U.S. Depart	ment	of Transportatio	n DAF No. L	.TP -	SLN	- 0	0 1 - 1 4				
Federal Hig	ghway	Administration	Sheet # 1 of	2 Federa	al Project # EO	ER - 15	5J7 (179)				
Damage As	ia Div	ision- Title 23 ient Form (DAF) Disaster No. CA	2 3 -	1 PR	ER - 15	5J7 (179)				
cant Other f O	1	va dua	County Alameda		Incident Date	e (mm/dd/yyy	y) Inspection				
City of S	an Lea	inaro	Congressional districts 1	4	/2022	12/31/2022					
ion of Damag	ge:		Per Site or	Per Mile	Federal-aid Highway?						
ne of Road/Br	idge:	Lake Chabot Roa	d		Y for yes, if no, ineligible for ER funds Y						
PM Begin:	200' e	ast of Chabot Ter	race PM L	ength: 1,500.00	Map No 5L34						
PM End:	1700'	east of Chabot Te	errace	(in feet)	Functional Classification Type:						
Bridge	Bri	dge	Type:		Minor Arteria Route	al #					
aveled Way.] W	idth 28 ft		Gravel	Forest Hww		Interstate? V/N N				
Shoulder:	W	idth 2 ft	Type: PCC AC	Gravel	Existing	ADT: 3,521					
escription	helow road slid	down hill and									
of	unde	mined pavement	in the westbound lane.	Site B, 1600' east of C	Chabot Terrac	e, approximatel	y 100' of				
Damage:	emba	nkment above roa	ad slid onto road and bloc	ked the eastbound la	ane.						
			COST E	STIMATE							
EQ ACENC	Type of	f Repair	De	scription of Work		Cost	Summary				
CT Work Or	der #(s):	_			PE	0				
$\overline{\mathrm{FA}(s)}$			-			CE	0				
LA(3)			-			Construction	0				
EO- CONTR	RACT		Force account work	by McGuire and Hest	er: Install	PE	0				
EO EA(s):			plastic over slides at sandbags. Repair pl	site A and B and sec astic after subsequer	ure with it storms.	CE	0				
			Incl traffic control for	road closure.		Construction	82,652				
E: Environme	ental d	ocumentation for E	CO is required. It is genera	llly started after work	has begun.	R/W					
				Subtotal Emerge	ncy Opening		\$82,652				
PR- CONST FA requir	RUCTI es an a	ON pproved PIF	Site A: Construct ap	proximately 78 linear	feet of	PE	375,824				
Cont	tract	FA FA	westbound lane, repa	ave westbound lane.	idei	CE	248,736				
PR EAs			Site B: Construct app retaining wall, regrad	proximately 138 linear e hill, install rock slor	r feet of be	Construction	1,658,241				
OTE:PRIOR	R AUTI PEI	IORIZATION (AI	PROVED E-76) IS REQ ORATION R/W & CONS	UIRED TO PROCEE	D WITH	R/W	0				
E: Environme	ental cl	earance for perma al Federal-aid proc	nent restoration is	Subtotal Permanen	t Restoration		\$2,282,801				
Eligible			Signature	Date		PE Total	\$375,824				
Yes	N	Local Agency (if a	$\frac{1}{\sqrt{2}}$			\$248,736					
Yes	N	Caltrans: Bahac	Ur Singh Digitally signed by Bahadur Singh Date: 2023.12.08 13:53:00 -08:00	12/08/23	R/W Total						
	N	FHWA*: Ken	neth J. Koch	war 1/8/24	Cons	struction Total	\$1,740,893				
Yes			~	-							
	Damage As ant City of S ion of Damag ie of Road/Br PM Begin: PM End: Bridge aveled Way: Shoulder: Scription of vamage: EO- AGENO CT Work Or EA(s): EO- CONTF EO EA(s): E: Environmo PR-CONST FA requin PR-CONST FA requin Con PR EAs OTE:PRIOF ELigible Yes	Damage Assessm city of San Lead ion of Damage: ie of Road/Bridge: PM Begin: 200' e PM End: 1700' Bridge Bri aveled Way: W Shoulder: W scription Site A of under wanage: emba Contract FOF EO- CONTRACT EO EO EA(s):	Damage Assessment Form (DAF ant City of San Leandro ion of Damage: le of Road/Bridge: Lake Chabot Roa PM Begin: 200' east of Chabot Ter PM End: 1700' east of Chabot Ter Bridge No aveled Way: Width 28 ft Shoulder: Width 29 ft EA(s): Ea(s): Environmental documentation for E PR EAs OTE:PRIOR AUTHORIZATION (AI PREMANENT REST E: Environmental clearance for perma Intervent Participation Image: Properties N Local Agency (if a	Damage Assessment Form (DAF) Disaster No. CA ant County Alameda congressional districts 1 or ion of Damage: Per Site or te of Road/Bridge: Lake Chabot Road PM Edit or PM Begin: 200' east of Chabot Terrace PM La PM End: 1700' east of Chabot Terrace PM La Bridge Bridge Type:	Damage Assessment Form (DAF) Disaster No. CA 2 3 County Alameda Congressional districts 14 Congressional districts 14 ion of Damage: Per Site or ✓ Per Mile te of Road/Bridge: Lake Chabot Road Per Site or ✓ Per Mile te of Road/Bridge: Lake Chabot Terrace PM Length: 1,500.00 PM Begin: 200' east of Chabot Terrace PM Length: 1,500.00 Bridge Bridge Type:	Damage Assessment Form (DAF) Disaster No. CA 2 3 - 1 PR ant County Alameda Congressional districts 14 1/2/31 1/2/31 ion of Damage: Per Site or ✓ Per Mile Federal-aid 1 ie of Road/Bridge: Lake Chabot Road Y for yes, if Federal-aid 1 Y for yes, if PM Begin: 200' east of Chabot Terrace PM Length: 1,500.00 Map No PM End: 1700' east of Chabot Terrace PM Length: 1,500.00 Map No Bridge Bridge No	Damage Assessment Form (DAF) Disaster No. CA 2 3 1 PR ER 15 iant Cly of San Leandro Country Alameda Incider Date (mm/dd/yzy) ion of Damage: Per Site or ✓ Per Mile Federal-aid Highwa? te of Road/Bridge: Lake Chabot Road Per Site or ✓ Per Mile Federal-aid Highwa? PM Begin: 200° east of Chabot Terrace PM Length: 1,500.00 Map No 5L34 PM End: 1700° east of Chabot Terrace PM Length: 1,500.00 Map No 5L34 Bridge Bridge No Type: Route # Forest Hwy? V/N N Shoulder: Width 2 ft Type: PC AC ✓ Gravel Existing ADT: 3,521 scription Site A: 200° east of Chabot Terrace, approximately 100 linear feet of embankment below road slid undermined pavement in the westbound lane. Site B, 1600° east of Chabot Terrace, approximately and blocked the eastbound lane. Existing ADT: 3,521 scription Site A: 200° east of Chabot Terrace, approximately 100 linear feet of embankment below road slid undermined pavement in the westbound lane. Site B, 1600° east of Chabot Terrace, approximately 100 l				

Original: Caltrans District Copies: FHWA, Division of Local Assistance(local roads), Federal Resources (state hwy), HQ Major Damage Engineer (state hwy) *Write "N/A" in FHWA signature block if the project has no Federal ER funding or Federal ER funding delegated to the State. FHWA Signature: REQUIRED for all Federal Funded <u>State projects</u>. REQUIRED for any Local Agency projects with 1) any BETTERMENT, 2) more than 2 ROW takes or 3) when paving is more than 50% of the Total Estimated Cost. Reminder: This DAF must be accompanied by photos of the damage.



	DAF # LTP - SLN	_ 0 0 1 _ 1	
U.S. Department of Transportation Federal Highway Administration- California Division- Title 23 Damage Assessment Form (DAF)	Sheet # 3 Applicant City of San Leandro	of <u>12</u>	
Photo	s, Sketches and/or Narrative		

Site A: Downslope failed. Geotechnical engineer says support under pavement is lost to midpoint of westbound Photo description: lane.



U.S. Department of Transportation Federal Highway Administration- California Division- Title 23 Damage Assessment Form (DAF)	DAF # LTP - SLN - 0 0 1 - 1 Sheet # 4 of 12 12 - 1 Applicant
Pho	tos, Sketches and/or Narrative
Pho Este A: Downslope failed. Photo description:	

	DAF #	LTP .	_ (SLN		_ 0	0 1	-	1
U.S. Department of Transportation	Sheet #	5	-		of	12		-	
Federal Highway Administration-		Applicant			01				
California Division- Title 23			1 .						
Damage Assessment Form (DAF)		City of San Lean	ndro	0					
Dhat	og Stratala	aa and/an Namat							
<u>P1101</u>	os, sketch	es and/or marrat		<u>e</u>					
Site B: upslope failed. This is th	e site of a p	revious failure circ	са	1998.	ROW is the	e fence	at the to	p of t	he hill, note
Photo description: proximity of houses. Geotechnica	al engineer	says all rock slope	e p	protecti	on from 199	98 shou	ld be rep	olace	d. 🕂
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	_	_	I	LTP	SLN	0	0 1	1
U.S. Depart	tment of Transp	ortation	Sheet #	6	C	of 12		
Federal Hig	ghway Adminis	tration-	-	Applicant				
Damage As	ssessment Form	(DAF)		(City of San L	eandro		
Dunnagern			Agency	EO Calc	E	O - Contract		PR Calc
		1			II			
Quantity*	Unit*	Labor	, Materials	s, and Equip	ment	Unit Pri	ce	Cost
4	EA	Road Closed s	signs			159.00	<u> </u>	636.00
4	EA	Sign braces				58.00		232.00
4	EA	Flagstands				159.00	<u>'</u>	636.00
15	EA	Type 1 barrica	des			52.46		786.90
32	LF	Chain link fend	ce			190.06		6,081.92
375	HRS	Labor				120.00		45,000.00
375	HRS	Truck pick up				21.81		8,178.75
500	EA	Sandbags				1.00		500.00
1000	LF	Rope				0.60		600.00
40000	SF	Plastic Sheetir	ng			0.50		20,000.00
								0.00
								0.00
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								0.00
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								0.00
								0.00
		1						0.00
		1						0.00
		1						0.00
								0.00
						T	otal	82,651.57

*Lump Sum will generally only be accepted for non biddable items, such as Mobilization.

Justifications/comments: Non-typical Scope, PE/CE Cost, Engineering estimates etc.

At both sites A and B, plastic sheeting, weighted with sandbags was installed on the hillsides to prevent further erosion damage and safety barricades were installed at the perimeter.

The roadway was closed to traffic. Road Closed signs and fencing were installed.

The DAF was revised because PE is increased to \$375,824 due to the significant NEPA effort required for this project due in part to it's proximity to a creek. The NEPA effort alone exceeds 10% of the estimated construction costs.

U.S. Depart Federal Hiş Californ Damage A:	tment of Trans ghway Admini ia Division- Ti ssessment Fori	portation istration- itle 23 m (DAF)	Sheet # $\frac{LTP}{7}$ Applicant City	Sheet # $\frac{LTP}{7} \xrightarrow{SLN} \underbrace{0 0 1}_{Applicant}$ City of San Leandro - Site A							
			Agency EO Calc			PR Calc 🖌					
Ouantity*	Unit*	Labo	r. Materials, and Equipme	ent	Unit Price	Cost					
1	LS	Mobilization			53,000.00	53,000.00					
80	LF	Remove Meta	l Beam Guardrailing		30.00	2,400.00					
1	EA	Remove Conc	rete Drainage Inlet Swale		3,000.00	3,000.00					
50	LF	Remove Dowr	n Drain		78.00	3,900.00					
200	SY	Clearing and (Grubbing		40.00	8,000.00					
193	CY	Excavation (rc	padway)		200.00	38,600.00					
21	CY	Excavation (st	ructure pile base)		260.00	5,460.00					
154	LF	24" Cast-In-Dr	rilled-Hole		290.00	44,660.00					
140	LF	24" Cast-In-Dr	rilled-Hole (Rock Socket)		920.00	128,800.00					
350	LF	Steel Soldier F	Pile		148.00	51,800.00					
294	LF	24" Cast-In-Dr	rilled-Hole Concrete (Soldier P	ile)	330.00	97,020.00					
309	SF	Concrete Lag	ging		105.00	32,445.00					
48	SY	Geocomposite	e Drain		112.00	5,376.00					
1	EA	Concrete Drai	n Inlet		4,200.00	4,200.00					
70	LF	HDPE Downd	rain		210.00	14,700.00					
5	CY	Rock Slope Pr	rotection Class II		650.00	3,250.00					
228	CY	Class 2 Aggre	gate Base		180.00	41,040.00					
80	LF	Metal Beam G	uardrailing		270.00	21,600.00					
120	TN	Hot Mix ASph	alt		290.00	34,800.00					
350	LF	Pavement Stri	ping		2.00	700.00					
						0.00					
						0.00					
						0.00					
						0.00					
						0.00					
						0.00					
						0.00					
						0.00					
						0.00					
						0.00					
					Total	594,751.00					

*Lump Sum will generally only be accepted for non biddable items, such as Mobilization.

Justifications/comments: Non-typical Scope, PE/CE Cost, Engineering estimates etc.

The work cannot be done under EO as it cannot be done in 270 days.

This repair method will be staged and constructed from the above roadway and will not require any access or easements to the adjacent downslope private property. The hillside below the newly constructed retaining structure will remain in its current condition and with minimal environmental impact to the creek below.

Betterment is less expensive than Repair In Kind, formula in cell K44 (of Betterment Justification Form) is not applicable. Repair In-Kind is more costly and access is extremely difficult. Repair in kind will require acquisition of an easement and will require extensive regulatory consultation and permitting due (predominantly) to proximity to the creek.

U.S. De	U.S. Department of Transportation									of		12	
Federal Highway Department	- California Divi	sion - Title 23 - I	Emergency	/ Relie	f		DAF No:		LTP - SL	.N - 001-	1		
Betterme	ent Justification	Form (DAF)											
		REPAIF	r in-Kind				REPAIR WITH BETTERMENT						
ITEM	Description: Site A	Reconstruct an 80	feet high hillsi	de emba	ankm	nent	Description:Site A I	nstall approximatel	y 78 linear	feet of ret	aining	, structure	
	UNIT	QUANTITY	UNIT PR	RICE		COST	UNIT	QUANTITY	UNIT	PRICE		COST	
Environmental Review (proximity to creek)	EA	1	\$ 8	80,000	\$	80,000					\$	-	
Permanent Easement	SF	33500	\$	15	\$	502,500							
Temporary Construction Easement (TCE)	SF	SF 36400 \$ 10 \$ 364,000 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 10 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 10 \$ 5 1 \$ 5 1 \$ 5 10 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 5 1 \$ 1											
Mobilization	LS	LS 1 \$ 111,000 \$ 111,000 LS 1 \$ 53,000 \$											
Remove Metal Beam Guardrailing	LF	LF 80 \$ 30 \$ 2,400 LF 80 \$ 30 \$											
Remove Concrete Drainage Inlet and Swale	EA	EA 1 \$ 3,000 \$ 3,000 \$ 3,000 EA 1 \$ 3,000 \$ 3,000 \$ 3,000 EA 1 \$ 3,000											
Remove Downdrain	LF	LF 50 \$ 78 \$ 3,900 LF 50 \$ 78 \$											
Clearing and Grubbing	SY	SY 1425 \$ 45 \$ 64,125 SY 200 \$ 40 \$											
Excavation	CY	CY 956 \$ 500 \$ 478,000 CY \$											
Benched Embankment Backfill	CY	6222	\$	500	\$	3,111,000	CY						
Geosynthetic Fabric	SY	2333	\$	45	\$	104,985	SY				\$	-	
Hydroseed	SY	SY 1425 \$ 5 \$ 7,125 SY											
Excavation (Roadway)	CY						CY	193	\$	200	\$	38,600	
Excavation (Structure - Pile Base)	CY	CY CY 21 \$ 260 \$											
24"Cast-In-Drilled Hole								154	\$	290	\$	44,660	
24 Cast-In-Drilled-Hole (Rock Socket)								140	\$	920	\$	128,800	
Steel Soldier Pile								350	\$	148	\$	51,800	
24 Cast-In-Diffied-Hole Concrete (Soldier Pile)								294	ф Ф	105	9	97,020	
Casesemposite Drain	OF eV						OF eV	309	Ф Ф	100	\$ ¢	52,440	
Concrete Drain Inlet		1	¢	4 200	¢	4 200		40	φ φ	4 200	ф ¢	4 200	
		70	φ Φ	210	φ Φ	4,200		70	φ ¢	4,200	9	4,200	
Rock Slope Protection Class II		10	Ψ	210	φ	14,700		5	ψ ¢	650	ф Ф	3 250	
Class 2 Aggregate Base	CY						CY	228	\$	180	\$	41 040	
Metal Beam Guardrailing	IF	80	\$	270	\$	21 600	I F	80	\$	270	\$	21,600	
Hot Mix Asphalt	TN	120	\$	120	\$	14 400	TN	120	\$	290	ŝ	34 800	
Pavement Striping	LF	350	\$	2	\$	700	LF	350	\$	2	\$	700	
					· · ·						<u> </u>		
					\$	-					\$	-	
					\$	-					\$	-	
ΤΟΤΑ	L		-		\$	4,887,635					\$	594,751	
Cost to repair damage in the future (with betterment)	Minor repairs/mair	ntenance. Annual mo	onitoring and c	leaning	of dı	rainage system	n over a 50 year perio	od.			\$	50,000	
Cost to repair damage in the future (without betterment)	Standard repairs/r applications of hyd	naintenance. Annual droseeding	l monitoring ar	nd clean	ing c	of drainage sys	stem over a 50 year p	period. Monitoring a	and spot re	-	\$	90,000	
BENEFIT		(Difference in future repair costs over equal life.)										40,000	
COST		(Additional cost to repair the site as a result of adding the betterment.)									\$	(4,292,884)	
BENEFIT / COST		(A Benefit-Cost Ratio of less than 1.00 doesn't necessarily mean automatic rejection. If the Benefit-Cost Ratio is less than 1.00, a justification should be provided in the REMARKS section (provide additional pages, if necessary.)										-0.01	
REMARKS	Betterment is less in kind will require	expensive than Rep acquisition of an ea	pair In Kind, for sement and w	rmula in vill requir	cell e ex	K44 is not app tensive regulat	licable. Repair In-Ki tory consultation and	nd is more costly a permitting due (p	and access redominant	is extreme tly) to prox	ely dif	ficult. Repair to the creek.	

L if			t Anol	voio	Histor	ria Si	ito A		Discou	Int Rate	
	e Cych	6 002	Alla	y515 -	пізіо	11C = 31	le A		Analysi	s Period	
									(ye	50	
	B	enair In .	kind Alt	ernative	1				Initial Pro	oject Cost	\$4,887,635
	Service L	ife (years)	50								
	Year	Year									
	5	10	15	20	25	30	35	40	45	50	
Project Description:											
Repair/Reconstruct - Future	\$0	\$18,000	\$0	\$18,000	\$0	\$18,000	\$0	\$18,000	\$0	\$18,000	\$90,000
Remaining Service Life - Repair								6	fer 2		\$0
Remaining Service Life - Asset								[\$0
Life Cycle Cost											\$4,997,635
		Dottorm		rnativa					Initial Pro	oject Cost	\$594,751
		Dellenni		mative					Service L	ife (years).	50
	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	
	5	10	15	20	25	30	35	40	45	50	
Project Description:	Install appr	oximately 7	'8 linear fee	t of retainin	g structure			6		-	
Repair/Reconstruct - Future	\$0	\$10,000	\$0	\$10,000	\$0	\$10,000	\$0	\$10,000	\$ 0	\$10,000	\$50,000
Remaining Service Life - Repair											\$0
Remaining Service Life - Asset)								\$0
Life Cycle Cost											\$644,751
									Benefit/Cos	st Ratio =	01

U.S. Depart Federal Hig Californ Damage As	tment of Transp ghway Adminis ia Division- Tit ssessment Form	portation stration- tle 23 n (DAF)	Sheet # $\frac{LT}{A}$	P 10 Applicant C	0 12 dro - Site B	0	<u>1 1</u> 			
			Agency :	EO Calc					PR Calc 🖌	
Quantity*	Unit*	Labor	· Materials	and Equip	nent		Unit Pri	ce	Cost	
1	LS	Mobilization	, 111110111115,	una Equipi		112,740.0	00	112,740	.00	
900	SY	Clearing and C	Grubbing				10.00		9,000	.00
125	LF	Remove 4' Ch	ain Link Fence				20.00		2,500	.00
122	LF	Remove Conc	rete V-ditch				40.00		4,880	.00
220	CY	Remove and S	Salvage Rock S	lope Protecti	on		70.00		15,400	.00
357	LF	24" Drilled Hol	e				300.00		107,100	.00
613	LF	24" Cast-in-pla	ace Concrete P	ile (Soldier P	ile)		120.00		73,560	.00
1462	SF	Structural Con	crete (Precast	Concrete La	gging)		120.00		175,440	.00
840	CY	Excavation					50.00		42,000	.00
20	CY	Structure Back	cfill				40.00		800	.00
1048	CY	Rock Slope Pr	otection Class	V			320.00		335,360	.00
465	CY	Rock Slope Pr	otection Class	II			350.00		162,750	.00
122	LF	Concrete V dit	ch				180.00		21,960	.00
									0	.00
									0	.00
									0	.00
									0	0.00
									0	.00
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									0	.00
									0	.00
									0	.00
									0	.00
									0	.00
							Т	otal	1,063,490	.00

*Lump Sum will generally only be accepted for non biddable items, such as Mobilization.

Justifications/comments: Non-typical Scope, PE/CE Cost, Engineering estimates etc.

The work cannot be done under EO as it cannot be done in 270 days.

This betterment repair will provide long lasting stability to the embankment and will afford continual vital structural support to the above dwellings.

The existing embankment has a history of failure. The repair installed 20 years ago failed. Similar failure is to be expected with replacement in kind, jeopardizing structural support to two structures above. A more robust betterment repair, conforming to current design standards is the preferred long term option.

U.S. Dep	partment of Trar	nsportation					Sheet No:	11		of		12
Federal Highway Department -	California Divis	sion - Title 23 - I	Emergei	ncy Relie	əf		DAF No:		- LTP -	SLN - 001-	1	
Betterme	nt Justification	Form (DAF)										
		REPAIF	R IN-KINI	D			REPAIR WITH BETTERMENT					
ITEM	Description: Site B	ription: Site B reinstall failed rock slope protection Description: Site B Install approximately 138 feet of retaining										ll, install taller
	UNIT	JNIT QUANTITY UNIT PRICE COST UNIT QUANTITY UNIT PRICE										COST
Mobilization	LS	LS 1 \$ 40,500 \$ 40,500 LS 1 \$ 112,740 \$										
Clearing and Grubbing	SY	SY 450 \$ 10 \$ 4,500 SY 900 \$ 10 \$										
Remove 4' Chain Link Fence	LF	LF 80 \$ 20 \$ 1,600 LF 125 \$ 20 \$										
Remove Concrete V-ditch	LF	70	\$	40	\$	2,800	LF	122	\$	40	\$	4,880
Remove 6' Chain Link Fence top of slope	LF	LF 65 \$ 25 \$ 1,625										
Remove and Salvage Rock Slope Protection	CY	CY 110 \$ 70 \$ 7,700 CY 220 \$ 70 \$										
24"Drilled Hole	LF	LF 0 \$ - LF 357 \$ 300 \$										
24" Cast-in-place Concrete Pile (Soldier Pile)	LF	LF 0 \$ - LF 613 \$ 120 \$										
Structural Concrete (Precast Concrete Lagging)	SF	SE 0 \$ - SE 1462 \$ 120 \$										
Excavation	CY	540	\$	50	\$	27,000	CY	840	\$	50	\$	42,000
Hillside Backfill	CY	CY 120 \$ 350 \$ 42.000										
Structure Backfill	CY	0	\$	60	\$	-	CY	20	\$	40	\$	800
Rock Slope Protection Class V	CY	0			\$	-	CY	1048	\$	320	\$	335,360
Rock Slope Protection Class II	CY	140	\$	350	\$	49,000	CY	465	\$	350	\$	162,750
Concrete V-Ditch	LF	70	\$	180	\$	12,600	LF	122	\$	180	\$	21,960
Geosynthetic Fabric when no RSP	SY	420	\$	25	\$	10,500	SY				\$	-
Hydroseeding	SY	420	\$	6	\$	2,520	SF	0			\$	-
Install Chain Link Fence	LF	145	\$	50	\$	7,250	LF	0			\$	-
Repair keyway Drainage	LF	80	\$	40	\$	3,200	LF	0			\$	-
TCE	SF	585	\$	25	\$	14,625	SF	0			\$	-
					\$	-					\$	-
					\$	-					\$	-
TOTAL		•			\$	227,420					\$	1,063,490
Cost to repair damage in the future (with betterment)	Minor repairs/main	itenance. Monitoring	g and peric	dic clearing	g of '	V-ditch and sto	orm drain over a 50 y	/ear			\$	25,000
Cost to repair damage in the future (without betterment)	Substantial Repair and installation of	s 50% of existing re temporary plastic sh	epair failed neeting we	at 20 years ighted with	s. As san	ssume replace dbags	100% at 20 intervals	. Also includes pe	riodic m	nonitoring	\$	949,680
BENEFIT		(Difference in future repair costs over equal life.)										924,680
COST		(Additional cost to repair the site as a result of adding the betterment.)										836,070
BENEFIT / COST		(A Benefit-Cost Ratio of less than 1.00 doesn't necessarily mean automatic rejection. If the Benefit-Cost Ratio is less than 1.00, a justification should be provided in the REMARKS section (provide additional pages, if necessary.)										1.11
REMARKS	The existing emba structural support t	nkment has a histor to two structures abo	ry of failure ove. A moi	e. The repair re robust be	ir ins etter	stalled 20 years ment repair, co	s ago failed. Similar f onforming to current	failure is more likely design standards is	y with re s the pro	eplacement in eferred long t	i kind, erm o	, jeopardizing option.

Life			t Apol	voio	Histor	ria Si	ito P		Discou	nt Rate		
LIIE	Cych		l Anai	ysis =	ΠΙSΙΟΙ	ic = 3		2	Analysi (ye	s Period ars)	50	
	D	on oir In		ownotive					Initial Pro	Initial Project Cost		
	Service Life (y											
Year Year Year Year Year Year Year Year												
	45	50										
roject Description: Reinstall failed section of rocks slope protection												
Repair/Reconstruct - Future	\$5,000	\$5,000	\$5,000	\$469,540	\$5,000	\$5,000	\$5,000	\$469,540	\$5,000	\$5,000	\$979,080	
Remaining Service Life - Repair											\$0	
Remaining Service Life - Asset		[\$0	
Life Cycle Cost											\$1,177,100	
		Detterm							Initial Pro	oject Cost	\$1,063,490	
		Betterm		rnative					Service L	ife (years)	50	
	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year		
	5	10	15	20	25	30	35	40	45	50		
Project Description:	Replace wh	ole rock sl	ope protect	ion to meet	current des	ign standar	rds					
Repair/Reconstruct - Future	\$0	\$5,000	\$0	\$5,000	\$0	\$5,000	\$0	\$5,000	\$0	\$5,000	\$25,000	
Remaining Service Life - Repair		ſ									\$0	
Remaining Service Life - Asset	Remaining Service Life - Asset											
Life Cycle Cost									· · · · · ·		\$1,088,490	
									Benefit/Cos	t Ratio =	1.11	