<u>Appendix 7</u> Cost-Benefit

Appendix B3 Cost/ Benefit Data

			Cost	-Benefit Ana	ılysis			ı	Base Case	7	
Site No	1	N001A290	A-Node	1109	B-Node	706	1	Maintenance	Dase Case	J	
Site Name	NIC 1, 60.9	1400174230		Link Length (km)		31.2	ł	Cost per km			
	1		,-,					1340			
Type of Disaste	21	Rock Fall]	Permanent/Tem	porary (P/T)	T]				
Discount Rate ((%)	10]	Discount Period		18]				
		it Prevention Me				years	J				
	Score	70]	Benefit Factor	70						
		003	20	010	20.	20	1				
Mode	Base	Disaster	Base	Disaster	Base	Disaster					
1	268075	286774	391821	437200	713997	780521	i	AADT	Cars		
2	472217	509041	691700	785385	1230257	1361510	l	Vehicle	Pick-ups		
3	161758	169458	199148	217435	271850	292703	<	- Kilometres	Buses		
4	193383	208435	309413	343656	560748	611220		input from	L Goods		
5	131812	137885	199698	211750	379407	397997		JICASTRADA	M Goods		
6	93606	97090	107094	113766	260251	272737]	Traffic Model	H Goods		
Ven. Op Cost			Ben	iefits, US \$, per y	ear		,				
1000 km	40	2003	15000	2010		2020		Capital Cost			
185.5	18699	1265950		3072226		4503773		Estimate US \$			
215.1	36824	2890742		7354419		10303566		413370			
529.7 549.1	7700	1488840		3535899		4032051				-	
549.1 768.2	15052 6073	3016767 1702803		6863084 3379249		10115748 5212432					
878.5	3484	1117100		2139291		4003475					
Total	J-104	11482201	00/2	26344168		38171046					
TOTAL		11-102201		20011100		00111040	ł				
1	4299	5165	6165	7173	11365	13511	1	AADT	Cars		
2	7579	9258	10981	12965	19726	23744		Vehicle	Pick-ups		
3	2686	3079	3136	3524	4340	4985	\	Hours	Buses		
4	3128	3725	4931	5749	9028	10748	İ	input from	L Goods		
5 .	2118	2394	3100	3446	6030	6786	ŀ	JICASTRADA	M Goods		
6	1558	1737	1683	1840	4141	4616		Traffic Model	H Goods		
Passenger			Ben	efits, US \$, per y	ear						
VOT, 2002		2003		2010		2020					
2.84	866	921933		1294622		5957328					
1.09	1679	686026		977985		4280947					
14.9	- 393	2195038		2614461		9393975 1748498					
1.04 1.04	597	232740 107598	818 346	384725 162732		768526					
0.75	276 179	50324		53251		348224					
Total	179	4193660		5487777		22497498					
Value of Time	Base	1.027		1.239		2.678		Occurrence pro	bability	1/3	
Factors	Sensitivity	0.97		0.924		0.811	Re	storation Cost		US\$	
<with project=""></with>	·										
	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	₿en	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits	<u> </u>	Benefits	Benefits	- Cost	Value
								sus	\$ US	\$US	\$ US
2002											
2003	413370		413370	413370	1887485	689369			1333	-412037	-412037
2004			8267 8267	7441	2236494 2585503	719759 750149			1774952 1080	1963901	1767511
2005 2006	- 0		8267	6697 6027	2934512	780539	0		972	-6934 -6934	-5617 -5055
2006			8267	5424	3283521	810930	- 0		875	-6934 -6934	-5055 -4549
2008			8267	4882	3632530	841320	0		787	-6934	-4094
2009	<u> </u>		8267	4394	3981539	871710			709	-6934	-3685
2010			8267	3954	4330548	902100	ō		638	-6934	-3317
2011	0		8267	3559	4524963	1181712			574		-2985
2012			8267	3203	4719377	1461324	0		517	-6934	-2686
2013	413370		413370	144133	4913791	1740936	0		465	-412037	-143668
2014	· 0	1	8267	2594	5108206	2020548			1491804	4745568	1489210
2015	C		8267	2335	5302620	2300160	0		377	-6934	-1958
2016	0		8267	2101	5497035	2579771	0		339	-6934	-1763
2017	9		8267	1891	5691449	2859383	- 0		305	-6934	-1586
2018	0		8267	1702	5885864	3138995	<u> </u>		275	-6934	-1428
	0		8267	1532	6080278	3418607	0		247	-6934	-1285
2019		8267	8267	1379	6274692	3698219	0	1333	222	-6934	-1156
2020	 -	1									
2020 2021		_	-					, ,		, I	
2020 2021 2022											
2020 2021 2022 2023) 132.27R	959018	616,618	78,870,408	30,765.532		6,747.338	3,276,470	5.788,319	2,659.851
2020 2021 2022	826,740	132,278	959018	616,618	78,870,408	30,765,532		6,747,338	3,276,470	5,788,319 B/C	2,659,851 5.31
2020 2021 2022 2023		132,278	959018	616,618	78,870,408	30,765,532		6,747,338	3,276,470		

			Cost	-Benefit An	alysis				Base Case	٦	
Site No	2	N001A280	A-Node	1109	B-Node	1102	7	Maintenance	Dase Oase	1	
Site Name	NIC 1, 73.2	INCOLUZZO	A-Node	Link Length (km		36.4	_	Cost per km			
Type of Disaste	er	Rock Fall	1	Permanent/Tem	norary (P/T)	T Þ	7	1	I		
Discount Rate		1 10	1	Discount Period		11	i				
							_				
		t Prevention M	easures Road v			years	J				
	Score	78	J	Benefit Factor	78						
		003	1 3	010	1 2	020	٦.				
Mode	Base	Disaster	Base 2	Disaster	Base	Disaster	1	*			
1	268075	289512	391813	440747	713975	783332	1	AADT	Cars	*	
2	472217	505241	691648	778155	1230257	1343893		Vehicle	Pick-ups	-	
3	161758	169705	199148	217227	271850	291178	k	 Kilometres 	Buses		
4	193383	209752	309370	344033	560748	610522	l	input from	L Goods		
5	131812	137811	199683	210966	379385	396166	1	JICASTRADA	M Goods		
6	93606	97189	107094	113857	260251	272008	j	Traffic Model	H Goods		
Veh. Op Cost 1000 km		2003	Ber	efits, US \$, per 2010		2020	7	Capital Cost			
185.5	21437	1451317	48934	3312904		4695572		Estimate US \$			
215.1	33024	2592436		6790935		8920604		12339			
529.7	7947	1536599	18079	3495681		3737183					
549.1	16369	3280724		6947262		9975858					
768.2	5999	1682054		3163629		4705208					
878.5	3583	1148843	6763	2168469		3769731	1				
Total		11691972		25878881		35804151	j				
1	4300	5208	6167	7239	11365	13634	1	AADT	Com		
2	7586	9116	10991	12749	19747	23359		Vehicle	Cars Pick-ups		
3	2686	3058	3136	3503	4340	4940	\ 	- Hours	Buses		
4	3133	3750	4938	5777	9042	10812	· ·	input from	L Goods		
5 .	2121	2390	3105	3432	6042	4634		JICASTRADA	M Goods		
6	1560	1739	1684	1842	4146	4636]	Traffic Model	H Goods		
Passenger			Ben	efits, US \$, per y	rear		,		•		
VOT, 2002	202	2003	4070	2010		2020	_				
2.84 1.09	908	966646 625146	1072	1376820		6298778					
14.9	1530 372	2077746	1758 367	866582 2472957		3848378 8738582					
1.04	617	240537	839	394602		1799327					
1.04	269	104869	327	153796		-1431329					
0.75	179	50324	158	53590		359220	1				
Total		4065269		5318347		19612955	ŀ				
Value of Time	Base	1.027		1.239		2.678	_	Occurrence pro		1/3	
Factors <with project=""></with>	Sensitivity	0.97		0.924	-	0.811	He	storation Cost	2000	USD	
- Trail Filojeco	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits		Benefits	Benefits	- Cost	Value
								\$US	\$ US	\$ US	\$ US
2002											
2003	12339		12339	12339	480492	167066		1333	1333	-11006	-11006
2004	0		247	222	563781	174422	1	493469	444122	493222	443900
2005 2006	0		247 247	200	647070 730359	181779 189136		1333 1333	1080 972	1087	880 792
2007	- 0		247	180 162	813648	196492		1333	972 875	1087 1087	792
2008	<u>0</u>		247	146	896937	203849	O	1333	787	1087	642
2009			247	131	980227	211206	ō	1333	709	1087	577
2010	0	247	247	118	1063516	218562	0	1333	638	1087	520
2011	0		247	106	966973	277307		1333	574	1087	468
2012	<u>0</u>		247	96	870431	336052		1333	517	1087	421
2013	0	247	247	86	773889	394797	0	1333	465	1087	379
2014 2015	0		247 247	77 70	677347 580805	453542 512287	0	1333 1333	418 377	1087	341
2016	. 0	247	247	63	484262	571032	0	1333	377	1087 1087	307 276
2017	0	247	247	56	387720	629777	0	1333	305	1087	249
2018	0	247	247	51	291178	688522	0	1333	275	1087	224
2019	0		247	46	194636	747267	0	1333	247	1087	201
2020	0	247	247	41	98094	806012	0	1333	222	1087	181
2021							Ш				
2022 2023								-			
Total	12,339	4,195	16535	14,190	11,501,366	6,959,107		516,136	454,254	499,601	440,064
	12,008	4,730	100001	14, 130	(1,502,500)	0,509,107	أسسما	210,130	704,204		
										B/C	32.01

•			Cost	-Benefit Ana	lysis					_	
Site No	3	Junquillal	A Nado	1404	D Node	4400	1	- Maintanna	Base Case		
Site Name	NIC 1, 113.2	Junquilla	A-Node	1101 Link Length (km)	B-Node	1102 10,4	1	Maintenance Cost per km			
							,	1340			
Type of Disaste		Bridge Scouring		Permanent/Temp	orary (P/T)	T]				
Discount Rate	(%)	10		Discount Period		18]				
	Risk · Withou	t Prevention Me	acuree Poad v	vill fail in		years	1				
	Score	90		Benefit Factor	90	yeara	1				
							_				
	•	003		010	20		1				
Mode	Base	Disaster	Base	Disaster	Base	Disaster	1				
1 2	268075 472217	289503 522499	391813 691648	440012 800377	713975 1230257	790357 1399546	Į.	AADT Vehicle	Cars Pick-ups		
3	161758	182692	199148	231323	271850	315491		- Kilometres	Buses		
4	193383	214298	309370	351475	560748	632607	1	input from	L Goods		
5	131812	141319	199683	214772	379385	408119		JICASTRADA	M Goods		
6	93606	98849	107094	115397	260251	278904	ŀ	Traffic Model	H Goods		
Veh. Op Cost 1000 km		2003	Ber	efits, US \$, per your 2010	ear	2020	1	Capital Cost			
185.5	21428	1450707	48199	3263144		5171175		Estimate US \$			
215.1	50282	3947216	108729	8535397		13289452		51825		•	
529.7	20934	4047712	32175	6221226		8438245	i				
549.1	20915	4191847	42105	8438809		14402195					
768.2 878.5	9507 5243	2665658	15089	4230790		8056698 5980844					
Total	5243	1681100 17984241	8303	2662250 33351616		55338608					
							ı				
1	4300	5158	6167	7192	11365	13522	1	AADT	Cars		
2	7586	9359	10991	13147	19747	24070	i	Vehicle	Pick-ups		
3	2686	3319	3136	3852	4340	5423		- Hours	Buses		-
4 5	3133 2121	3807 2497	4938 3105	5890 3586	9042 6042	11018 7052		input from JICASTRADA	L Goods M Goods		
6	1560	1763	1684	1873	4146	4714		Traffic Model	H Goods		
Passenger				efits, US \$, per y				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	., 65555		
VOT, 2002		2003		2010		2020					
2.84	858	913417	1025	1316456		5987864					
1.09	1773	724434	2156	1062770		4605907					
14.9 1.04	633 674	3535520 262758	716 952	4824624 447749		15773140 2008740					
1.04	376	146583	481	226226		1026734					
0.75	203	57072	189	64104		416402					
Total		5639783		7941929		29818788]	_			
Value of Time	Base	1.027		1.239		2,678	ъ.	Occurrence pro	bability 1000	1/3	
Factors <with project=""></with>	Sensitivity	0.97		0.924		0.811	He	storation Cost	1000	საა	
144,447, 10,000	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits		Benefits	Benefits	- Cost	Value
								\$ US	\$ US	\$US	\$ US
2002	Finan		FIOOF	EARGET	700070	004770	_ ^	007		54450	- Edden
2003	51825 0		51 82 5 1037	51825 933	739078 829298	231772 201770	0	667 688045	667 619241	-51159 687009	-51159 618308
2005	0		1037	840	919517	171768			540	-370	-300
2006	Ŏ		1037	756	1009737	141766			486	-370	-270
2007	0		1037	680	1099956	111764		667	437	-370	-243
2008	D		1037	612	1190176	81762			394	-370	-218
2009	0		1037 1037	551 496	1280395 1370614	51761 21759	9		354 319	-370 -370	-197 -177
2010	0		1037	446	1460972	142126			287	-370	-177
2012	Ö		1037	402	1551329	262493			258	-370	-143
2013	51825	0	51825	18070	1641687	382860		667	232	-51158	-17838
2014			1037	325	1732044	503227	_1	1490848	467844	1489811	467519
2015	0		1037	293	1822402	623594			188	-370	-104
2016 2017	0		1037 1037	263 237	1912759	743961 864328	0		169 153	-370 -370	-94 -85
2018	0		1037	213	2093474	984695			137	-370	-76
2019	0		1037	192	2183832	1105063			124	-370	-69
2020	0		1037	173	2274189	1225430			111	-370	-62
2021								[
2022	<u> </u>	<u> </u>					<u> </u>	<u> </u>			
Total	103,650	16,584	120235	77,307	27,114,577	7,851,900	 	2,189,560	1,091,941	2,069,325	1,014,634
									.,	B/C	14.12
										EIRR	12%

			Cost	t-Benefit Ana	alysis					7	
Dia 61-	,	10 M16-) 6 51-do	204	1 17 Stdo	1101	7	Maintanagan	Base Case	1	
Site No Site Name	4 NIC 1, 135.64	San Nicolás	A-Node	304 Link Length (km	B-Node	1101 20.8	-	Maintenance Cost per km			
Oile Name	[NIO 1, 130.04			Truit Feudu (va	1	20.0	1	1340			
Type of Disaste	er	Bridge Scourin	a	Permanent/Tem	porary (P/T)	T	1				
Discount Rate		10		Discount Period		16	3				
							_				
		nt Prevention M	easures Road v			years]				
	Score	100		Benefit Factor	100	i					
							7		-		
		003	í	2010	1 .)20 .	ŀ				
Mode	Base	Disaster	Base	Disaster	713997	Disaster 760768	-	AADT	0000		
1 2	267097 470719	285605 504343	391813 691648	418104 740532	1230274	1313252	1	Vehicle	Cars Pick-ups		
3	161384	171408	199148	211679	271850	288832	L	- Kilometres	Buses		
. 4	192832	204035	309370	327249	560766	592874	1	input from	L Goods		
5	131282	136891	199683	206529	379407	392346	ı	JICASTRADA	M Goods		
6	93418	97176	107094	110753	260286	269366	ĺ	Traffic Model	H Goods		
Veh. Op Cost			Ber	nefits, US\$, per	year		-				
1000 km		2003		2010		2020		Capital Cost			
185.5	18508	1253019		1779940		3166466		Estimate US \$			
215.1	33624	2639537	48884	3837471		6513903		30849			
529.7	10024	1938200	12531	2422943		3283570				*	
549.1 768.2	11203	2245339	17879	3583362		6435181					
878.5	5609 3758	1572702 1204954	6846 3659	1919543 1173211		3627954 2911386					
Total	3736	10853750	3059	14716470		25938459					
10100						20000100	3		*		
1	4299	4731	6166	6754	11367	12643	1	AADT	Cars		
2	7584	8364	10988	12062	19743	21999	1	Vehicle	Pick-ups		
3	2686	2941	3135	3438	4340	4826	k	- Hours	Buses		
4	3131	3391	4936	5319	9038	9938	1	input from	L Goods		
5	2119	2288	3104	3328	6039	6545	1	JICASTRADA	M Goods		
_ 6	1558	1654	1683	1769	4143	4428]	Traffic Mode!	H Goods		
Passenger			Ber	nefits, US \$, per y			1				
VOT, 2002	490	2003	588	2010 755196		2020 3542195					
2.84 1.09	432 780	459902 318702	1074	529413		2403638					
14.9	255	1424262	303	2041705		7078251					
1.04	260	101361	383	180134		914912					
1.04	169	65885	224	105353		514384					
0.75	96	26990	86	29169		208934					
Total		2397100		3640971		14662314					
Value of Time	Base	1.027		1.239		2.678		Occurrence pro		1/3	
Factors	Sensitivity	0.97		0.924		0.811	Re	storation Cost	1000	U\$\$	
<with project=""></with>		l Mariana anno "		Total Dis-	V-E V-	Veh Hour	D.	Tatal 1	Total Dis.	D	Net Dec
Year	Capital Cost US\$	Maintenance Cost (US\$)	Total Cost (US \$)	counted Cost	Veh Km Benefits	Benefits	Ben	Total Benefits	Benefits	Benefits - Cost	Net Pre Value
1eas	0031 034	Cost (Coo)	Cost (US 4)	Codined Cost	Delicitia	Delleille	<u> </u>	\$ US	\$ US	\$ US	\$ US
2002				" <u></u>	-			450	<u> </u>	- +00	4 55
2003	30849	[30849	30849	446045	98511	0	667	667	-30182	-30182
2004	0	617	617	555	468722	105814	1	383690	345321	383073	344766
2005	0		617	500	491399	113116	0	667	540	50	40
2006	0		617	450	514077	120419	0	667	486	50	36
2007	0		617	405	536754	127721	0		437	50	33
2008	0		617	364	559432	135024	0	667	394	50	29
2009	0		617	328	582109	142326	0	667	354	50	26
2010	0		617 617	295 266	604786 650904	149629 194922	- 0	667 667	319 287	50 50	24
2011 2012	0		617	239	697022	240215	0	667	267 258	50	21 19
2012	30849		30849	10756	743140	285509	0	667	232	-30182	-10524
2014	00048		617	194	789257	330802	1	747373	234534	746756	234340
2015	0		617	174	835375	376095	0	667	188	50	14
2016	0		617	157	881493	421388	0	667	169	50	13
2017	0		617	141	927611	466681	0	667	153	50	11
2018	0		617	127	973729	511974		667	137	50	10
2019	0		617	114	1019846	557268	0	667	124	50	9
2020	0	617	617	103	1065964	602561	0	667	111	50	8
2021		<u> </u>					\vdash				
2022							\vdash				
Total	61,697	9,872	71569	46,016	12,787,665	4,979,975		1,141,730	584,712	1,070,161	538,695
, Julia	51,037		71500		,,	1,070,010		7,1,71,1,00	-0 171 720	B/C	12.71
										EIRR	12%

			Cost	-Benefit And	alysis						
							_		Base Case]	
Site No	5	Las Chenillas	A-Node	303	B-Node	302]	Maintелапсе		_	
Site Name	NIC 1, 150.33			Link Length (km)	11.4	J	Cost per km		•	
Turn of Discost		Dideo Coourin	<u>.</u>	Permanent/Tem	(PIT)	T	3	1340			
Type of Disaste Discount Rate		Bridge Scourin		Discount Period		18	-				
EDISCOSIII TIGIC	(70)		ŀ	Dioocalit 7 choc		, , , ,	3				
	Risk : Withou	t Prevention Me	easures Road v	will fail in		years	1				
	Score	90		Benefit Factor	90						
			·				-				
	P .	03	1	2010		20	l				
Mode	Base	Disaster	Base	Disaster	Base	Disaster	ł	4457	0		
1 2	268075 472217	283215 494278	391813 691648	413404 725035	713975 1230257	755041 1290990	Į	AADT Vehicle	Cars Pick-ups		
3	161758	169277	199148	208355	271850	285828	ļ	- Kilometres	Buses		
4	193383	202409	309370	325099	560748	589534	1	input from	L Goods		
5	131812	137046	199683	207544	379385	393355	l	JICASTRADA	M Goods		
6	93606	96577	107094	110014	260251	267905]	Traffic Model	H Goods		
Veh. Op Cost			Bei	nefits, US \$, per			-		1		
1000 km		2003		2010		2020		Capital Cost			
185.5	15140	1025000		1461743		2780229		Estimate US \$			
215.1 529.7	22061	1731823		2620932		4767636		233215	ł		
549.1	7519 9026	1453843 1809018		1780228 3152453		2702729 5769376					
768.2	5234	1467556		2204138		3917035				+ .	
878.5	2971	952613		936260		2454157					
Total		8439853		12155754		22391161					
·····							•				
1	4300	4879	6167	7004	11365	12907	1	AADT	Cars		
2	7586	8369	10991	12143	19747	21785		Vehicle	Pick-ups		
3	2686	2940	3136	3445	4340	4785	<	Hours	Buses		
4	3133	3485	4938	5522	9042 6042	10067	ŀ	input from	L Goods		
5 6	2121 1560	2400 1692	3105 1684	3531 1821	4146	6764 4507	ŀ	JICASTRADA Traffic Model	M Goods H Goods		
Passenger'	1300	1002		nefits, US \$, per		-1507	1	Tallic Model	II CODOS		
VOT, 2002	+	2003		2010		2020	1				
2.84	579	616397	837	1074999		4280615	-				
1.09	783	319927	1152	567862		2171371					•
14.9	254	1418676	309	2082135		6481115					
1.04	352 279	137227	584	274669 200358		1041983 733963					
1.04 0.75	132	108768 37111	426 137	200336 4 8 467		264650					
Total	132	2638106		4246491		14973697					
Value of Time	Base	1.027		1.239		2.678	J	Occurrence pro	bability	1/3	
Factors	Sensitivity	0.97		0.924		0.811	Re	storation Cost		US\$	
<with project=""></with>											
1	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits	<u> </u>	Benefits	Benefits	- Cost	Value
2002								\$US	\$ US	\$US	\$ US
2002	233215	<u> </u>	233215	233215	346843	108415	0	667	667	-232548	-232548
2004	0	4664	4664	4198	368659	117858	1	325011	292510	320347	288312
2005	0	4664	4664	3778	390474	127300	. 0	667	540	-3998	-3238
2006	. 0		4664	3400	412290	136743	0		486	-3998	-2914
2007	0		4664	3060	434105	146186	Ö		437	-3998	-2623
2008	0		4664	2754	455921	155628		667	394	-3998	-2361
2009	0		4664	2479	477736	165071	0		354	-3998	-2125
2010	0		4664 4664	2231 2008	499552 541615	174513 218598	0	667 667	319 287	-3998	-1912
2012	0		4664	1807	583678	262682	0		258	-3998 -3998	-1721 -1549
2012	233215	4004	233215	81317	625741	306767	. 0		232	-232548	-81084
2014	0		4664	1464	667805	350851	1	679771	213319	675106	211855
2015	0	4664	4664	1317	709868	394935	0	667	188	-3998	-1129
2016	С		4664	1186	751931	439020	0	667	169	-3998	-1016
2017	0	4664	4664	1067	793995	483104	0	667	153	-3998	-915
2018	0	4664	4664	960	836058	527189	0	667	137	-3998	-823
2019	0		4664 4664	864 778	878121 920185	571273	0	667 667	124	-3998	-741
2020	0	4004	4004		320185	615357	- 0	66/	111	-3998	-667

THE STUDY ON VULNERABILITY REDUCTION FOR MAJOR ROADS IN THE REPUBLIC OF NICARAGUA 510,686

474,390 B/C EIRR

162,803 1.47

Site No			COS	t-Benefit Ana	ıı yələ			1	Base Case	1	
	6	San Ramón	A-Node	303	B-Node	302	7	Maintenance	2400 0400	3	
Site Name	NIC 1, 151.9		7111000	Link Length (km)		11.4	1	Cost per km			
	4			,		7	_	1340			
Type of Disast	er	Bridge Scouring	3	Permanent/Tem	porary (P/T)	T	Ī	<u></u>			
Discount Rate		10		Discount Period		18	3				
						•	_				
	Risk : Withou	it Prevention Me	asures Road	will fail in		years	7				
	Score	100		Benefit Factor	100		_				
							_				
	2	003	2	2010	20	20					
Mode	Base	Disaster	Base	Disaster	Base	Disaster	1				
1	268075	283215	391813	413404	713975	755041		AADT	Cars		
2	472217	494278	691648	725035	1230257	1290990	1	Vehicle	Pick-ups		
. 3	161758	169277	199148	208355	271850	285828	ļ<	 Kilometres 	Buses		
4	193383	202409	309370	325099	560748	589534		input from	L Goods		
5	131812	137046	199683	207544	379385	393355		JICASTRADA	M Goods		
6	93606	96577	107094	110014	260251	267905	J	Traffic Model	H Goods		
Veh. Op Cost			Bei	nefits, US \$, per y	ear		7				
1000 km		2003		2010		2020		Capital Cost			
185.5	15140	1025000	21591	1461743		2780229		Estimate US \$			
215.1	22061	1731823	33387	2620932		4767636		11105			
529.7	7519	1453843	9207	1780228		2702729					
549.1	9026	1809018	15729	3152453		5769376					
768.2	5234	1467556	7861	2204138		3917035					
878.5	2971	952613	2920	936260	·	2454157					
Fotal		8439853		12155754	 	22391161	J		•		
	4000	4070	6467	7004	11005	+0007	1	AADT			
1	4300	4879	6167	7004	11365	12907	ļ	AADT	Cars		
2	7586	836 9 2940	10991	12143	19747	21785	_	Vehicle	Pick-ups		
3	2686		3136	3445	4340	4785	<	- Hours	Buses L Goods		
4	3133	3485	4938	5522 3531	9042	10067		input from JICASTRADA			
5 6	2121	2400	3105 1684	1821	6042 4146	6764		Traffic Model	M Goods H Goods		
	1560	1692		nefits, US \$, per y		4507	J	Hanc Would	n Goods		
Passenger VOT, 2002		2003	DEI	2010	eai	2020	1				
2.84	579	616397	837	1074999		4280615					
1.09	783	319927	1152	567862		2171371					
14.9	254	1418676	309	2082135		6481115					
1.04	352	137227	584	274669		1041983					
1.04	279	108768	426	200358		733963					
0.75	132	37111	137	46467		264650					
Fotal		2638106		4246491		14973697					
/alue of Time	Base	1.027	·	1.239		2.678		Occurrence prob	ability	1/3	
Factors	Sensitivity	0.97		0.924		0.811	n	storation Cost	1000		
With Project>						0.011	ne:			004	
	Capital					0.011	He	3101411011 0001		004	
		Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits.	Net Pre
Year	Cost US\$	Maintenance Cost (US\$)	Total Cost (US \$)	Total Dis- counted Cost	Veh Km Benefits			Total Benefits	Total Dis. Benefits	Benefits - Cost	Value
Year		! !				Veh Hour		Total	Total Dis.	Benefits	
Year 2002	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Veh Hour Benefits	Ben	Total Benefits \$ US	Total Dis. Benefits \$ US	Benefits - Cost \$ US	Value \$ US
Year 2002 2003	Cost US\$ 11105	Cost (US\$)	Cost (US \$)	counted Cost	Benefits 346843	Veh Hour Benefits 108415	Ben 0	Total Benefits \$ US	Total Dis. Benefits \$ US	Benefits - Cost \$ US	Value \$ US -104
Year 2002 2003 2004	11105 0	Cost (US\$)	11105 222	11105 200	346843 368659	Veh Hour Benefits 108415 117858	Ben 0	Total Benefits \$ US 667 325011	Total Dis. Benefits \$ US 667 292510	Benefits - Cost \$ US -10439 324789	Value \$ US -104; 2923
Year 2002 2003 2004 2005	11105 0	Cost (US\$) 222 222	11105 222 222	11105 200 180	346843 368659 390474	Veh Hour Benefits 108415 117858 127300	0 1	Total Benefits \$ US 667 325011 667	Total Dis. Benefits \$ US 667 292510 540	Benefits - Cost \$ US -10439 324789 445	Value \$ US -104: 2923
Year 2002 2003 2004 2005 2006	11105 0 0	222 222 222 222	11105 222 222 222	11105 200 180 162	346843 368659 390474 412290	Veh Hour Benefits 108415 117858 127300 136743	0 1 0	Total Benefits \$ US 667 325011 667 667	Total Dis. Benefits \$ US 667 292510 540 486	Benefits - Cost \$ US -10439 324789 445 445	Value \$ US -104 2923 3
Year 2002 2003 2004 2005 2006 2007	11105 0 0 0 0	222 222 222 222 222	11105 222 222 222 222 222	11105 200 180 162 146	346843 368659 390474 412290 434105	Veh Hour Benefits 108415 117858 127300 136743 146186	0 1 0	Total Benefits \$ US 667 325011 667 667	Total Dis. Benefits \$ US 667 292510 540 486 437	Benefits - Cost \$ US -10439 324789 445 445	Value \$ US -104 2923 3 3
Year 2002 2003 2004 2005 2006 2007 2008	11105 0 0 0 0	222 222 222 222 222 222 222	11105 222 222 222 222 222 222	11105 200 180 162 146 131	346843 368659 390474 412290 434105 455921	Veh Hour Benefits 108415 117858 127300 136743 146186 155628	0 1 0 0	Total Benefits \$ US 667 325011 667 667 667 667	Total Dis. Benefits \$ US 667 292510 540 486 437 394	Benefits - Cost \$ US -10439 324789 445 445 445	Value \$ US -104 2923 3 3 2 2
Year 2002 2003 2004 2005 2006 2007 2008 2009	11105 0 0 0 0 0	222 222 222 222 222 222 222 222 222	11105 222 222 222 222 222 222 222 222	11105 200 180 162 146 131 118	346843 368659 390474 412290 434105 455921 477736	Veh Hour Benefits 108415 117858 127300 136743 146186 15628 165071	0 1 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667	Total Dis. Benefits \$ US 667 292510 540 486 437 394	Benefits - Cost \$ US -10439 -324789 -445 -445 -445 -445 -445 -445	Value \$ US -104: 2923 3: 3: 2: 2: 2:
Year 2002 2003 2004 2005 2006 2007 2008 2009 2010	11105 0 0 0 0 0 0 0	222 222 222 222 222 222 222 222 222 22	11105 222 222 222 222 222 222 222 222 222 2	11105 2000 180 162 146 131 118 106	346843 368659 390474 412290 434105 455921 477736 499552	Veh Hour Benefits 108415 117858 127300 136743 146186 155628 165071 174513	0 1 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667	Total Dis. Benefits \$ US 667 292510 540 486 437 394 364 319	Benefits - Cost \$ US -10439 -324789 -445 -445 -445 -445 -445 -445 -445 -44	Value \$ US -104 2923 3 3 2 2 2 2
Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011	Cost US\$ 11105 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	222 222 222 222 222 222 222 222 222 22	11105 222 222 222 222 222 222 222 222 222 2	11105 2000 1800 1622 146 131 118 1066 96	346843 368659 390474 412290 434105 455921 477736 499562 541615	Veh Hour Benefits 117858 127300 136743 146186 155628 165071 174513 218598	0 1 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287	Benefits - Cost \$ US -10439 324789 445 445 445 445 445 445 445 445	Value \$ US -104 2923 3 3 2 2 2 2 2 1
Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012	Cost US\$ 11105 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cost (US\$) 222 222 222 222 222 222 222 222 222	11105 222 222 222 222 222 222 222 222 222 2	11105 200 180 162 146 131 118 106 96	346843 368659 390474 412290 434105 455921 477736 499552 541615 543678	Veh Hour Benefits 108415 117858 127300 136743 146186 155628 165071 174513 218598 262682	0 0 0 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667 667	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258	Benefits - Cost \$ US -10439 324739 445 445 445 445 445 445 445 445 445 44	Value \$ US -104 2923 3 3 2 2 2 2 2 11
Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013	Cost US\$ 11105 0 0 0 0 0 0 0 0 0 11105	Cost (US\$)	11105 222 222 222 222 222 222 222 222 222 2	11105 2000 1800 1622 146 1311 118 106 96 86 88	346843 368659 390474 412290 434105 455921 477736 499552 541615 583679 5625741	Veh Hour Benefits 108415 117858 127300 136743 146186 156588 165071 174513 218598 26688 306767	0 0 0 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667 667 667 667	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258 232	Benefits - Cost \$ US - 10439 - 324789 - 445 - 445 - 445 - 445 - 445 - 10439	Value \$ US -104 2923 3 3 2 2 2 2 1: 1 1 -366
Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2011 2012 2013 2014	Cost US\$ 11105 0 0 0 0 0 0 0 0 0 11105 0 11105	222 222 222 222 222 222 222 222 222 22	Cost (US \$) 11105 222 222 222 222 222 222 222 222 211105 222	11105 2000 1800 1622 146 1311 118 106 96 66 3872 70	346843 368659 390474 412290 434105 455921 477736 499552 541615 583678 628741 627805	Veh Hour Benefits 117858 117858 127300 136743 146186 155628 165071 174513 218598 262682 306767 350851	0 0 0 0 0 0 0 0 0 1 1	Total Benefits \$ US	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258 232 213319	Benefits - Cost \$ US -10439 -324789 -445 -445 -445 -445 -445 -445 -445 -44	Value \$ US -104 2923 3 3 2 2 2 2 2 11 1 -36 2132
Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015	Cost US\$ 11105 0 0 0 0 0 0 0 0 0 11105	Cost (US\$) 222 222 222 222 222 222 222	Cost (US \$) 11105 222 222 222 222 222 222 222 211105 222 222 222 222 222 222 222 222 222 2	11105 2000 1800 1622 146 131 118 106 96 86 3872 70 63	346843 368659 390474 412290 434105 455921 477736 499562 541615 583678 667805 709868	Veh Hour Benefits 108415 117958 127300 136743 146186 155628 165071 174513 218598 262682 305767 350851 394935	0 1 0 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667 667 667 667 6	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258 232 213319 188	Benefits - Cost \$ US -10439 324739 445 445 445 445 445 445 445 445 -10439 679548	Value \$ US -104 2923 3 3 3 2 2 2 2 2 1 1 1 1 1 1 -36 2132 1 1 2
Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016	Cost US\$ 11105 0 0 0 0 0 0 0 0 11105 0 0 0 0 0	Cost (US\$) 222 222 222 222 222 222 222 222 222	Cost (US \$) 11105 222 222 222 222 222 222 222 222 222 2	11105 200 180 162 146 131 118 106 96 86 3872 70 63 56	346843 368659 390474 41290 434105 455921 477736 499552 541615 583678 625741 667805 709868 751931	Veh Hour Benefits 108415 117858 127300 136743 146186 155628 165071 174513 218598 262682 306767 350851 394935 439020	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667 667 667 667 6	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258 232 213319 188 169	Benefits - Cost \$ US -10439 324739 445 445 445 445 445 445 445 445 445 44	Value \$ US -104 2923 3 3 2 2 2 2 2 1: 1: -36 2132
Year 2002 2003 2004 2005 2006 2007 2008 2010 2011 2011 2012 2013 2014 2015 2016 2017	Cost US\$ 11105 0 0 0 0 0 0 0 11105 0 0 0 0 0 0	Cost (US\$) 222 222 222 222 222 222 222 222 222	Cost (US \$) 11105 222 222 222 222 222 222 222 222 222 2	11105 2000 1800 1622 146 1311 118 106 96 86 3872 70 63 56	846843 346843 368659 390474 412290 434105 455921 477736 499552 541615 583678 525741 667805 709868 751931 793995	Veh Hour Benefits 108415 117858 127300 136743 146186 156528 165071 174513 218598 266882 306767 350851 394935 439020 483104	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667 667 667 667 6	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258 232 213319 188 169 153	Benefits - Cost \$ US - 10439 - 324789 - 445 - 445 - 445 - 445 - 445 - 445 - 10439 - 679548 - 445	Value \$ US -104 2923 3 3 2 2 2 2 11 1 -36 2132
Year 2002 2003 2004 2005 2006 2007 2008 2010 2011 2012 2013 2014 2015 2016 2017 2018	Cost US\$ 11105 0 0 0 0 0 0 0 0 0 11105 0 0 0 0	Cost (US\$) 222 222 222 222 222 222 222 222 222	Cost (US \$) 11105 222 222 222 222 222 222 222 222 222 2	11105 2000 1800 1622 146 146 1311 118 106 96 86 3872 70 83 55 51	846843 346843 368659 390474 412290 434105 455921 477736 541615 583678 525741 667805 709868 751931 793995 836058	Veh Hour Benefits 108415 117958 127300 136743 146186 155628 165071 174513 218598 262682 306767 350851 394935 439020 483104 527189	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667 667 667 667 6	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258 232 213319 188 169 153 137	Benefits - Cost \$ US -10439 324739 445 445 445 445 445 445 -10439 679548 445 445 445 445 445 445 445 445 445	Value \$ US -104 2923 3 3 3 2 2 2 2 11 -36 2132 11
Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019	Cost US\$ 11105 0 0 0 0 0 0 0 0 0 11105 0 0 0 0	Cost (US\$) 222 222 222 222 222 222 222	Cost (US \$) 11105 222 222 222 222 222 222 222 222 222 2	11105 2000 1800 1602 1466 1311 118 1086 966 866 3872 770 633 556 511 446	346843 368659 390474 412290 434105 455921 477736 525741 583678 667805 709868 751931 793995 836058 878121	Veh Hour Benefits 108415 117858 127300 136743 146186 155628 165071 174513 218598 262682 306767 350851 439020 483104 527189 571273	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667 667 667 667 6	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258 232 213319 188 169 153 137 124	Benefits - Cost \$ US \$ US - Cost \$ US - 10439 - 324789 - 445 - 445 - 445 - 445 - 445 - 10439 - 679548 - 445 -	Value \$ US -104 2923 3 3 2 2 2 2 11 -36 2132 11 11
Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020	Cost US\$ 11105 0 0 0 0 0 0 0 0 0 11105 0 0 0 0	Cost (US\$) 222 222 222 222 222 222 222	Cost (US \$) 11105 222 222 222 222 222 222 222 222 222 2	11105 2000 1800 1622 146 146 1311 118 106 96 86 3872 70 83 55 51	846843 346843 368659 390474 412290 434105 455921 477736 541615 583678 525741 667805 709868 751931 793995 836058	Veh Hour Benefits 108415 117958 127300 136743 146186 155628 165071 174513 218598 262682 306767 350851 394935 439020 483104 527189	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667 667 667 667 6	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258 232 213319 188 169 153 137	Benefits - Cost \$ US -10439 324739 445 445 445 445 445 445 -10439 679548 445 445 445 445 445 445 445 445 445	Value \$ US -104 2923 3 3 2 2 2 2 11 -36 2132 11 11
Year 2002 2003 2004 2005 2006 2007 2008 2010 2011 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021	Cost US\$ 11105 0 0 0 0 0 0 0 0 0 11105 0 0 0 0	Cost (US\$) 222 222 222 222 222 222 222	Cost (US \$) 11105 222 222 222 222 222 222 222 222 222 2	11105 2000 1800 1602 1466 1311 118 1086 966 866 3872 770 633 556 511 446	346843 368659 390474 412290 434105 455921 477736 525741 583678 667805 709868 751931 793995 836058 878121	Veh Hour Benefits 108415 117858 127300 136743 146186 155628 165071 174513 218598 262682 306767 350851 439020 483104 527189 571273	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667 667 667 667 6	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258 232 213319 188 169 153 137 124	Benefits - Cost \$ US \$ US - Cost \$ US - 10439 - 324789 - 445 - 445 - 445 - 445 - 445 - 10439 - 679548 - 445 -	Value \$ US -104 2923 3.3 3.3 2.2 2.2 2.1 11 1.1 1.1 1.1 1.1 1.1 1.1
Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2020	Cost US\$ 11105 0 0 0 0 0 0 0 0 0 11105 0 0 0 0	Cost (US\$) 222 222 222 222 222 222 222	Cost (US \$) 11105 222 222 222 222 222 222 222 222 222 2	11105 2000 1800 1602 1466 1311 118 1066 966 866 3872 770 633 556 511 446	346843 368659 390474 412290 434105 455921 477736 525741 583678 667805 709868 751931 793995 836058 878121	Veh Hour Benefits 108415 117858 127300 136743 146186 155628 165071 174513 218598 262682 306767 350851 439020 483104 527189 571273	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667 667 667 667 6	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258 232 213319 188 169 153 137 124	Benefits - Cost \$ US \$ US - Cost \$ US - 10439 - 324789 - 445 - 445 - 445 - 445 - 445 - 10439 - 679548 - 445 -	Value \$ US -104 2923 3.3 3.3 2.2 2.2 2.1 11 1.1 1.1 1.1 1.1 1.1 1.1
Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023	Cost US\$ 11105 0 0 0 0 0 0 0 0 0 11105 0 0 0 0	Cost (US\$) 222 222 222 222 222 222 222	Cost (US \$) 11105 222 222 222 222 222 222 222 222 222 2	11105 2000 1800 1800 1802 1466 1311 188 1066 966 686 3872 770 633 556 551 446 411	346843 368659 390474 412290 434105 455921 477736 525741 583678 625741 667805 709868 751931 793995 836058 878121 920185	Veh Hour Benefits 108415 117858 127300 136743 146186 155628 165071 174513 218598 262682 306767 350851 439020 483104 527189 571273 615357	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667 667 667 667 6	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258 232 213319 188 169 153 137 124	Benefits - Cost \$ US - 10439 324739 445 445 445 445 445 445 445 445 445 44	Value \$ US -104: 2923 3: 3: 2: 2: 2: 2: 2: 2: 15: 17: 36-2: 17: 11: 11: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1:
Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2020	Cost US\$ 11105 0 0 0 0 0 0 0 0 0 11105 0 0 0 0	Cost (US\$) 222 222 222 222 222 222 222	Cost (US \$) 11105 222 222 222 222 222 222 222 222 222 2	11105 2000 1800 1602 1466 1311 118 1066 966 866 3872 770 633 556 511 446	346843 368659 390474 412290 434105 455921 477736 525741 583678 667805 709868 751931 793995 836058 878121	Veh Hour Benefits 108415 117858 127300 136743 146186 155628 165071 174513 218598 262682 306767 350851 439020 483104 527189 571273	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 667 325011 667 667 667 667 667 667 667 667 667 6	Total Dis. Benefits \$ US 667 292510 540 486 437 394 354 319 287 258 232 213319 188 169 153 137 124	Benefits - Cost \$ US \$ US - Cost \$ US - 10439 - 324789 - 445 - 445 - 445 - 445 - 445 - 10439 - 679548 - 445 -	Value \$ US -104; 2923

			Cost	t-Benefit Ana	ilysis						
					•			Į	Base Case	1	
Site No	7	N001A240	A-Node	302	B-Node	301	1	Maintenance		•	
Site Name	NIC 1, 168.4			Link Length (km))	26.0]	Cost per km			
			,				,	1340			
Type of Disaste		Rock Fall		Permanent/Tem	porary (P/T)	<u>T</u>					
Discount Rate	(%)	1 10	i	Discount Period		18					
	Risk : Withou	t Prevention Ma	easures Road	will fail in		years	1				
	Score	84		Benefit Factor	84	1	_				
			, 				_				
	1	303		2010		20	1				
Mode	Base	Disaster	Base	Disaster	Base	Disaster	1	4457			
1 2	268075 472217	277292 486793	391813 691648	404830 713654	713975 1230257	737697 1267254	'	AADT Vehicie	Cars Pick-ups		
3	161758	166566	199148	205011	271850	280087	ļ	- Kilometres	Buses		
4	193383	198866	309370	318958	560748	578093		input from	L. Goods		
5	131812	134526	199683	203777	379385	386096		JICASTRADA	M Goods		
6	93606	95278	107094	108679	260251	264403	1	Traffic Model	H Goods		
Veh. Op Cost			Be	nefits, US \$, per y	rear		7				
1000 km 185,5	9217	2003 624005	13017	2010 881270		2020 1606015		Capital Cost			
215.1	14576	1144239		1727506		2904323		Estimate US \$ 32082			
529,7	4808	929655		1133646		1592873		02002			
549.1	5483	1098919		1921655		3476336					
768.2	2714	760976	4094	1147913		1881691				÷	
878.5	1672	536105	1585	508210		1331285					
Total		5093899		7320199		12792322	1				
1	4300	4688	6167	6726	11365	12375	1	AADT	Cars	-	
2	7586	8106	10991	11739	19747	21043	l	Vehicle	Pick-ups		
3	2686	2851	3136	3333	4340	4617	ļ	- Hours	Buses		
4	3133	3363	4938	5316	9042	9698	į	input from	L. Goods		
5	2121	2314	3105	3398	6042	6528		JICASTRADA	M Goods		
_ 6	1560	1653	1684	1780	4146	4400	i	Traffic Model	H Goods		
Passenger		2003	Be	nefits, US \$, per y	rear	2020	7				
VOT, 2002 2.84	388	413060	559	2010 717950		2803775					
1.09	520	212468	748	368716		1380813					
14.9	165	921581	197	1327445		4034312					
1.04	230	89665	378	177783		666869	ı				
1.04	193	75241	293	137805		494052					
0.75 Total	93	26146 1 73816 1	96	32561 2762260		186208 9566030					
Value of Time	Base	1.027		1,239		2,678	1	Occurrence pro	hahility	1/3	
Factors	Sensitivity	0.97		0.924		0.811	Re	storation Cost	2000		
< With Project>											
	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	1	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits	L	Benefits	Benefits	- Cost	Value
2002								\$US	\$ US	\$US	\$US
2002	32082		32082	32082	628015	214294	0	1333	1333	-30749	-30749
2004	0	642	642		667226	232331	1	601038	540934	600396	540356
2005	O	642	642	520	706436	250368	0		1080	692	560
2006	0		642	468	745647	268405		1333	972	692	504
2007	0		642	421	784858	285442	-0		875	692	454
2008	0		642 642	379 341	824069 863280	304479	-8		787 709	692	408
2009	0		642	307	902490	322516 340553			638	692 692	368 331
2011	- ŏ		642		969955	424435			574	692	298
2012	0		642	249	1037419	508317	0		517	692	268
2013	32082		32082		1104884	592199	0		465	-30749	-10722
2014	0		642		1172348	676081	1		387123	1232978	386922
2015	0		642	181	1239813	759963	0		377	692	195
2016 2017	0		642 642	163 147	1307278 1374742	843845 927727	0		339 305	692 692	176 158
2018	0		642	132	1442207	1011609	- 0		275	692	142
2019	0		642	119	1509671	1095491	0		247	692	128
2020	0		642		1577136	1179374	0		222	692	115
2021											
2022							<u> </u>				
2023 Total	64,165	10,266	74431	47,857	18,857,473	10,238,427	<u> </u>	1,855,991	937,770	1,781,559	889,914
L	04,120	10,200	1-7-701	47,037]	10,001,410]	10,200,427		1,000,331	301,114	B/C	19.60
		,								EIRR	19%

			Cost	t-Benefit Ana	alysis				Dana Cons	1	
Site No	8	N001B230	A-Node	302	B-Node	301	7	Maintenance	Base Case	J	
Site Name	NIC 1, 168.6	1400 7 0200	A-Noue	Link Length (km		26.0	1	Cost per km			
eno mario	1110 11 100.0				· · · · · · · · · · · · · · · · · · ·		3	1340			
Type of Disaste	er	Rock Collapse	2	Permanent/Tem	porary (P/T)	T	1	,	•		
Discount Rate	(%)	10]	Discount Period		18]				
			·				-				
		t Prevention M	easures Road			years	J				
	Score	72	į	Benefit Factor	72	l					
		003	1	010	20	20	3				
Mode	Base	Disaster	Base	Disaster	Base	Disaster					
1	268075	277292	391813	404830	713975	737697	1	AADT	Cars		
2	472217	486793	691648	713654	1230257	1267254	1	Vehicle	Pick-ups		
. 3	161758	166566	199148	205011	271850	280087	k	 Kilometres 	Buses		
4	193383	198866	309370	318958	560748	578093		input from	L Goods		
5	131812	134526	199683	203777	379385	386096	1	JICASTRADA	M Goods		
6	93606	95278	107094	108679	260251	264403]	Traffic Model	H Goods		
Veh. Op Cost			Be	nefits, US \$, per y	ear	*****	7				
1000 km	0047	2003	10017	2010		2020		Capital Cost			
341.9 365.6	9217 14576	1150222 1945080		1624437 2936569		2960351 4937028		Estimate US \$ 7404			
909.8	4808	1596626	5863	1946967		2735318		<u>, 444</u>			
891.9	5483	1784955	9588	3121311		5646552					
1289.8	2714	1277689	4094	1927361		3159384					
1509.8	1672	921401	1585	873457		2288072					
Total		8675972		12430102		21726705					
							_				
1	4300	4688	6167	6726	11365	12375]	AADT	Cars		
2	7586	8106	10991	11739	19747	21043		Vehicle	Pick-ups		
3	2686	2851	3136	3333	4340	4617	 <	- Hours	Buses		
4	3133	3363	4938	5316	9042	9698	ļ	input from	L Goods		
5	2121	2314	3105	3398	6042	6528	İ	JICASTRADA	M Goods		
6	1560	1653	1684	1780	4146	4400	ŀ	Traffic Model	H Goods		
Passenger VQT, 2002		2003	Bei	nefits, US \$, per y 2010	ear	2020	ī				
2.84	388	413060	559	717950		2803775	ŀ				
1.09	520	212468	7 4 8	368716		1380813					
14.9	165	921581	197	1327445		4034312					
1.04	230	89665	378	177783		666869					
1.04	193	75241	293	137805		494052					
0.75	93	26146	96	32561		186208	_				
Total		1738161		2762260		9566030			-		
Value of Time	Base	1.027		1.239		2678		Occurrence pro		1/3	
Factors	Sensitivity	0.97		0.924		0.811	Re	storation Cost	2000	US\$	
<with project=""></with>	0	l na creation	7.4-1	the college	V-5 6	Maria Maria	Ben		Total Dis.		N - 3 75
Year	Capital Cost US\$	Maintenance Cost (US\$)	Total Cost (US \$)	Total Dis- counted Cost	Veh Km Benefits	Veh Hour					Net Pre
1eal	COSCUSS	COSt (034)	COSI (OG 4)	COURSE COST		Ponofite i	Deli	Total Popofite		Benefits	Maha
2002	 					Benefits	Det	Benefits	Benefits	- Cost	Value
				·		Benefits	Dei				Value \$ US
1 2003 1	7404		7404	7404				Benefits \$ US	Benefits \$ US	- Cost \$ US	\$US
2003 2004	7404 0		7404 148	7404 133	178273 189293	35716 38722	0	Benefits \$ US	Benefits	- Cost	
		148			178273	35716	0	Benefits \$ US 1333 153343	Benefits \$ US 1333i	- Gost \$ US -6070	\$ US -6070
2004 2005 2006	0 0 0	148 148 148	148 148 148	133 120 108	178273 189293 200313 211333	35716 38722 41728 44734	0 1 0	Benefits \$ US 1333 153343 1333 1333	Benefits \$ US 1333 138009 1080 972	- Cost \$ US -6070 153195 1185	\$ US -6070 137876 960 864
2004 2005 2006 2007	0 0 0	148 148 148 148	148 148 148 148	133 120 108 97	178273 189293 200313 211333 222353	35716 38722 41728 44734 47740	0 1 0 0	Benefits \$ US 1333 153343 1333 1333 1333	Benefits \$ US 1333i 138009 1080 972 875	- Cost \$ US -6070 153195 1185 1185	\$ US -6070 137876 960 864 778
2004 2005 2006 2007 2008	0 0 0 0	148 148 148 148 148	148 148 148 148 148	133 120 108 97 87	178273 189293 200313 211333 222353 233373	35716 38722 41728 44734 47740 50746	0 1 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333	Benefits \$ US 1333 138009 1080 972 875 787	- Cost \$ US -6070 153195 1185 1185 1185	\$ US -6070 137876 960 864 778 700
2004 2005 2006 2007 2008 2009	0 0 0 0	148 148 148 148 148 148	148 148 148 148 148 148	133 120 108 97 87 79	178273 189293 200313 211333 222353 233373 244393	35716 38722 41728 44734 47740 50746 53753	0 1 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333	Benefits \$ US 1333 138009 1080 972 875 787 709	- Cost \$ US -6070 153195 1185 1185 1185 1185	\$ US -6070 137876 960 864 778 700 630
2004 2005 2006 2007 2008 2009 2010	0 0 0 0 0 0	148 148 148 148 148 148 148	148 148 148 148 148 148 148	133 120 108 97 87 79	178273 189293 200313 211333 222353 233373 244393 255413	35716 38722 41728 44734 47740 50746 53753 56759	0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 13	Benefits \$ US 1333 138009 1080 972 875 787 709 638	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185	\$ US -6070 137876 960 864 778 700 630 567
2004 2005 2006 2007 2008 2009 2010 2011	0 0 0 0 0 0	148 148 148 148 148 148 148 148	148 148 148 148 148 148 148 148	133 120 108 97 87 79 71 64	178273 189293 200313 211333 222353 233373 244393 255413 274516	35716 38722 41728 44734 47740 50746 53753 56759 70739	0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 13	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185	\$ US -6070 137876 960 864 778 700 630 567 510
2004 2005 2006 2007 2008 2009 2010 2011 2012	0 0 0 0 0 0 0	148 148 148 148 148 148 148 148 148	148 148 148 148 148 148 148 148	133 120 108 97 87 79 71 64	178273 189293 200313 211333 222353 233373 244393 255413 274516 293618	35716 38722 41728 44734 47740 50746 53753 56759 70739 84719	0 0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 13	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 1185	\$ US -6070 137876 960 864 778 700 630 567 510 459
2004 2005 2006 2007 2008 2009 2010 2011 2011 2012 2013	0 0 0 0 0 0 0 0 0 0	148 148 148 148 148 148 148 148 148 148	148 148 148 148 148 148 148 148 148 148	133 120 108 97 87 79 71 64 57 2581	178273 189293 200313 211333 222353 233373 244393 255413 274516 293618 312721	35716 38722 41728 44734 47734 50746 53753 56759 70739 84719 98700	0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 13	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517 465	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 1185 -6070	\$ US -6070 137876 960 864 778 700 630 567 510 459 -2117
2004 2005 2006 2007 2007 2008 2010 2011 2012 2012 2013 2014	0 0 0 0 0 0 0 0 0 0 0 0 7404	148 148 148 148 148 148 148 148 148 0	148 148 148 148 148 148 148 148 148 148	133 120 108 97 87 79 71 64 57 2581	178273 189293 200313 211333 222353 233373 244393 255413 274516 293618 312727 331823	35716 38722 41728 44734 47740 50746 53753 56759 70739 84719 98700 112680	0 0 0 0 0 0 0	Benefits \$ US 1333 153343 15334 1333 1333 1333 1333 1	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517 465	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 1185 -6070 297521	\$US -6070 137876 960 864 778 700 630 567 510 459 -2117 93365
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	148 148 148 148 148 148 148 148 148 148	148 148 148 148 148 148 148 148 148 148	133 120 108 97 87 79 71 64 57 2581 46	178273 189293 200313 211333 222353 233373 244393 255413 274516 293618 312721	35716 38722 41728 44734 47734 50746 53753 56759 70739 84719 98700	0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 13	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517 465	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 1185 -6070	\$ US -6070 137876 960 864 778 700 630 567 510 459 -2117 93365 335
2004 2005 2006 2007 2007 2008 2010 2011 2012 2012 2013 2014	0 0 0 0 0 0 0 0 0 0 0 0 7404	148 148 148 148 148 148 148 148 148 0 0 148 148	148 148 148 148 148 148 148 148 148 148	133 120 108 97 87 79 71 64 57 2581	176273 189293 200313 211333 2222353 233373 244393 274516 293618 312721 331823 350926	35716 38722 41728 44734 47740 50746 53753 56759 70739 84719 98700 112880 126661	0 0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 13	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517 4655 93412	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 -6070 297521 1185	\$US -6070 137876 960 864 778 700 630 567 510 459 -2117 93365
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016	0 0 0 0 0 0 0 0 0 0 7404 0 0	148 148 148 148 148 148 148 148 0 0 148 148 148	148 148 148 148 148 148 148 148 148 148	133 120 108 97 87 79 71 64 57 2581 46 42	176273 189293 200313 211333 2133373 244393 255413 274516 293618 312721 331823 350926 370029	35716 38722 41728 44734 47740 50746 53753 56759 70739 84719 98700 112680 126661 140641	0 1 0 0 0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 13	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517 465 99412 377 339	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 1185 1185 1185 1185 1185 1185 1185	\$US -6070 137876 960 864 778 700 630 567 510 459 -2117 93365 335
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2016 2018 2018 2018	0 0 0 0 0 0 0 0 0 0 0 7404 0 0 0 0 0 0 0	148 148 148 148 148 148 148 148 0 148 148 148 148 148	148 148 148 148 148 148 148 148 148 7404 148 148 148 148	133 120) 108 97 87 79 71 64 57 2581 46 42 38 34	176273 189293 200313 211333 222353 233373 244393 255413 274516 293618 312721 331823 350926 370029 389131 408234 427337	35716 38722 41728 44734 47740 50746 53753 56759 98700 112680 126661 140641 154621 168602 16862	0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 1	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517 465 993412 377 339 305 275 247	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 -6070 297521 1185 1185 1185 1185	\$US -6070 137876 960 864 778 700 630 567 510 459 -2117 93365 335 301 271 2444 220
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2019	0 0 0 0 0 0 0 0 0 0 7404 0 0 0 0 0 0 0 0	148 148 148 148 148 148 148 148 0 148 148 148 148 148	148 148 148 148 148 148 148 148 148 7404 148 148 148 148	133 120) 108 97 87 79 71 64 57 2581 46 42 38 34	176273 189293 200313 211333 222353 233373 244393 255413 274516 293618 312721 31823 350926 370029 389131 468234	35716 38722 41728 44734 47740 50746 53753 56759 70739 84719 98700 126861 140641 154821 168602	0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 13	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517 485 93412 377 339 305 275	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 -6070 297521 1185 1185 1185 1185	\$US -6070 137876 960 864 778 700 630 567 510 459 -2117 93365 335 301 271
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2018 2019 2020 2020	0 0 0 0 0 0 0 0 0 0 0 7404 0 0 0 0 0 0 0	148 148 148 148 148 148 148 148 0 148 148 148 148 148	148 148 148 148 148 148 148 148 148 7404 148 148 148 148	133 120) 108 97 87 79 71 64 57 2581 46 42 38 34	176273 189293 200313 211333 222353 233373 244393 255413 274516 293618 312721 331823 350926 370029 389131 408234 427337	35716 38722 41728 44734 47740 50746 53753 56759 98700 112680 126661 140641 154621 168602 16862	0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 1	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517 465 993412 377 339 305 275 247	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 -6070 297521 1185 1185 1185 1185	\$US -6070 137876 960 864 778 700 630 567 510 459 -2117 93365 335 301 271 2444 220
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022	0 0 0 0 0 0 0 0 0 0 0 7404 0 0 0 0 0 0 0	148 148 148 148 148 148 148 148 0 148 148 148 148 148	148 148 148 148 148 148 148 148 148 7404 148 148 148 148	133 120) 108 97 87 79 71 64 57 2581 46 42 38 34	176273 189293 200313 211333 222353 233373 244393 255413 274516 293618 312721 331823 350926 370029 389131 408234 427337	35716 38722 41728 44734 47740 50746 53753 56759 98700 112680 126661 140641 154621 168602 16862	0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 1	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517 465 993412 377 339 305 275 247	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 -6070 297521 1185 1185 1185 1185	\$US -6070 137876 960 864 778 700 630 567 510 459 -2117 93365 335 301 271 244 220
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2016 2017 2018 2018 2019 2020 2022 2023	0 0 0 0 0 0 0 0 0 7404 0 0 0 0 0 0 0 0 0	148 148 148 148 148 148 148 148 0 148 148 148 148 148 148	148 148 148 148 148 148 148 148 148 7404 148 148 148 148	133 120) 108 97 87 79 71 64 57 2581 46 42 38 34 30 27	176273 189293 200313 211333 222363 233373 244393 255413 274516 293618 312721 331823 350926 370029 389131 408234 446439	35716 38722 41728 44734 47740 50746 53753 56759 98700 112680 126661 140641 154621 16662 182582	0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 1	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517 465 993412 377 339 3055 275 247 222	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 1	\$US -6070 137876 960 864 778 700 630 567 510 459 -2117 93365 335 301 271 244 220 198
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022	0 0 0 0 0 0 0 0 0 0 0 7404 0 0 0 0 0 0 0	148 148 148 148 148 148 148 148 0 148 148 148 148 148	148 148 148 148 148 148 148 148 148 7404 148 148 148 148	133 120) 108 97 87 79 71 64 57 2581 46 42 38 34	176273 189293 200313 211333 222353 233373 244393 255413 274516 293618 312721 331823 350926 370029 389131 408234 427337	35716 38722 41728 44734 47740 50746 53753 56759 98700 112680 126661 140641 154621 168602 16862	0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 1	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517 465 993412 377 339 305 275 247	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 -6070 297521 1185 1185 1185 1185 1185 1185 1185 1185 1185	\$US -6070 137876 960 864 778 700 630 567 510 459 -2117 93365 331 271 244 220 198
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2016 2017 2018 2019 2020 2021 2022 2023	0 0 0 0 0 0 0 0 0 7404 0 0 0 0 0 0 0 0 0	148 148 148 148 148 148 148 148 0 148 148 148 148 148 148	148 148 148 148 148 148 148 148 148 7404 148 148 148 148	133 120) 108 97 87 79 71 64 57 2581 46 42 38 34 30 27	176273 189293 200313 211333 222363 233373 244393 255413 274516 293618 312721 331823 350926 370029 389131 408234 446439	35716 38722 41728 44734 47740 50746 53753 56759 98700 112680 126661 140641 154621 16662 182582	0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 1333 153343 1333 1333 1333 1333 1333 1	Benefits \$ US 1333 138009 1080 972 875 787 709 638 574 517 465 993412 377 339 3055 275 247 222	- Cost \$ US -6070 153195 1185 1185 1185 1185 1185 1185 1185 1	\$US -6070 137876 960 864 778 700 630 567 510 459 -2117 93365 335 301 271 244 220 198

			0001	-Delicit Alia	,0.0]	Base Case		
Site No	11	N001B170	A-Node	302	B-Node	301]	Maintenance			
Site Name	NIC 1, 171.3			Link Length (km)		26.0]	Cost per km			
				-			,	1340			
Type of Disaste		Rock Collapse		Permanent/Tem	oorary (P/T)	P	l				
Discount Rate	(%)	10		Discount Period		18	•				
	Diek - Mithout	t Prevention Me	neuroe Bood v	vill fail in		years	1				
	Score	78		Benefit Factor	78	years	3				
	Source	/0		Dericia i dotor		•					
	20	003	2	010	20	20					
Mode	Base	Disaster	Base	Disaster	Base	Disaster]				
1	268075	277292	391813	404830	713975	737697		AADT	Cars		
2	472217	486793	691648	713654	1230257	1267254		Vehicle	Pick-ups		
3	161758	166566	199148	205011	271850	280087	<	Kilometres	Buses		
4	193383	198866	309370	318958	560748	578093		input from	L Goods		
5	131812	134526	199683	203777	379385	386096		JICASTRADA Traffic Model	M Goods		
6	93606	95278	107094	108679	260251	264403	j	тапіс модел	H Goods		
Veh. Op Cost		2003	ber	nefits, US \$, per y 2010	ear	2020	1	Capital Cost			
1000 km 185.5	9217	624005	13017	881270		1606015		Estimate US \$			
215.1	14576	1144239	22006	1727506		2904323		1961965			
529.7	4808	929655	5863	1133646		1592673					
549.1	5483	1098919	9588	1921655	,	3476336					
768.2	2714	760976	4094	1147913		1881691					
878.5	1672	536105	1585	508210		1331285					
Total		5093899		7320199		12792322	1				
,										\$	
1	4300	4688	6167	6726	11365	12375		AADT	Cars		
2	7586	8106	10991	11739	19747	21043		Vehicle	Pick-ups		
3	2686	2851	3136	3333	4340	4617		Hours	Buses		
4	3133	3363	4938	5316	9042	9698	•	input from	L Goods		
5	2121	2314	3105	3398	6042	6528		JICASTRADA	M Goods		
6	1560	1653	1684	1780	4146	4400	i	Traffic Model	H Goods		
Passenger VOT, 2002		2003	Der	nefits, US \$, per y 2010	ear	2020	ī				
2.84	388	413060	559	717950		2803775					
1.09	520	212468	748	368716		1380813					
14.9	165	921581	197	1327445		4034312					
1.04	230	89665	378	177783		666869					
1.04	193	75241	293	137805		494052					
0.75	93	26146	96	32561		186208					
Total		1738161		2762260		9566030]				
Value of Time	Base	1.027		1.239		2.678	_	Occurrence pro		1/3	
Factors	Sensitivity	0.97	•	0.924		0.811	Re	storation Cost	400	US\$	
<with project=""></with>			T-4-1	Tatal Dia	Mah Kar	Vals Starre	Davi	Tatal	Tetal Dia	Benefite 1	Mat Dua
Voor	Capital Cost US\$	Maintenance Cost (US\$)	Total Cost (US \$)	Total Dis- counted Cost	Veh Km Benefits	Veh Hour Benefits	Ben	Total Benefits	Total Dis. Benefits	Benefits - Cost	Net Pre Value
Year	_ CUS(US\$	COS((CSQ)	CASI (NG 9)	Councu Cust	Designo	Delletto	•	\$US	\$ US	\$US	\$ US
2002											. + +
2003	1961965		1961965	1961965	2791177	952417	0	267	267	-1961698	-1961698
2004	0	39239	39239	35315	2965448	1032582	1	2665619	2399057	2626380	2363742
2005	0	39239	39239	31784	3139718	1112746	O	267	216	-38973	-31568
2006	0	39239	39239	28605	3313988	1192910		267	194	-38973	-28411
2007	0		39239	25745	3488258	1273074	٥	267	175	-38973	-25570
2008	0		39239	23170	3662528	1353239	0	267	157	-38973	-23013
2009	0	39239	39239	20853	3836798	1433403	0	267	142	-38973	-20712
2010		39239	39239	18768	4011068	1513567	0	267	128	-38973	-18640
2011	0	39239	39239 39239	16891	4310910	1886377 2259186	0	267 267	115 103	-38973	-16776
2012		39239 39239	39239 39239	15202 13682	4610753 4910595	2259186 2631995	0	267	93	-38973 -38973	-15099 -13589
2013	0	39239	39239	12314	5210438	3004804	0	267	84	-38973	-13589 -12230
2014	0	39239	39239	11082	5510280	3377614	0	267	75	-38973	-11007
2016	0	39239	39239	9974	5810122	3750423	Ö	267	68	-38973	-9906
2017	o		39239	8977	6109965	4123232	0	267	.61	-38973	-8916
2018	ő	39239	39239	8079	6409807	4496042	ő	267	55	-38973	-8024
2019	ő		39239	7271	6709649	4868851	0		49	-38973	-7222

THE STUDY ON VULNERABILITY REDUCTION FOR MAJOR ROADS IN THE REPUBLIC OF NICARAGUA

39239

2019 2020

2021 2022 2023

39239

7009492

7271 6544

2,256,222

4868851 5241660

267 267

-38973 -38973

41,120 B/C

-6500

144,861 1,06

			Cos	t-Benefit An	alysis						
Site No	12	N001B150	I A Mada	302	B-Node	201	7	Maintanana	Base Case]	
Site Name	NIC 1, 175.0	THOOTETSO	A-Node	Link Length (km		301 26.0	┪	Maintenance Cost per km			
Cito Name	<u> </u>			TERRA ECHGET (KI)	·/	20.0		1340			
Type of Disaste	эг	Rock Collapse	2	Permanent/Terr	porary (P/T)	P]				
Discount Rate	(%)	10		Discount Period		1.	B.]				
	Biole With a	ut Danisantina II.	annuman Danel	udif Eath ta			-				
	Score	ut Prevention Mo 76	easures Hoad	Benefit Factor	76	years	Ţ				
	1000.0	,,,	j	DOTION T GOLOT	70	1					
	. 2	003	2	2010	2	020	7				
Mode	Base	Disaster	Base	Disaster	Base	Disaster	╛			•	
1	268075	277292	391813	404830	713975	737697	1	AADT	Cars		
2	472217	486793	691648	713654	1230257	1267254	I.	Vehicle	Pick-ups		
. 3 4	161758 193383	166566 198866	199148 309370	205011 318958	271850 560748	280087 578093	\\	 Kilometres input from 	Buses L Goods		
5	131812	134526	199683	203777	379385	386096	1	JICASTRADA	M Goods		
6	93606	95278	107094	108679	260251	264403	l	Traffic Model	H Goods		
Veh. Op Cost	<u> </u>			nefits, US \$, per			-				
1000 km		2003		2010		2020		Capital Cost			
185.5	9217	624005		881270		160601		Estimate US \$			
215.1	14576	1144239		1727506		290432		33316			
529.7 549.1	4808	929655	5863	1133646		159267					
768.2	5483 2714	1098919 760976	9588 4094	1921655 1147913		3476336 188169					
878.5	1672	536105	1585	508210		133128					
Total		5093899		7320199		12792322					•
							_				
1	4300	4688	6167	6726	11365	12375	1	AADT	Cars		
2	7586	8106	10991	11739	19747	21043	1	Vehicle	Pick-ups		
3	2686	2851	3136	3333	4340	4617	<	- Hours	Buses		
- 4 5	3133 2121	3363 2314	4938 3105	5316 3398	9042 6042	9698 6528		input from JICASTRADA	L Goods M Goods		
. 6	1560	1653	1684	1780	4146	4400		Traffic Model	H Goods		
Passenger	1000	1000		nefits, US \$, per y		4100	_	mano model	00000		
VOT, 2002		2003		2010		2020	1				
2.84	388	413060	559	717950	•	2803775	5				
1.09	520	212468	748	368716		1380813					
14.9	165	921581	197	1327445		4034312					
1.04 1.04	230 193	89665 75241	378 293	177783 137805		666869 494052					
0.75	93	26146	2 3 3	32561		186208					
Total		1738161		2762260		9566030					
Value of Time	Base	1.027		1.239		2678	-1	Occurrence prol		1/3	
Factors	Sensitivity	0.97		0.924		0.811	Re	storation Cost	2000	บร\$	
<with project=""></with>		·								· · · · · · · · · · · · · · · · ·	
	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	1 1	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits	<u> </u>	Benefits \$ US	Benefits \$ US	- Cost \$ US	Value \$ US
2002								, \$00	ψ 03	# 03	\$ 03
2003	33316		33316	33316	837353	285725	0	1333	1333	-31983	-31983
2004	0	566	666	600	889634	309774	1	800939	720845	800273	720246
2005	0		666	540	941915	333824	O	1333	1080	667	540
2006	0		666	486	994196	357873			972	667	486
2007			666	437	1046477	381922			875	667	438
2008	0		666 666	393 354	1098758 1151039	405972 430021	0		787 709	667 667	394 354
2010	0		666	319	1203320	454070			638	667	354
2011	0		666	287	1293273	565913			574	667	287
2012	0		666	258	1383226	677756			517	667	258
2013	0		666	232	1473179	789599	0	1333	465	667	233
2014	0		666	209	1563131	901441	0		418	667	209
2015	0		666	188	1653084	1013284			377	667	188
2016	0		666	169	1743037	1125127	0		339	667	170
2017 2018	0		666 666	152 137	1832989 1922942	1236970 1348812			305 275	667 667	153 137
2019	0		666	123	2012895	1460655	ő		247	667	124
2020	ŏ		666	111	2102847	1572498			222	667	111
2021											
2022											
2023					A		<u> </u>		700.00		*****
Total	33,316	11,328	44644	38,313	25,143,298	13,651,237		823,606	730,977	778,962	692,664
										B/C	19.08
										EIRR	24%

Size Name Ni Cit Tries Size Name Ni Cit Tries Size Name Ni Cit Tries Size Name Ni Cit Tries Size Name Ni Cit Tries Size Name Ni Cit Tries Size Name Ni Cit Tries Size Name Ni Cit Tries Size Name Ni Cit Size N				Cost	-Benefit Ana	alysis			ı	Base Case	7	
Sign Name	Site No	13	N001B120	A-Node	302	R-Node	301	1	Maintenance	Dase Ouse	J	
Type of Disaster Rock Colleges Discount Fronts File File Discount Fronts D			1100 (12)20	7111000				1				
Page Page		1,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				6 -		1				
Page Page	Type of Disaste	÷r	Rock Collapse	'	Permanent/Tem	porary (P/T)	Р	1				
Secret 74							18	1				
Secret 74				·				-				
Mode Disselter Base		Risk ; Without	Prevention Me	asures Road v	vill fail in		years	1				
Mode Base Disaster Base Disaster Base Disaster 1		Score	74		Benefit Factor	74				-		
Mode Base Disaster Base Disaster Base Disaster 1								_				
1		20		2		20	20	ĺ				
2 472217 486733 691648 713654 1230627 1267254 1267254 1436366 161788 168666 199148 205011 1271850 205001 1275760 130187 13			Disaster					[
161758 161856 169148 205011 271850 280087 27187083 318968 203777 379385 380086 303877 379385 380086 303877 379385 380086 303877 379385 380086 303877 379385 380086 303877 379385 380086 303877 379385 380086 303877 379385 380086 303877 379385 380086 303877 379385 380086 303877 379385 380086 303877 379385 380086 303877 379385 380086 303877 379385 380086 303877 380086 320873 380086								ŀ				
1								ì				
S								 <				
6												
Veh. Op. Cost 1000 km								1				
1000 km		93606	95278				264403	1	Traffic Model	H Goods		
186.5. 9217				Bei				7				
215.1 14578 1144299 22006 1727506 2904323 1004427												
562-7, 4908 9-39655 5863 1133646 1592675 549.1 5483 1098919 9688 1921655 3476305 5768.2 2714 760976 4094 1147913 1881891 878.5 1672 536105 1585 506210 1331285 10704												
549.1 5483 1098919 9588 1921855 347838 7782.2 2714 709076 4094 1147913 1831891 878.5 1672 538105 1585 508210 1331285 1672 538105 1585 508210 1331285 17048 1									1004427			
768.2 Br. 1 dry 2 538105 1585 58810 1385 1587 1587 1587 1587 1587 1587 1587 15												
Total												
Total S093889 T320199 12732322											•	
1		10/2		1585								
2 7886 8106 10991 11739 19747 21043	lotai		5093899		7320199		12792322	1				
2 7886 8106 10991 11739 19747 21043		4000	4000	04.07	6706	11005	10075	1	AADT	0		
3 2866 2851 3136 3333 4340 4617 Hours Buse's February Feb								1				
4 3133 3363 4938 5316 9042 6988 1504 67 3989 6042 6528 1694 1780 1655 1389 6042 6528 1694 1780 4146 4400 1781 1656 1653 1684 1780 4146 4400 1781 1656 1658 1684 1780 1658 1684 1780 1658 1684 1780 1658 1684 1780 1685 1684 1780 1685 1685 1685 1685 1685 1685 1685 1685												
Passenger VOT, 2022 203 3398 6042 6528 360 1653 1664 1780 4146 4400 4146 4400 4146 4400 4146 4400 4146 4400 4146 4400 4146 4400 4146 4400 4146 4400 4146 4400 4146 4400 4146 4400 4146												
Passenger Pass												
Passenger VOT, 2002 2003 2016 2020												
VOT, 2002 2008		1300	1000				4400	J	Trattic Moder	n Goods		
2.84 388 413060 559 717950 2803775 1300475 1 1.09 520 212488 748 388716 1 380813 9 1 1.09 1 1		1	2003	561		reas	2020	1				
1.09 520 212468 748 368716 1380913 14.9 165 921581 197 1327445 4024312 1.04 193 75241 293 137805 494052 186208 187738161 75241 293 137805 494052 186208 7027 1.239 2.678 7000 US\$	388		550									
14.9 165 921581 197 1327445 4034312 1.04 230 89665 378 137783 666869 1.04 193 75241 293 137805 494052 1.04 193 75241 293 137805 494052 1.075 93 26146 96 32561 188208 Value of Tirne Factors Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.811 Restoration Cost Sensitivity 0.97 0.924 0.928 0.9289 1.9284 0.9289 1.9289 0												
1.04						*						
1.04 193 75241 293 137805 494052 188208												
193 26146 96 32561 198208 1												
Total												
Value of Time Base 1.027 1.239 0.914	Total											
Pactors Pact	Value of Time	Base			1,239		2.678	•	Occurrence pro	bability	1/3	
Year Capital Cost US\$ Maintenance Cost (US\$) Total Discounted Cost Weh Km Benefits Weh Hour Benefits Total Benefits Benefits Net Pre Value 2002 \$ US\$	Factors	Sensitivity	0.97		0.924		0.811	Re			US\$	
Year Cost US\$ Cost (US\$) Cost (US\$) counted Cost Benefits Benefits Benefits Cost Value 2002 \$US	<with project=""></with>	·										
\$US \$US \$US \$US \$US \$US \$US \$US \$US \$US		Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
2002	Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits		Benefits	Benefits	- Cost	Value
2003 1004427 1004427 1884045 128506 0 4667 4667 -999761 -999761 2004 0 20089 20089 18080 2001677 256099 1 1509851 1358866 1489762 1340786 2005 0 20089 20089 16272 2119309 383692 0 4667 3780 -15422 -11243 2006 0 20089 20089 14645 2236942 511285 0 4667 3402 -15422 -11243 2007 0 20089 20089 13180 2354574 633679 0 4667 3662 -15422 -10118 2008 0 20089 20089 11862 2472206 766472 0 4667 2756 -15422 -10118 2009 0 20089 20089 10676 2589839 894065 0 4667 2480 -15422 -7376 2010 0 20089 20089 9608 2707471 1021658 0 4667 2232 -15422 -7376 2011 0 20089 20089 36647 2909865 1273304 0 4667 2232 -15422 -6638 2011 0 20089 20089 7783 311228 1524950 0 4667 1808 -15422 -5975 2013 0 20089 20089 3644 314652 1776597 0 4667 1808 -15422 -4846 2015 0 20089 20089 5674 3719439 2028243 0 4667 1627 -15422 -4346 2016 0 20089 20089 5674 3719439 2531536 0 4667 1188 -15422 -4346 2016 0 20089 20089 5674 3719439 2531536 0 4667 1188 -15422 -4356 2016 0 20089 20089 5674 3719439 2531536 0 4667 1188 -15422 -4356 2016 0 20089 20089 5674 3719439 2531536 0 4667 1188 -15422 -3528 2017 0 20089 20089 5106 3921833 2531536 0 4667 1188 -15422 -3528 2017 0 20089 20089 5106 3921833 2531536 0 4667 1188 -15422 -3528 2017 0 20089 20089 3350 4731407 3538121 0 4667 1688 -15422 -3528 2019 0 20089 20089 3350 4731407 3538121 0 4667 1688 -15422 -3528 2020 0 20089 20089 3350 4731407 3538121 0 4667 1686 -15422 -3528 2022 0 20089 20089 3350 4731407 3538121 0 4667 1686 -15422 -3528 2022 0 20089 20089 3350 4731407 3538121 0 4667 866 -15422									\$ US	\$ US	\$US	\$US
2004 0 20089 20089 18080 2001677 256099 1 1509851 1358866 1489762 1340786 2005 0 20089 20089 16272 2119309 333582 0 4667 3780 -15422 -12435 2006 0 20089 20089 14645 2236942 511285 0 4667 3402 -15422 -11243 2007 0 20089 20089 13180 2354574 633679 0 4667 3402 -15422 -11145 2008 0 20089 20089 13180 2354574 633679 0 4667 3062 -15422 -10118 2008 0 20089 20089 11862 2472206 766472 0 4667 2756 -15422 -9106 2009 0 20089 20089 10676 2589639 894065 0 4667 2480 -15422 -8108 2010 0 20089 20089 9608 2707471 1021658 0 4667 2232 -15422 -7376 2011 0 20089 20089 8647 2909865 1273304 0 4667 2009 -15422 -6638 2012 0 20089 20089 7783 311258 1524950 0 4667 1808 -15422 -5975 2013 0 20089 20089 7004 3314652 1776597 0 4667 1627 -15422 -5377 2014 0 20089 20089 6304 3517045 2028243 0 4667 1464 -15422 -5377 2015 0 20089 20089 5048 5674 3719439 2279889 0 4667 1464 -15422 -4940 2016 0 20089 20089 5106 3921833 2531536 0 4667 1186 -15422 -3920 2017 0 20089 20089 5106 3921833 2531536 0 4667 1186 -15422 -3920 2017 0 20089 20089 5106 3921833 2531536 0 4667 1186 -15422 -3920 2017 0 20089 20089 4596 4124226 2783162 0 4667 1186 -15422 -3920 2017 0 20089 20089 3722 4529013 3286474 0 4667 961 -15422 -3358 2019 0 20089 20089 3722 4529013 3286474 0 4667 961 -15422 -3527 2011 0 20089 20089 3722 4529013 3286474 0 4667 961 -15422 -3527 2012 0 20089 20089 3722 4529013 3286474 0 4667 961 -15422 -3528 2019 0 20089 20089 3350 4731407 3538121 0 4667 778 -15422 -2572 2021 0 2028 2028 3350 4731407 3538121 0 4667 778 -15422 -2572 2021 0 2028 2028 3350 4731407 3538121 0 4667 778 -15422 -2572 2021 0 2028 2028 3350 4731407 3538121 0 4667 778 -15422 -2572 2021 0 2028 2028 3350 4731407 3538121 0 4667 778 -15422 -2572 2021 0 2028 2028 3350 4731407 3538121 0 4667 778 -15422 -2572 2022	2002											
2005										4667	-999761	-999761
2006 0 20089 20089 14645 2236942 511285 0 4667 3402 -15422 -11243 2007 0 20089 20089 13180 2354574 633679 0 4667 3062 -15422 -10118												1340786
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THE STUDY ON VULNERABILITY REDUCTION FOR MAJOR ROADS IN THE REPUBLIC OF NICARAGUA PAGE A7-11

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2018 0 20434 20434 4207 512195 746347 0 3333 686 -17101 -352 2019 0 20434 20434 3786 558054 806764 0 3333 618 -17101 -316 2020 0 20434 20434 3408 603913 867180 0 3333 556 -17101 -285 2021	2003 2004 2005 2006 2007 2008 2009 2010 2011 2011 2012 2013	1021702 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cost (USS) 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	Cost (US \$) 1021702 20434 20434 20434 20434 20434 20434 20434 20434 1021702 20434	1021702 18391 16552 14896 13407 12066 10859 9774 8796 7917 356246 6412	190653 184178 177702 1771226 164750 158274 151799 145323 191182 237041 282900 328759 374618	8enefits 164056 178193 192330 206467 220603 234740 248877 263014 323431 383847 444264 504681 565097	0 1 0 0 0 0 0 0 0	Benefits \$ US 3333 244914 3333 3333 3333 3333 3333 3333 3333	Benefits \$ US 3333 220422 2700 2430 2187 1968 1771 1594 1435 1291 1162 175407 941	- Cost \$ US -1018369 224479 -17101 -17101 -17101 -17101 -17101 -17101 -17101 -17101 -17101 -17101 -17101 -17101 -17101 -17101	Value \$ US -1018369 202032 -13852 -12466 -11220 -1098 -9088 -9088 -8179 -7361 -6625 -355083 -36895 -4830
2018 0 20434 20434 4207 512195 746347 0 3333 686 -17101 -352 2019 0 20434 20434 3786 558054 806764 0 3333 618 -17101 -316 2020 0 20434 20434 3408 603913 867180 0 3333 556 -17101 -285 2021 2022 2023 2023 2024 2024 2024 2024 2024 2024 2024 2025 2025 2026 2027 2027 2027 2027 2027 2027 2027 2028 2027 2028 2029<	2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2012 2013 2014 2015	1021702 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cost (USS) 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	Cost (US \$) 1021702 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	1021702 18391 16552 14896 13407 12066 10859 9774 8796 7917 356246 6412	190653 184178 177702 171226 164750 158274 151799 145323 191182 237041 282900 328759 374618 420477	Benefits 164056 178193 192330 206467 220603 234740 248877 263014 323431 383847 444264 504681 565097 625514	0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US	Benefits \$ US 3333 220422 2700 2430 2187 1968 1771 1594 1435 1291 1162 175407 941 847	- Cost \$ US -1018369 224479 -17101 -17101 -17101 -17101 -17101 -17101 -1018369 538526 -17101 -17101	Value \$ US -1018369 202032 -13852 -12466 -11220 -1098 -9088 -8179 -7361 -6625 -355083 168995 -4830 -4347
2019 0 20434 20434 3786 558054 806764 0 3333 618 -17101 -316 2020 0 20434 20434 3408 603913 867180 0 3333 556 -17101 -285 2021 0 0 3408 603913 867180 0 3333 556 -17101 -285 2021 0 0 0 3408 0 3333 556 -17101 -285 2022 0 0 0 0 3333 556 -17101 -285 2022 0	2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016	1021702 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cost (USS) 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	Cost (US \$) 1021702 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	1021702 18391 16552 14896 13407 12066 10859 9774 8796 7917 356246 6412 5771 5194	190653 184178 177702 171226 164750 158274 151799 145323 191182 237041 282900 328759 374618 420477 466336	Benefits 164056 178193 192330 206467 220603 234740 248877 263014 323431 383847 444264 504681 565097 625514 685930	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 3333 244914 3333 3333 3333 3333 3333 3333 3333	Benefits \$ US 3333 220422 2700 2430 2187 1968 1771 1594 1435 1291 1162 175407 941 847	- Cost \$ US -1018369 224479 -17101 -17101 -17101 -17101 -17101 -17101 -17101 -1018369 538526 -17101 -17101	Value \$ US -1018369 202032 -13852 -12466 -11220 -10098 -8179 -7361 -6625 -355083 168995 -4830 -4347 -3912
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2021	2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018	1021702 0 0 0 0 0 0 0 0 0 0 1021702 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	Cost (US \$) 1021702 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	1021702 18391 16552 14896 13407 12066 10859 9774 8796 7917 356246 6412 5771 5194 4675	190653 184178 177702 1771226 164750 158274 151799 145323 191182 237041 282900 328759 374618 420477 466336 512195	Benefits 164056 178193 192330 206467 220603 234740 248877 263014 323431 383947 444264 504681 565097 625514 685930 746347	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US	Benefits \$ US 3333 220422 2700 2430 2187 1968 1771 1594 1435 1291 1162 175407 941 847 763 686	- Cost \$ US -1019369 224479 -17101 -17101 -17101 -17101 -17101 -17101 -17101 -1018369 538526 -17101 -17101 -17101 -17101 -17101	Value \$ US -1018369 202032 -13852 -12466 -11220 -10098 -8179 -7361 -6625 -355083 168995 -4830 -4347 -3912
2022 2023 2,043,405 326,945 2370350 1,524,059 5,319,377 7,661,336 857,206 420,114 -1,513,143 -1,103,94 B/C 9,28	2003 2004 2005 2006 2007 2008 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019	1021702 0 0 0 0 0 0 0 0 0 0 1021702 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cost (USS) 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	Cost (US \$) 1021702 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	1021702 18391 16552 14896 13407 12066 10859 9774 8796 7917 356246 6412 5771 5194 4675 4207	190653 184178 177702 177126 164750 158274 151799 145323 191182 237041 282900 328759 374618 420477 466336 512195 558054	Benefits 164056 178193 192330 206467 220603 234740 248877 263014 323431 383847 444264 504681 565097 625514 685930 746347 806764	0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 3333 244914 3333 3333 3333 3333 3333 3333 3333	Benefits \$ US 3333 220422 2700 2430 2187 1968 1771 1594 1435 1291 1162 175407 763 686 686 686	- Cost \$ US -1018369 224479 -17101 -17101 -17101 -17101 -17101 -17101 -1018369 538526 -17101 -17101 -17101 -17101 -17101 -17101 -17101	Value \$ US -1018369 202032 -13852 -12466 -11220 -10098 -9088 -8179 -7361 -6625 -35508 -4830 -4347 -3912 -3521
2023 Total 2,043,405 326,945 2370350 1,524,059 5,319,377 7,661,336 857,206 420,114 -1,513,143 -1,103,94 B/C 0.28	2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2018 2019 2019	1021702 0 0 0 0 0 0 0 0 0 0 1021702 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cost (USS) 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	Cost (US \$) 1021702 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	1021702 18391 16552 14896 13407 12066 10859 9774 8796 7917 356246 6412 5771 5194 4675 4207	190653 184178 177702 177126 164750 158274 151799 145323 191182 237041 282900 328759 374618 420477 466336 512195 558054	Benefits 164056 178193 192330 206467 220603 234740 248877 263014 323431 383847 444264 504681 565097 625514 685930 746347 806764	0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 3333 244914 3333 3333 3333 3333 3333 3333 3333	Benefits \$ US 3333 220422 2700 2430 2187 1968 1771 1594 1435 1291 1162 175407 763 686 686 686	- Cost \$ US -1018369 224479 -17101 -17101 -17101 -17101 -17101 -17101 -1018369 538526 -17101 -17101 -17101 -17101 -17101 -17101 -17101	Value \$ US -1018369 202032 -13852 -12466 -11220 -1098 -9088 -8179 -7361 -6625 -355083 168995 -4830 -4347 -3912 -3521 -3169
Total 2.043,405 326,945 2370350 1,624,059 5,319,377 7,661,336 857,206 420,114 -1,513,143 -1,103,94 B/C 0.28	2003 2004 2005 2006 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2019 2019 2020 2020	1021702 0 0 0 0 0 0 0 0 0 0 1021702 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cost (USS) 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	Cost (US \$) 1021702 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	1021702 18391 16552 14896 13407 12066 10859 9774 8796 7917 356246 6412 5771 5194 4675 4207	190653 184178 177702 177126 164750 158274 151799 145323 191182 237041 282900 328759 374618 420477 466336 512195 558054	Benefits 164056 178193 192330 206467 220603 234740 248877 263014 323431 383847 444264 504681 565097 625514 685930 746347 806764	0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 3333 244914 3333 3333 3333 3333 3333 3333 3333	Benefits \$ US 3333 220422 2700 2430 2187 1968 1771 1594 1435 1291 1162 175407 763 686 686 686	- Cost \$ US -1018369 224479 -17101 -17101 -17101 -17101 -17101 -17101 -1018369 538526 -17101 -17101 -17101 -17101 -17101 -17101 -17101	Value \$ US -1018369 202032 -13852 -12466 -11220 -10098 -9088 -9187 -7361 -6625 -355083 168995 -4830 -4347 -3912 -3521 -3169
B/C 0.28	2003 2004 2005 2006 2007 2008 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2020 2020	1021702 0 0 0 0 0 0 0 0 0 0 1021702 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cost (USS) 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	Cost (US \$) 1021702 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	1021702 18391 16552 14896 13407 12066 10859 9774 8796 7917 356246 6412 5771 5194 4675 4207	190653 184178 177702 177126 164750 158274 151799 145323 191182 237041 282900 328759 374618 420477 466336 512195 558054	Benefits 164056 178193 192330 206467 220603 234740 248877 263014 323431 383847 444264 504881 565097 625514 685930 746347 806764 667180	0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 3333 244914 3333 3333 3333 3333 3333 3333 3333	Benefits \$ US 3333 220422 2700 2430 2187 1968 1771 1594 1435 1291 1162 175407 763 686 686 686	- Cost \$ US -1018369 224479 -17101	Value \$ US -1018369 202032 -13852 -12466 -11220 -10098 -8179 -7361 -6625 -355083 168995 -4830 4347 -3912 -3521 -3169 -2852
EIRR #DIV/0!	2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2020 2021	1021702 0 0 0 0 0 0 0 0 0 0 0 1021702 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cost (USS) 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	Cost (US \$) 1021702 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	1021702 18391 16552 14896 13407 12066 10859 9774 8796 7917 356246 6412 5771 5194 4675 4207 3786 3408	190653 184178 177702 171226 164750 158274 151799 145323 191182 237041 282900 328759 374618 420477 466366 512195 558054 603913	Benefits 164056 178193 192330 206467 220603 234740 248877 263014 323431 383847 444264 504881 565097 625514 685930 746347 806764 667180	0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 3333 244914 3333 3333 3333 3333 3333 3333 3333	Benefits \$ US 3333 220422 2700 2430 2187 1968 1771 1594 1435 1291 1162 175407 941 347 763 686 613 556	- Cost \$ US -1018369 224479 -17101	Value \$ US -1018369 202032 -13852 -12466 -11220 -10098 -9088 -9187 -7361 -6625 -355083 168995 -4830 -4347 -3912 -3521 -3169
	2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2020 2021	1021702 0 0 0 0 0 0 0 0 0 0 0 1021702 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cost (USS) 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	Cost (US \$) 1021702 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434 20434	1021702 18391 16552 14896 13407 12066 10859 9774 8796 7917 356246 6412 5771 5194 4675 4207 3786 3408	190653 184178 177702 171226 164750 158274 151799 145323 191182 237041 282900 328759 374618 420477 466366 512195 558054 603913	Benefits 164056 178193 192330 206467 220603 234740 248877 263014 323431 383847 444264 504881 565097 625514 685930 746347 806764 667180	0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Benefits \$ US 3333 244914 3333 3333 3333 3333 3333 3333 3333	Benefits \$ US 3333 220422 2700 2430 2187 1968 1771 1594 1435 1291 1162 175407 941 347 763 686 613 556	- Cost \$ US -1018369 224479 -17101 -17101 -17101 -17101 -17101 -17101 -1018369 538526 -17101 -17101 -17101 -17101 -17101 -17101 -17101 -17101	Value \$ US -1018369 202032 -13852 -12466 -11220 -10098 -8179 -7361 -6625 -355083 168995 -4830 -4347 -3912 -3521 -3169 -2852

			0031	Delicit Alle	,0.0				Base Case	· ·	
Site No	19	Rio Tapacali	A-Node	405	B-Node	404	7	Маілтепалсе		ı	
Site Name	NIC 1, 233.2			Link Length (km)		18.7	1	Cost per km			
							-	1340			
Type of Disaste		Bridge Scouring		Permanent/Tem	porary (P/T)	Т	1				
Discount Rate (%)	10		Discount Period		18	1				
1	Printe : Lettels	• D					1				
	Score	t Prevention Me		Benefit Factor	100	years	3				
	Score	100		Denent ractor	100						
ľ	20	203	2	010	20	20	7				
Mode	Base	Disaster	Base	Disaster	Base	Disaster					
1	268075	268115	391813	391891	713975	714321	1	AADT	Cars		
2	472217	472678	691648	692283	1230257	1231245		Vehicle	Pick-ups		
3	161758	161746	199148	199141	271850	271839	 	 Kilometres 	Buses		
4	193383	193290	309370	309245	560748	560748		input from	L Goods		
5	131812	131637	199683	199406	379385	378861	1	JICASTRADA	M Goods		
6	93606	94105	107094	107553	260251	261674	_	Traffic Model	H Goods		
Veh. Op Cost 1000 km		2003	Ber	efits, US \$, per y 2010	rear	2020	a i	Capital Cost	I		
185.5	40	2708	78	5281	· · · · · ·	23425		Estimate US \$			
215.1	461	36189	635	49848		77560		347971			
529.7	-12	-2320	-7	-1353		-2127			,		
549.1	-93	-18639	-125	-25053		O					
768.2	-175	-49068	-277	-77668		-146924				•	
878.5	499	159998	459	147172		456267					
Total		128868		98228		408200					
	F						,		_		
1	4300	4323 7625	6167	6198	11365 19747	11432 19823		AADT Vehicle	Cars		
2 3	7586 2686	7625 2694	10991 3136	11046 3146	4340	4351	L	· Hours	Pick-ups Buses		
4	3133	3164	4938	4983	9042	9111		input from	L Goods		
5	2121	2141	3105	3138	6042	6089		JICASTRADA	M Goods		
6	1560	1581	1684	1704	4146	4202	1	Traffic Model	H Goods		
Passenger			Ber	nefits, US \$, per y	rear .						
VOT, 2002		2003		2010		2020					
2.84	23	24486	31	39815		185993					
1.09	39	15935	55	27111		80974					
14.9 1.04	8 31	44683 12085	10	67383		160207 70143					
1.04	20	7797	45 33	21165 15521		47779					
0.75	20 21	5904	20	6784		41054					
Total		110890		177778		586150					
Value of Time	Base	1.027		1.239		2.678	•	Occurrence pro	bability	1/3	
Factors	Sensitivity	0.97		0.924		0.811	Re	storation Cost	1000	US\$	
<with project=""></with>											
	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits	_	Benefits	Benefits	- Cost	Value
2002								\$US	\$ US	\$ US	\$US
2002	347971		347971	347971	105919	91142	0	667	667	-347304	-347304
2003	04/9/1	6959	6959	6263	102321	98996		134878	121390	127918	115127
2005	ő		6959	5637	98723	106850	_		540	-6293	-5097
2006	0		6959	5073	95126	114704	0		486	-6293	-4587
2007	0	6959	6959	4566	91528	122557	Ö	667	437	-6293	-4129
2008	. 0		6959	4109	87930	130411	0		394	-6293	-3716
2009	0		6959	3699	84333	138265			354	-6293	-3344
2010	0		6959	3329	80735	146119		7.4.0	319	-6293	-3010
2011	0		6959	2996	106212	179684	0		287	-6293	-2709
2012 2013	0 347971	6959 0	6959 347971	2696 121330	731689 157167	213249 246813	0	667 667	258 232	-6293 -347304	-2438 -121098
1 2010	34/3/1	6959	6959	2184	182644	280378			97077	-34/304 302388	94893

2184 1966

1769 1592 1433

1290

1161

519,064

182644 208121

233598 259075 284553

310030

335507

280378 313943

347508

381072 414637

448202 481767

-352,401 -295,740 B/C 0.43 EIRR #DIV/0!

302388

-6293

-6293

-6293 -6293

-6293

-6293

94893 -1777

-1600

-1440 -1296

-1166

-1049

6959

6959

6959 6959

6959

6959

111,351

6959

6959

6959

6959

6959

6959

2014 2015

2016

2017

2018

Total

232 97077 188

169

153

137

124

111

223,324

309348 667

667

667 667

667

667

			Cos	t-Benefit An	alysis			ī	Base Case	1	
Site No	24	N003B400	A-Node	1115	B-Node	1102	7	Maintenance	Duse Ouse	ı	
Site Name	NIC 3, 6.9	1110003-00	1 Timode	Link Length (km		9.0	<u> </u>	Cost per km			
÷		D	-	In			-	1340			
Type of Disaste Discount Rate		Rock Collapse	-,	Permanent/Ten Discount Period		P 18	4				
Discourt Hate	[70]		4	Discount Feriou		10	2]				
	Risk : Witho	ut Prevention M	easures Road	will fail in		years					
	Score	72]	Benefit Factor	72		_				
		2002		2010		200	7				
Mode	Base	2003 Disaster	Base	2010 Disaster	Base	020 Disaster	1				
1	268075	285360	391813	417062	713975	757858	†	AADT	Cars		
2	472217	505010	691648	739359	1230257	1312652		Vehicle	Pick-ups		
. 3	161758	169090	199148	207977	271850	284020	<	- Kilometres	Buses		
4 5	193383 131812	205837 135869	309370 199683	328691 205365	560748 379385	594278 389506	1	input from JICASTRADA	L Goods M Goods		
6	93606	94563	107094	108290	260251	263698		Traffic Model	H Goods		
Veh. Op Cost			Be	nefits, US \$, per	year		_				
1000 km		2003		2010		2020		Capital Cost			
185.5 215.1	17285 32793	1170220 2574302		1709395 3745388		2970944 6468137		Estimate US \$ 49358			
529.7	7332	1417685		1707139		2353141		48358			
549.1	12454	2496068		3872372		6720182					
768.2	4057	1137538		1593170		2837817					
878.5	957	306850		383482		1105236					
otal		9102663		13010947		22455458	3				
1	4300	4732	6167	6760	11365	12515	1	AADT	Cars		
2	7586	8409	10991	12120	19747	21897		Vehicle	Pick-ups		
3	2686	2928	3136	3418	4340	4770	<	- Hours	Buses		
4 5	3133 2121	3436 2249	4938 3105	5374 3287	9042 6042	9889	İ	input from JICASTRADA	L Goods		
6	1560	1593	1684	1718	4146	6367 4257		Traffic Model	M Goods H Goods		
Passenger				nefits, US \$, per y		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		TILMO MOLO	77 40040		
VOT, 2002		2003		2010		2020					
2.84	432	459902		761618		3192417					
1.09 14.9	823 242	336271 1351652	1129 282	556525 1900201		2290701 6262650					
1.04	303	118124	436	205061		861034					
1.04	128	49901	182	85599		330385					
0.75	33	9278	34	11532		81374					
otal /alue of Time	Base	2325128 1.027		3520536 1.239		13018561 2.678	1	Occurrence prob	ability	1/3	
Factors	Sensitivity	0.97		0.924		0.811	Re	storation Cost	2000		
With Project>											
V	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits	L	Benefits \$ US	Benefits \$ US	- Cost \$ US	Value \$ US
2002					• • • • • • • • • • • • • • • • • • • •			. 456	Ψ 03	Ψ 55	ψ U3
2003	49358		49358	49358	2244492	573319			1333	-48024	-4802
2004			987	888	2382162	615428	1	1999726	1799754	1998739	179886
2005 2006	(987 987	800 720	2519831 2657501	657536 699644	0		1080 972	346 346	28
2007			987	648	2795170	741753	0		972 875	346	25
2008		987	987	583	2932840	783861	0		787	346	20
2009			987	525	3070509	825969	0	1333	709	346	18
2010	(987	472	3208179	868077	0	1333	638	346	16
2011 2012	(987 987	425 382	3441057 3673935	1102275 1336473	0	1333 1333	574 517	346 346	14
2013	(987	344	3906814	1570671	0	1333	465	346	12
2014			987	310	4139692	1804869	0	1333	418	346	_ 10
2015			987	279	4372570	2039067	0	1333	377	346	
2016 2017	(987 987	251 226	4605449 4838327	2273265 2507463	0	1333 1333	339 305	346 346	
2018			987	203	5071206	2741660	0	1333	275	346	
2019	(987	987	183	5304084	2975858	0	1333	247	346	
2020	. (987	987	165	5536962	3210056	Ō	1333	222	346	
2021											
2022 2023		 						-		\longrightarrow $+$	
	49,358	16,782	66139	56,760	66,700,781	27,327,245		2,022,393	1,809,886	1,956,254	1,753,1
Total	49,300	7	001030	30,7001	00,100,7011		1	2,022,0301	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
Total	49,330	10,702	001001	30,7001	00,700,7011	21,021,240		2,022,030	1,000,000	B/C EIRR	31.89

			Cost	Benefit Ana	alysis			,	Base Case	7	
Site No	25	N003B370	A-Node	1115	B-Node	1102	1	Maintenance	Dase Case	1	
	NIC 3, 7.4			Link Length (km		9.0	1 .	Cost per km			
							_	1340			
Type of Disaste		Rock Collapse		Permanent/Tem	porary (P/T)	P]				
Discount Rate ((%)	10	l i	Discount Period		18	ŀ				
	Dick : Without	t Dravantian Ma	easures Road w	All fail in			1				
	Score	80		Benefit Factor	80	years	1				
			; L	Dericik i Botor		ı					
	20	103	20	010	20	20	Ī			:	
Mode	Base	Disaster	Base	Disaster	Base	Disaster		•			
1	268075	285360	391813	417062	713975	757858	l	AADT	Cars		
2	472217	505010	691648	739359	1230257	1312652	1	Vehicle	Pick-ups		
3	161758	169090	199148	207977	271850	284020		- Kilometres	Buses		
4 5	193383 131812	205837 135869	309370 199683	328691 205365	560748 379385	594278 389506		input from JICASTRADA	L Goods M Goods		
6	93606	94563	107094	108290	260251	263698		Traffic Model	M Goods	•	
Veh. Op Cost	00000			efits, US \$, per y		200000	J	,	11 00000		
1000 km		2003		2010		2020	1	Capital Cost		-	
185.5	17285	1170220	25249	1709395		2970944		Estimate US \$			
215.1	32793	2574302	47711	3745388		6468137		215940			
529.7	7332	1417685	8829	1707139		2353141					
549.1	12454	2496068	19321	3872372		6720182					
768.2	4057	1137538	5682	1593170		2837817					
878.5	957	306850	1196	383482		1105236					
Total		9102663		13010947		22455458	1				
1	4300	4732	6167	6760	11365	12515	1	AADT	Cars	-	
2	7586	8409	10991	12120	19747	21897	-	Vehicle	Pick-ups	•	
3	2686	2928	3136	3418	4340	4770	ļ	- Hours	Buses		
4	3133	3436	4938	5374	9042	9889		input from	L Goods	:	
5	2121	2249	3105	3287	6042	6367		JICASTRADA	M Goods		
6	1560	1593	1684	1718	4146	4257		Traffic Model	H Goods		
Passenger			Ben	efits, US \$, per y	/еаг						
VOT, 2002		2003		2010		2020					
2.84	432	459902	593	761618		3192417					
1.09	823	336271	1129	556525		2290701					-
14.9	242	1351652	282	1900201		6262650					
1.04	303	118124	436	205061		861034					
1.04 0.75	128 33	49901 9278	182 34	85599 11532		330385 81374					
Total		2325128		3520536		13018561					
Value of Time	Base	1.027		1.239		2.678	,	Occurrence pro	bability	1/3	
Factors	Sensitivity	0.97		0.924		0.811	Re	storation Cost		US\$	
<with project=""></with>					<u></u>						
	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits	L	Benefits	Benefits	- Cost	Value
								\$ US	\$ US	\$US	\$US
2002	215940	,	215940	215940	1122246	286660	0	4200	1000	DAABDO	.014000
2003	215940	4319	4319	215940 3887	1191081	307714	U		1333 900477	-214606 996211	-214606 896590
2005	0		4319	3498	1259916	328768	-		1080	-2985	-2418
2006	ŏ		4319	3148	1328750	349822	ŏ		972	-2985	-2176
2007	0		4319	2834	1397585	370876	<u> </u>		875	-2985	-1959
2008	ő	4319	4319	2550	1466420	391930	Ö		787	-2985	-1763
2009	0	4319	4319	2295	1535255	412985	0	1333	709	-2985	-1587
2010	0	4319	4319	2066	1604089	434039	0		638	-2985	-1428
2011	0		4319	1859	1720529	551138	0		574	-2985	-1285
2012	ol		4319	1673	1836968	668237	0		517	-2985	-1157
2013	0		4319	1506	1953407	785336	0		465	-2985	-1041
2014	0		4319	1355	2069846	902434	<u>ہ</u>		418	-2985	-937
2015	0		4319	1220	2186285	1019533	- 0		377	-2985	-843
2016 2017	0	4319 4319	4319 4319	1098 988	2302724 2419164	1136632 1253731	-0		339 305	-2985	-759
2017	0	4319	4319	889	2535603	1370830	0		275	-2985 -2985	-683 -615
2019	ő	4319	4319	800	2652042	1487929	-	1333	247	-2985	-553
			4319	720	2768481	1605028	- 0		222	-2985	-498
2020	·			. 20		. 5500,20				-2000	
2020 2021								· · · · · · · · · · · · · · · · · · ·			
2020 2021 2022								I	i	1. 1	
2021											
2021 2022	215,940	73,419	289359	248,326	33,350,390	13,663,622		1,023,196	910,609	733,837	662,283
2021 2022 2023	215,940	73,419	289359	248,326	33,350,390	13,663,622	 	1,023,196	910,609	B/C	3.67
2021 2022 2023	215,940	73,419	289359	248,326	33,350,390	13,663,622		1,023,196	910,609		

			Cost	-Benefit An	alysis					-	
lon N	^-	E	A No. 4-	4445	5 N-4-	4440	_	111-1-1-1-1	Base Case	}	
Site No Site Name	26 NIC 3, 119.1	El Guayacán	A-Node	1115 Link Length (km	B-Node	1116 8.2	-	Maintenance Cost per km			
Site (Value	MC 3, 118.1			Link Length (kil	''	0.2	Ţ	1340			
Type of Disaste	er	Bridge Scourin	g	Permanent/Ten	porary (P/T)	P	7		,		
Discount Rate	(%)	10		Discount Period		18	3]				
							7				
	Risk : Without Score	Prevention Me 100		vill fail in Benefit Factor	90	years	J				
	Score	100	i. I	Denem Factor	90	j					
	20	203	2	010	20	020	7				
Mode	Base	Disaster	Base	Disaster	Base	Disaster					
1	268075	285360	391813	416884	713975	756194	7	AADT	Cars		
2	472217	504898	691648	738891	1230257	1309210		Vehicle	Pick-ups		
3	161758	169090	199148	207977	271850	283857	 	- Kilometres	Buses		
4 5	193383 131812	205726 135869	309370 199683	328244 205365	560748 379385	592807 389185	1	input from JICASTRADA	L Goods M Goods		
6	93606	94563	107094	108290	260251	263551	1	Traffic Model	H Goods		
Veh. Op Cost				nefits, US \$, per							
1000 km		2003		2010		2020]	Capital Cost			
185.5	17285	1170220	25071	1697344		2858289		Estimate US \$			
215.1	32681	2565510		3708650		6197934		1701604		*	
529.7 549.1	7332	1417685	8829	1707139		2321624					
768.2	12343 4057	2473821 1137538	18874 5682	3782783 1593170		6425360 2747812					
878.5	957	306850	1196	383482		1058103					
Total		9071624	1.00	12872568		21609123					
							_				
1	4300	4732	6167	6758	11365	12523	1	AADT	Cars		
2	7586	8410	10991	12119	19747	21920	1	Vehicle	Pick-ups		
3	2686	2928	3136	3418	4340	4767	 	- Hours	Buses		
4 5	3133 2121	3437 2249	4938 3105	5375 3287	9042 6042	9891 6367		input from JICASTRADA	L Goods M Goods		
6	1560	1593	1684	1718	4146	4258		Traffic Model	H Goods		
Passenger	1000	7000		efits, US \$, per			1	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,, 00000		
VOT, 2002		2003		2010		2020	1				
2.84	432	459902	591	759049		3214625					
1.09	824	336680	1128	556032		2315206					
14.9	242	1351652	282	1900201		6218957					
1.04 1.04	304 128	118514 49901	437 182	205532 85599		863067 330385					
0.75	33	9278	34	11532		82107					
Total		2325927		3517945		13024348					
Value of Time	Base	1.027		1.239	•	2.678	-	Occurrence pro		1/3	
Factors	Sensitivity	0.97		0.924		0.811	Re	storation Cost	1000	US\$	
<with project=""></with>				T. (.) D'-	10.00	V2-1-11		T	(ib)	Daniel I	
V	Capital Cost US\$	Maintenance Cost (US\$)	Total Cost (US \$)	Total Dis- counted Cost	Veh Km Benefits	Veh Hour Benefits	Ben	Total Benefits	Total Dis. Benefits	Benefits - Cost	Net Pre Value
Year	Cust usa	COSE (COS)	COST (OS 4)	Courned Cost	Denents	Denenis		\$ US	\$ US	\$ US	\$ US
2002								1 7 3 5	<u> </u>	700	4 00
2003	1701604		1701604	1701604	9071624	6372401	0	667	667	-1700937	-1700937
2004	. 0		34032	30629	9614616	5964622			9348143	10352793	9317514
2005	0		34032	27566	10157608	5556843			540	-33365	-27026
2006	0	34032 34032	34032	24809	10700600	5149063 4741284	0		486 437	-33365 -33365	-24323
2007	0	34032	34032 34032	22328 20096	11243592 11786584	4333504	0	667	394	-33365 -33365	-21891 -19702
2009	0	34032	34032	18086	12329576	3925725			354	-33365	-17732
2010	0	34032	34032	16277	12872568	3517945	0		319	-33365	-15959
2011	0	34032	34032	14650	13746224	4468585			287	-33365	-14363
2012	0		34032	13185	14619879	5419226			258	-33365	-12926
2013	0	34032	34032	11866	15493535	6369866			232	-33365	-11634
2014 2015	Ο	34032 34032	34032 34032	10680 9612	16367190 17240845	7320506 8271146			209 188	-33365 -33365	-10470 -9423
2015	0	34032	34032	8650	18114501	9221787			169	-33365	-9423 -8481
2017	0	34032	34032	7785	18988156	10172427			153	-33365	-7633
2018	0	34032	34032	7007	19861812	11123067	Ŏ		137	-33365	-6870
2019	0	34032	34032	6306	20735467	12073708	0	667	124	-33365	-6183
2020	0	34032	34032	5676	21609123	13024348	0	667	111	-33365	-5564
2021		·					ļ				
2022						- 	H				
Total	1,701,604	578,545	2280149	1,956,812	264,553,502	127,026 053		10,398,159	9,353,209	8,118,010	7,396,397
	1,101,004	0.10,0-0		.,200,012		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			-,	B/C	4.78
										EIRR	5%
										·	

			Cost	-Benefit Ana	lysis			ı	Base Case	7	
Site No	27	N003B320	A-Node	1116	B-Node	1103	1	Maintenance	Dase Case	J	
Site Name	NiC 3, 22.1	11000000	7.11000	Link Length (km)		13.0	1	Cost per km			
Type of Disaste	·r	Rock Collapse		Permanent/Tem	porary (P/T)	Р	1	1070			
Discount Rate		10		Discount Period		18	1				
		it Prevention Me				years	j				
	Score	74	J	Benefit Factor	74						
		003		010	20	20	ī				
Mode	Base	Disaster	Base	Disaster	Base	Disaster	ŀ				
1	268075	284859	390157	403981	710529	734347	t	AADT	Cars		
2	472217	504008	687643	713452	1222922	1267241	ļ	Vehicle	Pick-ups		
3	161758	169090	198464	204131	270874	278928	<	 Kilometres 	Buses		
4	193383	204835	307556	317340	556835	574399	1	input from	L Goods		
5	131812	135869	198831	201147	377752	382686	l	JICASTRADA	M Goods		
6	93606	94563	106710	107223	259277	261018	J	Traffic Model	H Goods		
Veh. Op Cost 1000 km		2003	Ber	nefits, US \$, per y 2010	ear	2020	1	Capital Cost			
185.5	16784	1136302	13824	935905		1612514		Estimate US \$			
215.1	31791	2495643		2026047		3479111		294912			
529.7	7332	1417685	5667	1095748		1557288		· · · · · · · · · · · · · · · · · · ·			
549.1	11452	2295244	9784	1960938		3520229	ı				
768.2	4057	1137538	2316	649381		1383439					*
878.5	957	306850	513	164487		558229					
Total		8789262		6832506		12110811	l	*			
1	4229	4357	6138	6536	11289	11910	ī	AADT	Cars		
2	7581	7771	10923	11633	19581	20690		Vehicle	Pick-ups		
3	2686	2721	3124	3336	4134	4585	<	Hours	Buses		
4	3128	3227	4903	5151	8959	9344		input from	L Goods		
5	2114	2153	3091	3202	6007	6163		JICASTRADA	M Goods		
6	1560	1580	1678	1690	4126	4167		Traffic Model	H Goods		
Passenger'			Ber	nefits, US \$, per y	ear						
VOT, 2002 2.84	128	2003 136267	398	2010 511170		2020 1723905	I				
1.09	190	77632	710	349985		1181576					
14.9	35	195487	212	1428520		6568501					
1.04	99	38595	248	116640		391379					
1.04	39	15204	111	52206		158585					
0.75	20	5623	12	4070		30057					
Total	Dess	468809		2462591		10054002		~	L - L IIIa.	170	
Value of Time Factors	Base Sensitivity	1.027 0.97		1.239 0.924		2.678 0.811	В.	Occurrence pro storation Cost		1/3 US\$	
<with project=""></with>	Sensitivity	0.57		0.524		0.011	ne	Storation Cost	2000		
	Capita!	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits		Benefits	Benefits	- Cost	Value
								\$ US	\$ US	\$US	\$ US
2002	001011		504040	294912	70040-1	00500	_	1000	4000	200777	
2003 2004	294912		294912 5898	294912 5308	722405 699430	38532 61943	0 1		1333 458023	-293578 503017	-293578 452715
2005			5898	4778	676454	85353	0		1080		-3698
2006			5898	4300	653478	108763	0		972	-4565	-3328
2007		5898	5898	3870	630503	132174	C	1333	875	-4565	-2995
2008			5898	3483	607527	155584	0		787	-4565	-2696
2009			5898	3135	584551	178994	0		709	-4565	-2426
2010			5898	2821	561576	202405	0		638	-4565	-2183
2011 2012			5898 5898	2539 2285	604959 648343	264800 327195	0		574 517	-4565 -4565	-1965 -1769
2012			5898	2057	691726	389590	0		465	-4565 -4565	-1769
2014			5898	1851	735109	451985	0		418		-1433
2015			5898	1666	778492	514381	0		377	-4565	-1289
2016			5898	1499	821876	576776	0	1333	339	-4565	-1160
2017			5898	1349	865259	639171	0		305	-4565	-1044
2018			5898	1214	908642	701566	0		275	-4565	-940
2019 2020			5898 5898	1093 984	952026 995409	763961 826356	0		247 222	-4565 4565	-846
2020		5898	5038	984	995409	020306	U	1333		-4565	-761
2022		 									
2023											
Total	294,912	100,270	395182	339,143	13,137,766	6,419,529		531,581	468,155	136,400	129,012
										B/C	1.38

			Cost	t-Benefit Ana	dysis			-		-	
							٦.		Base Case]	
Site No	29	N003C230	A-Node	602	B-Node	610	1	Maintenance			
Site Name	NIC 3, 32.9			Link Length (km	<u> </u>	13.0	ز	Cost per km			
			1				7	1340			
Type of Disast		Stope Slide	Į.	Permanent/Tem	porary (P/T)	Р	4				
Discount Rate	(%)	10]	Discount Period		18	59	*			
	Dinte - Miller	d Duniantina 10					7				
	Score	it Prevention Me	easures Hoad '	Benefit Factor	73	years	.i				
	Score	/3	J	Delietit i actor		1					
	2	003		2010	21	020	7				
Mode	Base	Disaster	Base	Disaster	Base	Disaster	l				
1	268075	269916	390157	390157	710529	710674	†	AADT	Cars		
2	472267	478408	687643	687685	1222922	1223285		Vehicle	Pick-ups		
3	161758	162820	198464	198464	270874	270874	<	 Kilometres 	Buses		
4	191426	195880	307556	307440	556835	557116	ĺ	input from	L Goods		
5	131812	132815	198831	198831	377752	378125		JICASTRADA	M Goods		
6	93606	94274	106710	106710	259277	259306		Traffic Model	H Goods		
Veh. Op Cost	<u> </u>			nefits, US \$, per y	/ear						
1000 km		2003		2010		2020		Capital Cost			
185.5	1841	124638	0	0		9817		Estimate US \$			
215.1	6141	482078	42	3297		28496		404732			
529.7	1062	205344	0	0		(
549.1	4454	892684	-116	-23249		56319					
768.2	1003	281230	Ð	0		104585					
878.5	668	214186	. 0	0	<u> </u>	9298					
Total		2200160		-19952		208515	1				
_							1		_		
1	4229	4357	6138	6138	11289	11292		AADT	Cars		
2	7581	7771	10923	10924	19581	19590	١.	Vehicle	Pick-ups		
3	2686	2721	3124	3124	4134	4136	 -	- Hours	Buses		
4	3128	3227	4903	4905	8959	8969		input from	L Goods		
5 6	2114 1560	2153 1580	3091	3091 1678	6007 412 6	6005 4127	1	JICASTRADA Traffic Modei	M Goods H Goods		
Passenger	1360	1560	1678	nefits, US \$, per y		412/	1	Trainic Micdet	n doous		
VOT, 2002		2003	Dei	2010	eai	2020	1				
2.84	128	136267	0	0		8328					
1.09	190	77632	1	493		9589					
14.9	35	195487	Ö	.0		29129					
1.04	99	38595	2	941		10166					
1.04	39	15204	0	C		-2033					
0.75	20	5623	0	0		733	}				
Total		468809		1434		55911]				
Value of Time	Base	1.027		1.239		2.678	_	Occurrence prol		1/3	
Factors	Sensitivity	0.97		0.924		0.811	Re	storation Cost	3000	US\$	
< With Project:	>								· · · · · · · · · · · · · · · · · · ·		
	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Веп		Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits	<u> </u>	Benefits	Benefits	- Cost	Value
								\$US	\$ US	\$US	\$ US
2002	1	,								40400	4000-
2003	404732		404732	404732	904175	192661	0		2000	-402732	-402732
2004	ļ		8095	7285	773836	165222			565235	619944	557950
2005	0		8095	6557	643497	137783			1620	-6095	-4937
2006	0		8095	5901	513158	110345			1458	-6095	-4443
2007	0		8095	5311	382818 252479	82906 55467	0		1312	-6095 -6095	-3999 -3599
2008	0		8095	4780 4302	122140	28028			1181 1063	-6095	-3239
2009	0		8095 8095	3872	-8199	28028 589			957	-6095	-2915
2010	+ - ×	8095	8095 8095		1190	2828			957 861	-6095	-2915 -2624
2017	0		8095	3484	10579	5067	0		775	-6095	-2361
2012	0		8095	2822	19968	7306			697	-6095	-2125
2013	- 0		8095	2540	29357	9544			628	-6095	-1913
2014	0		8095	2286	38746	11783			565	-6095	1721
2016	 6		8095	2058	48135	14022			508	-6095	-1549
2017	1 0		8095	1852	57524	16261	0		458	-6095	-1394
2018	0		8095	1667	66913	18500			412	-6095	-1255
2019	i i		8095	1500	76302	20738			371	-6095	-1129
2020	1 0		8095		85691	22977			334	-6095	-1016
2021	1	1		1.250							
2022	1	 	·				-				
2023											
Total	404,732	137,609	542341	465,435	4,018,308	902,027		662,039	580,433	119,698	114,999
										B/C	1.25
										EIRR	0.01

Size Numbers Size Debts Flow Debts F				Cost	-Benefit Ana	ılysis					•	
Type of Diseaser	Toba Na	20	NOCOT-70	A No.	600	D Node	010	1		Base Case		
Page Disaster Debits Flow			N003E170						L .			
Page Page												
Birds: Without Prevention Measures Road will fall in						porary (P/T)		1				
Mode	Discount Rate	(%)	10	İ	Discount Period		18	4				
Mode Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater Base Diseater D		Risk : Withou	t Prevention Me	easures Road v	vill fail in		years	1				
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Mode Base Dissetter Base Dissetter Base Dissetter 1 268075 299916 300175 300175 700629 71062			200		010		000	τ		•		
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Second Part									362521			
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Total	768.2	1003	281230	0	0		104585	i				
1		668		0								
2	Liotai	·	2200160		-19952		208515	J				
2	1	4229	4357	6138	6138	11289	11292	1	AADT	Cars	-	
Size												
Passenger VOT. 2002 2.84 1.28 1.36287 0 0 0 0 6.005 0 0 0 0 0 0 0 0 0		2686						 <				
Passenger Pass								}				
Passenger VOT. 2002 128 138287 2003 2010 202												
VOT, 2002 2.84 128 13027 0 0 0 0 3328 14.93 35 195487 0 0 0 0 29129 1.04 99 38595 2 941 10168 1.04 39 15204 0 0 0 -2033 0 .75 20 5623 0 0 0 5733 Total 468809 1434 55911 Value of Time Factors - Sensitivity 0.97 Cost US\$ Cost (US\$) Cost (US\$		1300	1300				4127	i	Trainc woder	H Goods		
1.09 190 77632 1 493 9589 141 10168 1.04 39 35895 2 941 10168 1.04 39 15204 0 0 0 -2033 10.76 20 5623 0 0 0 733			2003				2020	[.				
1.04 99 38595 2 941 10166 1.04 39 15204 0 0 0 -2033 1.04 39 15204 0 0 0 733 Total												
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Value of Time Base 1.027 1.239 2.678 Cocurrence probability 1/3 Factors Sensitivity 0.97 0.924 0.924 0.811 Restoration Cost 2000 US\$		20		0								
Capital Capi		Paga						Í	Occurrence pro	habitibe	179	
Vear				,				Re				
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Total 382,521 130,057 512579 439,892 4,888,941 1,097,466 785,681 696,845 273,102 256,952 B/C 1.58									 			
B/C 1.58		382.521	130.057	512579	439.892	4,888.941	1,097,466		785.681	696.845	273.102	256.952
EIRR 0.01			,,		, , , , , ,							
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Sign Name 100, 38 9				Cos	t-Benefit Ana	alysis					_	
Sign Name	-							-		Base Case]	
Pertuament/Temporary (PyT)			N003C150	A-Node				1				1
Page	Site Name	NIC 3, 38.9			Link Length (km)	13.0	١				
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File Without Prevention Measures Read will fail in Secret So Bernetif Factor So Bernetif Factor So Bernetif Factor So Bernetif Factor So Bernetif Factor So Bernetif Factor So Bernetif Factor So Bernetif Factor So So So So So So So						porary (P/1)]				
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6 95006 94674 106710 106710 259277 259306 Traffic Model H Goods H								ŀ				
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Total Value of Time Base 1.027 1.239 2.678 Restoration Cost 2000 US\$	1.04	39	15204	0	0		-2033			•		
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Factors Capital Projects Project Pro	Total		468809		1434		55911]				
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Year Capital Cost (US\$) Maintenance Cost (US\$) Total counted Cost Veh Km Benefits Weh Hour Benefits Benefits Benefits Total Dis. Benefits Benefits Benefits Benefits Benefits Net Pre Value Sus 2002 \$US \$U			0.97		0.924		0.811	Res	storation Cost	2000	US\$	
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2002 2003	Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits		Benefits	Benefits	Cost	Value
2003									\$US	\$ US	\$US	\$US
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2022 2023 1,132,757 385,137 1517894 1,302,649 9,777,883 2,194,932 1,547,361 1,382,357 29,467 79,708 B/C 1.06		.0	22655	22655	3778	208515	55911	0	1333	222	-21322	-3556
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Total 1,132,757 385,137 1517894 1,302,649 9,777,883 2,194,932 1,547,361 1,382,357 29,467 79,708 B/C 1.06		·										
B/C 1.06		<u> </u>										
	Total	1,132,757	385,137	1517894	1,302,649	9,777,883	2,194,932		1,547,361	1,382,357		
EIRR 0.00				-								_
											EIRR	0.00

Sign No. 38 No.				Cost	-Benefit Ana	alysis			ı	Base Case	1	
Sign Name Nic 3, 39.4	Site No	33	N003C140	A-Node	602	R-Node	610	7	Maintenance	Dase Case	į.	
Type of Dissalar D			1140000140	A-NOUL				1	Cost per km			
Discourt Rate (%)	Type of Disasta	sr .	Slone Slide	l	Permanent/Tem	norany (P/T)	Ь	1	1340			
Rink: Without Provention Measures Road will fail years Score 80 Benefit Factor 90 Benefit Factor						po.a.y (1) 1/		1				
Score 90	12.0002	1.57		·				_				
Mode Base Disaster Base Disaster Base Disaster Base Disaster Base Disaster Base Disaster Disa				easures Road v			years]				
Mode Base Disaster Base Disaster Base Disaster Service Ser		Score	90		Benefit Factor	90	1					
Mode Base Disaster Base Disaster Base Disaster Service Ser			003		2010	20	120	7				
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161758								1	AADT	Cars		
191426	2	472267	478408	687643	687685	1222922	1223285	1	Venicle	Pick-ups		
S								 <				
6 93806 94274 106719 106710 259277 259306 Traffic Model H Goods Final Holes H Goods												
Veh. Op. Cost												
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215.1 6141 482078 42 3297 28496 92421 5581.1 6181 482078 42 3297 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			2003				2020		Capital Cost			
September Sept												
Total									924221			
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3 2866 2721 3124 3124 4134 4136												
A 3128 3227 4903 4905 8969 896												
Passenger VOT, 2002 2.84 1.28 136297 0 0 0 0 2.020												
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Site No			COS	-Benefit Ana	aiyələ				Base Case	٦	
	35	N005A010	A-Node	1117	B-Node	1111	7	Maintenance		J	
	NIC 5, 24.6			Link Length (km		12.0	1	Cost per km			
								1340			
Type of Disaster		Rock Fall]	Permanent/Tem		Р	1	_	`		
Discount Rate (9	(%)	10	J	Discount Period		18	3				
г	Per Contract			27.6-2-7-			٦.				
		t Prevention Me	easures Hoad y		70	years]				
L	Score	76	1	Benefit Factor	76			•			
r	20	003	1 0	010	20	20	7				
Mode	Base	4976	Base	Disaster	Base	Disaster	-				
1	269904	270850	394190	395397	719386	720689	1	AADT	Cars		
2	488684	495999	717076	728372	1276519	1294976		Vehicle	Pick-ups		
3	166510	167628	205422	206844	280705	282296	 <	 Kilometres 	Buses		
4	194878	195909	310937	312251	564193	566762		input from	L Goods		
5	134970	136623	204274	206725	386998	391867		JICASTRADA	M Goods		
6 [94185	94437	107931	108295	261770	262304	j	Traffic Model	H Goods		
Veh. Op Cost			Ber	nefits, US \$, per y	<i>г</i> еаг		.				
1000 km	0.40	2003	4007	2010		2020		Capital Cost			
185.5 215.1	946	64046	1207	81716 886754		88215 1448903		Estimate US \$ 480003			
529.7	7315 1118	574239 216172	11296 1422	274952		307629		400000	-		
549.1	1031	206636	1314	263356		514887					
768.2	1653	463483	2451	687233		1365214					
878.5	252	80801	364	116712		171220					
Total		1605376		2310723		3896069					
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1 5	4342	4401	6229	6313	11498	11638]	AADT	Cars		
2	7963	8346	11579	12165	20803	21843	l	Vehicle	Pick-ups		
3	2795	2876	3280	3386	4541	4683	 <	- Hours	Buses		
4	3165	3213	4976	5034	9123	9257	ŀ	input from	L Goods		
5	2192	2277	3210	3333	6216	6445		JICASTRADA	M Goods		
6 [1574	1587	1703	1722 nefits, US \$, per y	4180	4211	i .	Traffic Model	H Goods		
Passenger VOT, 2002		2003	Ber	2010	ear	2020	ī				
2.84	59	62811	84	107885		388642					
1.09	383	156491	586	288861		1108060					
14.9	81	452412	106	714260		2068131					
1.04	40	18713	58	27279							
1.04 1.04	48 85	18713 33137	58 123	27279 57850		136220 232794					
1.04 0.75				57 8 50 6444		136220 232794 22726					
1.04 0.75 Total	85 13	33137 3655 727219	123	57850 6444 1 202579		136220 232794 22726 3956574					
1.04 0.75 Total Value of Time	85 13 Base	33137 3655 727219 1.027	123	57850 6444 1202579 1.239		136220 232794 22726 3956574 2.678]	Occurrence pro		1/3	
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1.04 0.75 Total Value of Time Factors <with project=""></with>	85 13 Base Sensitivity	33137 3655 727219 1.027 0.97 Maintenance	123 19	57850 6444 1202579 1.239 0.924 Total Dis-	Veh Km	136220 232794 22726 3956574 2.678 0.811]	storation Cost	2000 Total Dis.	US\$ Benefits	Net Pre
1.04 0.75 Total Value of Time Factors	85 13 Base Sensitivity	33137 3655 727219 1.027 0.97	123 19	57850 6444 1202579 1.239 0.924	Veh Km Benefits	136220 232794 22726 3956574 2.678 0.811] Re	storation Cost Total Benefits	2000 Total Dis. Benefits	US\$ Benefits Cost	Value
1.04 0.75 Total Value of Time Factors <with project=""> Year</with>	85 13 Base Sensitivity	33137 3655 727219 1.027 0.97 Maintenance	123 19	57850 6444 1202579 1.239 0.924 Total Dis-		136220 232794 22726 3956574 2.678 0.811] Re	storation Cost	2000 Total Dis.	US\$ Benefits	
1.04 0.75 Total Value of Time Factors <with project=""></with>	85 13 Base Sensitivity	33137 3655 727219 1.027 0.97 Maintenance	123 19	57850 6444 1202579 1.239 0.924 Total Dis-		136220 232794 22726 3956574 2.678 0.811] Re	Total Benefits \$ US	2000 Total Dis. Benefits	US\$ Benefits Cost	Value \$ US
1.04 0.75 Total Value of Time Factors <with project=""> Year 2002</with>	85 13 Base Sensitivity Capital Cost US\$	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$)	123 19 Total Cost (US \$)	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost	Benefits	136220 232794 22726 3956574 2.678 0.811 Veh Hour Benefits	Re:	Total Benefits \$ US	Z000 Total Dis. Benefits \$ US	Benefits - Cost \$ US	Value \$ US -478669
1.04 0.75 Total Value of Time Factors <with project=""> Year 2002 2003</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600	123 19 Total Cost (US \$) 480003 9600 9600	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost 480003	989615 1051730 1113845	136220 232794 22726 3956574 2.678 0.811 Veh Hour Benefits 448286 490147 532008	Re Ben	Total Benefits \$ US 1333 1029251 1333	Total Dis. Benefits \$ US	Benefits - Cost \$ US -478669	Value \$ US -478669 917686
1.04 0.75 Total Value of Time Factors <with project=""> Year 2002 2003 2004 2005 2006</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600	123 19 Total Cost (US \$) 480003 9600 9600	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost 480003 8640 7776 6998	989615 1051730 1113845 1175959	136220 232794 22726 3956574 2,678 0,811 Veh Hour Benefits 448286 490147 532008 573870	Ren O 0 0 0	Total Benefits \$ US 1333 1029251 1333 1333	2000 Total Dis. Benefits \$ US 1333 926326 1080 972	Benefits - Cost \$ US -478669 1019651 -8267 -8267	Value \$ US -478669 -6696 -6026
1.04 0.75 Total Value of Time Factors <with project=""> Year 2002 2003 2004 2005 2006 2007</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600	123 19 Total Cost (US \$) 480003 9600 9600 9600	57850 6444 1202579 1,239 0,924 Total Dis- counted Cost 480003 8640 7776 6998 6299	989615 1051730 1113845 1175959 1238074	136220 232794 22726 3956674 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615731	Ben 0 1 0 0 0 0	Total Benefits \$ US 1333 1029251 1333 1333 1333 1333	2000 Total Dis. Benefits \$ US 1333 926326 1080 972 875	Benefits - Cost \$ US -478669 1019651 -8267 -8267	Value \$ US -478669 -6996 -6026 -5424
1.04 0.75 Total Value of Time Factors <with project=""> Year 2002 2003 2004 2005 2006 2007 2008</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600	57850 6444 1202579 1,239 0,924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669	989615 1051730 1113845 1175959 1238074 1300189	136220 232794 22726 3956674 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615731 657593	Ben 0 1 0 0 0 0 0 0	Total Benefits \$ US 1333 1029251 1333 1333 1333 1333 1333	2000 Total Dis. Benefits \$ US 1333 926326 1080 972 875 787	Benefits - Cost \$ US -478669 1019651 -8267 -8267 -8267 -8267	Value \$ US -478669 917686 -6696 -6020 -5424 -488
1.04 0.75 Total Value of Time Factors <with project=""> Year 2002 2003 2004 2005 2006 2007 2008 2009</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600	57850 6444 1202579 1,239 0,924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102	989615 1051730 1113845 1175959 1238074 1300189 1362303	136220 232794 22726 3956574 2.678 0.811 Veh Hour Benefits 440286 490147 532008 573870 615731 657583 699454	Ren	Total Benefits \$ US 1333 1029251 1333 1333 1333 1333 1333 1333 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 972 875 787 709	US\$ Benefits - Cost \$ US -478669 1019651 -8267 -8267 -8267 -8267 -8267	Value \$ US -478669 917686 -6696 -6026 -5424 -488
1.04 0.75 Total Value of Time Factors <with project=""> 2002 2003 2004 2005 2006 2007 2008 2009 2010</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102 4592	989615 1051730 1113845 1175959 1238074 1300189 1362303 1424418	136220 232794 22726 3956574 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615791 657593 699454 741316	Re Ben 0 1 0 0 0 0 0 0 0 0	Total Benefits \$ US 1333 1333 1333 1333 1333 1333 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 972 875 787 709 638	US\$ Benefits - Cost \$ US -478689 1019651 -8267 -8267 -8267 -8267 -8267 -8267	Value \$ US -478669 917686 -6696 -6026 -5424 -488 -4395 -3954
1.04 0.75 Total Value of Time Factors <with project=""> Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102 4592 4133	989615 1051730 1113845 1175959 1238074 1300189 1362303 1424418 1522145	136220 232794 22726 3956674 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615731 657593 699454 741316 911083	Ben 0 1 0 0 0 0 0 0 0 0	Total Benefits \$ US 1333 1333 1333 1333 1333 1333 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 9722 875 787 709 638 574	US\$ Benefits - Cost \$ US -478669 1019651 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267	Value \$ US -478669 917684 -6694 -6924 -488 -4395 -3954 -3559
1.04 0.75 Total Value of Time Factors With Project> Year 2002 2003 2004 2006 2006 2007 2008 2009 2010 2011 2012	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1,239 0,924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102 4592 4133 3719	989615 1051730 1113845 1175959 1238074 1300189 1362303 1424418 1522145 1619872	136220 232794 22726 3986674 2.678 0.811 Veh Hour Benefits 440286 490147 532008 573870 615731 657593 69454 741316 911083	Re- Ben 0 1 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 1333 1333 1333 1333 1333 1333 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 972 875 787 709 638 574 517	Benefits - Cost \$ US -478669 1019651 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267	Value \$ US -478669 917684 -6694 -6020 -5422 -4883 -4393 -3952 -3559 -3203
1.04 0.75 Total Value of Time Factors <with project=""> 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600 960	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5609 5102 4592 4133 3719	989615 1051730 1113845 1175969 1238074 1300189 1362303 1424418 1522145 1619872 1717599	136220 232794 22726 3956574 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615731 657593 699454 741316 911083 1080849 1250616	Re- Ben 0 1 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 1333 1029251 1333 1333 1333 1333 1333 1333 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 972 875 787 709 638 574 517 485	Benefits - Cost \$ US -478669 1019651 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267	Value \$ US -478669 -6694 -6020 -5422 -488 -4393 -3952 -3203 -2882
1.04 0.75 Total Value of Time Factors <with project=""> 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600 960	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1,239 0,924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102 4592 4133 3719 3347 3013	989615 1051730 1113845 1175959 1238074 1300189 1362303 1424418 1522145 1619872 1717599 1815325	136220 232794 22726 3956574 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615731 657593 699454 741316 911083 1080849 1250616 1420383	Ren 00 01 00 00 00 00 00 00 00	Total Benefits \$ US 1333 1029251 1333 1333 1333 1333 1333 1333 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 9722 875 767 709 638 574 517 465 418	US\$ Benefits - Cost \$ US -478669 1019651 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267	Value \$ US -478661 917684 -6694 -5422 -488 -4393 -3954 -3203 -2882 -2594
1.04 0.75 Total Value of Time Factors <with project=""> Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600 960	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102 4592 4133 3719 3347 3013 2711	989615 1051730 1113845 1175959 1238074 1300189 1362303 1424418 1522145 1619872 177599 1815325 1913052	136220 232794 22726 3956574 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615731 657593 699454 741316 911083 1080849 1250616	Ren 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 1333 1333 1333 1333 1333 1333 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 9722 875 787 709 638 574 517 465 418 377	Benefits - Cost \$ US -478669 1019651 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267	Value \$ US -478669 917684 -6699 -6024 -5426 -4889 -4889 -3954 -3555 -3200 -2889 -2594 -2336
1.04 0.75 Total Value of Time Factors <with project=""> 2002 2003 2004 2006 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600 960	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1,239 0,924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102 4592 4133 3719 3347 3013	989615 1051730 1113845 1175959 1238074 1300189 1362303 1424418 1522145 1619872 1717599 1815325	136220 232794 22726 3956574 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615731 657593 699454 741316 911083 1080849 1250616 1420383	Ren 00 01 00 00 00 00 00 00 00	Total Benefits \$ US 1333 1029251 1333 1333 1333 1333 1333 1333 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 9722 875 767 709 638 574 517 465 418	US\$ Benefits - Cost \$ US -478669 1019651 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267	Value \$ US -478661 917684 -6699 -6023 -488 -4395 -3205 -3205 -2886 -2534 -2334 -2101
1.04 0.75 Total Value of Time Factors <with project=""> Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600 960	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102 4592 4133 3719 3347 3013 2711 2440	989615 1051730 1113845 11775959 1238074 1300189 1362303 1424418 1522145 1619872 1717599 1815325 1913052 2010779	136220 232794 22726 3956574 2.678 0.811 Veh Hour Benefits 440286 490147 532008 573870 615731 657593 69454 741316 911083 1030849 1250616 1420383 1590150 1759917	Res 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 9722 875 787 709 638 574 517 465 418 377 339	Benefits - Cost \$ US -478669 1019651 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267	Value \$ US -47866: 91768: 91768: -5692: -542: -542: -595: -3555: -320: -259: -259: -210: -189: -210: -189: -210: -189: -210: -189: -210: -189: -210: -189: -210: -
1.04 0.75 Total Value of Time Factors <with project=""> 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2011 2012 2013 2014 2015 2016 2017</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600 960	123 19 Total Cost (US \$) 480003 96000 96000 96000 96000 96000 96000 96000 96000 96000 96000 96000	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102 4133 3719 3347 3013 2711 2440 2196	989615 1051730 1113845 1175959 1238074 1300189 1362303 1424418 1522145 1619872 1717599 1815325 1913052 2010779 2108506	136220 232794 22726 3956574 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615731 657593 1080849 1250616 1420383 1590150 1759917 1929683	Res 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 1333 1333 1333 1333 1333 1333 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 972 875 767 709 638 574 517 465 418 377 339 305	Benefits - Cost \$ US -478669 1019651 -8267	Value \$ US -47866: 91768-659 -659: -542: -542: -320: -325: -223: -231: -210: -170: -170: -170: \$ US
1.04 0.75 Total Value of Time Factors <with project=""> 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600 960	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1,239 0,924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102 4133 3719 3347 3013 2711 2440 1977	989615 1051730 1113845 1175959 1238074 1300189 1362303 1424418 1522145 1619872 1717599 1815325 1913052 2010779 2108506 2206233	136220 232794 22726 3956574 2.678 0.811 Veh Hour Benefits 448286 490147 573870 615731 657593 699454 741316 911083 1080849 1250616 1420383 1590150 1759917 1929683 2099450	Res Ben 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 1333 1333 1333 1333 1333 1333 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 9722 875 787 709 638 574 517 485 418 377 339 3055 275	Benefits - Cost \$ US -478669 1019651 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267 -8267	Value \$ US -47866i 91768i -669i -669i -642i -488i -439i -320i -288i -233i -210i -189i -170i -153i
1.04 0.75 Total Value of Time Factors <with project=""> Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2011 2012 2013 2014 2015 2016 2017 2018 2019 2019 2011 2011 2011 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2020 2021</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600 960	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102 4592 4133 3719 3347 3013 2711 2440 2196 1977	989615 1051730 1113845 1175959 1239074 1300189 1362303 1424418 1522145 1619872 177599 1815325 1913052 2010779 2108506 2208233 2303959	136220 232794 22726 3986674 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615731 657593 69454 741316 911083 1030849 1250616 1420383 1590150 1759917 1929683 2099450 2269217	Ren 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 972 875 787 709 638 574 517 465 418 377 339 305 275 247	Benefits - Cost \$ US -478669 1019651 -8267	Value \$ US -47866i 91768i -669i -669i -642i -488i -439i -320i -288i -233i -210i -189i -170i -153i
1.04 0.75 Total Value of Time Factors <with project=""> Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2019 2019 2019 2020 2021 2022</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600 960	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102 4592 4133 3719 3347 3013 2711 2440 2196 1977	989615 1051730 1113845 1175959 1239074 1300189 1362303 1424418 1522145 1619872 177599 1815325 1913052 2010779 2108506 2208233 2303959	136220 232794 22726 3986674 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615731 657593 69454 741316 911083 1030849 1250616 1420383 1590150 1759917 1929683 2099450 2269217	Ren 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 972 875 787 709 638 574 517 465 418 377 339 305 275 247	Benefits - Cost \$ US -478669 1019651 -8267	Value \$ US -47866i 91768i -669i -669i -642i -488i -439i -320i -288i -233i -210i -189i -170i -153i
1.04 0.75 Total Value of Time Factors Year 2002 2003 2004 2006 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600 960	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5609 5102 4592 4133 3719 3347 3013 2711 2440 2196 1977 1779 1601	989615 1051730 1113845 1175969 1238074 1300289 1362303 1424418 1522145 1619872 1717599 1815325 1913052 2010779 2108506 2206233 2303959 2401686	136220 232794 22726 3956574 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615731 657593 699454 741316 911083 1590150 1759917 1929683 2099450 2269217 2438984	Ren 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 972 875 707 709 638 574 517 465 418 377 339 305 275 247	Benefits - Cost \$ US -478669 1019651 -8267	Value \$ US -478661 917684 -56924 -542488 -3954 -3954 -3954 -2886 -2594 -1891 -1700 -11375
1.04 0.75 Total Value of Time Factors <with project=""> Year 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2019 2019 2019 2020 2021 2022</with>	85 13 Base Sensitivity Capital Cost US\$ 480003 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	33137 3655 727219 1.027 0.97 Maintenance Cost (US\$) 9600 9600 9600 9600 9600 9600 9600 960	123 19 Total Cost (US \$) 480003 9600 9600 9600 9600 9600 9600 9600	57850 6444 1202579 1.239 0.924 Total Dis- counted Cost 480003 8640 7776 6998 6299 5669 5102 4592 4133 3719 3347 3013 2711 2440 2196 1977	989615 1051730 1113845 1175959 1239074 1300189 1362303 1424418 1522145 1619872 177599 1815325 1913052 2010779 2108506 2208233 2303959	136220 232794 22726 3986674 2.678 0.811 Veh Hour Benefits 448286 490147 532008 573870 615731 657593 69454 741316 911083 1030849 1250616 1420383 1590150 1759917 1929683 2099450 2269217	Ren 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Benefits \$ US 1333 1	2000 Total Dis. Benefits \$ US 1333 926326 1080 972 875 787 709 638 574 517 465 418 377 339 305 275 247	Benefits - Cost \$ US -478669 1019651 -8267	Value

					•				Base Case		
Site No	44	N026A060	A-Node	1101	B-Node	604]	Maintenance			
Site Name	NIC26, 24.7			Link Length (km)	26.0	j	Cost per km			
			, ,				,	1340			
Type of Disaste		Rock Fall		Permanent/Tem	porary (P/T)	P 10	1				
Discount Rate	(%)	10		Discount Period		18	ļ				
	Diek Wahan	t Prevention Me	Seurce Bond u	vill fail in		years	ī				
	Score	70		Benefit Factor	70	yeara	ŀ				
	COCIC	. 70		20110111 20101		ı					
-	20	003	2	010	20	20	ŀ				
Mode	Base	Disaster	Base	Disaster	Base	Disaster	ŀ				
1	268075	269413	391813	393527	713975	716938		AADT	Cars		
2	472217	477630	691648	698644	1230257	1242272		Vehicle	Pick-ups		1
3	161758	164995	199148	202950	271850	276824	<	Kilometres	Buses		
4	193383	196945	309370	314928	560748	569767		input from	L Goods		
5	131812	133060	199683	200944	379385	380919		JICASTRADA	M Goods		
6	93606	94114	107094	107693	260251	261726	i	Traffic Model	H Goods		
Veh. Op Cost 1000 km		2003	Ber	efits, US \$, per y 2010	/ear	2020	1 1	Capital Cost			
185.5	1338	90585	1714	116040		200599		Estimate US \$			
215.1	5413	424929	6996	549197		943196		389925			
529.7	3237	625893	3802	735139		961752					
549.1	3562	713907	5558	1113951		1807615					
768.2	1248	349926	1261	353571		430117					
878.5	508	162884	599	192062		472940					
Total		2368122		3059960		4816219					
1	4300	4350	6167	6253	11365	11523	ı	AADT	Cars		
2	7586	7737	10991	11244	19747	20191	۱.	Vehicle	Pick-ups		
3	2686	2759 3225	3136 4938	3235 5101	4340 9042	4468 9327	<	Hours input from	Buses L Goods		
4 5	3133 2121	3225 2167	4938 3105 .	3183	9042 6042	9327 6184		JICASTRADA	M Goods		
6	1560	1580	1684	1717	4146	4225	l	Traffic Model	H Goods		
Passenger	1000			nefits, US \$, per y			•				
VOT, 2002		2003		2010		2020	Ī				
2.84	50	53229	86	110454		438610					
1.09	151	61697	253	124713		473056					•
14.9	73	407730	99	667092		1864231					
1.04	92	35866	163	76663		289722					
1.04	46	17933	78	36685		144353					
0.75	20	5623	33	11193 1026800		57915 3267887	t				
Total Value of Time	Base	582079 1.027		1.239		2.678	l	Occurrence pro	hability	1/3	
Factors	Sensitivity	0.97	,	0.924		0.811	Res	storation Cost	2000		
<with project=""></with>		0.57		0.021		0.0			2000		
	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits		Benefits	Benefits	- Cost	Value
								\$ US	\$US	\$ US	\$ US
2002	T		·	****			ام				
2003	389925		389925	389925	811001	199342	0	1333	1333	-388592	-388592
2004	0		7799 7799	7019 6317	844848	221099	- 1	711965 1333	640768 1080	704166 -6465	633750
2005 2006	0		7799 7799	5685	878695 912542	242857 264614	0	1333	972	-6465	-5237 -4713
2007	1 8		7799	5117	946390	286372	6	1333	875	-6465	-4242
2007	1		7799	4605	980237	308129	0	1333	787	-6465	-3818
2009	1 0		7799	4144	1014084	329886	ŏ	1333	709	-6465	-3436
2010	1 0		7799	3730	1047931	351644	ō	1333	638	-6465	-3092
2011	0		7799	3357	1108077	428393	Ō	1333	574	-6465	-2783
2012	0		7799	3021	1168223	505143	0	1333	517	-6465	-2505
2013	Ö		7799	2719	1228369	581892	0	1333	465	-6465	-2254
2014			7799	2447	1288515	658642	_0	1333	418	-6465	-2029
2015	0		7799	2203	1348661	735392	0	1333	377	-6465	-1826
2016	0		7799	1982	1408807	812141	, o	1333	339	-6465	-1643
2017	0		7799	1784	1468953	888891	0	1333	305	-6465	-1479
2018	0		7799 7799	1606 1445	1529098 1589244	965640 1042390	0	1333 1333	275 247	-6465 -6465	-1331
2019 2020	0		7799	1301	1649390	1119140	0	1333	247	-6465	-1198 -1078

202,494 B/C EIRR 1.45 0.01

-6465

222

-1078

7799

2021 2022 2023

Total

1119140

1333

1649390

1301

			Cos	t-Benefit Ana	alysis			,		-	
lov- v-		D. B. G.	1		I 5 11 1		٦.	F-2	Base Case	_}	
Site No Site Name	45 NIC26, 24.7	La Banderita	A-Node	1101 Link Length (km	B-Node	604 26.0		Maintenance Cost per km			
Type of Disaste		Rock Fall	1	Permanent/Tem	noran/(D/T)	Г Р	T	1340			
Discount Rate		10	j	Discount Period		18	3				
	Risk - Withou	t Prevention M	easures Boarl	will fail in		years	7				
	Score	70		Benefit Factor	70	years	1				
	20	003		2010	20	020	7				
Mode	Base	Disaster	Base	Disaster	Base	Disaster	İ				
1	268075	269413	391813	393527	713975	716938	1	AADT	Cars		
2	472217	477630	691648	698644	1230257	1242272	L	Vehicle	Pick-ups		
. 3 4	161758 193383	164995 196945	199148 309370	202950 314928	271850 560748	276824 569767	 	 Kilometres input from 	Buses L Goods		
5	131812	133060	199683	200944	379385	380919	ĺ	JICASTRADA	M Goods		
. 6	93606	94114	107094	107693	260251	261726	1	Traffic Model	H Goods		
Veh. Op Cost			Be	nefits, US \$, per y			- -				
1000 km 185.5	1990	2003	1714	2010		2020		Capital Cost			
215.1	1338 5413	90585 424929		116040 549197		200599 943196		Estimate US \$ 38252			
529.7	3237	625893		735139		961752		OUZUE			
549.1	3562	713907		1113951		1807615					
768.2	1248	349926		353571		430117					
878.5	508	162884		192062		472940					
Total		2368122		3059960		4816219	3				
1	4300	4350	6167	6253	11365	11523	1	AADT	Cars		
2	7586	7737	10991	11244	19747	20191		Vehicle	Pick-ups		
3	2686	2759	3136	3235	4340	4468	 	- Hours	Buses		
4	3133	3225	4938	5101	9042	9327		input from	L Goods		
5 6	2121 1560	2167 1580	3105 1684	3183 1717	6042 4146	6184 4225		JICASTRADA Traffic Model	M Goods H Goods		
Passenger	1000			nefits, US \$, per y		7623	3	Tranic model	11 00003		
VOT, 2002		2003		2010		2020					
2.84	50	53229	86	110454		438610					
1.09	151 73	61 6 97 407730	253	124713 667092		473056					
14.9 1.04	73 92	407730 35866	99 163	76663		1864231 289722					
1.04	46	17933	78	36685		144353					
0.75	20	5623	33	11193		57915					
Total		582079		1026800		3267887	ļ		t ma	470	
Value of Time Factors	Base Sensitivity	1.027 0.97		1.23 9 0.924		2.678 0.811	Bo	Occurrence prot storation Cost	1000 to 1000	1/3	
<with project=""></with>	Censisting	0.57		0.02.4		0.013	110	sion Edon Cost	1000	004	
	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Веп	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits		Benefits	Benefits	- Cost	Value
2002								\$US	\$ US	\$US	\$ US
2002	38252		38252	38252	194640	47842	Ó	1000	1000	-37252	-37252
2004	0	765	765	689	202764	53064	1	171552	154396	170787	153708
2005	0		765	620	210887	58286	0	1000	810	235	190
2006	. 0		765	558	219010	63507	0	1000	729	235	171
2007 2008	. 0		765 765	502 452	227134 235257	68729 73951	0	1000	656 590	235 235	154 139
2009	. 0		765	407	243380	79173	0	1000	531	235	125
2010	0		765 765	366	251504	84394	. 0	1000	478	235	112
2011	0	765	765	329	265939	102814	0	1000	430	235	101
2012	. 0		765	296	280374	121234	0	1000	387	235	91
2013 2014	0		765 765	267 240	294809 309244	139654 158074	0	1000	349 314	235 235	82
2015	0		765	216	323679	176494	0	1000	282	235	74 66
2016	0	765	765	194	338114	194914	0	1000	254	235	60
2017	0	765	765	175	352549	213334	0	1000	229	235	54
2018	0		765	158	366984	231754	0	1000	206	235	48
2019 2020	0		765 765	142 128	381419 395854	250174 268593	0	1000	185 167	235 235	39
2020	υ	700	/05	120	585654	200093	- 0	1000	10/		39
2022											
2023											
Total	38,252	13,006	51258	43,989	5,093,536	2,385,986		188,552	161,995	137,294	118,006
										B/C	3.68
										EIRR	0.04

			Cost	Benefit Ana	ılysis			ı	Base Case	ĭ	
Site No	49	N026B140	A-Node	302	B-Node	301	ī	Maintenance		i	
Site Name	NIC 26, 34.0			Link Length (km)		26.0	<u> </u>	Cost per km 1340			
Type of Disaste	er	Rock Collapse	1	Permanent/Tem	porary (P/T)	P	1		•		
Discount Rate (10		Discount Period	, , , ,	18	1				
							,				
	Risk : Without				60 1	years	j				
	Score	80_		Benefit Factor	80						
	20	03	2	010	20	20	1				
Mode	Base	Disaster	Base	Disaster	Base	Disaster	ŀ				
1	268075	271711	391813	396818	713975	722465	1	AADT	Cars '		
2	472217	480873	691648	703098	1230257	1249978		Vehicle	Pick-ups		
3	161758	167419	199148	205533	271850	280477	<	Kilometres	Buses		
4	193383	197817	309370	315853	560748	571425		input from	L Goods		
5 6	131812 93606	134167 94293	199683 107094	202956 107741	379385 260251	384300 262138		JICASTRADA Traffic Model	M Goods H Goods		
Veh. Op Cost	23000	34230		efits, US \$, per y		202130	1	Transc Woder	ri Guous		
1000 km	I	2003		2010		2020	1	Capital Cost			
185.5	3636	246163	5005	338846		574786		Estimate US \$			
215.1	8656	679510	11450	898843		1548129		1115482			
529.7	5661	1094588	6385	1234577	•	1668081					
549.1	4434	888675	6483	1299342		2139916					
768.2 878.5	2355	660316 220278	3273	917713 207452		1378112 605042					
Total	687	3789529	647	4896774		7914067					
Total		0100025		7030774		1514001	1				
1	4300	4457	6167	6429	11365	11890	Ţ	AADT	Cars		
2	7586	7928	10991	11545	19747	20808		Vehicle	Pick-ups		
3	2686	2858	3136	3375	4340	4686	 <	Hours	Buses		
4	3133	3306	4938	5236	9042	9604		input from	L Goods		
5	2121	2244	3105	3302	6042	6432		JICASTRADA	M Goods		
6	1560	1605	1684	1752 refits, US \$, per y	4146	4347]	Traffic Model	H Goods		
Passenger VOT, 2002	i	2003	Dei	2010	rear	2020	Ī				
2.84	157	167140	262	336499		1457408					
1.09	342	139738	554	273087		1130434				*	
14.9	172	960678	239	1610454		5039249					
1.04	173	67444	298	140157		571312					
1.04	123	47951	197	92654		396462					
0.75 Total	45	12651 1395604	68	23064 2475914		147354 8742218					
Value of Time	Base	1.027		1.239		2.678	ı	Occurrence pro	shahility	1/3	
Factors	Sensitivity	0.97		0.924		0.811	Re	storation Cost	2000		
<with project=""></with>											
	Capital	Maintenance	Total	Total Dis-	Ven Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits		Benefits	Benefits	- Cost	Value
								\$US	\$US	\$US_	\$US
2002	1115493		1115400	1115492	3490377	903050	_	1993	1999	1114140	1114140
2003 2004	1115482 0	22310	1115482 22310	1115482 20079	2180277 2271284	802950 891743			1333 1899016	-1114149 2087708	-1114149 1878937
2005	Ö	22310	22310	18071	2362290	980535	0		1080	-20976	-16991
2006	Ö	22310	22310	16264	2453296	1069328			972	-20976	-15292
2007	0.	22310	22310	14637	2544303	1158121	0		875	-20976	-13763
2008	0	22310	22310	13174	2635309	1246913			787	-20976	-12386
2009	. 0	22310	22310	11856	2726316	1335706			709	-20976	-11148
2010	0	22310	22310	10671	28173221	1424499	0		638	-20976	-10033
2011	0	22310 22310	22310	9604	2990920 3164517	1785026 2145553			574 517	-20976	-9030 9137
2012	0	22310	22310 22310	8643 7779	3338115	2506080			517 465	-20976 -20976	-8127 -7314
2014	0	22310	22310	7001	3511713	2866607	0		418	-20976	-6583
2015	ō	22310	22310	6301	3685310	3227134			377	-20976	-5924
2016	0	22310	22310	5671	3858908	3587661	0		339	-20976	-5332
2017	0	22310	22310	5104	4032506	3948188		1333	305	20976	-4799
2018	0	22310	22310	4593	4206103	4308715			275	-20976	-4319
2019	0	22310	22310	4134	4379701	4669242			247	-20976	-3887
2020	0	22310	22310	3721	4553299	5029769	0	1333	222	-20976	-3498
2021 2022							_				
2023	 									· · · · · · · · · · · · · · · · · · ·	
Total	1,115,482	379,264	1494746	1,282,783	57,711,488	42,983,770		2,132,684	1,909,148	637,938	626,365
										B/C	1.49
										EIRR	0.01

Sile No. SO NicoCol 100 A-hole Sile Sile Name Nico So 126 Sile S				Cos	t-Benefit An	alysis					ī	
Site Name	Site No	50	NOS6A150	A-Noda	300	R-Node	201	٦	Weintenance	Base Case	_	
Page of Disseller			1110207100	1 Andre				٦				
Page Page				-				_	1340			
Risk: Without Prevention Measures Road will rail in				_			4	1				
Mode Biss	Discount Rate (%)	1 10	<u>'</u>	Discount Period		1 18	3				
Mode Biss		Risk : Withou	t Prevention M	easures Road	will fail in		vears	1				
Mode Base Densiter Base Disaster Base Disaster Base Disaster Base Disaster Base Disaster Disa				I		85	T	j				
Mode Base Disaster Base Disaster Base Disaster 1 296975 2171 391813 398818 713975 712975 7								-				
1 268076 271711 391913 3981918 713075 722465 Vehicle Flok-ups 3 161778 1617419 199148 205053 271950 280477 71425 2804878 713912 271917 2804878 713912 271917 2804878 713912 271917 2804878 713912 271918 71491						1		1				
2 472217 4606973 691448 730908 1230257 1249978 3 161798 167149 199148 290533 291595 28477 - Minorents Buss 197817 399870 315853 560748 571425 5 193818 197817 39983 202956 379385 389400								-	AADT	0		
161778 161749 199148 265533 271950 280477								1				
1 193833 197817 399870 315863 560748 571425 39986 39986 39986 39988 398800 3								\ 				
Fig.		ı										
Value Valu	5	131812	134167	199683	202956	379385	384300		JICASTRADA	M Goods		
1000 km		93606	94293				262138	_	Traffic Model	H Goods		
185.5								a a				
215.1 8656 679510 11450 898843 1543129 259127 529.7 5661 1084588 6355 12244577 1688081 549.1 4434 888675 6483 1299542 2139916 788.2 2555 669316 2373 917713 1378112 878.5 687 220278 647 27452 805042 678.6 3789629 14896774 77914067 1 4300 4457 6167 6429 11365 11890 2 7588 7928 10991 11545 19747 20808 Hours 1898 1988 1988 1988 1988 1988 1988 198		3636										
529.7 5661 1094598 6385 1234577 16968081 549.1 4134 48507 6483 1295942 2139915 878.5 687 220278 647 207452 605042 678.2 2355 660316 3273 917713 1378112 878112 605042 647 207452 605042 649 207452 605042 649 207452 605042 649 207452 605042 649 207452 605042 649 207452 649 2074												
549.1									2 200 (2)			
768.2 2365 660316 5273 917713 1378112 F78.5 687 220278 647 207452 505042 1 4300 4457 6167 6429 11365 13690 1 2 7368 7928 10991 11545 19747 20808	549.1											
1							1378112	2				
1		687										
2 7588 7928 10991 11545 19747 20808	Total		3789529		4896774		7914067]				
2 7588 7928 10991 11545 19747 20808	4 I	4300	4457	6167	6470	11285	11800	1	AADT	Corn		
Second Passenger Second Pass								1				
4 3133 3306 4938 5236 9042 8604 5 1212 12244 3105 3302 6012 8422 1878 1580 1605 1608 1752 4146 4347 Passenger VOT, 2012 284 1.09 342 138738 554 273087 133044 157408 14.9 1772 906678 239 1610454 5039249 1.04 1773 67440 288 140157 571312 1.04 173 67440 288 140157 571312 1.04 123 47351 197 28504 3804452 1.075 187140 287 138504 2475914 3742218 1.075 187140								<				
Passenger Pass												
Passenger VOT, 2002 2.84 2.03 2.010 2.020 2.84 1.57 167140 2.62 336499 1457408 1.04 1.73 67444 2.98 1.0157 571312 3.0545 3.05	5	2121	2244	3105	3302	6042	6432		JICASTRADA	M Goods		
VOT, 2002 2,84 1,57 1,671-6) 2,92 3,364-99 1,14.9 1,72 9,606-78 2,98 1,14.9 1,72 9,606-78 2,98 1,14.9 1,72 9,606-78 2,98 1,14.9 1,72 1,04 1,73 1,74 1,74 1,75 1,75 1,75 1,75 1,75 1,75 1,75 1,75		1560	1605				4347]	Traffic Model	H Goods		
2.94 157 167140 282 386499 1457408 139738 554 273087 130434 14.9 172 960678 239 1610454 5039249 1.0.4 173 67444 288 140157 571312 3966678 239 1610454 5039249 1.0.4 173 67444 288 140157 571312 396662 396662 39664 147354 396462 396662 39664 147354 396462 396662 39664 147354 396662 39664 147354 396662 39664 147354 396662 39664 396662 39664 396662 39664 396662 39664 396662 39664 396662 39664 396662 39664 396662 39664 396662 39664 396662				Ber				7				
1.09 342 139738 554 27087 1130434 14.9 172 960678 239 1610457 571312 1.04 173 67444 288 140157 571312 1.04 123 47951 197 92654 396462 0.75 45 12651 68 230964 147354 cital 1395604 2475914 8742218		157		000								
14.9												
1.04												
1.75 45 1.265 68 23064 1.47364 2475914 8742218 2475914 8742218 2475914 8742218 2475914 8742218 2.6778 2.6778 2.67899 2.67899 2.67899 2.67899 2.67899 2.67899 2.67899 2.67899 2.678	1.04	173	67444	298	140157		571312					
Clair												
Second S		45		- 68								
Factors Sensitivity O.97 O.924 O.811 Restoration Cost 2000 US\$		Page				 		j	Ossuironas arab	a dellitus	1/9	
With Project> Capital Cost US\$ Maintenance Cost US\$ Total Dis- counted Cost Veh Km Benefits Veh Hour Benefits Benefits Benefits Total Dis- Benefits Benefits Benefits Benefits Benefits Cost Value 2002 \$US								Re				
Year Capital Cost US\$ Maintenance Cost (US\$) Total Discounted Cost Veh Km Veh Hour Benefits Benefits Benefits Benefits Benefits Benefits Benefits Benefits Net Pre Sus Sus Net Pre Sus Sus Sus Sus \$ US \$ US<		Constituty	0.57		0.524		0.011	110	310120011 0031	2000		
2002 2003 259127 259127 259127 259127 467202 172061 0 1333 1333 2557794 2557794 25779 2004 0 5183 5183 4664 486704 191088 1 453194 407875 448012 40321 2005 0 5183 5183 4198 506205 210115 0 1333 1080 -3849 -3849 -381 2006 0 5183 5183 3778 555706 229142 0 1333 972 -3849 -280 2007 0 5183 5183 5183 3400 545208 248169 0 1333 787 -3349 -252 2008 0 5183 5183 5183 3060 554709 267196 0 1333 787 -3349 -262 2010 0 5183 5183 5183 2754 584210 286223 0 1333 769 -3849 -204 2010 0 5183 5183 2479 603712 305250 0 1333 638 -3849 -184 2011 0 5183 5183 208 678111 459761 0 1333 577 -3849 -184 2011 0 5183 5183 208 678111 459761 0 1333 577 -3849 -184 2018 2018 0 5183 5183 1807 715310 537017 0 1333 465 -3849 -184 2014 0 5183 5183 1807 715310 537017 0 1333 465 -3849 -134 2016 0 5183 5183 1807 715310 537017 0 1333 339 -3849 -120 2016 0 5183 5183 1807 715310 537017 0 1333 339 -3849 -120 2016 0 5183 5183 1807 715310 537017 0 1333 339 -3849 -120 2016 0 5183 5183 1807 715310 537017 0 1333 339 -3849 -120 2016 0 5183 5183 1807 715310 537017 0 1333 339 -3849 -120 2016 0 5183 5183 1807 715310 537017 0 1333 339 -3849 -120 2016 0 5183 5183 1807 715310 537017 0 1333 339 -3849 -120 2016 0 5183 5183 1807 715310 537017 0 1333 339 -3849 -120 2016 0 5183 5183 1807 715310 537017 0 1333 339 -3849 -497 2017 0 5183 5183 1807 715310 537017 0 1333 339 -3849 -497 2017 0 5183 5183 1807 709 884104 0 5183 5183 1807 715310 537017 0 1333 339 -3849 -497 2017 0 5183 5183 1807 715310 537017 0 1333 339 -3849 -497 2017 0 5183 5183 5183 1807 7715310 537017 0 1333 339 -3849 -497 2017 0 5183 5183 5183 5183 5183 5183 5183 5183	· · ·	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
2002 2003	Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits					
2003 259127 259127 259127 467202 172061 0 1333 1333 -257794 -25779 2004 0 5183 5183 4664 486704 191088 1 453194 407875 448012 40321 40	0000								\$US	\$ US	\$US	\$ US
2004 0 5183 5183 4664 486704 191088 1 453194 407375 448012 40321 2005 0 5183 5183 4198 506205 210115 0 1333 1080 3849 311 2006 0 5183 5183 3778 525706 229142 0 1333 972 3849 280 2007 0 5183 5183 3778 525706 229142 0 1333 972 3849 280 2007 0 5183 5183 3780 545208 248189 0 1333 875 3849 252 2008 0 5183 5183 3060 564709 267196 0 1333 787 3849 227 2009 0 5183 5183 2754 584210 286223 0 1333 709 3849 200 2010 0 0 5183 5183 2479 603712 305250 0 1333 638 383 3849 201 2011 0 0 5183 5183 2231 640911 382506 0 1333 574 3849 -165 2012 0 5183 5183 2008 678111 459761 0 1333 517 3849 -149 2013 0 5183 5183 1807 715310 537017 0 1333 465 3849 -120 2014 0 5183 5183 1626 752510 614273 0 1333 476 3849 -120 2015 0 5183 5183 1464 789709 691529 0 1333 377 3849 -120 2016 0 5183 5183 1186 864 97570 691529 0 1333 377 3849 -120 2016 0 5183 5183 1186 864 97570 1333 377 3849 -120 2017 0 5183 5183 1186 86400 0 1333 377 3849 -120 2018 0 5183 5183 1186 86400 0 1333 377 3849 -97 2019 0 5183 5183 1186 864108 846040 0 1333 377 3849 -97 2019 0 5183 5183 1186 864108 846040 0 1333 377 3849 -97 2019 0 5183 5183 1067 901308 923296 0 1333 275 3849 -97 2019 0 5183 5183 1067 901308 923296 0 1333 275 3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 3849 -79 2010 0 5183 5183 5183 1067 901308 923296 0 1333 275 3849 -64 2012 2021 2021 2021 2022 2023 2023 2026 2028 2028 2028 2028 2028 2028 2028		250427		2504.07	950197	467909	172061	- 0	1999	1200	257704	25770
2005 0 5183 5183 4198 506205 210115 0 1333 1080 -3849 -311 2006 0 5183 5183 3778 525706 229142 0 1333 972 -3849 -280 2007 0 0 5183 5183 3400 545208 248189 0 1333 875 -3849 -252 2008 0 5183 5183 3060 564709 267196 0 1333 767 -3849 -222 2009 0 5183 5183 2754 584210 286223 0 1333 709 3849 -204 2010 0 5183 5183 2479 603712 305250 0 1333 638 -3849 -184 2011 0 5183 5183 2231 640911 382506 0 1333 574 -3849 -185 2012 0 5183 5183 2008 678111 459761 0 1333 577 -3849 -149 2013 0 5183 5183 1807 715310 537017 0 1333 465 -3849 -134 2014 0 5183 5183 1626 752510 614273 0 1333 475 -3849 -120 2015 0 5183 5183 1464 789709 691529 0 1333 377 -3849 -108 2016 0 5183 5183 1807 7752510 614273 0 1333 377 -3849 -108 2016 0 5183 5183 1807 7752510 614273 0 1333 377 -3849 -108 2016 0 5183 5183 1807 7752510 614273 0 1333 377 -3849 -108 2016 0 5183 5183 180 1464 789709 691529 0 1333 377 -3849 -108 2017 0 5183 5183 180 1806 901308 923266 0 1333 327 -3849 -97 2017 0 5183 5183 1186 884108 846040 0 1333 327 -3849 -97 2018 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -97 2019 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2020 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2020 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2020 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2020 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2020 0 5183 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2020 0 5183 5183 5183 684 975707 1077808 0 1333 247 -3849 -71 2020 0 5183 5183 5183 684 975707 1077808 0 1333 247 -3849 -71			5182									403211
2006 0 5183 5183 3778 525706 229142 0 1333 972 3849 -280 2007 0 5183 5183 3400 645208 248189 0 1333 875 3849 -282 2008 0 5183 5183 3060 564709 267196 0 1333 787 3849 -222 2009 0 5183 5183 2754 584210 286223 0 1333 709 3849 -204 2010 0 5183 5183 2479 603712 305250 0 1333 638 3849 -184 2011 0 5183 5183 2231 640911 382506 0 1333 577 3849 -184 2012 0 5183 5183 2008 678111 459761 0 1333 517 3849 -149 2013 0 5183 5183 1807 715310 537017 0 1333 465 3849 -134 2014 0 5183 5183 1626 752510 614273 0 1333 472 1 2849 -106 2015 0 5183 5183 1807 715310 537017 0 1333 416 3849 -120 2016 0 5183 5183 1626 752510 614273 0 1333 377 3849 -106 2017 0 5183 5183 1186 864108 846040 0 1333 305 3849 -106 2018 0 5183 5183 1186 864108 846040 0 1333 305 3849 -88 2018 0 5183 5183 1067 901308 923296 0 1333 275 3849 -79 2017 0 5183 5183 1186 864108 846040 0 1333 305 3849 -88 2018 0 5183 5183 1067 901308 923296 0 1333 275 3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 3849 -64 2021 2022 2023 2023 2020 0 5183 5183 5183 1067 901308 923296 0 1333 275 3849 -64 2021 2022 2023 2020 0 5183 5183 5183 5183 1067 901308 923296 0 1333 275 3849 -64 2021 2022 2023 2020 0 5183 5183 5183 5183 5183 5183 5183 5183												-3118
2007 0 5183 5183 3400 545208 248169 0 1333 875 -3849 -252 2008 0 5183 5183 3060 564709 267196 0 1333 787 3849 -252 2009 0 0 5183 5183 2754 584210 286228 0 1333 709 -3849 -220 2010 0 5183 5183 2479 603712 305250 0 1333 638 -3849 -184 2011 0 5183 5183 2231 640911 362506 0 1333 574 -3849 -165 2012 0 5183 5183 2008 678111 459761 0 1333 517 -3849 -165 2013 0 5183 5183 1807 715310 537017 0 1333 465 -3849 -134 2014 0 5183 5183 1626 752510 614273 0 1333 416 -3849 -120 2015 0 5183 5183 1626 752510 614273 0 1333 377 -3849 -120 2016 0 5183 5183 1464 789709 691529 0 1333 377 -3849 -108 2017 0 5183 5183 1186 864108 84604 0 1333 399 -3849 -97 2018 0 5183 5183 11067 901308 923296 0 1333 275 -3849 -88 2018 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 5183 960 938507 1000552 0 1333 275 -3849 -64 2021 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1												-2806
2009 0 5183 5183 2754 584210 286223 0 1333 709 3849 -204 2010 0 5183 5183 2479 603712 305250 0 1333 638 3849 -184 2011 0 5183 5183 2231 640911 382506 0 1333 574 -3849 -165 2012 0 5183 5183 2008 678111 459761 0 1333 517 -3849 -149 2013 0 5183 5183 1807 715310 537017 0 1333 465 -3849 -134 2014 0 5183 5183 1626 752510 614273 0 1333 416 3849 -120 2015 0 5183 5183 1626 752510 614273 0 1333 377 -3849 -108 2016 0 5183 5183 1317 826909 768785 0 1333 377 -3849 -108 2017 0 5183 5183 1186 864108 846040 0 1333 305 -3849 -97 2018 0 5183 5183 1186 864108 846040 0 1333 305 -3849 -88 2018 0 5183 5183 1067 901308 923266 0 1333 275 -3849 -79 2019 0 5183 5183 5163 960 938507 1000552 0 1333 225 -3849 -79 2020 0 0 5183 5183 5183 864 975707 1077808 0 1333 222 -3849 -64 2021 2022 1 2023	2007		5183	5183		545208	248169	0	1333			-252
2010 0 5183 5183 2479 603712 305250 0 1333 638 -3849 -184 2011 0 5183 5183 2231 640911 382506 0 1333 574 3849 -165 2012 0 5183 5183 2008 678111 459761 0 1333 517 -3849 -149 2013 0 5183 5183 1807 715310 537017 0 1333 465 -3849 -134 2014 0 5183 5183 1626 752510 614273 0 1333 418 -3849 -120 2015 0 5183 5183 1626 752510 614273 0 1333 377 3849 -120 2016 0 5183 5183 1464 789709 691529 0 1333 377 -3849 -106 2016 0 5183 5183 1317 826909 768785 0 1333 339 -3849 -97 2017 0 5183 5183 1186 864108 846040 0 1333 305 -3849 -88 2018 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 5183 960 938507 1000552 0 1333 275 -3849 -79 2020 0 0 5183 5183 5183 864 975707 1007580 0 1333 222 -3849 -64 2021												-2273
2011 0 5183 5183 2231 640911 362506 0 1333 574 3849 -165 2012 0 5183 5183 2008 678111 459761 0 1333 517 3849 -149 2013 0 5183 5183 1807 715310 537017 0 1333 466 3849 -134 2014 0 5183 5183 1626 752510 614273 0 1333 416 3849 -120 2015 0 5183 5183 1464 789709 691529 0 1333 377 3849 -120 2016 0 5183 5183 1317 826909 768785 0 1333 377 3849 -108 2017 0 5183 5183 1186 864108 84604 0 1333 305 3849 -97 2018 0 5183 5183 1067 901308 923296 0 1333 275 3849 -88 2018 0 5183 5183 1067 901308 923296 0 1333 275 3849 -79 2019 0 5183 5183 1067 901308 923296 0 1333 275 3849 -79 2019 0 5183 5183 864 975707 1000552 0 1333 247 3849 -71 2020 0 5183 5183 864 975707 1077808 0 1333 222 3849 -64 2021												-2046
2012 0 5183 5183 2008 678111 459761 0 1333 517 -3849 -149												
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2015 0 5183 5183 1464 789709 691529 0 1333 377 -3849 -108 2016 0 5183 5183 1317 826909 768785 0 1333 339 -3849 -97 2017 0 5183 5183 1186 86408 846040 0 1333 305 -3849 -88 2018 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 960 938507 1000552 0 1333 247 -3849 -71 2020 0 5183 5183 864 975707 1077808 0 1333 222 -3849 -64 2021 1 2021 1 1077808 0 1333 222 -3849 -64 2022 2023 1 259,127 88,103 <td< td=""><td></td><td></td><td></td><td></td><td></td><td>752510</td><td></td><td></td><td></td><td>418</td><td></td><td>-1208</td></td<>						752510				418		-1208
2017 0 5183 5183 1186 864108 846040 0 1333 305 3849 -88 2018 0 5183 5183 1067 901308 923296 0 1333 275 3849 79 2019 0 5183 5183 960 938507 1000552 0 1333 247 -3849 -71 2020 0 0 5183 5183 864 975707 1077808 0 1333 222 -3849 -64 2021 2022	2015	0	5183	5183	1464	789709	691529	0	1333			-108
2018 0 5183 5183 1067 901308 923296 0 1333 275 -3849 -79 2019 0 5183 5183 960 938507 1000552 0 1333 247 -3849 -71 2020 0 5183 5183 864 975707 1077808 0 1333 222 -3849 -64 2021 2022 2023 2024 2024 2024 2024 2024 2024 2024 2024 2025 2026 2026 2027 2027 2027 2028 2028 2029												-978
2019 0 5183 5183 960 938507 1000552 0 1333 247 -3849 -71												
2020 0 5183 5183 864 975707 1077808 0 1333 222 -3849 -64 2021 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0												
2021 2022 2023 Total 259,127 88,103 347231 297,992 12,366,747 9,210,808 475,861 418,007 128,630 120,01 B/C 1.40												
2022 2023 259,127 88,103 347231 297,992 12,366,747 9,210,808 475,861 418,007 128,630 120,0 B/C 1.40		ď	0100	5100		313/3/	1077000		1333		-0043	-04/
2023 Total 259,127 88,103 347231 297,992 12,366,747 9,210,808 475,861 418,007 128,630 120,0 B/C 1.40					1						<u> </u>	
B/C 1.40												
	Total	259,127	88,103	347231	297,992	12,366,747	9,210,808		475,861	418,007		120,01

			COSI	-penent Ana	19515			1	Base Case	I	
Site No	51	N026B160	A-Node	602	B-Node	610	ı	Maintenance		i	
	NIC 26, 37.0			Link Length (km)		7.3		Cost per km			
								1340			
Type of Disaste		Rock Collapse		Permanent/Temp	oorary (P/T)	T					
Discount Rate ((%)	. 10		Discount Period		18	i				
	Distance of the second	D		.u. z _ 15 z _			ı				
		Prevention Me 86		Will tail in Benefit Factor	86	years	ŀ				
	Score	80		Denetit Factor	60	i					
		03		010	20	20	ſ				
Mode	Base	Disaster	Base	Disaster	Base	Disaster					
1	268075	278692	391813	407297	713975	741196	i	AADT	Cars		
2	472217	497633	691648	728519	1230257	1295084		Vehicle	Pick-ups		
3	161758	175114	199148	215169	271850	293993	<	Kilometres	Buses		
4	193383	203219	309370	324822	560748	587516		input from	L Goods		
5	131812	137311	199683	207634	379385	393396		JICASTRADA	M Goods	-	
6	93606	94963	107094	108510	260251	265252		Traffic Model	H Goods		
Veh. Op Cost			Ber	efits, US \$, per y	ear	2000	1				
1000 km	40047	2003	15484	2010		2020 1842902	l	Capital Cost Estimate US \$			
185.5 215.1	10617 25416	718787	36871	1048290 2894431		5089021		16041			
529.7	13356	1995196 2582461	16021	3097755		4281480		10041			
549.1	9836	1971360	15452	3096936		5364922					
768.2	5499	1541859	7951	2229373		3928531					
878.5	1357	435105	1416	454022		1603506					
Total		9244768		12820807		22110362					
1	4300	4538	6167	6551	11365	12261	ļ.	AADT	Cars		
2	7586	8136	10991	11823	19747	21551		Vehicle	Pick-ups		
3	2686	2951	3136	3479	4340	4927	<	Hours	Buses		
4	3133	3373	4938	5337	9042	9887		input from	L Goods		
5 6	2121 1560	2282	3105 1684	3367	6042 4146	6618 4464		JICASTRADA Traffic Model	M Goods H Goods		
Passenger	1 1000	1613		1768 nefits, US \$, per y		4404	l	Hallic Woder	u donaz		
VQT, 2002	1	2003	Dei	2010	eai	2020	l				
2.84	238	253372	384	493189		2487309	•				
1.09	550	224726	832	410123		1922058			,		
14.9	265	1480115	343	2311237		8549246					
1.04	240	93564	399	187659		859001					
1.04	161	62766	262	123225		585544					
0.75	53	14900	84	28491		233127	,				
Total		2129443		3553925		14636284		_		410	
Value of Time	Base	1.027		1.239		2.678	_	Occurrence pro	obability 2000	1/3	
Factors <with project=""></with>	Sensitivity	0.97	•	0.924		0.811	не	storation Cost	2000	OSS	
-with Projects	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits	2011	Benefits	Benefits	- Cost	Value
		(/_)						\$US	\$US	\$US	\$ US
2002											
2003	16041		16041	16041	569883	131267	0		1333	-14708	-14708
2004	0	321	321	289	601375	143811			448312	497803	448023
2005	0	321	321	260	632866	156356	0		1080	1013	820
2006	0	321	321	234	664358	168900	0		972	1013	738
2007	0	321	321	210	695849	181444	0		875 787	1013	664
2008	0	321 321	321 321	189 170	727341 758832	193989 206533	0	1333 1333	787	1013 1013	598 538
2009 2010	0	321	321	153	790324	219078	0		638	1013	484
2010	0	321	321	138	847588	287393	0		574	1013	436
2012	ő	321	321	124	904852	355709	0		517	1013	392
2013	16041	0	16041	5593	962117	424025	0		465	-14708	-5128
2014	0	321	321	101	1019381	492341	1		316681	1008827	316581
2015	0	321	321	91	1076646	560657	0		377	1013	286
2016	0	321	321	82	1133910	628973	0		339	1013	257
2017	0	321	321	73	1191174	697289	Ö		305	1013	232
2018	0	321	321	66	1248439	765605	. 0		275	1013	208
2019	0	321	321	59	1305703	833921	O	1333	247	1013	188

THE STUDY ON VULNERABILITY REDUCTION FOR MAJOR ROADS IN THE REPUBLIC OF NICARAGUA 23,928

1013

1,491,390 B/C EIRR 169

750,778 32.38 0.33

			Cost	t-Benefit Ana	alysis						
							_	<u> </u>	Base Case]	
Site No	52	San Juan de I	A-Node	302	B-Node	301	1	Maintenance	1		
Site Name	NIC 26, 156+	785		Link Length (km	<u> </u>	26.0	J	Cost per km 1340			
Type of Disaste		Bridge Scourin	-	Permanent/Tem	norany (P/T)	Т Т	1 .	1340	1		
Discount Rate		10		Discount Period		18	ป				
			J			<u></u>	9				
	Risk : Withou	it Prevention Me	easures Road	will fait in		years]				
	Score	90		Benefit Factor	90	1					
					·		,				
Mode	1	Diagotos	•	2010)20 Diagotas					
Mode 1	Base 268075	Disaster 271711	391813	Disaster 396818	713975	Disaster 722465	-	AADT	Cars		
2	472217	480873	691648	703098	1230257	1249978	1	Vehicle	Pick-ups		· •
. 3	161758	167419	199148	205533	271850	280477	ļ	 Kilometres 	Buses		•
4	193383	197817	309370	315853	560748	571425		input from	L Goods		
5	131812	134167	199683	202956	379385	384300	į.	JICASTRADA	M Goods		
6	93606	94293	107094	107741	260251	262138	J	Traffic Model	H Goods		
Veh. Op Cost 1000 km		2003		nefits, US \$, per y 2010		2020	a .	Capital Cost	1		
185.5	3636	246163		338846		574786		Estimate US \$			
215.1	8656	679510		898843		1548129		6170			
529.7	5661	1094588		1234577		1668081			•		
549.1	4434	888675	6483	1299342		2139916	}				
768.2	2355	660316		917713		1378112					
878.5	687	220278		207452		605042					
Total		3789529		4896774		7914067	3				
1	4300	4457	6167	6429	11365	11890	1	AADT	Cars		
. 2	7586	7928	10991	11545	19747	20808]	Vehicle	Pick-ups		
3	2686	2858	3136	3375	4340	4686	ļ	Hours	Buses	•	
4	3133	3306	4938	5236	9042	9604		input from	L Goods		
5	2121	2244	3105	3302	6042	6432	ŀ	JICASTRADA	M Goods		
_ 6	1560	1605	1684	1752	4146	4347]	Traffic Model	H Goods		
Passenger VOT, 2002		2003	Bei	nefits, US \$, per y 2010	/ear	2020	1				
2.84	157	167140	262	336499		1457408					
1.09	342	139738	554	273087		1130434					
14.9	172	960678		1610454		5039249					
1.04	173	67444	298	140157		571312					
1.04	123	47 9 51	197	92654		396462					
0.75	45	12651	68	23064 2475914		147354					
Total Value of Time	Base	1395604 1.027		1.239		8742218 2.678	J	Occurrence pro	hability	1/3	
Factors	Sensitivity	0.97		0.924		0.811	Йe:	storation Cost	1000		
<with project=""></with>											
	Capital	Maintenance	Total	Total Dis-	Veh Km	Veh Hour	Ben	Total	Total Dis.	Benefits	Net Pre
Year	Cost US\$	Cost (US\$)	Cost (US \$)	counted Cost	Benefits	Benefits		Benefits	Benefits	- Cost	Value
2002								\$US	\$ US	\$ US	\$US
2002	6170		6170	6170	155734	57354	0	667	667	-5503	-5503
2004	0170		123	111	162235	63696	1.	151287	136158	151164	136047
2005	ő		123	100	168735	70038	Ö	667	540	543	440
2006	O.	123	123	90	175235	76381	0	667	486	543	396
2007	0		123	81	181736	82723	0		437	543	356
2008	0		123	73	188236	89065	0	667	394	543	321
2009 2010	0		123	66 59	194737 201237	95408 101750	0	667	354 319	543	289
2010	0		123 123	53	213637	127502	0	667 667	287	543 543	260 234
2012	0		123	48	226037	153254	O	667	258	543	210
2013	6170		6170	2151	238437	179006	0	667	232	-5503	-1919
2014	. 0	123	123	39	250837	204758	. 1	304396	95523	304273	95484
2015	<u> </u>		123	35	263236	230510	0	667	188	543	153
2016	0		123	31	275636	256262	0	667	169	543	138
2017	D		123	28	288036	282013	0	667 667	153	543	124
2018 2019	0		123 123	25 23	300436 312836	307765 333517	0	667	137 124	543 543	112 101
2020	. 0		123	21	325236	359269	0		111	543	91
2021					0		~~~	30.			

THE STUDY ON VULNERABILITY REDUCTION FOR MAJOR ROADS IN THE REPUBLIC OF NICARAGUA

452,036 B/C EIRR

25.70 0.26

Side Name NIC 26, 1091-114				Cost	-Benefit Ana	ılysis					1	
Sin Hame	Otto Ma	E4	Inanaléa I	A NI-d-	eoe i	D Node	600	7	Maintanana	Base Case	l	
Permanent Femorary (PT) T Discourt Perked T T Discourt Perked T T T Discourt Perked T T T T Discourt Perked T T T T T T T T T				A-Node				┨				
Property Programment Pro	Site Marile	MIC ZO, TUGT	134		LIIK LENGIN (NII)		20.0	ı				
Pieble 10	Type of Disaste	er	Bridge Scouring	· ·	Permanent/Temi	porary (P/T)	T	7	10.10			
Files Without Prevention Measures Road will fall in Years Score 80 Ementif Factor 90				r . :		, , , ,		<u> </u>				
Roce								-				
Mode Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase Disaster Rase				easures Road v			years]				
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S29,7 13309 2573374 15887 2975167 3969115 549,11 10380 2080390 1451237 7971 2234981 3339427 15809182 1	185.5	11451	775250	16047	1086406		1917983	•	Estimate US \$			
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Year Capital Cost (US\$) Maintenance Cost (US\$) Total Discounted Cost Veh Km Benefits Veh Hour Benefits Total Benefits Benefits Benefits Net Pre Value 2002 2003 62931 62931 62931 1528350 406793 0 667 667 -62264 -62264 2004 0 1259 1259 1133 1600779 443580 1 1363373 1227215 1362314 1228083 2005 0 1259 1259 1019 1673208 480367 0 667 540 -592 479 2006 0 1259 1259 918 1745637 517154 0 667 486 -592 479 2006 0 1259 1259 826 1818066 553941 0 667 486 -592 -388 2007 0 1259 1259 743 1890495 590728 0 667 437 -592 -388 2		Sensitivity	0.97		0.924		0.811	Re	storation Cost	1000	US\$	
Year Cost US\$ Cost (US\$) Cost (US\$) counted Cost Benefits Benefits Benefits Cost Value 2002 \$US\$	<with project=""></with>	Canital	Maintanana	Takal	Total Dia	Mah Kas	Val Hau	Bon	Tatal	Total Dia	Danasta I	N-+ D
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2012 0 1259 1259 488 2279543 1042310 0 667 258 592 529 2013 62931 0 62931 21943 2401638 1231313 0 667 232 62264 21710 2014 0 1259 1259 395 2223733 1420317 1 2630034 625332 2628775 824938 2015 0 1259 1259 355 2645829 1609321 0 667 188 592 167 2016 0 1259 1259 320 2767924 1798325 0 667 169 592 150 2017 0 1259 1259 288 2890019 1987328 0 667 153 592 135 2018 0 1259 1259 288 2890019 1987328 0 667 137 592 132 2019 0 1259 1259 259 3012114 2176332 0 667 137 592 122 2019 0 1259 1259 233 3134209 2365336 0 667 124 592 110 2020 0 1259 1259 210 3256304 2554340 0 667 111 592 99 2021 2022 2023 2038 146000 93,873 41,323,573 21,322,609 4,004,273 2,057,405 3,858,273 1,663,531 EIRR= B/C 21,92	2010										-592	-283
2013 62931 0 62931 21943 2401638 1231313 0 667 232 62264 -21710		0				2157448	853306			287		-255
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2020 0 1259 1259 210 3256304 2554340 0 667 111 -592 -99 2021 2022 2023 2023 203 204 2057405 2057405 3,858,273 1,963,531 21,322,609 4,004,273 2,057,405 3,858,273 1,963,531 EIRR= B/C 21,92												
2021 2022 2023 2023 2023 2023 2023												
2022 2023			1200	1200	210	0200004	200,040	<u>-</u>	307		-792	-33
2023 Total 125,862 20,138 146000 93,873 41,323,573 21,322,609 4,004,273 2,057,405 3,858,273 1,963,531 EIRR= B/C 21.92			l					T			-	
EIRR= B/C 21.92								L				
EIRR= B/C 21.92	Total	125,862	20,138	146000	93,873	41,323,573	21,322,609		4,004,273	2,057,405	3,858,273	1,963,531
										EIRR=		21.92

EIRR

0.21

			Cos	t-Benefit An:	alysis					-	
O:4- N-	55	lo-r-	A 16-3-	205	Districts	202	٦.	F 10 - 1 - 1 - 1	Base Case	J	
Site No Site Name	NIC 26, 107+	Solis	A-Node	605 Link Length (km	B-Node	608 25.0	+	Maintenance Cost per km			
Oite Hame	1410 20, 101	300		tran rendra (va	',	20.0	J	1340			
Type of Disast	er	Bridge Scourin	- a	Permanent/Tem	porary (P/T)	Т	7	1070			
Discount Rate		10		Discount Period		18	3				
			·				_				
		t Prevention Me	easures Road			years					
	Score	100]	Benefit Factor	100]					
					1		7				
Mode	E .	003 Discotor	1	2010 Disaster		120 Disaster					
Mode 1	Base 268075	Disaster 279526	Base	407860	Base 713975	742305	-	AADT	Cars		
2	472217	495774	691648	726194	1230257	1287002	}	Vehicle	Pick-ups		
. 3	161758	175067	199148	214535	271850	292326	ļ	- Kilometres	Buses		
4	193383	203763	309370	323929	560748	583174		input from	L Goods		
5	131812	137202	199683	207654	379385	391484		JICASTRADA	M Goods		
6	93606	95190	107094	108514	260251	265211		Traffic Model	H Goods		
Veh. Op Cost			Be	nefits, US \$, per ;	year		_				
1000 km		2003		2010		2020		Capital Cost			
185.5	11451	775250	16047	1086406		1917983	3	Estimate US \$			
215.1	23557	1849261	34546	2711915		4454572		81440	•		
529.7	13309	2573374		2975167		3959155		_			
549.1	10380	2080390		2917958		4494686					
768.2	5390	1511297	7971	2234981		3392427					
878.5	1584	507889	1420	455305		1590360					
Total		9297461		12381732		19809182					
	4000	1000	07.07	0070	44005	10101	7	AART	_		
1 2	4300	4632	6167	6670	11365	12424	i	AADT	Cars		
3	7586 2686	8196 2986	10991	11922 3516	19747 4340	21602 4953	ļ	Vehicle	Pick-ups		
3 4	3133	2986 3407	3136 4938	5363	9042	9881	<	Hours input from	Buses L Goods		
5	2121	2306	3105	3416	6042	6643	ŀ	JICASTRADA	M Goods		
6	1560	1622	1684	1771	4146	4461		Traffic Model	H Goods		
Passenger	1300	1022		nefits, US \$, per y		7701	1	manic wood	n accus		
VOT, 2002		2003		2010		2020	ì				
2.84	332	353443	503	646027		2939800					
1.09	610	249241	931	458924		1976395					
14.9	300	1675602	380	2560555		8927918	}				
1.04	274	106819	425	199888		852901					
1.04	185	72122	311	146271		610958					
0.75	62	17431	87	29508		230927					
Total		2474658		4041172		15538899]				
Value of Time	Base	1.027		1.239		2.678	_	Occurrence pro	bability	1/3	
Factors	Sensitivity	0.97		0.924		0.811	Res	storation Cost	1000	08\$	
<with project=""></with>		[14-1-1	#-1-1	Total Dis-	Value Van	37-b 11	161	+		P	
Van	Capital Cost US\$	Maintenance Cost (US\$)	Total Cost (US \$)	counted Cost	Veh Km Benefits	Veh Hour	Ben		Total Dis.	Benefits	Net Pre
Year	LOSI USS	Cost (US\$)	Cost (US \$)	F COURSEU COST	Deficits	Benefits	1	Benefits \$ US	Benefits \$ US	- Cost \$ US	Value \$ US
2002								\$05	\$ US	\$ 05	\$ U &
2003	81440	, : - 1	81440	81440	764175	203397	0.	667	667	-80773	-80773
2004	01440		1629	1466	800389	221790		682120	613908	680491	612442
2005	Ö		1629	1319	836604	240184		667	540	-962	-779
2006	Ö		1629		872818	258577	ŏ	667	486	-962	-70
2007	Ö		1629		909033	276971	0	667	437	-962	-63
2008	0		1629	962	945248	295364	0	667	394	-962	-568
2009	0		1629	866	981462	313758	Ō	667	354	-962	-511
2010	0	1629	1629	779	1017677	332151	0	667	319	-962	-460
2011	0		1629		1078724	426653		667	287	-962	-414
2012	. 0		1629	631	1139772	521155		667	258	-962	-37
2013	81440		81440		1200819	615657	0	667	232	-80773	-28164
2014	, 0		1629	511	1261867	710159		1315350	412771	1313721	412260
2015	0		1629	460	1322914	804660		667	188	-962	-27
2016	0		1629	414	1383962	899162	0	667	169	-962	-24
2017	0		1629	373	1445009	993664	0	667	153	-962	-220
2018	0		1629	335	1506057	1088166	0	667	137	-962	-198
2019	0		1629	302	1567104	1182668	0	667	124	-962	-178
2020	0	1629	1629	272	1628152	1277170	0	667	111	-962	-160
2021							\vdash				
2022	<u> </u>	 		<u> </u>			\vdash				
2023	400000	00.001	t one is	101 400	00 004 70-1	10 001 00-	<u> </u>	0.000.10=	1 867 FACT	1 940 400	028.4
Total	162,880	26,061	188941	121,483	20,661,787	10,661,305		2,008,137	1,031,535	1,819,196 B/C	910,05 8,49

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