

1. Supplementary Document

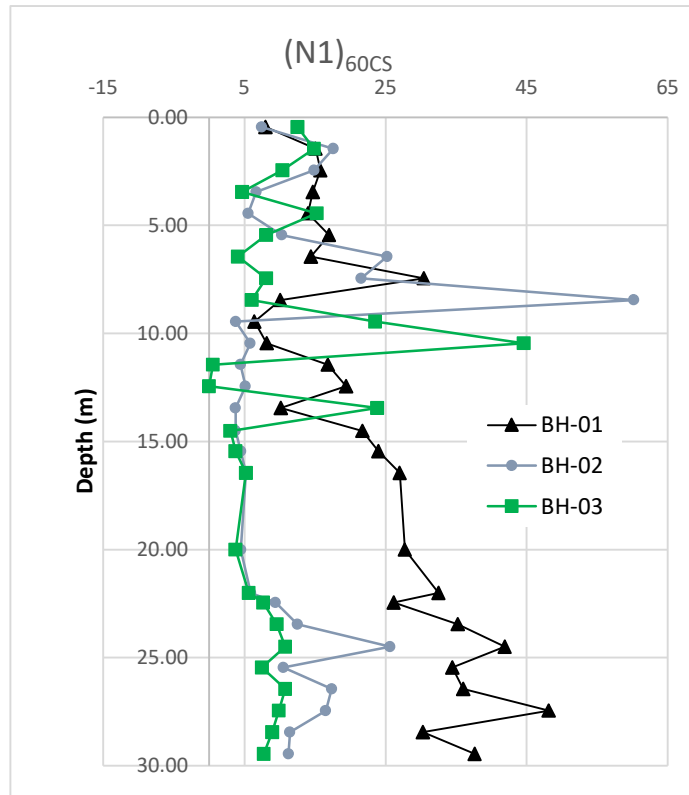


Figure A1. SPT test results vs depth.

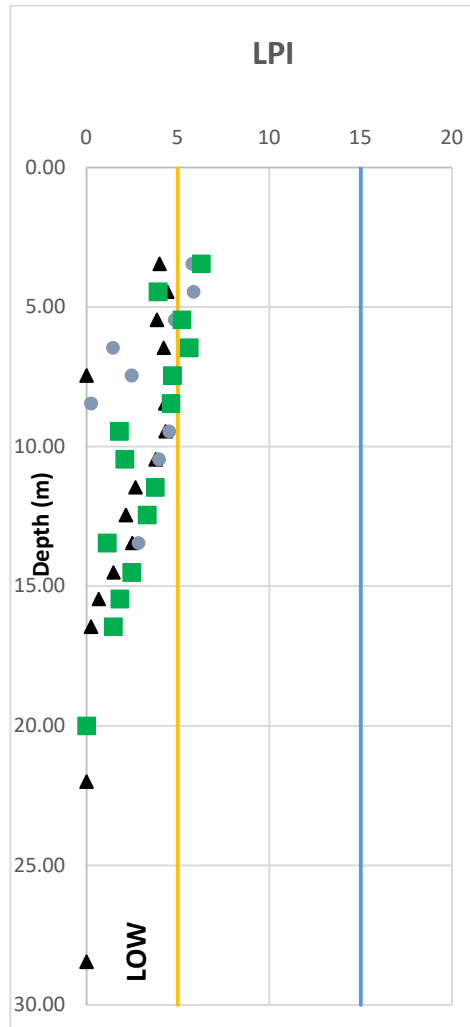


Figure A2. Results of the liquefaction potential index (LPI)

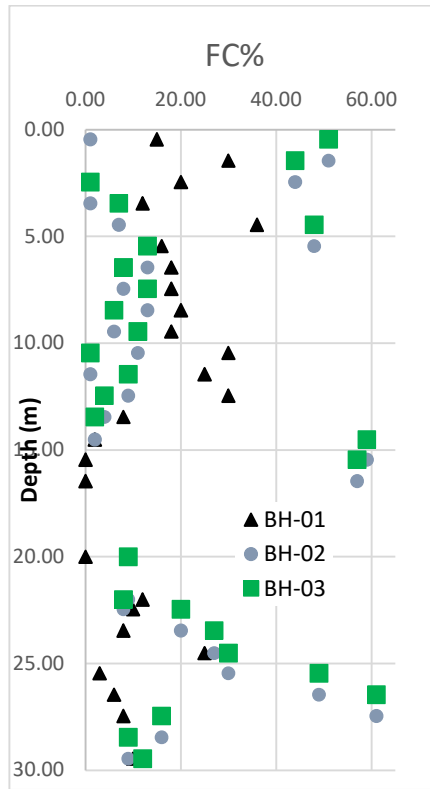


Figure A3. Fine content.

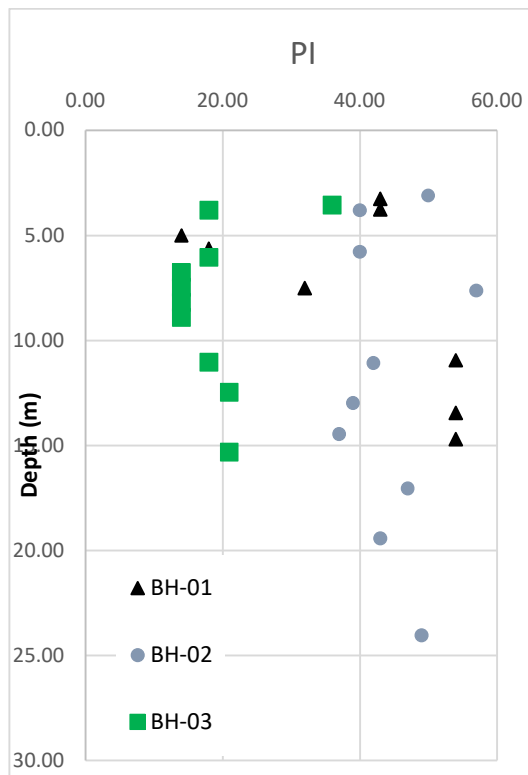


Figure A4. Plastic Index.

Table S1. LSN results.

BH	LPI	LSN
BH-01	7.12	82.48
BH-02	28.30	122.68
BH-03	29.65	142.20

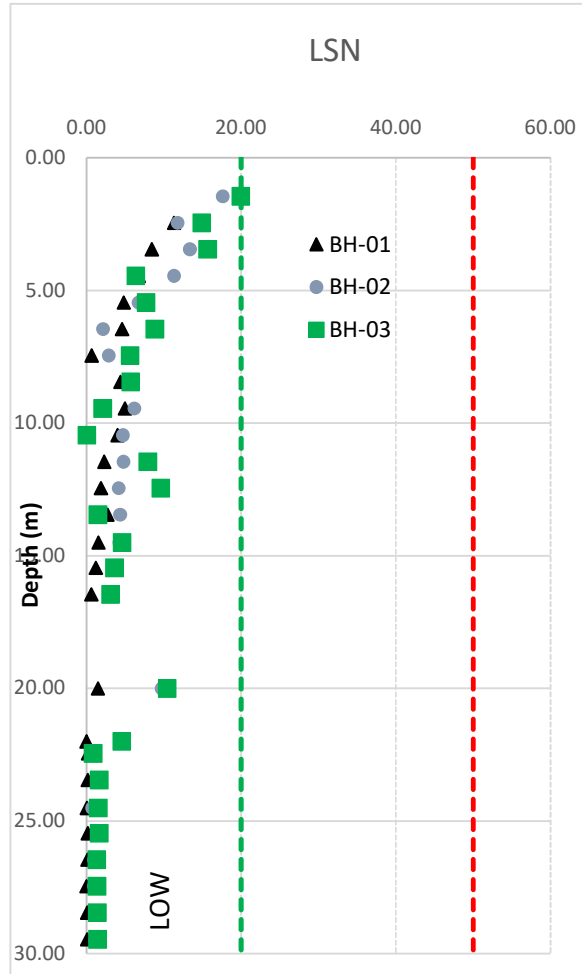


Figure A5. LSN chart.

Table S2. Seismological characteristics of the selected seismic movements compatible with the target Spectrum.

Mov	Scale Factor	Event	Magnitude	Fault Type	R _{JB} (Km)	R _{rup} (Km)	Vs30 (m/s)	File Name
1	1.1482	Chichi, Taiwan, 1999	7.62	Reverse Oblique	9.62	9.62	427.73	CHI-CHI_CHY024
2	1.1646	Chichi, Taiwan, 1999	7.62	Reverse Oblique	16.04	16.04	233.14	CHI-CHI_CHY036
3	2.1396	Chichi, Taiwan, 1999	7.62	Reverse Oblique	24.1	24.1	442.15	CHI-CHI_CHY046
4	1.8878	Chichi, Taiwan, 1999	7.62	Reverse Oblique	24.13	24.13	169.52	CHI-CHI_CHY047

5	2.0297	Chichi, Taiwan, 1999	7.62	Reverse Oblique	37.48	37.48	318.52	CHI-CHI_CHY088
6	1.5388	Chichi, Taiwan, 1999	7.62	Reverse Oblique	40.88	40.88	423.4	CHI-CHI_CHY033
7	1.5063	Chichi, Taiwan, 1999	7.62	Reverse Oblique	35.68	35.68	393.77	CHI-CHI_TCU034
8	1.3811	Chichi, Taiwan, 1999	7.62	Reverse Oblique	7.64	7.64	350.06	CHI-CHI_TCU051
9	1.2063	Chichi, Taiwan, 1999	7.62	Reverse Oblique	6.34	6.34	359.13	CHI-CHI_TCU055
10	1.2581	Chichi, Taiwan, 1999	7.62	Reverse Oblique	2.11	2.11	389.41	CHI-CHI_TCU101

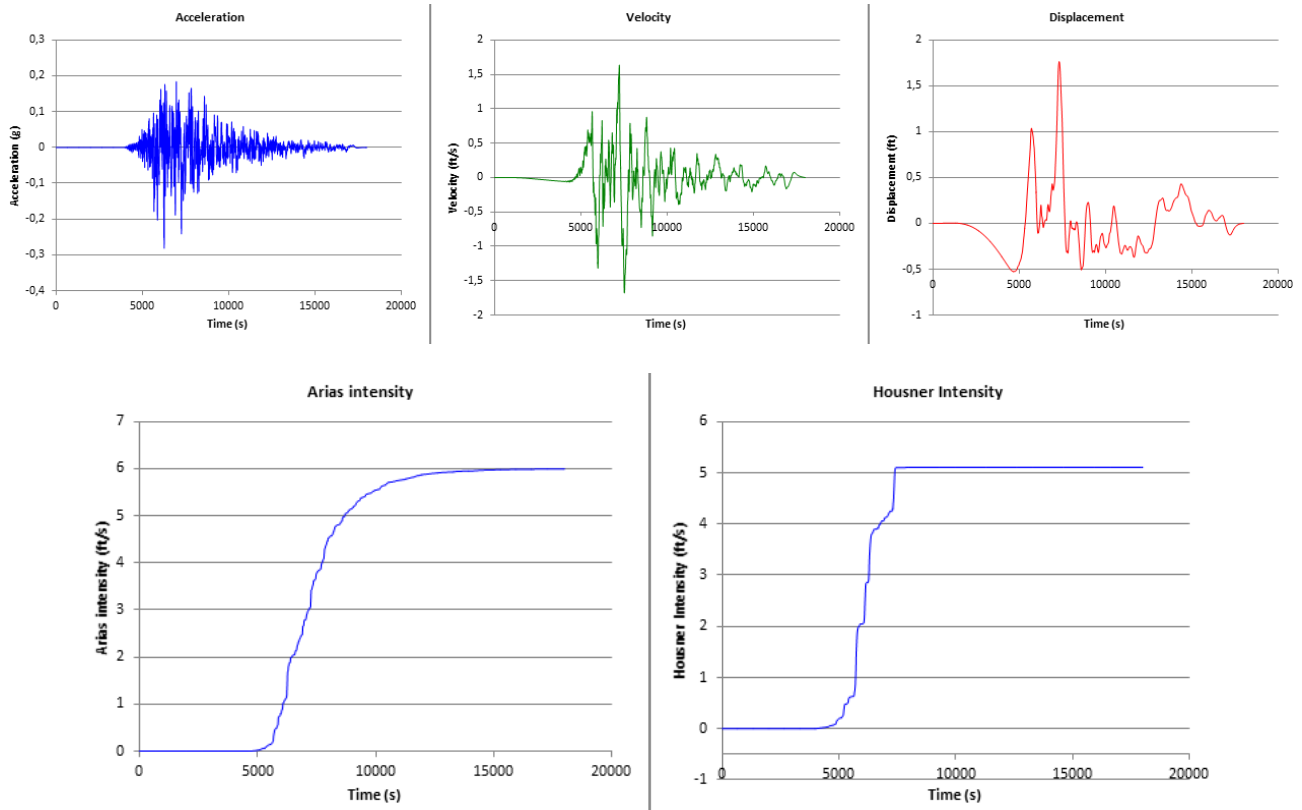


Figure A6. Records time-history and dynamic parameters of one of the earthquakes considered for the analysis corresponding to 475 years of return period (PEER, Center for the Development of Seismic Engineering of the Pacific).

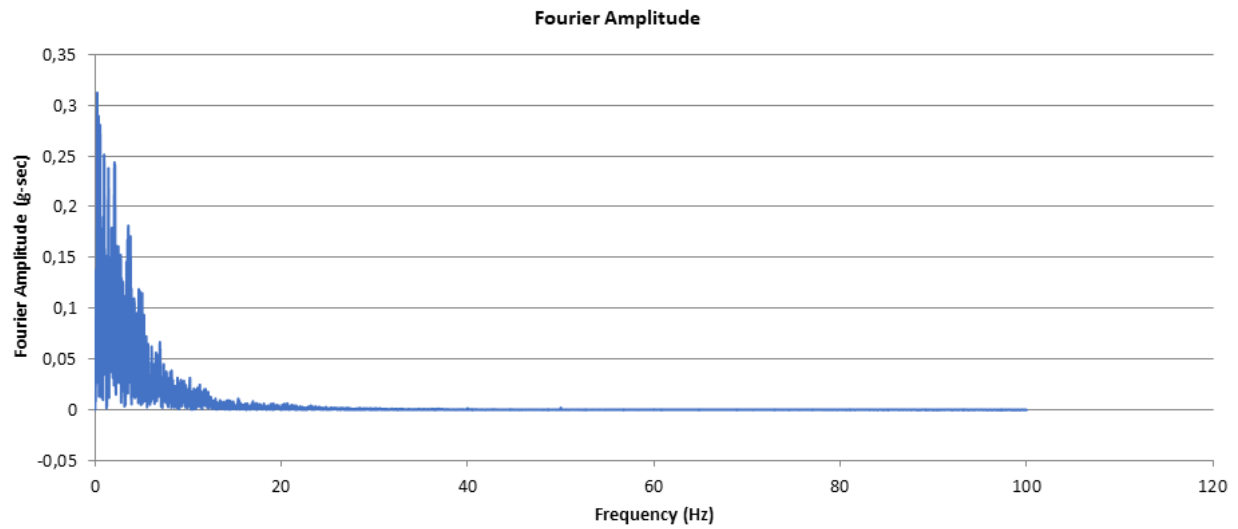
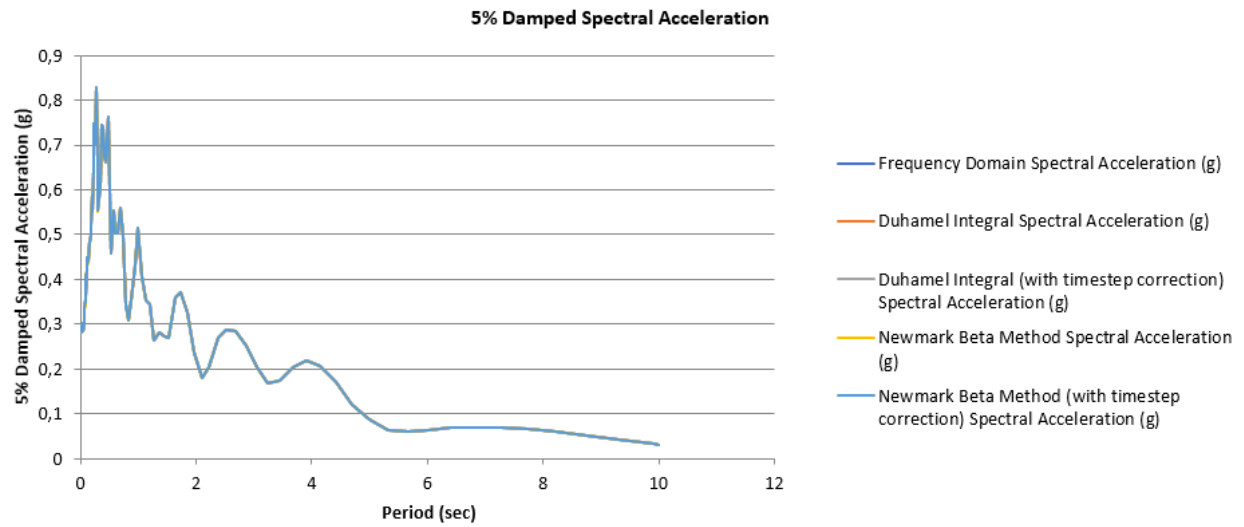


Figure A7. Dynamic parameters of one of the earthquakes considered for the analysis corresponding to 475 years of return period (PEER, Center for the Development of Seismic Engineering of the Pacific).

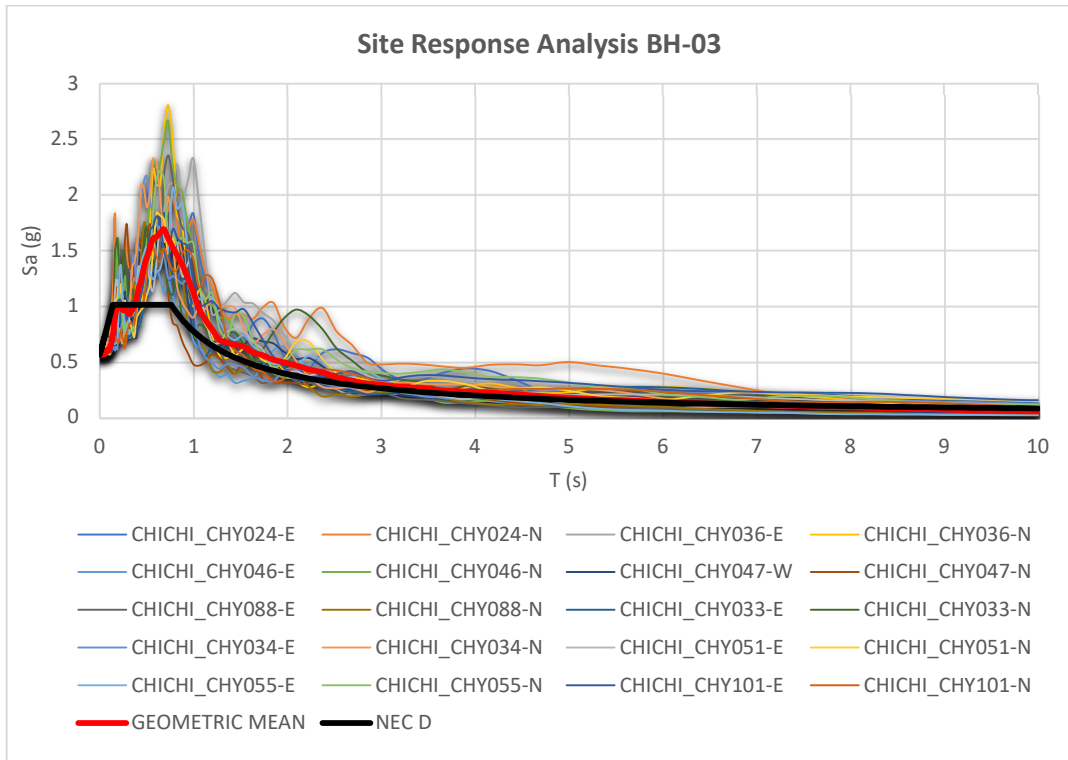


Figure A8. Comparison of acceleration spectra for the 5% structural damping for the horizontal components of the 10 earthquakes for coluvial deposits (ie. BH-03).

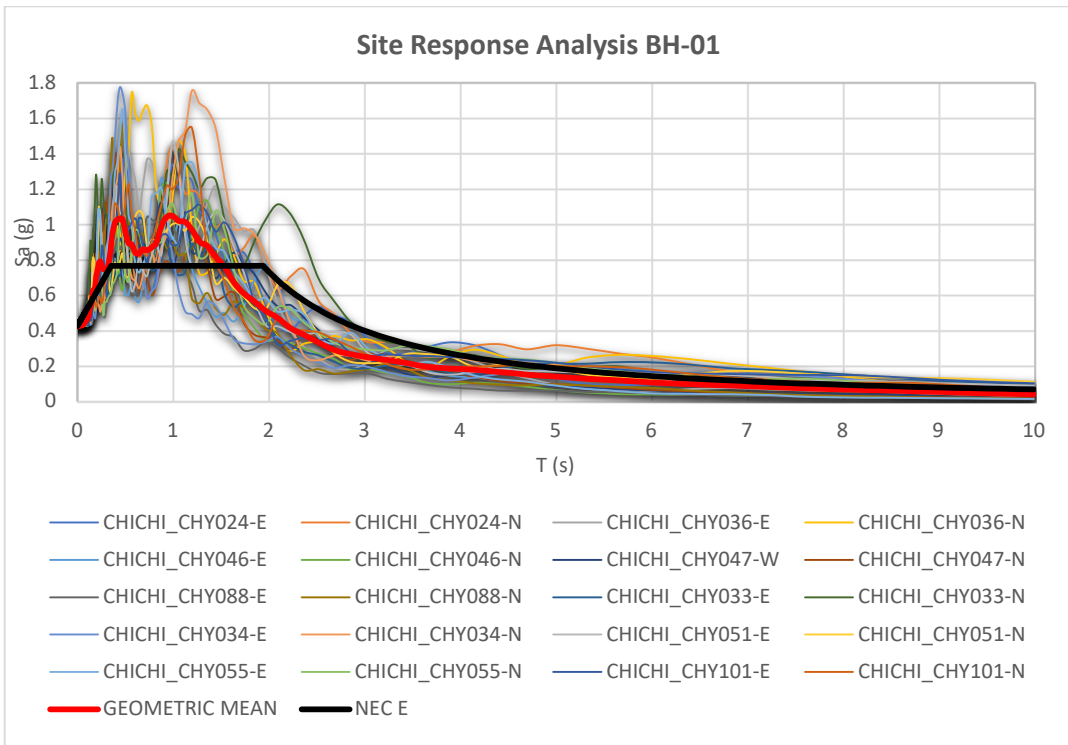


Figure A9. Comparison of acceleration spectra for the 5% structural damping for the horizontal components of the 10 earthquakes for alluvial soils (ie. BH-01).

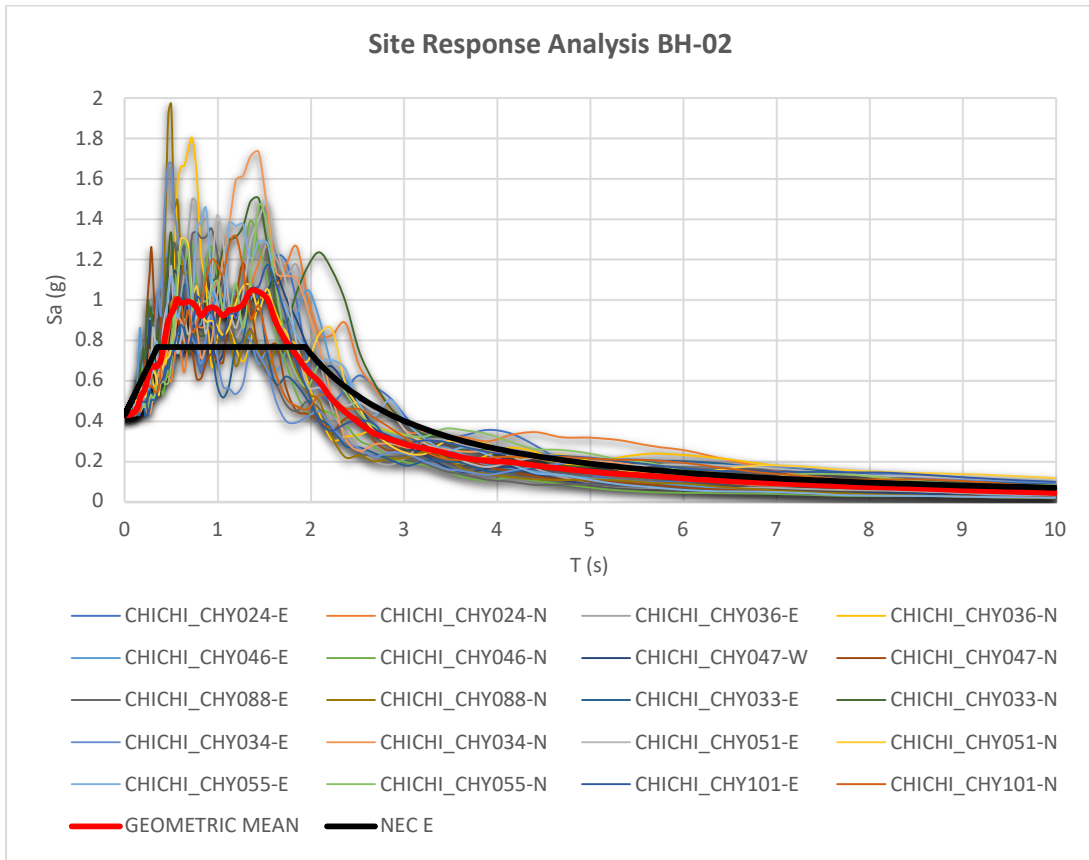


Figure A10. Comparison of acceleration spectra for the 5% structural damping for the horizontal components of the 10 earthquakes for abandoned floodplain deposits (ie. BH-02).

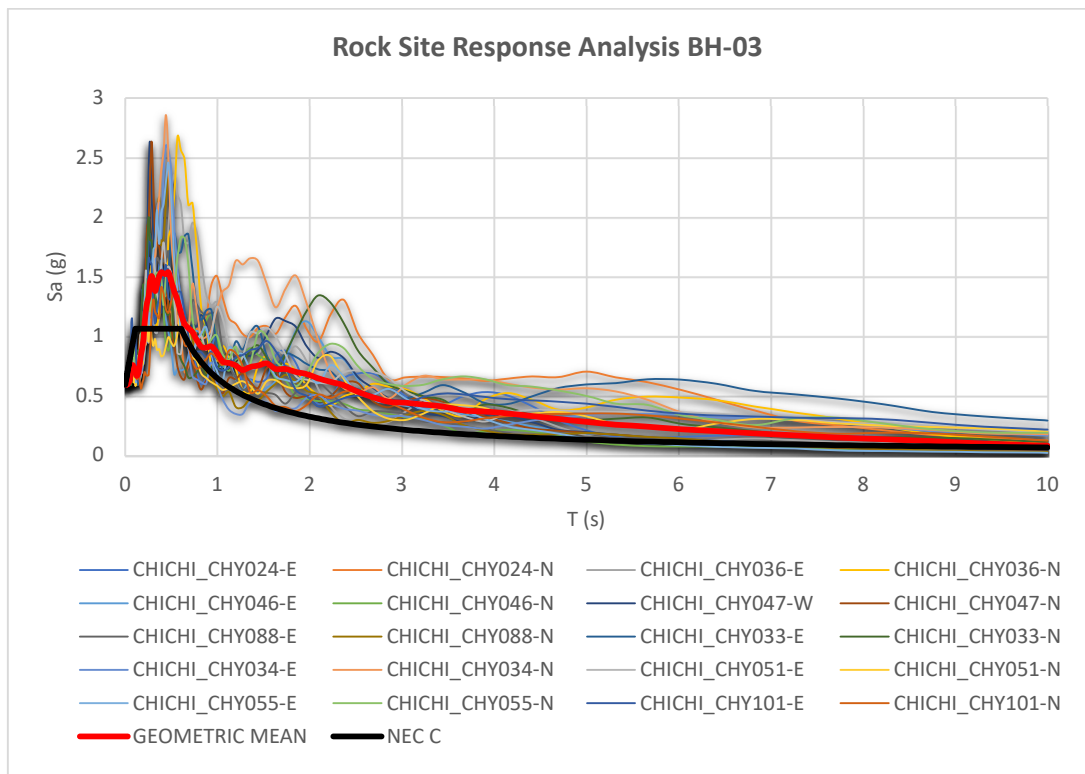


Figure A11. Rock response spectrum for JA-BH-03 and comparison with NEC C spectrum.

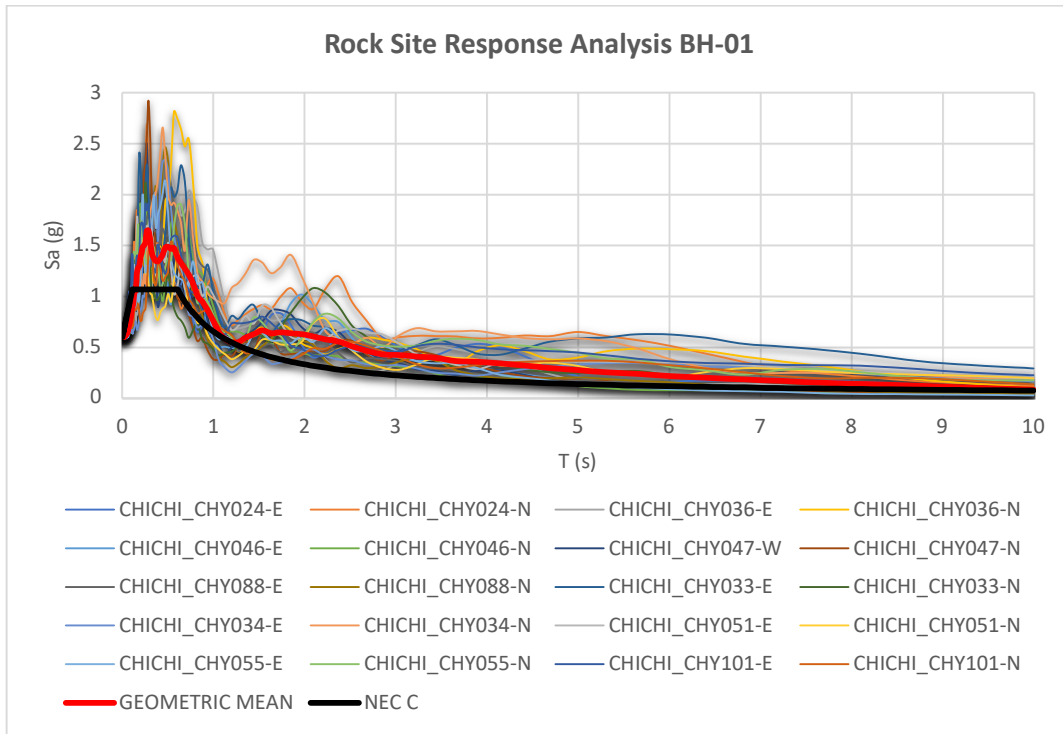


Figure A12. Rock response spectrum for BH-01 and comparison with NEC C spectrum.

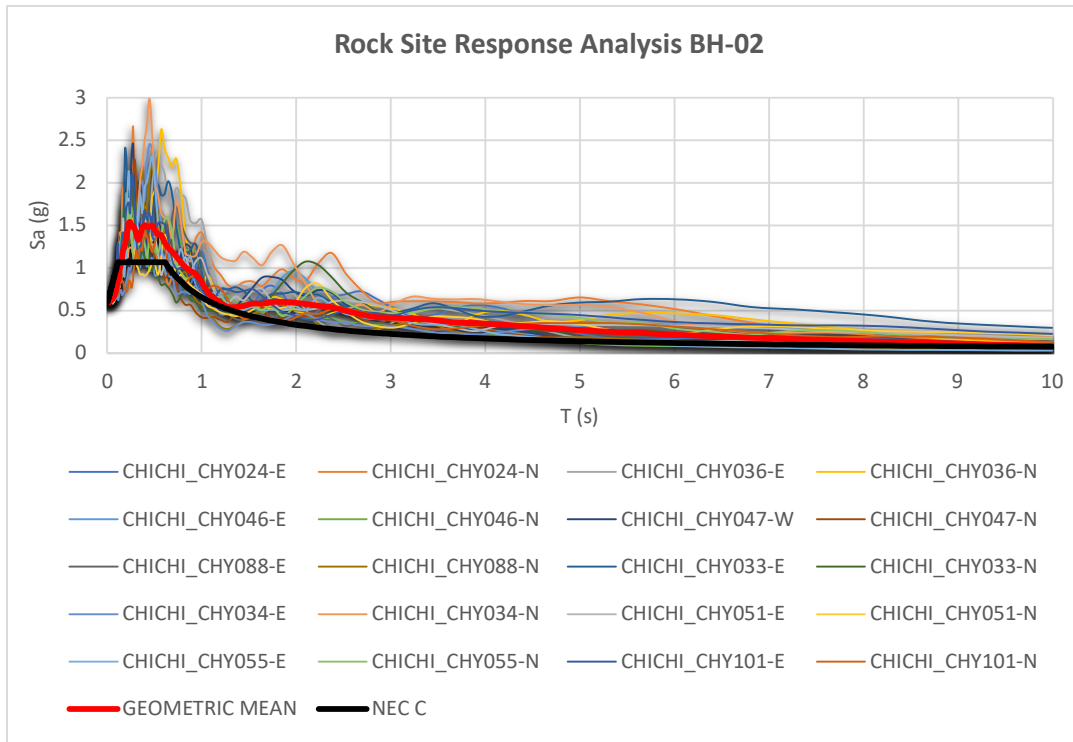


Figure A13. Rock response spectrum for BH-02 and comparison with NEC C spectrum.

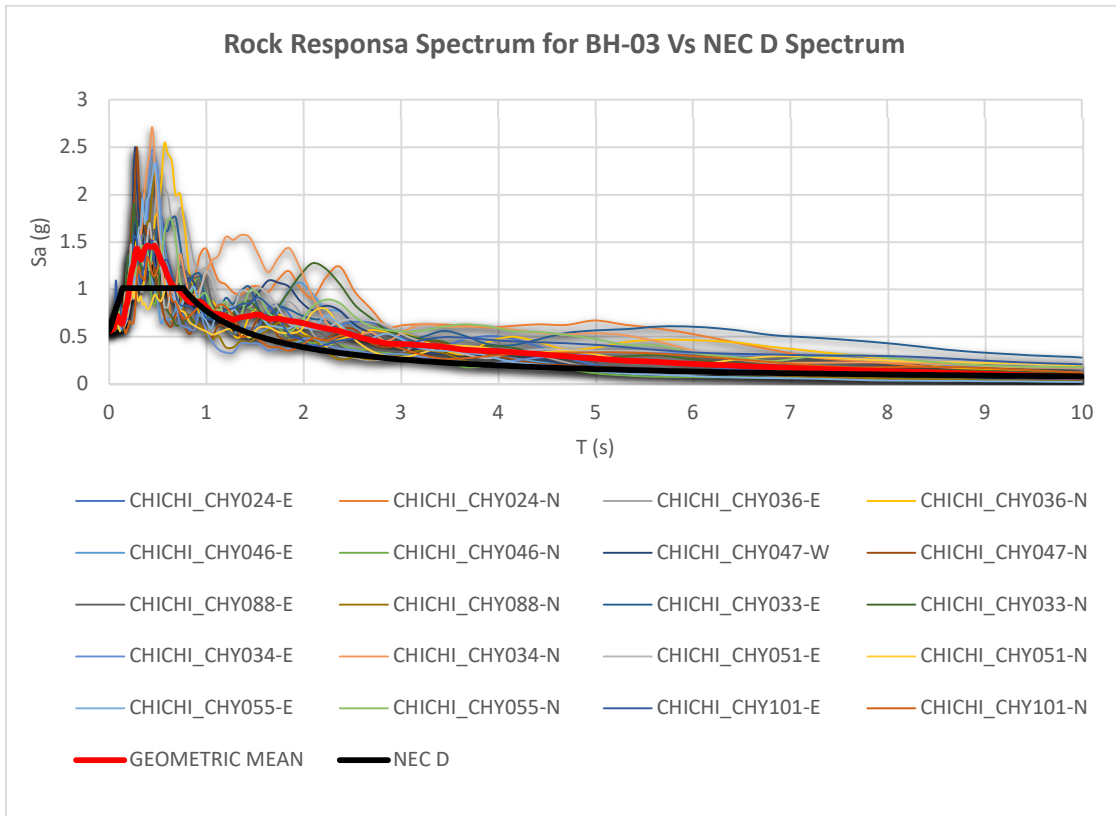


Figure A14. Rock response spectrum for BH-03 and comparison with NEC D spectrum.

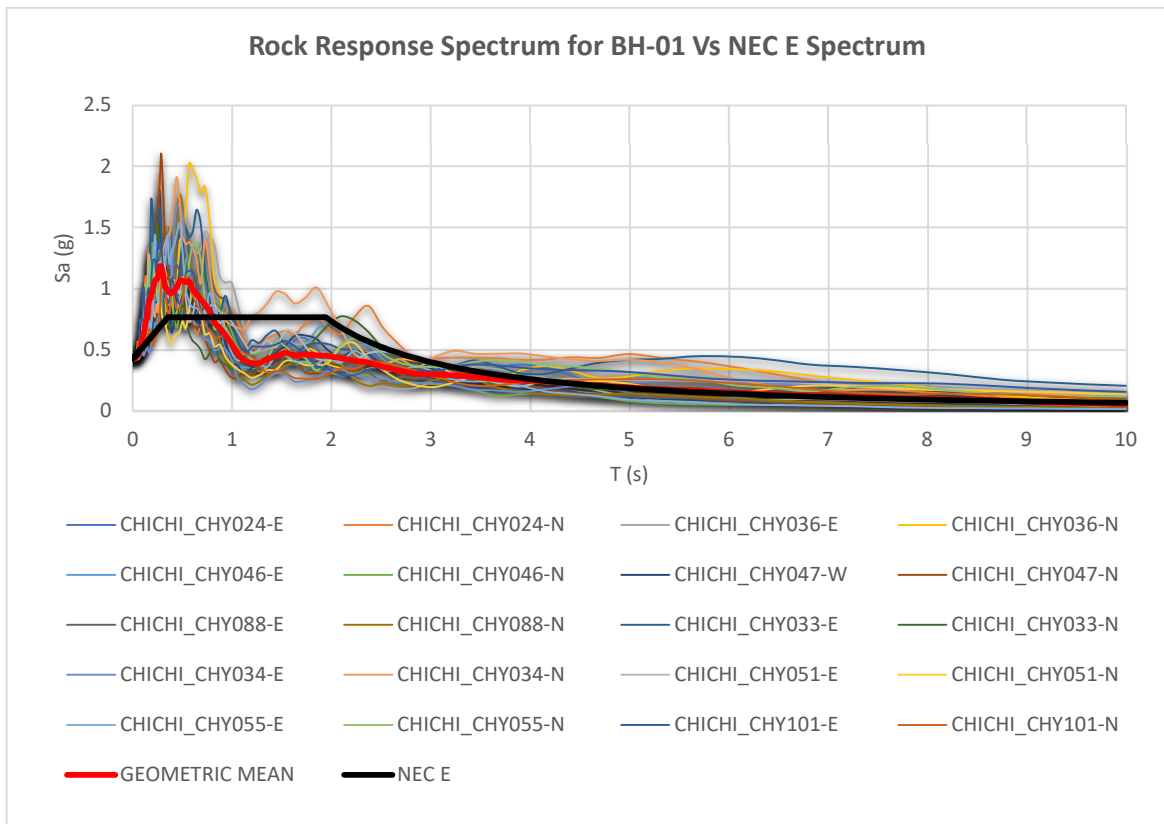


Figure A15. Rock response spectrum for BH-01 and comparison with NEC E spectrum.

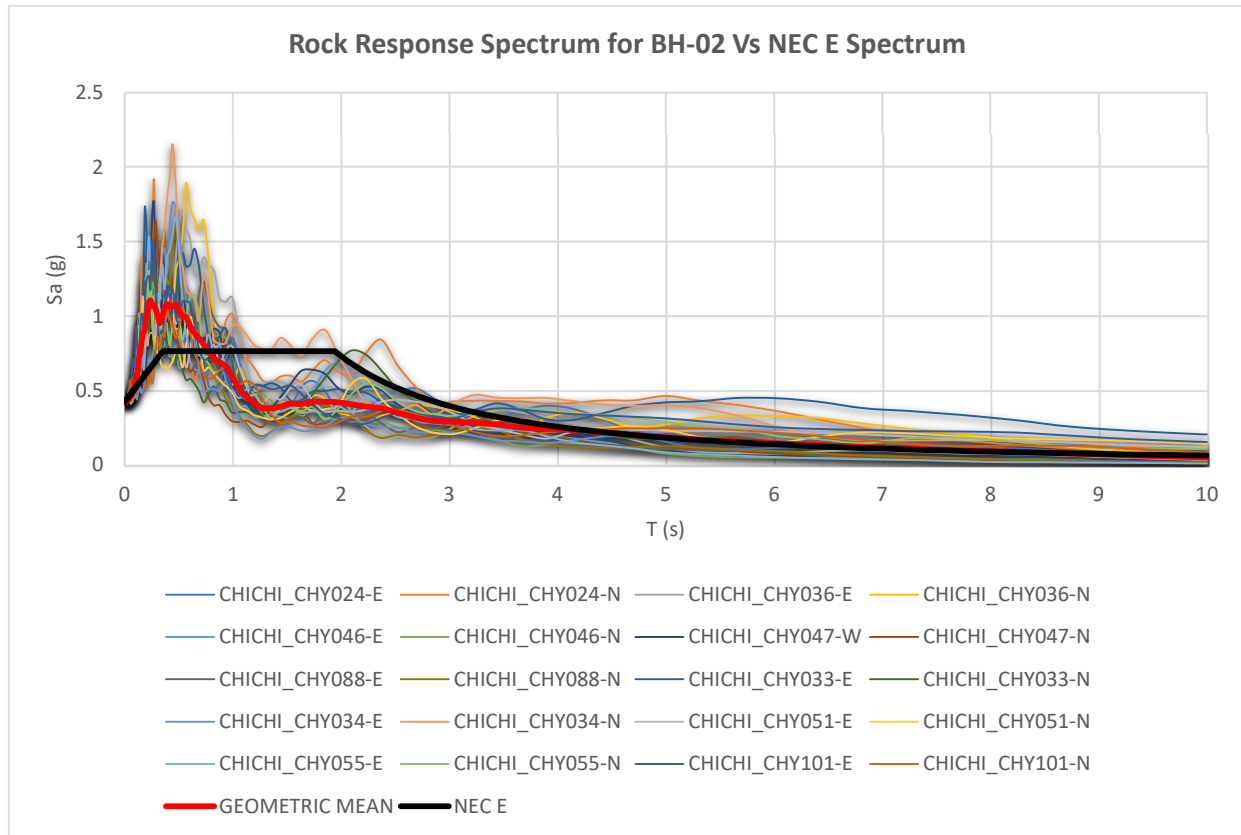


Figure A16. Rock response spectrum for BH-02 and comparison with NEC E spectrum.

Table S3. Soil model considered for BH-03.

Layer	Type	Thickness	γ	V_s	IP	σ'_{vo}	S_u	OCR	k_0
1.00	CH	3.25	15.25	157.73	43.00	24.78	56.31	11.47	0.62
2.00	CH	0.50	15.25	157.73	43.00	50.92	56.31	4.11	0.62
3.00	MH	1.25	15.25	157.73	43.00	55.68	56.31	3.62	0.62
4.00	MH	0.63	15.25	157.73	43.00	60.79	56.31	3.19	0.62
5.00	ML	1.88	15.25	157.73		67.62			0.44
6.00	MH	3.44	15.25	157.73	56.00	82.09	56.31	2.08	0.68
7.00	ML	2.50	15.25	157.73		98.25			0.44
8.00	ML	1.25	15.25	157.73		108.45			0.44
9.00	Sandstone	1.56	19.64	437.79		119.51			0.44
10.00	Conglomerate	2.50	19.64	437.79		139.47			0.44
11.00	Lutites	1.56	19.64	437.79		159.42			0.44
12.00	Lutites	3.13	19.64	437.79		182.47			0.44
13.00	ML	1.88	19.64	437.79		207.10			0.44
14.00	ML	3.13	19.64	437.79		231.72			0.44
15.00	ML	0.12	19.64	437.79		247.70			0.44

Table S4. Soil model considered for BH-01.

Layer	Type	Thickness	Y	V _s	IP	σ' _{vo}	S _u	OCR	k ₀
1.00	Fill	1.00	19.00	177.82		9.50	66.05		1.00
2.00	CH	2.09	15.00	177.82	50.00	34.67	66.05	8.92	0.65
3.00	CH	0.71	15.00	177.82	40.00	55.68	66.05	4.54	0.61
4.00	ML	1.97	15.00	177.82		66.11		0.00	0.44
5.00	ML	1.85	15.00	177.82		76.02		0.00	0.44
6.00	MH	1.91	14.00	138.83	65.00	84.82	47.52	1.56	0.71
7.00	MH	1.54	14.00	138.83	42.00	92.05	47.52	1.39	0.62
8.00	MH	1.91	14.00	138.83	39.00	99.28	47.52	1.25	0.60
9.00	MH	1.47	14.00	138.83	37.00	106.36	47.52	1.13	0.60
10.00	MH	2.60	15.00	138.83	47.00	116.19	47.52	1.00	0.64
11.00	MH	2.38	15.00	138.83	43.00	129.11	47.52	0.86	0.62
12.00	MH	4.61	15.00	151.96	49.00	147.25	53.59	0.84	0.65
13.00	MH	8.01	15.00	151.96	43.00	180.00	53.59	0.63	0.62
14.00	ML	2.00	15.00	330.58		205.97			0.44
15.00	SC	1.53	15.00	330.58		215.13			0.44

Table S5. Soil model considered for BH-02.

Layer	Type	Thickness	Y	V _s	IP	σ' _{vo}	S _u	OCR	k ₀
1.00	Fill	0.71	19.00	117.05		6.75	37.87		1.00
2.00	CH	2.84	16.00	117.05	36.00	36.21	37.87	3.80	0.59
3.00	ML	0.25	16.00	117.05		60.93			0.44
4.00	ML	2.25	16.00	117.05		69.89			0.44
5.00	SM	0.71	16.00	117.05		79.05			0.44
6.00	ML	0.71	16.00	117.05		83.44			0.44
7.00	SM	0.71	16.00	117.05		87.84			0.44
8.00	ML	0.71	16.00	117.05		92.23			0.44
9.00	ML	2.14	17.00	190.95		102.13			0.44
10.00	SM	1.43	17.00	190.95		114.96			0.44
11.00	MH	2.85	16.00	190.95	21.00	128.92	72.61	1.57	0.53
12.00	MH	15.00	16.00	127.94	43.00	184.17	42.63	0.44	0.62
13.00	MH	4.28	16.00	271.73	28.00	243.84	116.08	1.24	0.56