July 1, 2015

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Re: Monitoring Program
Municipal Solid Waste Landfill
Arecibo, Puerto Rico
(GEO-853-2014)

Dear engineer Zayas:

As part of the monitoring program conducted in Arecibo's municipal solid waste landfill, on April 29 and 30, 2015 we performed readings of the inclinometers installed along the landfill northern portion. Given below are our comments on the readings. The summary of the inclinometer readings and plots is attached.

- The readings from inclinometer I-2 were in the trend of the previous readings (except those from 12/27/13). The readings of this inclinometer seem to indicate the development of buckling of the casing between depths 5 ft and 13 ft. Landfill and soft organic soils were found within these depths when performing the boring (boring B-5) for this inclinometer. Additional readings will better characterize this condition.

- The readings of inclinometer I-3 were consistent with the previous readings and indicate that the casing has maintained deformations in the downslope direction between the depths of approximately 11 ft and 15 ft. On the basis of the log of the boring where this inclinometer was installed (boring B-3), the casing has deformed within landfill. As a result, the casing deformation is probably due to buckling of the casing caused by

vertical and/or lateral deformations developed within the landfill. No cracks were observed at the ground surface to confirm that lateral movements are occurring in the ground.

- The readings of inclinometer I-4 show an upslope deformation at a depth of 11 ft, which is in the vicinity of the contact between the existing upper fill and underlying landfill, and a depth of 3 ft. Two readings were performed (one in April 29 and the second in April 30, 2015) to confirm the casing deformations. The deformation at a depth of 11 ft is probably due to buckling of the inclinometer casing caused by vertical deformations undergoing within the fill and/or landfill. The deformation at a depth of 3 ft is probably caused by a loose casing as this area is constantly subjected to heavy traffic loads. Additional readings would be required to confirm this condition.

We expect to take the next inclinometer readings by August 2015 to verify the behavior of inclinometers I-3 and I-4.

If you have any questions, please do not hesitate to contact us.

Cordially,
GEO Engineering

Carlos E. Rodríguez Pérez, PhD, PE
Geotechnical Engineer

Enclosures

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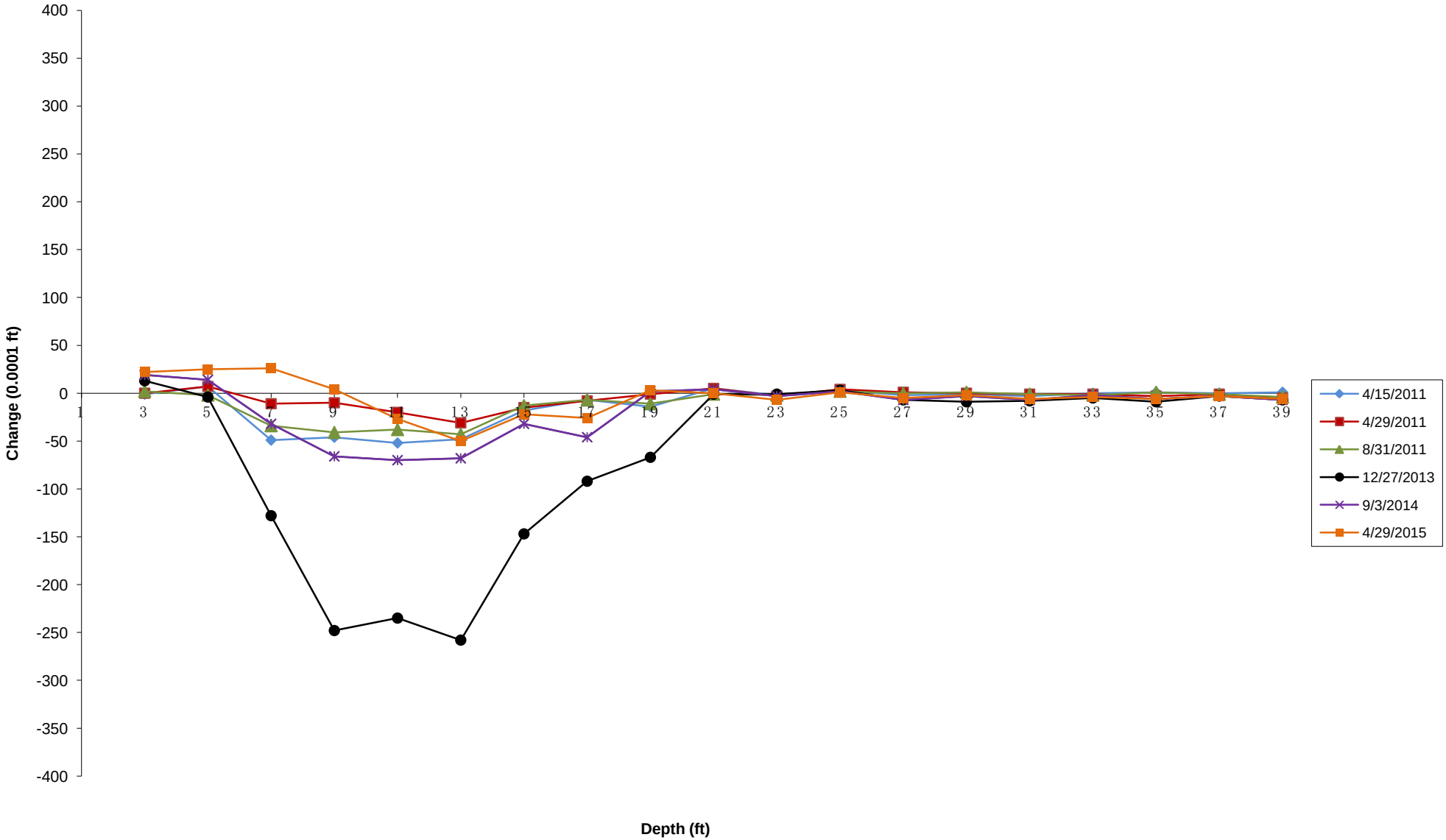
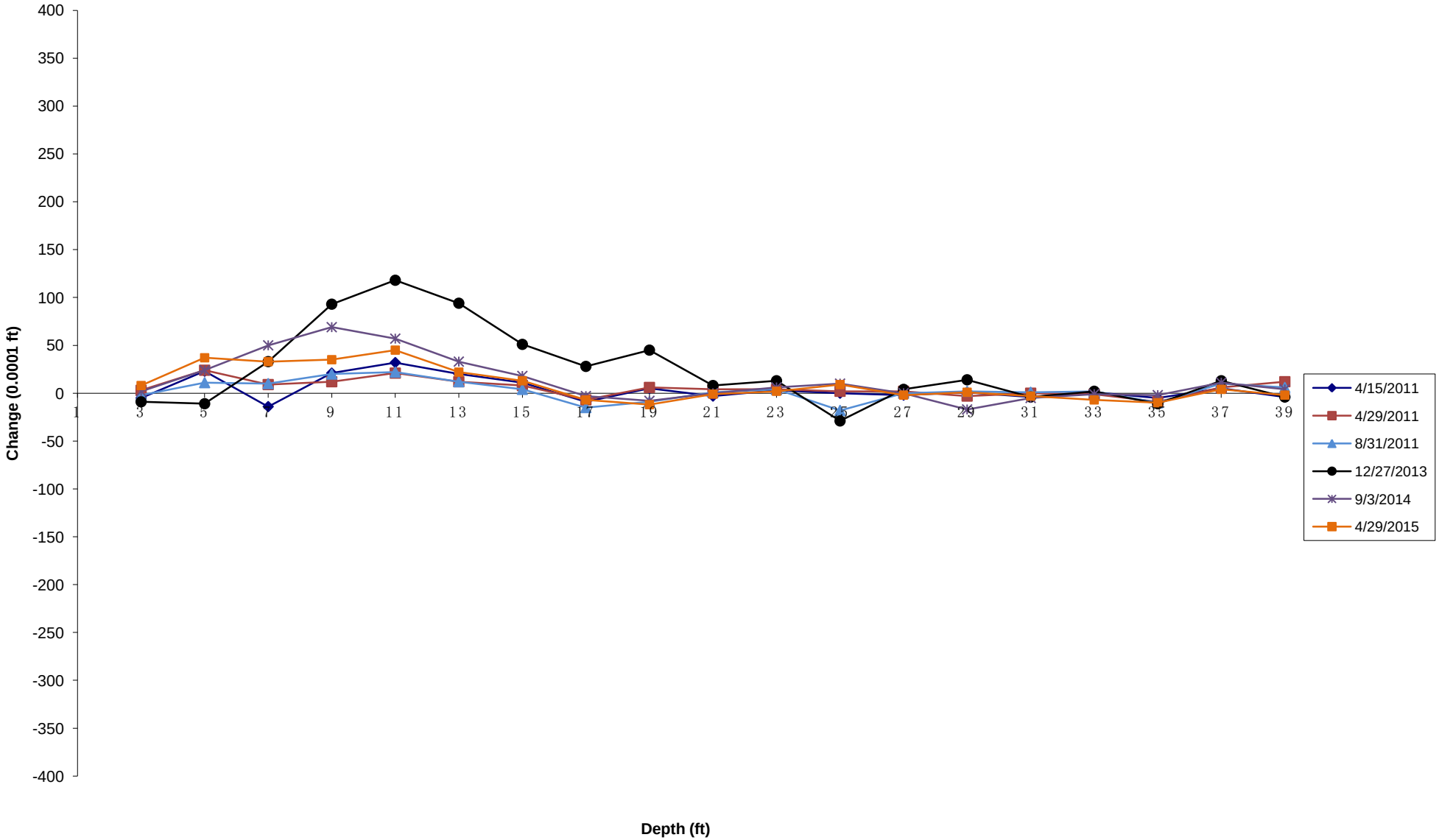
Arecibo' s Municipal Landfill

Inclinometer No. 2A (Bor. 5)



Arecibo' s Municipal Landfill

Inclinometer No. 2B (Bor. 5)

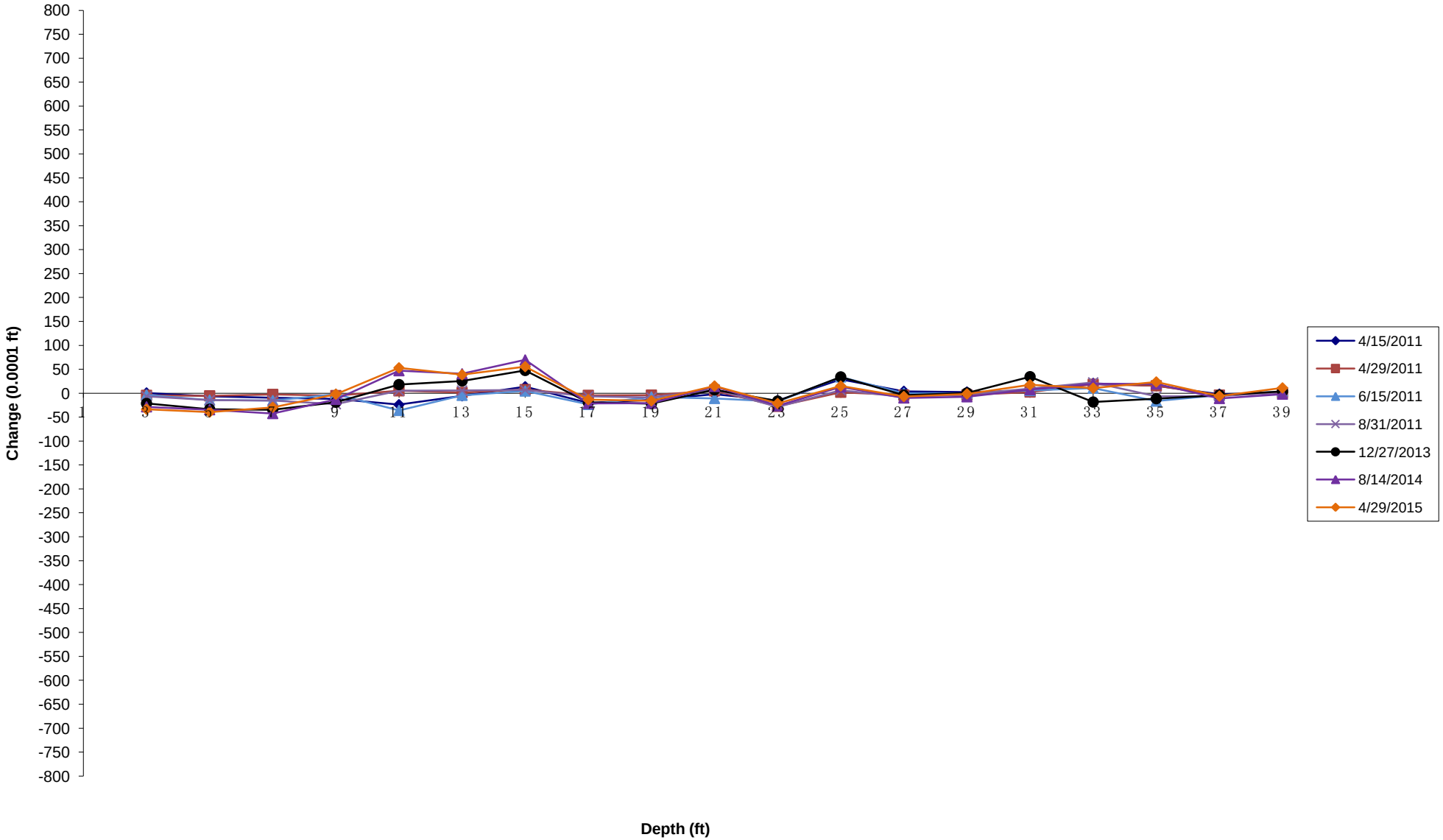


Project:	Arecibo' s Municipal Landfill			*Depth (ft):*	39	*Inclinometer No .*	2A (Bor. 5)	
Date:	4/29/2015			*Read:*	7	*Orientation of A -axis*		
Depth (ft)	Reading 1	Reading 2	Diff.	B - C	Initial	Change	G*.0006	Deflection
3.0	232	-227	5	459	437	22	0.0132	-0.0498
5.0	417	-408	9	825	800	25	0.015	-0.0630
7.0	604	-637	33	1241	1215	26	0.0156	-0.0780
9.0	606	-622	16	1228	1224	4	0.0024	-0.0936
11.0	620	-620	0	1240	1267	-27	-0.0162	-0.0960
13.0	661	-666	5	1327	1377	-50	-0.03	-0.0798
15.0	751	-752	1	1503	1525	-22	-0.0132	-0.0498
17.0	770	-732	38	1502	1528	-26	-0.0156	-0.0366
19.0	794	-722	72	1516	1513	3	0.0018	-0.0210
21.0	807	-855	48	1662	1662	0	0	-0.0228
23.0	774	-766	8	1540	1547	-7	-0.0042	-0.0228
25.0	788	-784	4	1572	1571	1	0.0006	-0.0186
27.0	820	-813	7	1633	1638	-5	-0.003	-0.0192
29.0	746	-742	4	1488	1490	-2	-0.0012	-0.0162
31.0	692	-690	2	1382	1388	-6	-0.0036	-0.0150
33.0	638	-629	9	1267	1271	-4	-0.0024	-0.0114
35.0	611	-610	1	1221	1227	-6	-0.0036	-0.0090
37.0	589	-584	5	1173	1176	-3	-0.0018	-0.0054
39.0	584	-579	5	1163	1169	-6	-0.0036	-0.0036

Project:	Arecibo' s Municipal Landfill			*Depth (ft):*	39	*Inclinometer No .*	2B (Bor. 5)	
Date:	4/29/2015			*Read:*	7	*Orientation of A -axis*		
Depth (ft)	Reading 1	Reading 2	Diff.	B - C	Initial	Change	G*.0006	Deflection
3.0	548	-608	60	1156	1148	8	0.0048	0.0990
5.0	880	-940	60	1820	1783	37	0.0222	0.0942
7.0	1376	-1418	42	2794	2761	33	0.0198	0.0720
9.0	1545	-1597	52	3142	3107	35	0.021	0.0522
11.0	1650	-1767	117	3417	3372	45	0.027	0.0312
13.0	1742	-1832	90	3574	3552	22	0.0132	0.0042
15.0	1778	-1870	92	3648	3635	13	0.0078	-0.0090
17.0	1771	-1836	65	3607	3614	-7	-0.0042	-0.0168
19.0	1606	-1856	250	3462	3474	-12	-0.0072	-0.0126
21.0	1708	-1774	66	3482	3483	-1	-0.0006	-0.0054
23.0	1665	-1748	83	3413	3411	2	0.0012	-0.0048
25.0	1723	-1777	54	3500	3491	9	0.0054	-0.0060
27.0	1748	-1819	71	3567	3569	-2	-0.0012	-0.0114
29.0	1722	-1793	71	3515	3514	1	0.0006	-0.0102
31.0	1716	-1773	57	3489	3492	-3	-0.0018	-0.0108
33.0	1681	-1754	73	3435	3442	-7	-0.0042	-0.0090
35.0	1682	-1754	72	3436	3446	-10	-0.006	-0.0048
37.0	1679	-1748	69	3427	3423	4	0.0024	0.0012
39.0	1689	-1715	26	3404	3406	-2	-0.0012	-0.0012

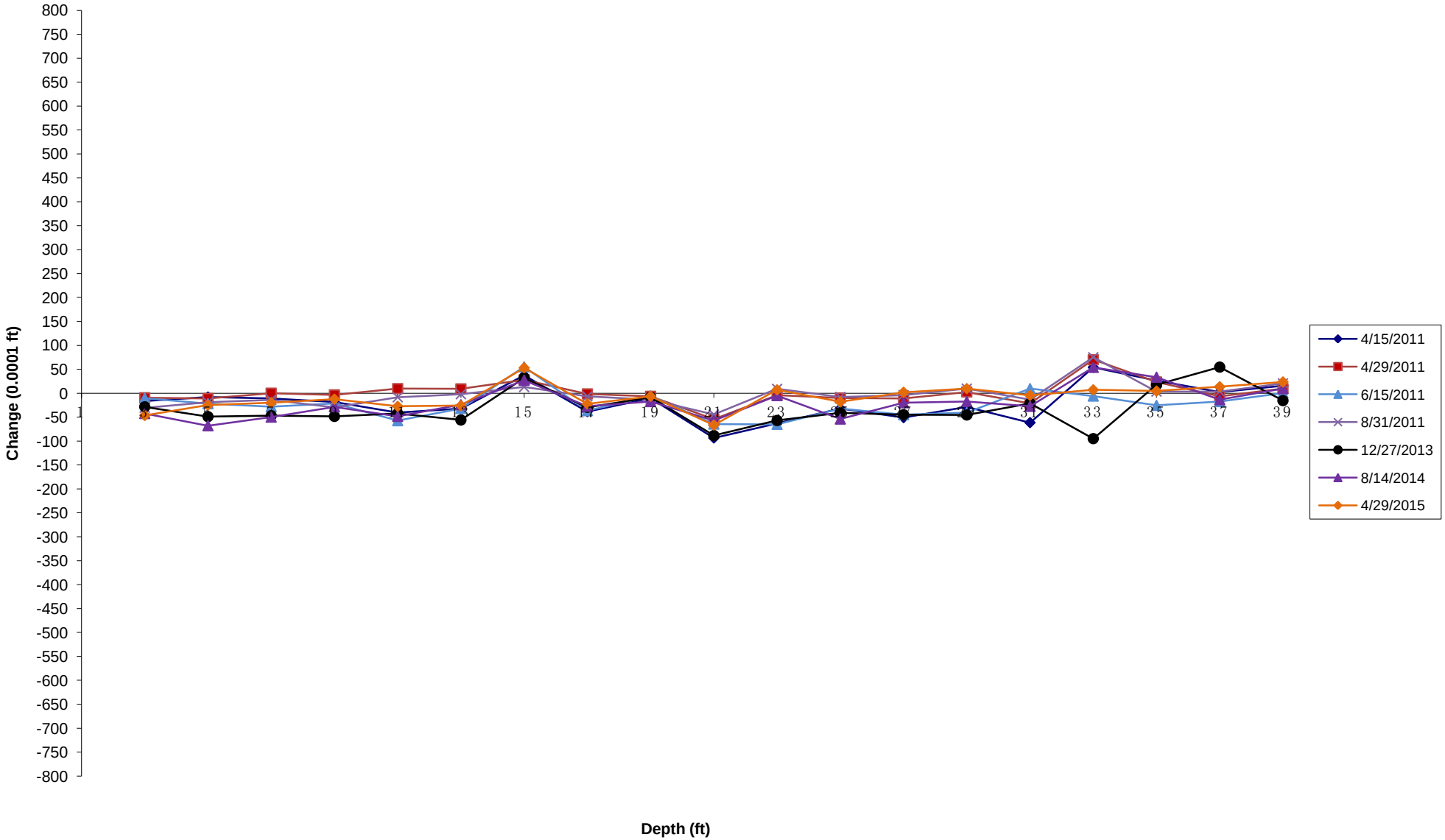
Arecibo' s Municipal Landfill

Inclinometer No. 3A (Bor. 3)



Arecibo' s Municipal Landfill

Inclinometer No. 3B (Bor. 3)

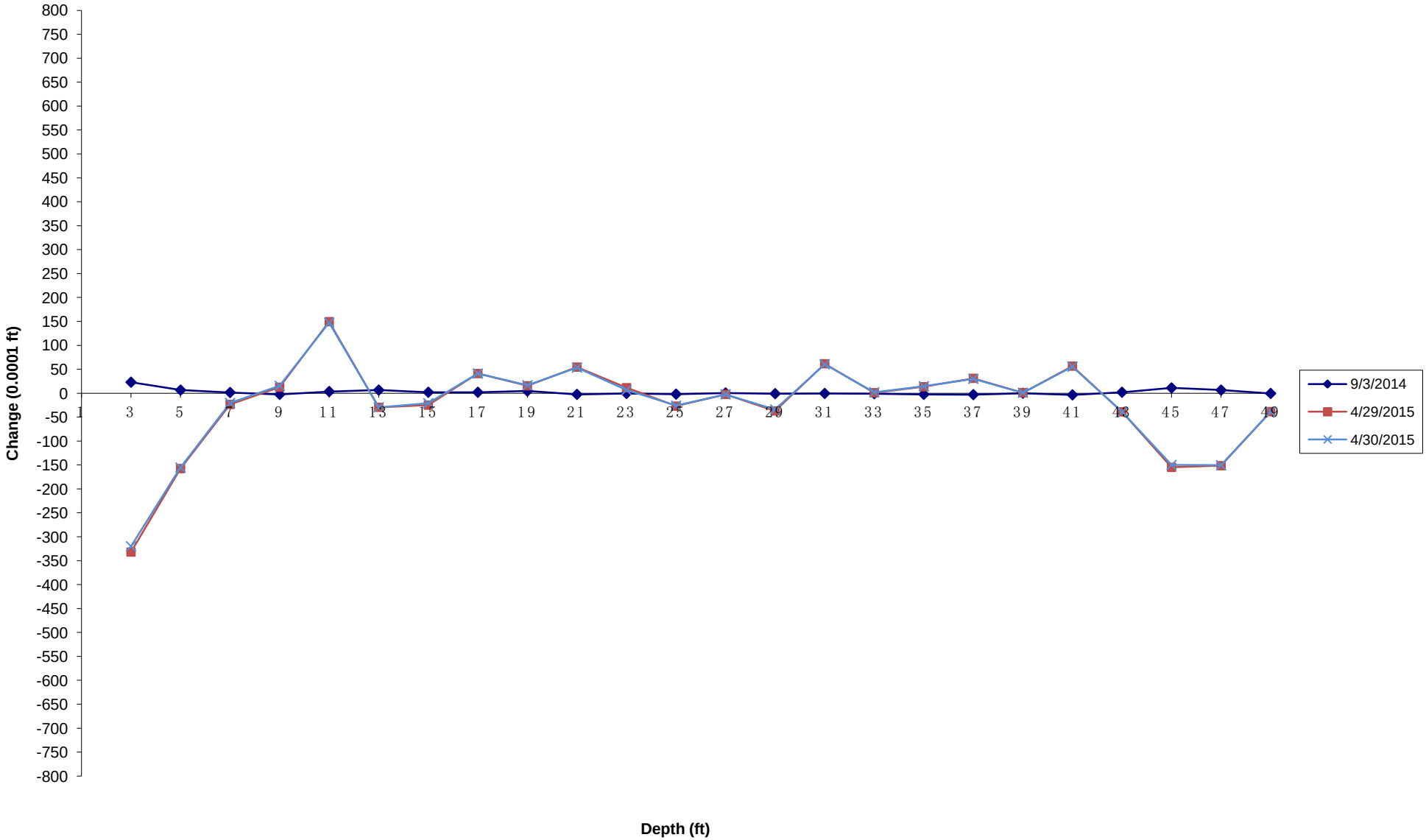


Project:	Arecibo' s Municipal Landfill			*Depth (ft):*	39	*Inclinometer No .*	3A (Bor. 3)	
Date:	4/29/2015			*Read:*	8	*Orientation of A -axis*		
Depth (ft)	Reading 1	Reading 2	Diff.	B - C	Initial	Change	G*.0006	Deflection
3.0	-239	246	7	-485	-452	-34	-0.0201	0.0417
5.0	-252	258	6	-510	-471	-40	-0.0237	0.0618
7.0	-257	253	4	-510	-481	-30	-0.0177	0.0855
9.0	-259	257	2	-516	-514	-2	-0.0012	0.1032
11.0	-288	279	9	-567	-620	53	0.0318	0.1044
13.0	-280	322	42	-602	-641	39	0.0231	0.0726
15.0	-479	522	43	-1001	-1057	56	0.0333	0.0495
17.0	-617	626	9	-1243	-1230	-14	-0.0081	0.0162
19.0	-600	612	12	-1212	-1196	-16	-0.0096	0.0243
21.0	-637	654	17	-1291	-1306	15	0.009	0.0339
23.0	-689	691	2	-1380	-1359	-22	-0.0129	0.0249
25.0	-690	691	1	-1381	-1396	15	0.009	0.0378
27.0	-682	687	5	-1369	-1362	-7	-0.0042	0.0288
29.0	-682	693	11	-1375	-1374	-2	-0.0009	0.0330
31.0	-646	684	38	-1330	-1348	18	0.0105	0.0339
33.0	-599	595	4	-1194	-1205	11	0.0063	0.0234
35.0	-537	550	13	-1087	-1111	24	0.0141	0.0171
37.0	-619	631	12	-1250	-1244	-6	-0.0036	0.0030
39.0	-580	596	16	-1176	-1187	11	0.0066	0.0066

Project:	Arecibo' s Municipal Landfill			*Depth (ft):*	39	*Inclinometer No .*	3B (Bor. 3)	
Date:	4/29/2015			*Read:*	8	*Orientation of A -axis*		
Depth (ft)	Reading 1	Reading 2	Diff.	B - C	Initial	Change	G*.0006	Deflection
3.0	-68	-8	76	-60	-14	-47	-0.0279	-0.0933
5.0	63	-150	87	213	238	-25	-0.015	-0.0654
7.0	149	-257	108	406	426	-20	-0.012	-0.0504
9.0	155	-226	71	381	394	-13	-0.0075	-0.0384
11.0	227	-269	42	496	524	-28	-0.0165	-0.0309
13.0	120	-151	31	271	297	-26	-0.0156	-0.0144
15.0	170	-353	183	523	470	53	0.0318	0.0012
17.0	224	-294	70	518	541	-23	-0.0135	-0.0306
19.0	185	-242	57	427	434	-7	-0.0039	-0.0171
21.0	1	-28	27	29	96	-67	-0.0399	-0.0132
23.0	-111	114	3	-225	-232	7	0.0042	0.0267
25.0	-190	176	14	-366	-348	-18	-0.0108	0.0225
27.0	-100	60	40	-160	-162	2	0.0012	0.0333
29.0	-44	37	7	-81	-91	10	0.0057	0.0321
31.0	29	-148	119	177	182	-5	-0.0027	0.0264
33.0	85	-183	98	268	261	7	0.0042	0.0291
35.0	-17	-37	54	20	16	5	0.0027	0.0249
37.0	-85	4	81	-89	-103	14	0.0081	0.0222
39.0	-53	51	2	-104	-128	24	0.0141	0.0141

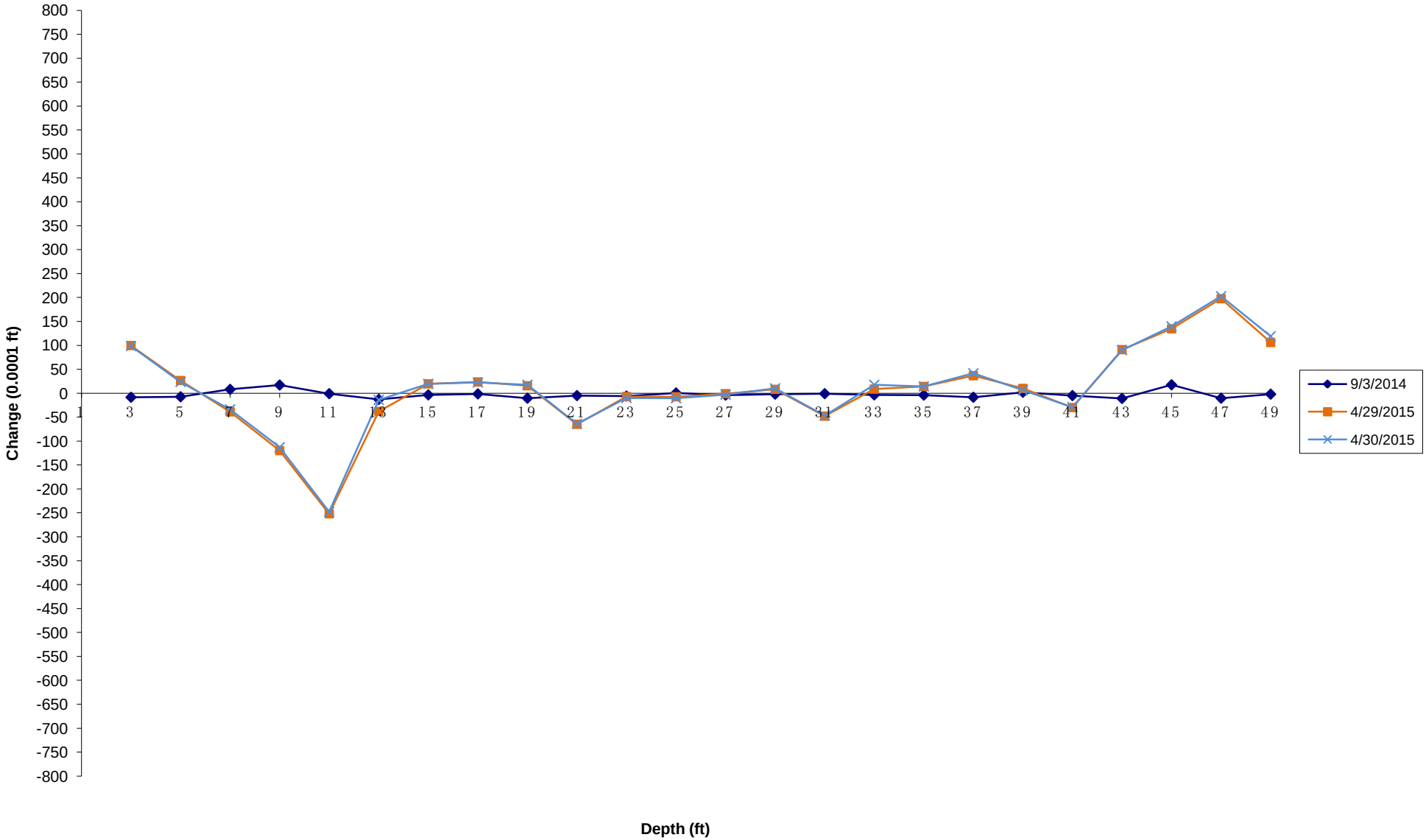
Arecibo' s Municipal Landfill

Inclinometer No. 4A (Bor. 7)



Arecibo' s Municipal Landfill

Inclinometer No. 4B (Bor. 7)



Project:	Arecibo' s Municipal Landfill			*Depth (ft):*	49	*Inclinometer No .*	4A (Bor. 7)	
Date:	4/30/2015			*Read:*	4	*Orientation of A -axis*	- North	
Depth (ft)	Reading 1	Reading 2	Diff.	B - C	Initial	Change	G*.0006	Deflection
3.0	893	-883	10	1776	2096	-320	-0.192	-0.3258
5.0	1183	-1176	7	2359	2515	-156	-0.0933	-0.1338
7.0	1318	-1309	9	2627	2648	-21	-0.0123	-0.0405
9.0	1332	-1326	6	2658	2643	16	0.0093	-0.0282
11.0	1302	-1293	9	2595	2448	148	0.0885	-0.0375
13.0	1247	-1239	8	2486	2516	-30	-0.0177	-0.1260
15.0	1313	-1307	6	2620	2641	-21	-0.0126	-0.1083
17.0	1337	-1331	6	2668	2627	41	0.0246	-0.0957
19.0	1317	-1311	6	2628	2612	17	0.0099	-0.1203
21.0	1321	-1314	7	2635	2582	54	0.0321	-0.1302
23.0	1277	-1269	8	2546	2540	7	0.0039	-0.1623
25.0	1274	-1270	4	2544	2570	-26	-0.0156	-0.1662
27.0	1294	-1288	6	2582	2585	-3	-0.0015	-0.1506
29.0	1290	-1286	4	2576	2610	-34	-0.0204	-0.1491
31.0	1303	-1297	6	2600	2540	61	0.0363	-0.1287
33.0	1268	-1260	8	2528	2526	2	0.0012	-0.1650
35.0	1256	-1249	7	2505	2491	15	0.0087	-0.1662
37.0	1229	-1224	5	2453	2423	30	0.018	-0.1749
39.0	1201	-1194	7	2395	2394	1	0.0006	-0.1929
41.0	1166	-1158	8	2324	2269	56	0.0333	-0.1935
43.0	1142	-1138	4	2280	2319	-39	-0.0234	-0.2268
45.0	1205	-1205	0	2410	2560	-150	-0.09	-0.2034
47.0	1367	-1366	1	2733	2884	-151	-0.0903	-0.1134
49.0	1472	-1480	8	2952	2991	-39	-0.0231	-0.0231

Project:	Arecibo' s Municipal Landfill			*Depth (ft):*	49	*Inclinometer No .*	4B (Bor. 7)	
Date:	4/30/2015			*Read:*	4	*Orientation of A -axis*	- North	
Depth (ft)	Reading 1	Reading 2	Diff.	B - C	Initial	Change	G*.0006	Deflection
3.0	-612	550	62	-1162	-1261	99	0.0591	0.1494
5.0	-690	632	58	-1322	-1346	24	0.0141	0.0903
7.0	-687	627	60	-1314	-1280	-34	-0.0204	0.0762
9.0	-605	553	52	-1158	-1045	-113	-0.0678	0.0966
11.0	-398	371	27	-769	-521	-248	-0.1488	0.1644
13.0	-264	195	69	-459	-445	-14	-0.0084	0.3132
15.0	-270	202	68	-472	-492	20	0.0117	0.3216
17.0	-303	231	72	-534	-557	23	0.0135	0.3099
19.0	-341	270	71	-611	-629	18	0.0105	0.2964
21.0	-354	298	56	-652	-588	-64	-0.0384	0.2859
23.0	-320	253	67	-573	-563	-10	-0.006	0.3243
25.0	-314	251	63	-565	-555	-11	-0.0063	0.3303
27.0	-312	246	66	-558	-555	-3	-0.0018	0.3366
29.0	-312	248	64	-560	-570	10	0.006	0.3384
31.0	-317	266	51	-583	-536	-47	-0.0282	0.3324
33.0	-300	227	73	-527	-545	18	0.0105	0.3606
35.0	-321	255	66	-576	-590	14	0.0084	0.3501
37.0	-358	285	73	-643	-685	42	0.0249	0.3417
39.0	-403	334	69	-737	-743	6	0.0036	0.3168
41.0	-398	329	69	-727	-698	-29	-0.0174	0.3132
43.0	-429	367	62	-796	-886	90	0.054	0.3306
45.0	-542	472	70	-1014	-1154	140	0.0837	0.2766
47.0	-700	632	68	-1332	-1535	203	0.1215	0.1929
49.0	-915	850	65	-1765	-1884	119	0.0714	0.0714