lang
structural
engineering
inc.

October 22, 2018

To Whom It May Concern

Re: VISTA Railing Systems Inc.
Vista Aluminum Glass and Glass Wind Wall Railing Systems

Dear Madam/Sir:

Lang Structural Engineering Inc. has reviewed the load testing program for the Vista Aluminum Glass and Glass Wind Wall Railing Systems provided by VISTA Railing Systems Inc. Results of the test program identified in this report show that the Vista Aluminum Glass and Glass Wind Wall Railing Systems complied with the following requirements for guards within dwelling units and in exterior guards serving not more than 2 dwelling units, as specified in the following building codes:

2015 National Building Code of Canada (NBC)
- Section 9.8.8.2, Loads On Guards
- Section 9.8.8.3, Height of Guards
- Section 9.8.8.5, Openings in Guards
- Section 9.8.8.6, Design of Guards Not to Facilitate Climbing

2012 Ontario Building Code (OBC)
- Section 9.8.8.2, Loads On Guards
- Section 9.8.8.3, Height of Guards
- Section 9.8.8.5, Openings in Guards
- Section 9.8.8.6, Design of Guards Not to Facilitate Climbing

Identical requirements are specified in the 2012 British Columbia Building Code (BCBC) and these same requirements are applicable for the provinces of Alberta, Saskatchewan, and Manitoba.

Furthermore, all fastener connections represented on the VISTA Railing Systems Vista Aluminum Glass and Glass Wind Wall Railing Systems sealed drawings included in this report, dated October 2, 2018, are in compliance with the aforementioned building codes load requirements. For additional details for acceptable guardrail mounting configurations, layouts, and the effects of wind loading and guardrail height variations on allowable post spacing, refer to the 8th edition of the Vista Aluminum Design Guide.

The seals applied are current for the details and tables assembled for the codes indicated above.

Annual resealing of these documents is not necessary.

Additionally, the tempered glass specified and used as part of the Vista Aluminum Glass and Vista Aluminum Glass Wind Wall Railing Systems in residential home applications has been determined to be in conformance with Ontario MMAH Supplementary Standard SB-13, Glass In Guards, September 14, 2012.

Regards,

Jay K. Pierson, P.Eng.
Lang Structural Engineering Inc

#201-2313 WEST RAILWAY STREET, ABBOTSFORD, BC V2S 2E3 (604) 853-8522 (604) 857-1757 FAX (604) 853-0158 mail@langeng.com

LOADS ON GUARDS TEST REPORT

Test	Loads On Guards NBC 2015 / OBC 2012 Section 9.8.8.2
Date	July 16, 2018
Product	Vista Aluminum Glass Wind Wall Railing System Sample #1
Post Spacing (o/c)	972mm (38.25”)
Height of Guard	1524mm (60”)
Opening in Guard	6.35mm (0.25”) openings @ posts
Method	NBC 2015 / OBC 2012 Loads On Guards Section 9.8.8.2 Loads On Guards
Safety Factor	1.67 (based on a resistance factor Ø = 0.9)
Equipment	Revere 3000lb load cell Serial # M 850441
	Rice Lake 3000lb scale Serial # 1393800055
Sample & Assembly Description	Vista Aluminum Glass Wind Wall System was assembled as follows : top and bottom rails were mechanically fastened to posts using (2) #10 x 3/4” pan head self- drilling screws. 914mm (36”) x 1372mm (54”) x 6.35mm (1/4”) tempered glass infill panel assembled into top and bottom rail. Glass support brackets mechanically fastened to post using (2) #10 x 3/4” pan head self drilling screws. Posts to sub-structure fastener evaluation is beyond the scope of this report.

Test	Design Load (Inward/ Outward) (lbf)	Factored Load (lbf)	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail
Individual Elements (4inx4in)	112	187			187	**Pass 187**
Vertical Uniform Load (per ft)	103	171	218	273	546	**Pass 546**
Horizontal Uniform Load(per ft)	34	57	73	91	127**	**Pass 127****
Midspan Horizontal Concentrated Load	225	375			263**	**Pass 263****
Rail Adjacent to Connection Concentrated Load	225	375			263**	**Pass 263****
Top Of Post Concentrated Load	225	375			263**	**Pass 339 * ****

**The required proof load was multiplied by 42/60 for horizontal loads that were applied at 1524mm (60”) in height above deck level. *Top of Post ultimate load: 1.51 kN (339 lbs) Out of Stroke

Test	Design Load (Inward/ Outward) (kN)	Factored Load (kN)	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Pass/Fail
Individual Elements (100mm x100mm)	0.5	0.83			0.83	**Pass 0.83**
Vertical Uniform Load (per m)	1.5	2.50	0.29	1.21	2.43	**Pass 2.43**
Horizontal Uniform Load (per m)	0.5	0.83	0.10	0.40	0.57**	**Pass 0.57****
Midspan Horizontal Concentrated Load	1.0	1.67			1.17**	**Pass 1.17****
Rail Adjacent to Connection Concentrated Load	1.0	1.67			1.17**	**Pass 1.17****
Top Of Post Concentrated Load	1.0	1.67			1.17**	**Pass 1.51* ****

DIMENSIONAL CHECKS TEST REPORT

Test	Dimensional Checks
Date	July 16, 2018
Company	Vista Railing Systems Inc.
Product	Vista Aluminum Glass Wind Wall Railing System. Assembly #1
Post Spacing (o/c)	972mm (38.25”)
Height of Guard	1524mm (60”)
Opening in Guard	25mm (1”) openings @ posts
Method	NBC 2015 / OBC 2012
	9.8.8.3 Height Of Guards
	9.8.8.5 Openings In Guards
	9.8.8.6 Design of Guards to Not Facilitate Climbing/ Guards Designed Not to Facilitate Climbing
Equipment	Revere 3000lb load cell Serial # M 850441
	Rice Lake 3000lb scale Serial # 1393800055
Sample & Assembly Description	Vista Aluminum Glass Railing System was assembled as follows: top and bottom rails were mechanically fastened to posts using (2) #10 x 3/4” pan head self- drilling screws. 914mm (36”) x1372mm (54”) x 6.35mm (1/4”) tempered glass infill panel assembled into top and bottom rail. Glass support brackets mechanically fastened to post using (2) #10 x 3/4” pan head self drilling screws.

Description		Measured Dimension (mm)	Requirement (mm)	Pass / Fail
9.8.8.3 Height of Guards		1524	1070	Pass
9.8.8.5 Openings in Guards	@ Posts	25	<100	Pass
	Under Bottom Rail	61	<100	Pass

Description	Result	Requirement	Pass / Fail
9.8.8.6 Design of Guards to Not Facilitate Climbing/ Guards Designed Not to Facilitate Climbing	No elements protruding from the vertical between 140mm and 900mm that facilitate climbing	No elements protruding from the vertical between 140mm and 900mm that facilitate climbing	Pass

LOADS ON GUARDS TEST REPORT

Test	Loads On Guards NBC 2015 / OBC 2012 Section 9.8.8.2
Date	July 17, 2018
Product	Vista Aluminum Glass Wind Wall Railing System Sample #2
Post Spacing (o/c)	972mm (38.25”)
Height of Guard	1524mm (60”)
Opening in Guard	6.35mm (0.25”) openings @ posts
Method	NBC 2015 / OBC 2012 Section 9.8.8.2 Loads On Guards
Safety Factor	1.67 (based on a resistance factor Ø = 0.9)
Equipmen t	Revere 3000lb load cell Serial # M 850441
	Rice Lake 3000lb scale Serial # 1393800055
Sample & Assembly Description	Vista Aluminum Glass Wind Wall Railing System was assembled as follows: top and bottom rails were mechanically fastened to posts using (2) #10 x 3/4” pan head self-drilling screws. 914mm (36”) x 1372mm (54”) x 6.35mm (1/4”) tempered glass infill panel assembled into top and bottom rail. Glass support brackets mechanically fastened to post using (2) #10 x 3/4” pan head self drilling screws.
	Posts to sub-structure fastener evaluation is beyond the scope of this report.

Test	Design Load (Inward/ Outward) (lbf)	Factored Load (lbf)	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail
Individual Elements (4inx4in)	112	187			187	**Pass 187**
Vertical Uniform Load (per ft)	103	171	218	273	546	**Pass 546**
Horizontal Uniform Load(per ft)	34	57	73	91	127**	**Pass 127****
Midspan Horizontal Concentrated Load	225	375			263**	**Pass 263****
Rail Adjacent to Connection Concentrated Load	225	375			263**	**Pass 263****
Top Of Post Concentrated Load	225	375			263**	**Pass 378* ****

**The required proof load was multiplied by 42/60 for horizontal loads that were applied at 1524mm (60”) in height above deck level. *Top of Post ultimate load: 1.68 kN (378 lbs) Out of Stroke

Test	Design Load (Inward/ Outward) (kN)	Factored Load (kN)	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Pass/Fail
Individual Elements (100mm x100mm)	0.5	0.83			0.83	**Pass 0.83**
Vertical Uniform Load (per m)	1.5	2.50	0.29	1.21	2.43	**Pass 2.43**
Horizontal Uniform Load (per m)	0.5	0.83	0.10	0.40	0.57**	**Pass 0.57 ****
Midspan Horizontal Concentrated Load	1.0	1.67			1.17**	**Pass 1.17****
Rail Adjacent to Connection Concentrated Load	1.0	1.67			1.17**	**Pass 1.17****
Top Of Post Concentrated Load	1.0	1.67			1.17**	**Pass 1.68* ****

DIMENSIONAL CHECKS TEST REPORT

Test	Dimensional Checks
Date	July 17, 2018
Company	Vista Railing Systems Inc.
Product	Vista Aluminum Glass Wind Wall Railing System. Assembly #2
Post Spacing	972mm (38.25")
Height of Guard	1524mm (60")
Opening in Guard	25mm (1") openings @ posts
Method	NBC 2015 / OBC 2012 9.8.8.3 Height Of Guards 9.8.8.5 Openings In Guards 9.8.8.6 Design of Guards to Not Facilitate Climbing/ Guards Designed Not to Facilitate Climbing
Equipment	Revere 3000lb load cell Serial # M 850441 Rice Lake 3000lb scale Serial # 1393800055
Sample & Assembly Description	Vista Aluminum Glass Railing System was assembled as follows: top and bottom rails were mechanically fastened to posts using (2) #10 x 3/4" pan head self- drilling screws. 1372mm (54") x 914mm (36") x 6.35mm (1/4") tempered glass infill panel assembled into top and bottom rail. Glass support brackets mechanically fastened to post using (2) #10 x 3/4" pan head self drilling screws.

Description		Measured Dimension (mm)	Requirement (mm)	Pass / Fail
9.8.8.3 Height of Guards		1524	1070	Pass
9.8.8.5 Openings in Guards	@ Posts	25	<100	Pass
	Under Bottom Rail	61	<100	Pass

Description	Result	Requirement	Pass / Fail
9.8.8.6 Design of Guards to Not Facilitate Climbing/ Guards Designed Not to Facilitate Climbing	No elements protruding from the vertical between 140mm and 900mm that facilitate climbing	No elements protruding from the vertical between 140mm and 900mm that facilitate climbing	Pass

Test: Individual Elements

Test: Top Of Post Concentrated Load