of the project site to approximately 0.25 miles downstream of the project site. Refer to the following website for an overview of the Tuolumne Wild and Scenic River areas. The project area is located on the map just south of Preston Falls (right hand side of map) below the Robert C Kirkwood label on the map and on the southwest side where a road crosses the Tuolumne River. http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5390822.pdf

Wilderness Act

The Yosemite Wilderness is located approximately seven miles east of the Project area and would not be affected by project implementation.

Other Relevant Laws and Environmental Regulations

The USFS may require a special use permit for project implementation.

EXECUTIVE ORDERS

E.O. 11988- Floodplains

The project is located outside of the FEMA Effective 100-year floodplain according to the California Department of Water Resources website (http://gis.bam.water.ca.gov/bam/). A map was not available that would depict the 500-year floodplain, but it is assumed that, based on the proximity of the 100-year floodplain, the project would be within the 500-year floodplain.

The project is depicted on a FEMA FIRM, predominantly at the northern-most edge of Section 06109C1275C. The project area is outside of the floodplain area indicated on the map at the following FEMA FIRM website: https://msc.fema.gov/webapp/wcs/stores/servlet/mapstore/homepage/MapSearch.html?isFloodMap=true&AddressQuery=tuolumne%20county%2C%20ca

E.O. 11990- Wetlands

There are no wetlands located in the project area. The NWI map was accessed on 5/19/14 from the USFWS website at the following web address: http://www.fws.gov/wetlands/Data/Google-Earth.html

E.O. 12898- Environmental Justice

The proposed project has no potential to adversely affect any community or low income or minority population. The project site is located in an isolated rural area immediately adjacent to an existing electrical substation. Because project construction/ work activities would be of small scale and short duration, only a small number of short term jobs/ limited amount of income would be generated by the project. SFPUC's contracting practice includes substantial requirements for outreach to disadvantaged and local business enterprises. Therefore, it is not anticipated that the project would have the potential to significantly affect any low income or minority community or population.

Attachment 3

Project Cost Estimate Excel Spreadsheet, prepared by Black & Veatch, May 2014

SECTION V – COST ESTIMATE

Some sample categories for projected expenditures are: Project Management, Engineering & Design, Site Acquisitions, Labor, Materials & Supplies, Equipment, Transportation. Additional line-item suggestions are included in sample budget categories on page 12 of sub-application instructions. Lump sum(s) in the unit of measure should not be commingled. Explain projected expeditures in detail in the Cost Estimate Narrative in Section V.

You must use this spreadsheet. Do not copy or adjust.

Refer back to the SUB-APPLICATION INSTRUCTIONS SECTION V - cost estimate for some ineligible items.

A.	Item name:	Work Area 1 Slope Grading by Earthwork Crew - see narrative					
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
	10.00		Crew-Days		17,334.00		173,340.00
B.	Item name:	Work Area 1 Catchment Wall Construction - see narrative					
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
	100.00		Foot		960.00		96,000.00
C.	Item name:	Work Area 2 Catchment Fences - see narrative					
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
	800.00		Foot		478.00		382,400.00
D.	Item name:	Surface Water Diversion - V-Ditch Construction - see narrative					
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
	2000.00		Foot		133.65		267,300.00
E.	Item name:	Vegetative Surface Stabilization					
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
	5.00		Acres		5,400.00		27,000.00
F.	Item name:	Mobilization / Demobilization for Items A - E					
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
	0.05		%		946,040.00		47,302.00
G.	Item name:	Final Design & Preparation of Contract Documents					
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
	662.00		Manhours		150.00		99,300.00
H.	Item name:	Historical and Biological/Water Quality Work by SFPUC					
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
	120.00		Manhours		150.00		18,000.00
I.	Item name:	Environmental Coordination with USFS and Cal-OES					
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
	120.00		Manhours		150.00		18,000.00

Hazard Mitigation Grant
Early Intake Switchyard Slope Stabilization Project

J.	Item name:	Professional Services for Permitting Support					
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
	200.00		Manhours		150.00		30,000.00
K.	Item name:	Construction Management Services					
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
	662.00		Manhours		150.00		99,300.00
L.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
							0.00
M.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
							0.00
N.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
							0.00
O.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
							0.00
P.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
							0.00
Q.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
							0.00
R.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
							0.00
S.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
							0.00
T.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
							0.00
U.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
							0.00
V.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
							0.00
W.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate

							0.00
X.	Item name:						
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
							0.00
* Y.	Item name:		**Subapplicant Pre-Award Costs**				
	Unit Qty:		Unit of Measure		Unit Cost		Cost Estimate
	1.00		LS		54,327.00		54,327.00
* **Item Y**	**SUB-APPLICANT PRE-AWARD COST**						

Allowable Pre-Award Project Costs: Costs incurred after the HMGP application period has opened, but prior to grant award, are identified as pre-award costs. Pre-award costs directly related to developing the application may be funded. Such costs may have been incurred to develop a BCA, to gather environmental and historic data, for preparing design specifications, or for workshops or meetings related to development and submission of the application. **Sub-applicants who are not awarded sub-grant funds will not receive reimbursement for pre-award costs.**

TOTAL PROJECT COST ESTIMATE		➔	**1,312,269.00**
SPECIFY COST BREAKDOWN			
SUB-APPLICANT (NON-FEDERAL) SHARE	➔	$328,067.00	25%
FEDERAL SHARE (MAX 75.00 %) OF ELIGIBLE COSTS)	➔	$984,202.00	75%
ESTIMATED TOTAL COST		$1,312,269.00	100%
			↑
			Must Be 100%

MATCH SOURCES (NON-FED SHARE) FUNDING

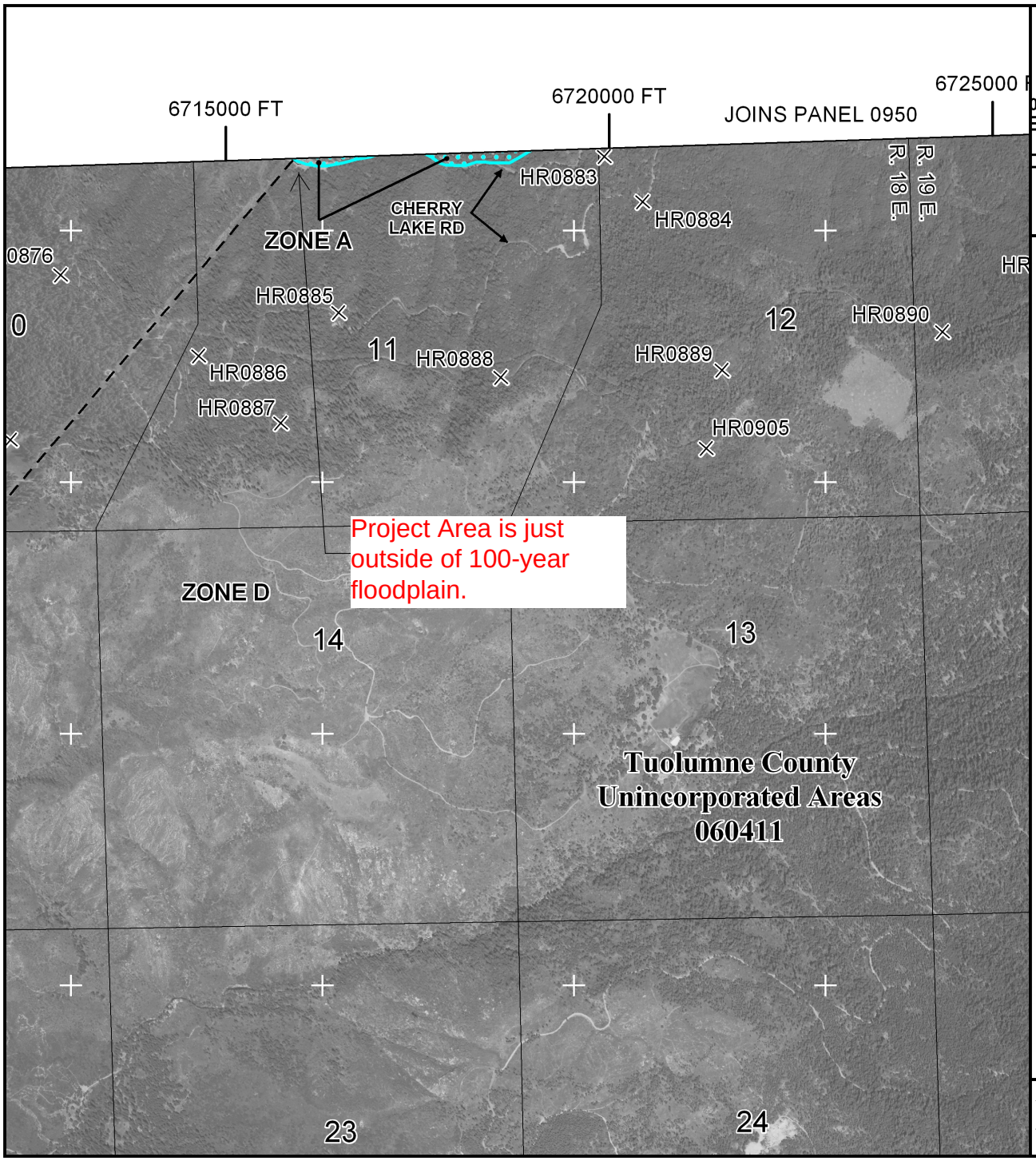
TOTAL PROJECT COST ESTIMATE	**$**	1,312,269.00
PROPOSED FEDERAL SHARE	**$**	984,202.00
FEDERAL SHARE PERCENTAGE		75%
PROPOSED NON-FEDERAL SHARE	**$**	328,067.00

Hazard Mitigation Grant
Early Intake Switchyard Slope Stabilization Project

NON-FEDERAL PERCENTAGE	25%
1. SOURCE :	**Select: Local Agency Funding, Other Agency Funding, Private Non-Profit, or State Agency Funding**
SOURCE NAME:	
FUNDING TYPE:	**(Select: Administration, Cash, Consulting Fees, Engineering Fees, Force Account Labor your agency personnel, Program Income, etc).**
OTHER FUNDING TYPE:	
FUNDS AVAILABILITY DATE: ➔	
FUNDS COMMITMENT LETTER DATE: ➔	

Attachment 4

NFIP Flood Insurance Rate Map, Panel 1275C.



MAP SCALE 1" = 2000'

00 0 2000 4000 FEET

0 600 1200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1275C

FIRM

FLOOD INSURANCE RATE MAP

TUOLUMNE COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 1275 OF 1550

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
TUOLUMNE COUNTY	060411	1275	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06109C1275C

EFFECTIVE DATE
APRIL 16, 2009

Federal Emergency Management Agency

Attachment 5

Maintenance Letter, May 29, 2014

San Francisco
Water Power Sewer
Operator of the Hetch Hetchy Regional Water System

Post Office Box 160
Moccasin, CA 95347
T 209.989.2012
F 209.989.2104
Junction of Hwy 49 and Hwy 120

May 29, 2014

California Office of Emergency Services
Hazard Mitigation Grants Division
3650 Schriever Avenue
Mather, CA 95655

RE: *Early Intake Switchyard Slope Stabilization Project*

Dear State Hazard Mitigation Officer:

This is to confirm that the City and County of San Francisco is committed to perform the necessary maintenance for the entire useful life of this project 30 years once completed. Hetch Hetchy Water & Power is allocated an annual budget which will allow maintenance to occur as needed to ensure the Early Intake Switchyard remains in good repair and operational.

Entity responsible for the maintenance: Hetch Hetchy Water & Power

Maintenance Task: Cleanout debris behind catchment wall and catchment fences; repair damage to wall and fences; inspect and cleanout culverts, ditches, and drains.

Maintenance Schedule: Annually.

Cost of Maintenance: $35,400 per year.

Associated Budget: $35,400 per year.

Please contact Margaret Hannaford if you have any questions.

Sincerely,

Margaret Hannaford
Division Manager
Hetch Hetchy Water & Power
San Francisco Public Utilities Commission
City and County of San Francisco