Sports Turf Solutions
Athletic Field Testing and Consulting Services

October 22, 2011

Erin Anderson, Field Operations Analyst
City of San Francisco, Recreation and Parks Dept.
501 Stanyon Street
San Francisco, CA 94132

Re: Impact Test Results – Garfield Square Playground

Dear Erin,

On October 20th I conducted impact attenuation tests on the synthetic turf athletic field at Garfield Square Playground, in San Francisco, CA. The tests were conducted in accordance with ASTM test method F355-A and test specification F1936-10. Section 8.3 of test specification F1936-10 was adapted for use on a previously tested field lined for soccer. Detailed test results are attached.

The test results reported herein reflect the performance of the points tested, at the time of testing and at the temperatures reported. As recorded in the attached results, **test points #2, #3, #5, #6, #9 and #10 failed to meet ASTM's requirement of <200 average *g*-max**, when tested in accordance with the above listed method and specification. (It should be noted that these results do not imply that an impact-related injury cannot occur if the surface system complies with ASTM's *g*-max requirement.)

Thank you for the opportunity to be of service. Please call if you have questions or would like additional copies of the report.

Sincerely,

Parker Wood
Sports Turf Solutions

Encl: Impact Test Data
Test Site Diagram

29001 Falcon Ridge Rd.
www.turftest.com Salinas, CA 93908 pwood@turftest.com
Phone: (831) 484-2138 *Assessing and Improving Safety and Playability* Fax: (831) 484-2139

Impact Test Data

Field Location: **Garfield Square Playground**
Date(s) of Test: **10/20/2011**

Field Description and Condition:

Field Layout:	Soccer
Surface Type:	Infilled synthetic turf
Manufacturer:	FieldTurf USA
Date Installed:	December, 2007
Condition:	Clean and dry
Orientation:	End A is North

Test Method/Specification: ASTM F1936-10
Standard Specification for Impact Attenuation of Turf Playing Systems as Measured in the Field

Weather Conditions

General:	Overcast; calm
Temp. (F):	59 °F (avg.)
Humidity:	81% Relative

Primary Contact:

Name	Erin Anderson
Phone #	(415) 831-6840

Test Performed By:
Parker Wood, Sports Turf Solutions

Summary of Test Results

Location	Vo (m/s)	h (m)	Avg ***g*-max**	SI	HIC	Temperatures				Depths		
						Air (°C)	Air (°F)	Surf (°C)	Surf (°F)	Pile (mm)	Infill (mm)	Turf (mm)
Test Point 1	3.58	0.65	**158**	593.1	514.6	15	59	19	66	33	27	6
Test Point 2	3.55	0.64	**222**	932.1	804.1	15	59	19	66	30	23	7
Test Point 3	3.55	0.64	**229**	946.6	818.2	15	59	19	66	28	23	5
Test Point 4	3.56	0.65	**168**	632.1	546.5	15	59	17	63	42	33	9
Test Point 5	3.56	0.64	**207**	803.4	692.7	15	59	15	59	34	27	7
Test Point 6	3.53	0.64	**270**	1148.9	991.9	15	59	18	64	31	22	9
Test Point 7	3.56	0.65	**185**	722.7	625.3	15	59	18	64	40	33	7
Test Point 8	3.56	0.65	**186**	698.4	602.0	15	59	18	64	37	29	8
Test Point 9	3.55	0.64	**266**	1139.3	987.0	15	59	19	66	21	17	4
Test Point 10	3.53	0.63	**327**	1375.9	1192.5	15	59	14	57	19	12	7

Range of *g*-max averages:	
Highest average reading	327
Lowest average reading	158
Average of the averages	222

Exceptions / Comments:

Section 8.3 of ASTM Specification F1936-10 was modified for use on a field that was previously tested. Test points #7 and #8 were selected in accordance with current ASTM guidelines. No site abnormalities were noted, and there were no deviations from standard test procedures. All tests met data integrity requirements. Some fibrillation and shedding are evident. Some areas are very low on infill. A large area in the center of the field is discolored. No seam problems were noted.

Impact Test Data

Field Location: **Garfield Square Playground**
Date(s) of Test: **10/20/2011**

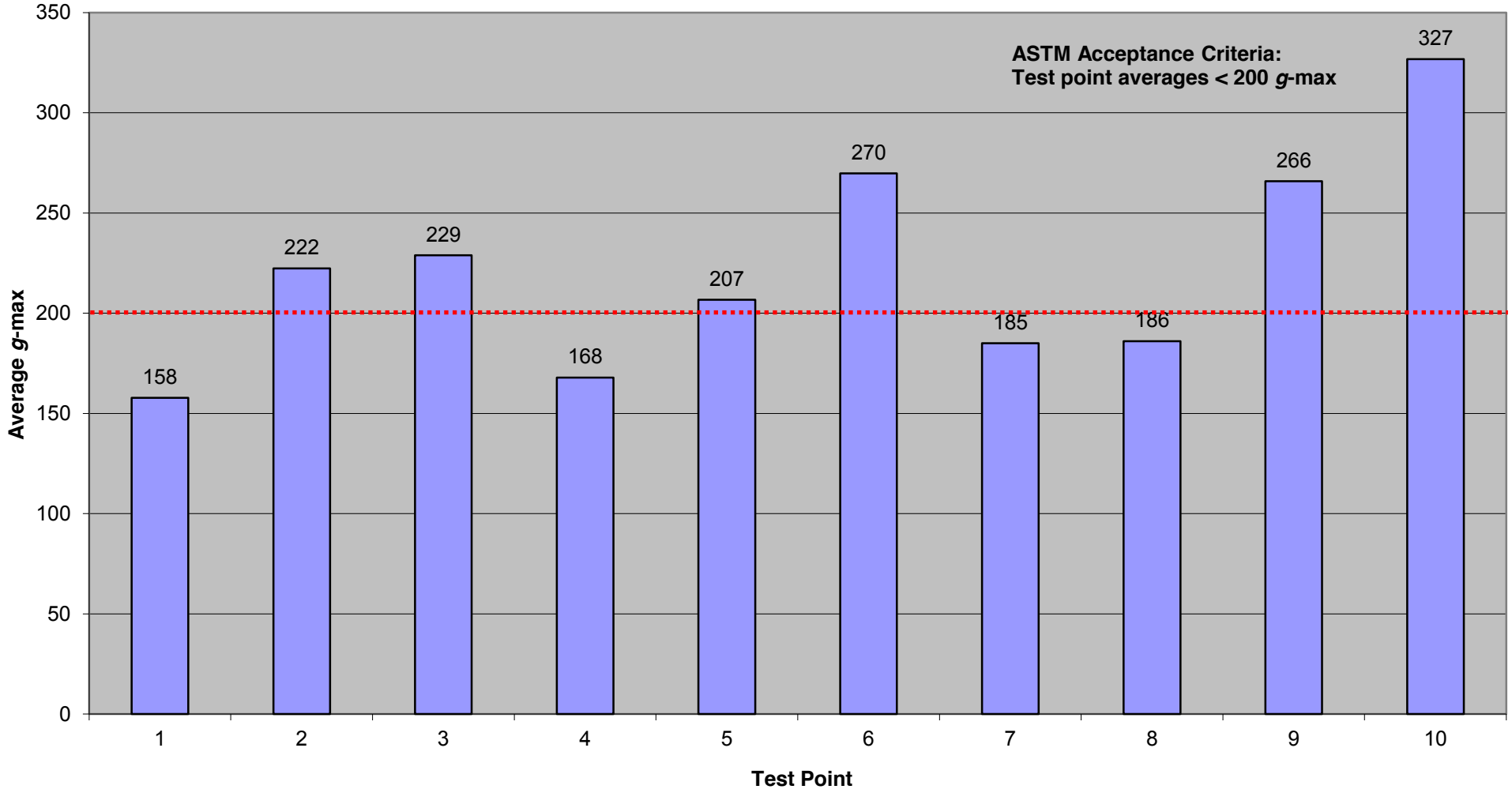
Detailed Test Results

Location	Drop #	Vo (m/s)	h (m)	***g*-max**	SI	HIC	Temperatures				Depths		
							Air (°C)	Air (°F)	Surf (°C)	Surf (°F)	Pile (mm)	Infill (mm)	Turf (mm)
Test Point 1	1	3.61	0.67	142.9	505.0	439.1							
Goal line, End A,	2	3.59	0.66	156.1	584.8	507.7							
Center Field	3	3.57	0.65	159.5	601.5	521.5							
	Avg 2&3	3.58	0.65	**157.8**	593.1	514.6	15	59	19	66	33	27	6
Test Point 2	1	3.56	0.65	198.2	783.4	676.0							
P-box cornr, btwn	2	3.54	0.64	218.7	912.6	787.8							
End A & mid field,	3	3.57	0.65	226.1	951.6	820.5							
Side C	Avg 2&3	3.55	0.64	**222.4**	932.1	804.1	15	59	19	66	30	23	7
Test Point 3	1	3.56	0.64	208.8	823.9	712.6							
Center Field	2	3.53	0.64	227.6	945.5	817.9							
	3	3.56	0.65	230.3	947.6	818.5							
	Avg 2&3	3.55	0.64	**229.0**	946.6	818.2	15	59	19	66	28	23	5
Test Point 4	1	3.60	0.66	149.8	528.9	458.0							
Mid-way from mid	2	3.56	0.65	166.1	624.7	540.4							
field to End B,	3	3.55	0.64	169.7	639.5	552.7							
3' from Side D	Avg 2&3	3.56	0.65	**167.9**	632.1	546.5	15	59	17	63	42	33	9
Test Point 5	1	3.57	0.65	196.3	750.1	647.3							
Corner of End B	2	3.56	0.64	205.1	795.5	686.5							
and Side D	3	3.56	0.65	208.4	811.2	698.9							
	Avg 2&3	3.56	0.64	**206.8**	803.4	692.7	15	59	15	59	34	27	7
Test Point 6	1	3.56	0.64	240.7	967.6	834.3							
Mid-way from mid	2	3.53	0.64	267.7	1142.2	985.8							
field to p-box at	3	3.53	0.64	271.8	1155.6	998.0							
End B, Center fld.	Avg 2&3	3.53	0.64	**269.8**	1148.9	991.9	15	59	18	64	31	22	9
Test Point 7	1	3.52	0.63	166.2	611.3	529.8							
30' from mid-field	2	3.56	0.65	182.5	708.7	613.6							
to End A, 5' out-	3	3.56	0.65	187.5	736.7	637.0							
side Side D	Avg 2&3	3.56	0.65	**185.0**	722.7	625.3	15	59	18	64	40	33	7
Test Point 8	1	3.56	0.65	160.3	554.9	478.6							
Corner of End A	2	3.57	0.65	181.6	673.7	581.0							
and Side C	3	3.56	0.65	190.5	723.2	623.1							
	Avg 2&3	3.56	0.65	**186.1**	698.4	602.0	15	59	18	64	37	29	8
Test Point 9	1	3.51	0.63	244.1	1007.7	872.6							
Top of penalty box,	2	3.54	0.64	265.3	1140.4	987.9							
End A, center of	3	3.55	0.64	266.5	1138.3	986.2							
field	Avg 2&3	3.55	0.64	**265.9**	1139.3	987.0	15	59	19	66	21	17	4
Test Point 10	1	3.53	0.64	321.2	1330.8	1155.0							
3' from goal line to	2	3.50	0.62	325.6	1388.9	1199.5							
mid-field, End B,	3	3.55	0.64	327.9	1362.9	1185.5							
center of field	Avg 2&3	3.53	0.63	**326.8**	1375.9	1192.5	15	59	14	57	19	12	7

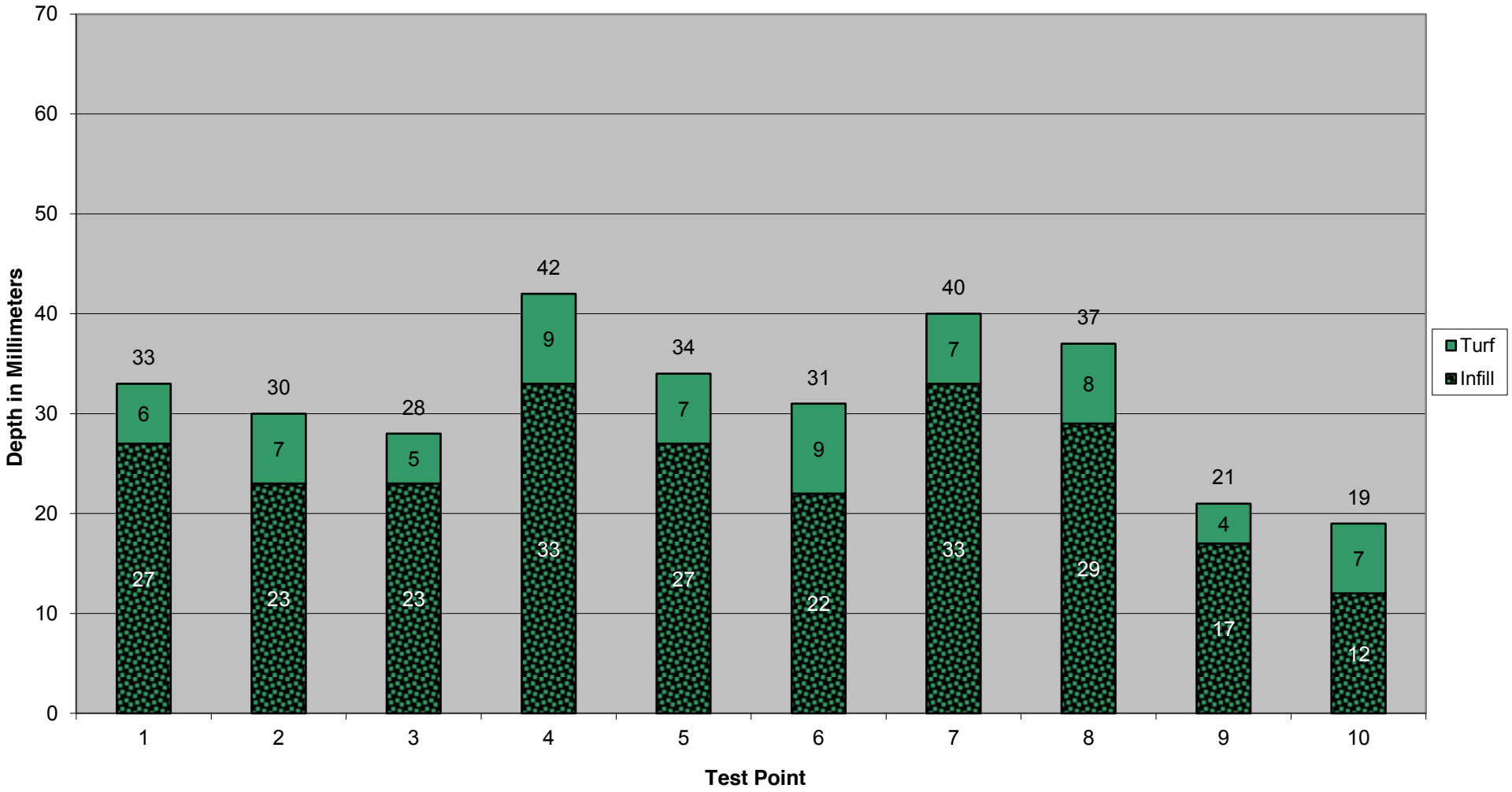
Note: The equipment used to determine *g*-max values was last calibrated 9/06/11. The calibration certificate is on file at Sports Turf Solutions. Copies are available upon request.

Garfield Square Park - Soccer Field

Average *g*-max Levels

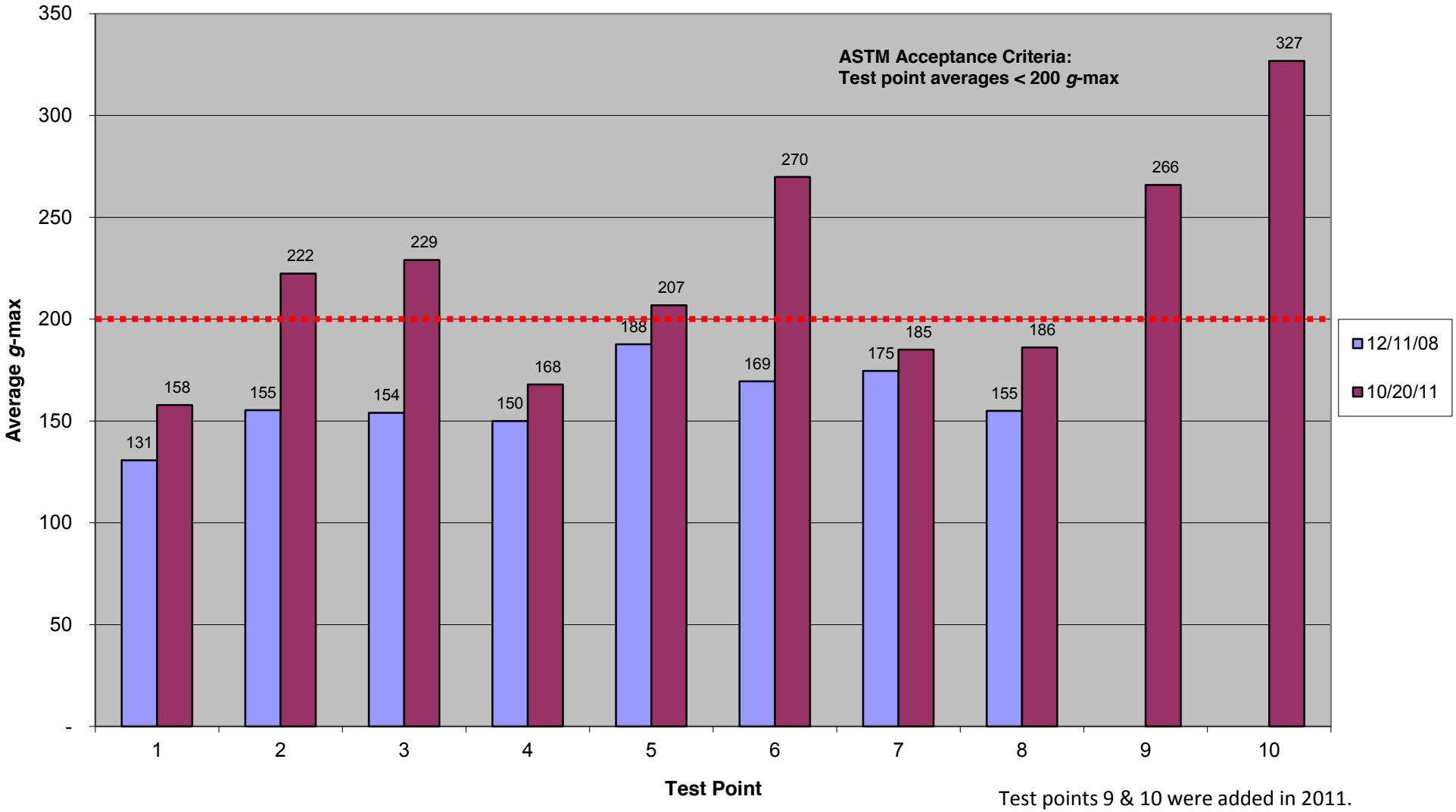


Garfield Square Park - Soccer Field
Test Point Profiles



Impact Test Data

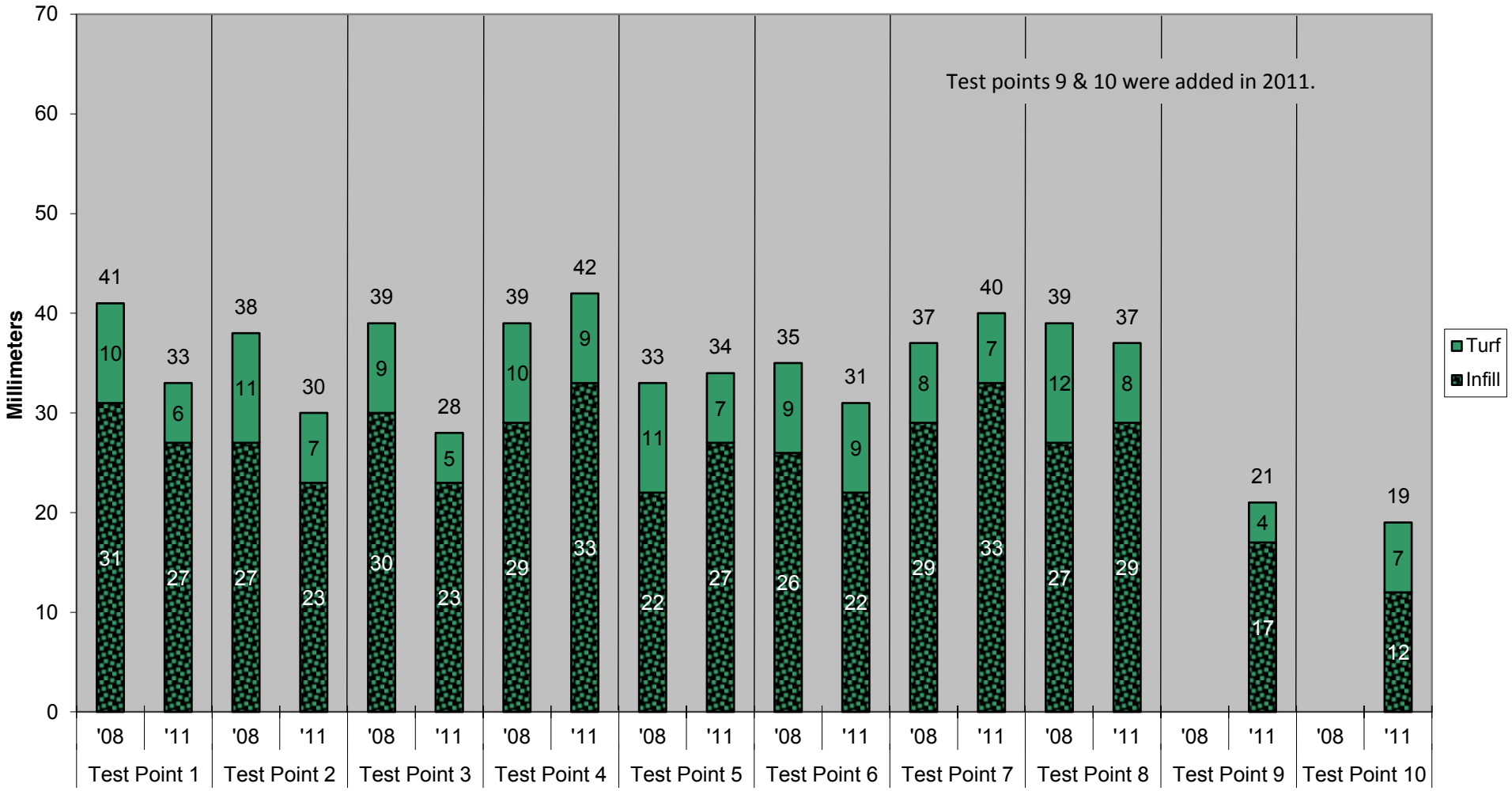
Garfield Square Park - Soccer Field
Comparison of Past and Present g-max Values



Test points 9 & 10 were added in 2011.

Garfield Square Park - Soccer Field

Comparison of Past and Present Surface Profile Data



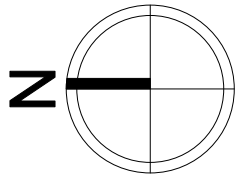
Test Point Reference Guide

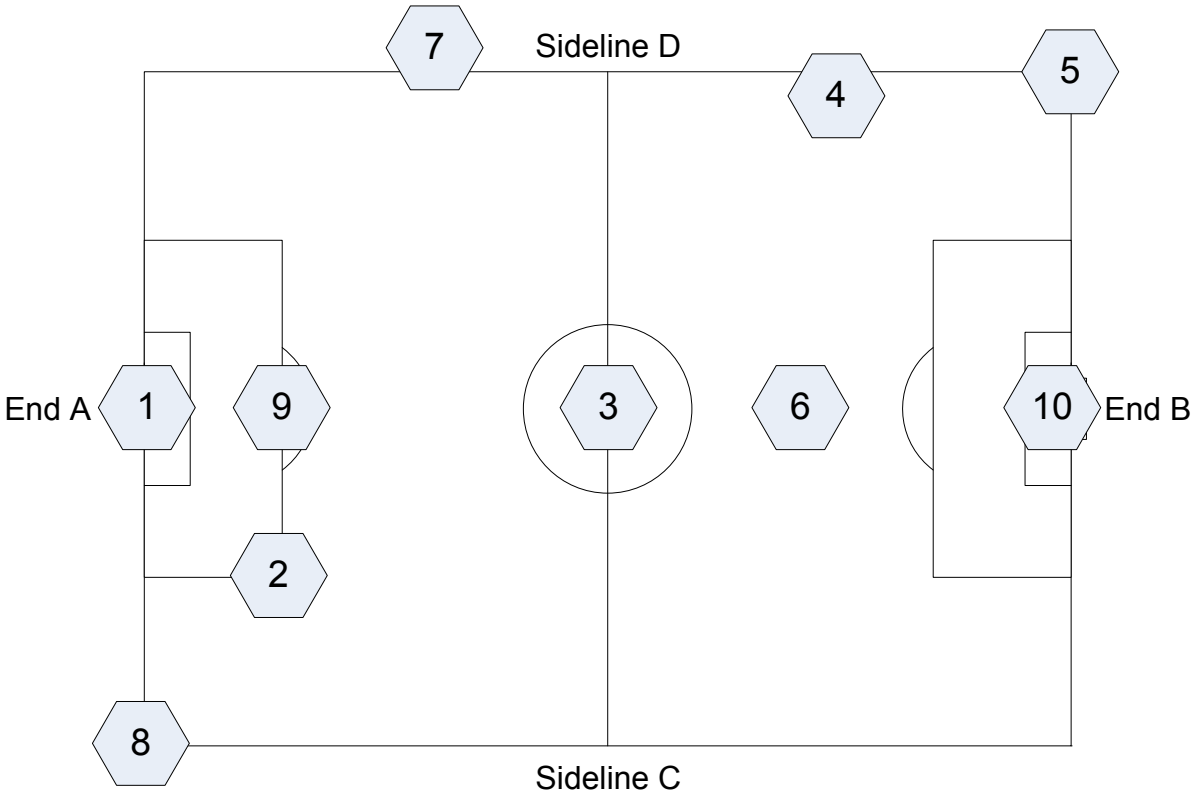
Job Number: 11-086

Client: City of San Francisco

Field: Garfield Square Playground

Date Tested: 10/20/2011





Test Points:

Point 1 – Goal line, end A, center of field
Point 2 – Corner of penalty box between end A and mid-field line, closest to sideline C
Point 3 – Mid-field line, center of field
Point 4 – Half way between mid-field line and end B, 3 ft into the field from sideline D
Point 5 – Corner of the field at end B and sideline D
Point 6 – Half way between mid-field line and penalty box at end B, center of field
Point 7 – 30' from mid-field line to end A, 5' outside sideline D
Point 8 – Corner of the field at end A and sideline C
Point 9 – Top of penalty box, end A, center of field
Point 10 - 3' from goal line to mid-field line, end B, center of field

Note: Not to scale.

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