Exhibit A

File No. 210387

Riverwalk SPROZ for Development known as Eighteen87 On Water

1887 N. Water St, Milwaukee, WI

June 18, 2021

Revised 06-28-2021.

Revised 07-12-2021.

Revised 07-20-2021.

Rule Enterprises is proposing to rezone 1887 N. Water Street to a new Detailed Planned Development (DPD, File No. 210172) to allow a 5-story, 79-unit multi-family residential building with associated parking. This site is also located within the Riverwalk Site Plan Review Overlay Zone (SPROZ) and as such, requires the construction of a Riverwalk.

Project Summary

(Tax Key -3540913110)

Project Overview:

The proposed project is for the design and construction of 5-story Residential Apartment building with two levels of interior and integrated parking within the building. There are total of 79 units, (7 of which will be walk-up townhouse-style units) with associated tenant amenities to include a management/leasing office, fitness room, community room, business center, storge, and indoor parking. The building height is up to 58 feet from street side elevation. A Riverwalk will also be constructed on the north and west sides of the building as shown in the drawings. Details relating to the Riverwalk, site plan, and building facades within the 50 foot overlay zone are provided in this exhibit relating to the Riverwalk Site Plan Review Overlay Zone (SPROZ). A deviation from the overlay standards is also being requested (FN 210388) with respect to the width of certain segments of the Riverwalk. Currently, the site is occupied by a one-story storage building and surface parking lot, which will be demolished to provide needed area for the new construction.

Building Overview:

- Street Level- First Floor: Main Building Resident Entrance & Lobby, leasing office, mechanicalspaces, indoor parking, indoor bike parking, trash/recycling, and all first floors of the two- story Townhomes. Additionally, 3 apartments have access from first floor interior hallways as apartment units.
- Second Level: Indoor parking, storage spaces, second floors of the two- story Townhomes, four apartment units, and a business center.
- Third Level: twenty apartments units, tenant amenities which includes a community room with roof terrace access, a fitness room, storage units, and other support spaces.
- Fourth – Fifth: twenty-one residential apartment units, support spaces
- The project also includes a roof terrace area located on third floor of the building with allocated use to six units and the community room, all with direct entry access to the terrace area.

Building Materials:

The exterior materials for the proposed building will consist of a combination of the following materials.Material samples will be provided to DCD as requested, and all final material selections will be reviewedand approved by DCD in advance of permit issuance:

- Face brick: utility size
- Precast Stone sills at brick surfaces: size varies.
- Architectural fiber cement panels in various shades and cuts.
- Smooth Surface Interlocking Metal panels with concealed fasteners
- Clear, Low E glazing
- Vinyl operable windows, and patio doors
- Aluminum storefront, for Building Entry, and Townhome Entries
- See Elevations on A400 – A401 for detailed information.
- Metal railings for terrace and exterior ramps
- Metal garage doors with windows
- Membrane roofing.
- Steel framed and hung balconies, with associated hardware. Prefinished pipe metal railing. Underside of balconies will show finished painted metal framing at mid support and perimeter. The walking surface of the balcony is made of composite decking material, which has a through body finish, therefore the underside looks like the finished top side. Balconies are provided to units facing Water Street. Units on west side of the building, as well and the corner unit on Northwest corner will also get balconies.

o Riverwalk specifics: North **Riverwalk perspectives on Sheet A100- A103**	o The River is located to the north side of the site. Grades from the River’s edge rise to a plateau as an existing condition. Site’s flat area meets Water Street at similar elevation as an existing condition. o The sloped area along the River’s edge, the bluff, is covered with existing greens, and trees. The project anticipates keeping this natural edge, as is, with minimal disturbance. Clearing of some of these will become critical during demolition and for staging areas needed for the construction of the new elevated ramp, and the building. It is inevitable that not all greens can be saved, however to the extent we can keep them they will be left as natural setting. Through this process and pruning of trees, perhaps some clearing becomes possible to expose views and glimpse of the water and river. o Riverwalk on the north is pulled away from the building at various setbacks to allow for functional creation of landscape beds, and privacy to units facing Riverwalk. o Riverwalk is planned to run along the top of this sloped area closer to the building. The top of the slope where it plateaus. The elevation of the Riverwalk along north will be kept at about 18 inches below the elevation of the first-floor plate of the building. This allows for the Townhomes that are located on the northside to receive

	3 steps before entering the units from outside. This provides separation from public walks and for creating privacy for units.
Connection at northeast corner:	- The Riverwalk connection to the east will be made with a series of three ramps and associated landings that connect to the existing Riverwalk at 1905 north Water Street which is the neighboring property. The ramp's first landing will be elevated from the grade at about 20 feet closest to the river, midway close to building the pier support will be 10 feet above grade, then 4 feet above grade diminishes to 2 feet above grade, until it matches grade on the north side. Please see info and detail on sheet A200 for structural details of this construction, and Sheet C200 of civil drawings for contours. - At the second landing of the ramp, before the ramp faces west, and to protect the setback area between the building and property line on the east, a 6-foot fence and an accessible gate for maintenance will be located. This ensures inaccessibility from ramp to other open areas of site around the building. - This elevated portion of the ramp is structured with steel framing supported by helical pier foundation with the least impact on the MMSD sub grade structure, and surrounding foundations. The pier support for a small portion of ramp and its first landing will be over MMSD's deep tunnel sanitary line. Continuous efforts have been made regarding coordination of this construction with MMSD project manager Micki Klappa Sullivan. Attached please see **Exhibit B**- A latter dated 07-15-2021 from her which provides MMSD's conditional approval for construction along NE corner, with details to be submitted with Construction documents prior to permitting. - Additional revised and updated technical report from geotechnical consultant on this project attached for preliminary technical overview of loading and soil conditions which will support this construction without adverse effect to the MMSD's deep tunnel. Please see technical memo as **Exhibit C**, updated to certify the use of helical piers in this area with no adverse effect to MMSD infrastructure. **Exhibit D** of previous submittal is not required and not used, as helical piers will be used for both sanitary pipe locations of MMSD's 30- and 48-inch pipes.

	Exhibit E, also see revised resubmitted structural calcs that provides new information based on use of helical piers based on which the geotechnical consultant has provided this certificate. Ramp Width at the Northeast side will be 9 feet, an application to request Deviation from width required for Riverwalk per design standards within this overlay zone is submitted for your consideration.
North Segment Riverwalk	○ The portion of north Riverwalk most parallel to the building is constructed from concrete on grade. However, where the Riverwalk expands over areas where the grade starts to fall off, north side of the site, and around northwest side of building where town homes are located, the construction of the walk will revert to steel framing supported by helical piers as their foundation form. The ramp specifically be constructed in the same manners with steel frames and piers for support. Ramp surfaces will be of composite decking. See Sheet A201, and Sheet EX-1 for extent of the 2 different types of construction proposed for the Riverwalk. Also see specification **Exhibit F** for material suggested for surface of the ramp where composite deck planks are being suggested.
West Segment Riverwalk	o Riverwalk along the West side will be built partially on our land, and partially on a land that is granted to this property via an easement. The western Riverwalk width shall be 12 feet, 7 feet of which will be built on the easement, granted from our western neighbor. o The Riverwalk connection to the west will be brought to the public pedestrian sidewalk meeting at Water Street **and** connects to the west side Riverwalk proposed by the adjacent west side property somewhat at mid-way. This connection will be coordinated for exactness and meeting proper elevations with our neighbor's proposal. Some of the steps we are taking to ensure this would work, is utilizing the 18-inch elevation difference introduced to lower Riverwalk below sill heights of Town homes and ramping to provide a gentle continuous slope over 80 feet of length, after the entrance of the last townhome is cleared. This ramping will be done in 2 segments **to allow for connection to the west side property somewhat at mid landing of this portion of Riverwalk.** We understand that we would need to coordinate with MMSD to make sure we do not interfere with their access road.

	○ This project will integrate a Riverwalk along **its two sides**, with two connections described above. The project will provide the City with a permanent public access easement for the Riverwalk, while it remains as part of the private property and will follow Riverwalk Design Guidelines to achieve this.
Riverwalk Surfaces and Railing details:	○ Ramp surfaces when elevated and supported by piers will be finished with composite decking material, **see Exhibit F**. The elevated ramp will be built over steel framing supported by either helical piers or driven piers depending on location and appropriate ness to not affect the MMSD structures below. Deck planks are synthetic composite material, that are weatherproof and used for exterior surfaces such as balconies and decks. made of wood fibers encased in plastic/resin. The ramp will have finished pipe rail system on both sides per code and code compliant height of 42 inches. The first initial elevated ramp section will have integrated lighting within the railing system to light the ramp path. **See Exhibit G-1.** ○ Continuation of Riverwalk on the north side at bottom of the ramp will be changed to be of concrete surfaces and will be constructed as slab on grade concrete sidewalk on the plateaued area. ○ Riverwalk along the west side will be also made from composite decking with steel framing supported by helical pier foundation. All portion of Riverwalk will receive railing continues and of same material except when the walk is along building side at the same protected elevation. **See Exhibit** F for composite decking material.
Lighting:	○ Harp lights are integrated as best as possible, wherever Riverwalk width is at 12 feet, both north side and west side. Harp lights will be placed on west Riverwalk as well as North Riverwalk portion. Minimal building mounted fixtures are used on a small portion of Northeast façade. These will not have up lighting and will respect dark sky will appropriate cut offs, See **Exhibit G-2.** This supplements the Ramp lighting only, which lights the foot path only. The lighting requirements for the elevated ramp on the Northeast portion will be achieved via integrated light/Rail

	system, see **Exhibit G-1.** The balance of ramp path along the building will be illuminated by fixtures installed on the building façade, see **Exhibit G-2**. - In addition to the installation of Harp lights and building light fixtures, prefinished benches and trash receptacles will be provided for public use, see **Exhibit H1 & H2**. These are placed in a manner to not interfere with townhome entrances and provide them with privacy, while accommodating public use. Please see sheet EX1, and Sheet A201 for location and numbers of harp lights. (12 harp lights, 2 trash receptacles, and 2 benches)
Landscaping:	- Riverwalk along the north edge against the building will also receive landscaping please see landscape plans, and **Sheets L100** and renderings of Riverwalk perspectives on **Sheet A202- A205.** - Growing vines will be planted **in ground along the edge of the building on north façade in appropriately created landscape bedding.** Vine species are indicated on the landscape plans. Additionally, **an inground irrigation system will be placed to service and promote the growth of vines on the building mounted trellis.** The trellis will be an aluminum frame structure system with interwoven smaller grid panels inbound of the structure of the frames to receive and allow space for vines to climb up from. The trellis system will be mounted to the brick wall of the parking structure along north side to provide more visual interest and will cover parking walls on seven locations. River Side bluff will be kept with minimal disturbance as a vital requirement of bluff stability. Potentially disturbance such as removal, and or pruning of limited number of shrubs and trees may be required for installation of elevated Riverwalk, whether it is the ramp portion on Northeast, or partially overhanging along Northwest side edges of the site. This may also provide some clear line of sight at some locations toward river.

EXHIBIT B

From: Christopher Carr, P.E.
To: Heather Wogsland
Cc: Colin Trautschold
Subject: MMSD
Date: Thursday, July 08, 2021 10:43:12 AM
Attachments: 58215085-Memo Regarding Helical Pier Foundations for Riverwalk near the 30 inch and 48 inch MMSD Pipes-.pdf

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This would be my response on MMSD comment

See below for latest correspondence with MMSD. Our team has modified our structural approach and provided the attached memo. After reviewing the memo, MMSD has begun to draft the "build over" letter which will act as their formal approval for the work. We need to provide final details of the foundation locations but MMSD has agreed to the location and access of the Riverwalk. MMSD's primary concern is actually with the future work that will be completed adjacent to our parcel.

I will get started on the letter so I can get it out as soon as possible once I receive the information. I will specifically state that we are not approving that work on the adjacent parcel for clarity. Thanks.

Micki Klappa-Sullivan, PE, ENV SP

Manager of Engineering Planning | MMSD

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EXHIBIT C
(replaces C & D)

To: **Brandon Rule, Rule Enterprises**

Megan Schuetz, Movin' Out

Falamak Nourzad, NCARB, AIA, ASID, LEED AP **Continuum Architects**

From: **Paul Koszarek, P.E., C.S.T.– Terracon**

Date: **July 7, 2021**

RE: **1887 N. Water Street, Milwaukee, WI**

Elevated River Walk Helical Pier Foundations near MMSD 30" and 48" Dia. Pipes

Terracon Project Number 58215085

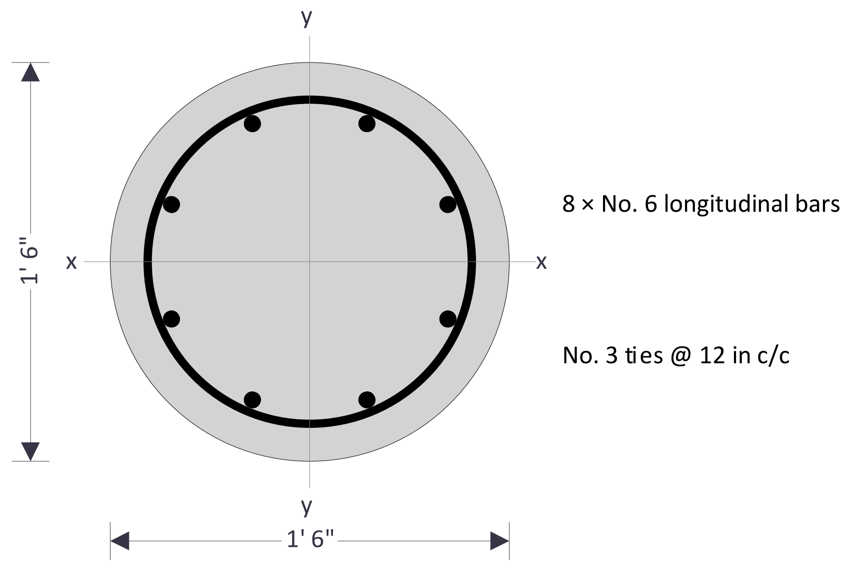
Terracon was asked to review and comment on the plan to support an elevated river walk using helical piers. It is our understanding that the helical piers will be designed with verical load only. Further, it is our understanding that the top helix for the piers being installed near the MMSD 30 inch pipe will be below the invert elevation of -2.5 MCD. Regarding the 48 inch pipe, these helical piers will terminate at least 10 feet above the top of the pipe. Therefore, there will not be additional load imparted on the 30 inch or the 48 inch MMSD pipes.

Regards,

Paul J. Koszarek, P.E., C.S.T.
Senior Associate/Geotechnical Department Manager

RC CIRCULAR COLUMN DESIGN (ACI318-11)

Tedds calculation version 2.2.02



Applied loads

Ultimate axial force acting on column P_{u_act} = **20** kips

Ratio of DL moment to total moment β_d = **0.600**

Geometry of column

Column diameter h = **18.0** in

Clear cover to all reinforcement c_c = **1.50** in

Unsupported height of column about x axis l_{ux} = **15.0** ft

Effective height factor about x axis k_x = **1.00**

Column state about the x axis Braced

Unsupported height of column about y axis l_{uy} = **15.0** ft

Effective height factor about y axis k_y = **1.00**

Column state about the y axis Braced

Reinforcement of column

Numbers of bars of longitudinal steel N = **8**

Longitudinal steel bar diameter number D_{bar_num} = **6**

Diameter of longitudinal bar D_{long} = **0.750** in

Stirrup bar diameter number D_{stir_num} = **3**

Diameter of stirrup bar D_{stir} = **0.375** in

Specified yield strength of reinforcement f_y = **60000** psi

Specified compressive strength of concrete f'_c = **4000** psi

Modulus of elasticity of bar reinforcement E_s = **29 × 10^6** psi

Modulus of elasticity of concrete $E_c = 57000 \times f'_c{}^{1/2} \times (1psi)^{1/2}$ = **3604997** psi

Yield strain $\varepsilon_y = f_y / E_s$ = **0.00207**

Ultimate design strain ε_c = **0.003** in/in

Check for minimum area of steel

Gross area of column $A_g = \pi \times h^2 / 4 = \mathbf{254.469}$ in^2

Area of steel $A_{st} = N \times (\pi \times D_{long}^2) / 4 = \mathbf{3.534}$ in^2

Minimum area of steel required $A_{st\_min} = 0.01\times A_g = \mathbf{2.545}$ in^2

A_{st}> A_{st_min}, PASS- Minimum steel check

Check for maximum area of steel - 10.9.1

Permissible maximum area of steel $A_{st\_max} = 0.08\times A_g = \mathbf{20.358}$ in^2

A_{st}< A_{st_max}, PASS - Maximum steel check

Slenderness check about x axis

Radius of gyration $r_x = 0.25 \times h = \mathbf{4.5}$ in

Actual slenderness ratio $s_{rx\_act} = k_x \times l_{ux} / r_x = \mathbf{40}$

Permissible slenderness ratio $s_{rx\_perm} = \min(34 - 12 * (M_{1x\_act} / M_{2x\_act}),40) = \mathbf{34}$

Column is slender about the X axis

Magnified moments about x axis

Moment of inertia of section $I_{gx} = (\pi\times h^4)/64 = \mathbf{5152.997}$ in^4

Euler's buckling load $P_{cx} = (\pi^2 / (k_x \times l_{ux})^2) \times (0.4 \times E_c\times I_{gx} / (1+\beta_d)) = \mathbf{1414.68}$ kips

Correction factor for actual to equiv. mmt.diagram $C_{mx} = 1.0$

Moment magnifier $\delta_{nsx} = \max(C_{mx} / (1 - (P_{u\_act} / (0.75 \times P_{cx}))),1.0) = \mathbf{1.019}$

Minimum factored moment about x axis $M_{2x\_min} = P_{u\_act} \times (0.6\text{ in} + 0.03 \times h) = \mathbf{1.9}$ kip_ft

Minimum magnified moment about x axis $M_{cx\_min} = \delta_{nsx} \times M_{2x\_min} = \mathbf{1.94}$ kip_ft

Slenderness check about y axis

Radius of gyration $r_y = 0.25 \times h = \mathbf{4.5}$ in

Actual slenderness ratio $s_{ry\_act} = k_y \times l_{uy} / r_y = \mathbf{40}$

Permissible slenderness ratio $s_{ry\_perm} = \min(34 - 12 * (M_{1y\_act} / M_{2y\_act}),40) = \mathbf{34}$

Column is slender about the Y axis

Magnified moments about y axis

Moment of inertia of section $I_{gy} = (\pi\times h^4)/64 = \mathbf{5152.997}$ in^4

Euler's buckling load $P_{cy} = (\pi^2 / (k_y \times l_{uy})^2) \times (0.4 \times E_c\times I_{gy} / (1+\beta_d)) = \mathbf{1414.68}$ kips

Correction factor for actual to equiv. mmt.diagram $C_{my} = 1.0$

Moment magnifier $\delta_{nsy} = \max(C_{my} / (1 - (P_{u\_act} / (0.75 \times P_{cy}))),1.0) = \mathbf{1.019}$

Minimum factored moment about y axis $M_{2y\_min} = P_{u\_act} \times (0.6\text{ in} + 0.03 \times h) = \mathbf{1.9}$ kip_ft

Minimum magnified moment about y axis $M_{cy\_min} = \delta_{nsy} \times M_{2y\_min} = \mathbf{1.94}$ kip_ft

Axial load capacity of axially loaded column

Strength reduction factor $\phi = \mathbf{0.650}$

Area of steel on compression face $A'_s = A_{st} / 2 = \mathbf{1.767}$ in^2

Area of steel on tension face $A_s = A_{st} / 2 = \mathbf{1.767}$ in^2

Net axial load capacity of column $P_n = 0.8 \times (0.85 \times f'_c \times (A_g - A_{st}) + f_y \times A_{st}) = \mathbf{852.188}$ kips

Ultimate axial load capacity of column $P_u = \phi \times P_n = \mathbf{553.922}$ kips

PASS : Column is safe in axial loading

Uniaxially loaded circular column

Details of column cross section

c/d_t ratio	r_{xb} = **0.286**
Depth of tension steel	$d_t = h - x_{x1}$ = **15.236** in
Depth of NA from extreme compression face	$c_x = r_{xb} \times d_t$ = **4.353** in
Factor of depth of compressive stress block	β_1= **0.850**
Depth of equivalent rectangular stress block	$a_x = \min((\beta_1 \times c_x),h)$= **3.700** in
Half angle subtended by compression concrete	$\theta_{sbxc} = \text{acos}((h / 2 – a_x) / (h / 2))$ = **53.9** deg
Angle in radians	$\theta_{sbxc\_rad} = \theta_{sbxc} / 90 \text{ deg} \times \pi / 2$ = **0.941**
Area of compression concrete	$A_{sbxc} = h^2 \times (\theta_{sbxc\_rad} - \sin(\theta_{sbxc}) \times \cos(\theta_{sbxc}))/4$ = **37.684** in^2
Moment of area of compressive block	$z_{sbx} = h^3 \times ((\sin(\theta_{sbxc}))^3)/12$ = **256.606** in^3
Yield strain in steel	$\varepsilon_{sx} = f_y / E_s$ = **0.002**
Strength reduction factor	ϕ_x = **0.900**

Details of concrete block

Force carried by concrete

Forces carried by concrete	$P_{xcon} = 0.85 \times f'_c \times A_{sbxc}$ = **128.126** kips

Moment carried by concrete

Moment carried by concrete	$M_{xcon} = 0.85 \times f'_c \times z_{sbx}$ = **72.705** kip_ft

Details of steel layer 1

Depth of layer	x_{x1} = **2.764** in
Strain of layer	$\varepsilon_{x1} = \varepsilon_c * (1 - x_{x1} / c_x)$ = **0.00110**
Stress in layer	$\sigma_{x1} = \min(f_y, E_s * \varepsilon_{x1}) - 0.85 * f'_c$ = **28366.99** psi
Force carried by layer	$P_{x1} = 2 * A_{bar} * \sigma_{x1}$ = **25.064** kips
Moment carried by steel layer	$M_{x1} = P_{x1} * ((h / 2) - x_{x1})$ = **13.025** kip_ft

Details of steel layer 2

Depth of layer	x_{x2} = **6.417** in
Strain of layer	$\varepsilon_{x2} = \varepsilon_c * (1 - x_{x2} / c_x)$ = **-0.00142**
Stress in layer	$\sigma_{x2} = \max(-1 * f_y, E_s * \varepsilon_{x2})$ = **-41237.32** psi
Force carried by layer	$P_{x2} = 2 * A_{bar} * \sigma_{x2}$ = **-36.436** kips
Moment carried by steel layer	$M_{x2} = P_{x2} * ((h / 2) - x_{x2})$ = **-7.843** kip_ft

Details of steel layer 3

Depth of layer	x_{x3} = **11.583** in
Strain of layer	$\varepsilon_{x3} = \varepsilon_c * (1 - x_{x3} / c_x)$ = **-0.00498**
Stress in layer	$\sigma_{x3} = \max(-1 * f_y, E_s * \varepsilon_{x3})$ = **-60000.00** psi
Force carried by layer	$P_{x3} = 2 * A_{bar} * \sigma_{x3}$ = **-53.014** kips
Moment carried by steel layer	$M_{x3} = P_{x3} * ((h / 2) - x_{x3})$ = **11.412** kip_ft

Details of steel layer 4

Depth of layer	x_{x4} = **15.236** in
Strain of layer	$\varepsilon_{x4} = \varepsilon_c * (1 - x_{x4} / c_x)$ = **-0.00750**
Stress in layer	$\sigma_{x4} = \max(-1 * f_y, E_s * \varepsilon_{x4})$ = **-60000.00** psi

Force carried by layer $P_{x4} = 2 * A_{bar} * \sigma_{x4} =$ **-53.014** kips

Moment carried by steel layer $M_{x4} = P_{x4} * ((h / 2) - x_{x4}) =$ **27.551** kip_ft

Force carried by steel

Sum of forces by steel $P_{xs} =$ **-112.1** kips

Total force carried by column

Nominal axial load strength $P_{nx} =$ **22.225** kips

Strength reduction factor $\phi_x =$ **0.900**

Ultimate axial load carrying capacity of column $P_{ux} = \phi_x \times P_{nx} =$ **20.002** kips

Total moment carried by column

Total moment carried by column $M_{ox} =$ **121.183** kip_ft

Ultimate moment strength capacity of column $M_{ux} = \phi_x \times M_{ox} =$ **109.065**kip_ft

Check load capacity for uniaxial loads about the x axis

Factored axial load $P_{u\_act} =$ **20** kips

Ultimate axial capacity $P_{ux} =$ **20** kips

PASS - Ultimate axial capacity exceeds factored axial load

Factored moment about x axis $M_{cx\_min} =$ **1.9** kip_ft

Ultimate moment capacity about the x axis $M_{ux} =$ **109.1** kip_ft

PASS - Ultimate moment capacity exceeds factored moment about x axis

Uniaxially loaded circular column

Details of column cross section

c/d_t ratio $r_{yb} =$ **0.293**

Depth of tension steel $d_t = h - x_{y1} =$ **15.750** in

Depth of NA from extreme compression face $c_y = r_{yb} \times d_t =$ **4.620** in

Factor of depth of compressive stress block $\beta_1 =$ **0.850**

Depth of equivalent rectangular stress block $a_y = \min((\beta_1 \times c_y),h) =$ **3.927** in

Half angle subtended by compression concrete $\theta_{sbyc} = \mathrm{acos}((h / 2 – a_y) / (h / 2)) =$ **55.7** deg

Angle in radians $\theta_{sbyc\_rad} = \theta_{sbyc} / 90\ \mathrm{deg} \times \pi / 2 =$ **0.972**

Area of compression concrete $A_{sbyc} = h^2 \times (\theta_{sbyc\_rad} - \sin(\theta_{sbyc}) \times \cos(\theta_{sbyc}))/4 =$ **41.015** in^2

Moment of area of compressive block $z_{sby} = h^3 \times ((\sin(\theta_{sbyc}))^3)/12 =$ **273.880** in^3

Yield strain in steel $\varepsilon_{sy} = f_y / E_s =$ **0.002**

Strength reduction factor $\phi_y =$ **0.900**

Details of concrete block

Force carried by concrete

Forces carried by concrete $P_{ycon} = 0.85 \times f'_c \times A_{sbyc} =$ **139.451** kips

Moment carried by concrete

Moment carried by concrete $M_{ycon} = 0.85 \times f'_c \times z_{sby} =$ **77.599** kip_ft

Details of steel layer 1

Depth of layer $x_{y1} =$ **2.250** in

Strain of layer $\varepsilon_{y1} = \varepsilon_c * (1 - x_{y1} / c_y) =$ **0.00154**

Stress in layer $\sigma_{y1} = \min(f_y, E_s * \varepsilon_{y1}) - 0.85 * f'_c =$ **41228.13** psi

Force carried by layer $P_{y1} = A_{bar} * \sigma_{y1} =$ **18.214** kips

Moment carried by steel layer $M_{y1} = P_{y1} * ((h / 2) - x_{y1}) =$ **10.245** kip_ft

Details of steel layer 2

Depth of layer $x_{y2} =$ **4.227** in

Strain of layer $\varepsilon_{y2} = \varepsilon_c * (1 - x_{y2} / c_y) =$ **0.00026**

Stress in layer $\sigma_{y2} = \min(f_y, E_s * \varepsilon_{y2}) =$ **7396.83** psi

Force carried by layer $P_{y2} = 2 * A_{bar} * \sigma_{y2} =$ **6.536** kips

Moment carried by steel layer $M_{y2} = P_{y2} * ((h / 2) - x_{y2}) =$ **2.600** kip_ft

Details of steel layer 3

Depth of layer $x_{y3} =$ **9.000** in

Strain of layer $\varepsilon_{y3} = \varepsilon_c * (1 - x_{y3} / c_y) =$ **-0.00284**

Stress in layer $\sigma_{y3} = \max(-1 * f_y, E_s * \varepsilon_{y3}) =$ **-60000.00** psi

Force carried by layer $P_{y3} = 2 * A_{bar} * \sigma_{y3} =$ **-53.014** kips

Moment carried by steel layer $M_{y3} = P_{y3} * ((h / 2) - x_{y3}) =$ **0.000** kip_ft

Details of steel layer 4

Depth of layer $x_{y4} =$ **13.773** in

Strain of layer $\varepsilon_{y4} = \varepsilon_c * (1 - x_{y4} / c_y) =$ **-0.00594**

Stress in layer $\sigma_{y4} = \max(-1 * f_y, E_s * \varepsilon_{y4}) =$ **-60000.00** psi

Force carried by layer $P_{y4} = 2 * A_{bar} * \sigma_{y4} =$ **-53.014** kips

Moment carried by steel layer $M_{y4} = P_{y4} * ((h / 2) - x_{y4}) =$ **21.086** kip_ft

Details of steel layer 5

Depth of layer $x_{y5} =$ **15.750** in

Strain of layer $\varepsilon_{y5} = \varepsilon_c * (1 - x_{y5} / c_y) =$ **-0.00723**

Stress in layer $\sigma_{y5} = \max(-1 * f_y, E_s * \varepsilon_{y5}) =$ **-60000.00** psi

Force carried by layer $P_{y5} = A_{bar} * \sigma_{y5} =$ **-26.507** kips

Moment carried by steel layer $M_{y5} = P_{y5} * ((h / 2) - x_{y5}) =$ **14.910** kip_ft

Force carried by steel

Sum of forces by steel $P_{ys} =$ **-110.8** kips

Total force carried by column

Nominal axial load strength $P_{ny} =$ **22.224** kips

Strength reduction factor $\phi_y =$ **0.900**

Ultimate axial load carrying capacity of column $P_{uy} = \phi_y \times P_{ny} =$ **20.002** kips

Total moment carried by column

Total moment carried by column $M_{oy} =$ **122.387** kip_ft

Ultimate moment strength capacity of column $M_{uy} = \phi_y \times M_{oy} =$ **110.148**kip_ft

Check load capacity for uniaxial loads about the y axis

Factored axial load $P_{u\_act} =$ **20** kips

Ultimate axial capacity $P_{uy} =$ **20** kips

PASS - Ultimate axial capacity exceeds factored axial load

Factored moment about y axis $M_{cy\_min} =$ **1.9** kip_ft

Ultimate moment capacity about the y axis $M_{uy} =$ **110.1** kip_ft

PASS - Ultimate moment capacity exceeds factored moment about y axis

Design of column ties - 7.10.5

Spacing of lateral ties s_{v_ties} = **12.000** in

16 times longitudinal bar diameter $s_{v1} = 16 \times D_{long}$ = **12.000** in

48 times tie bar diameter $s_{v2} = 48 \times D_{stir}$ = **18.000** in

Least column dimension s_{v3} = min (h,b) = **18.000** in

Required tie spacing s = min(s_{v1},s_{v2},s_{v3}) = **12.000** in

s_{v_ties} < s PASS

PILE CAP ANALYSIS & DESIGN (ACI318-11)

In accordance with ACI318-11

Tedds calculation version 2.0.05

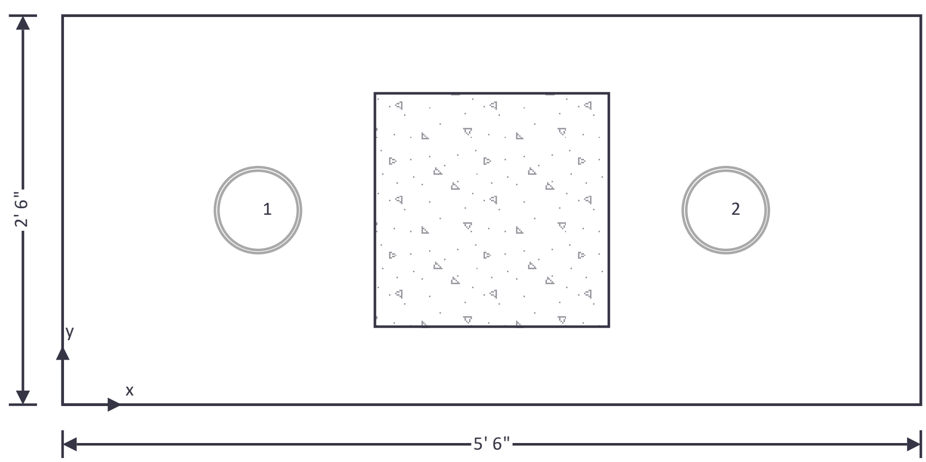
Design summary - PASS (0.810)

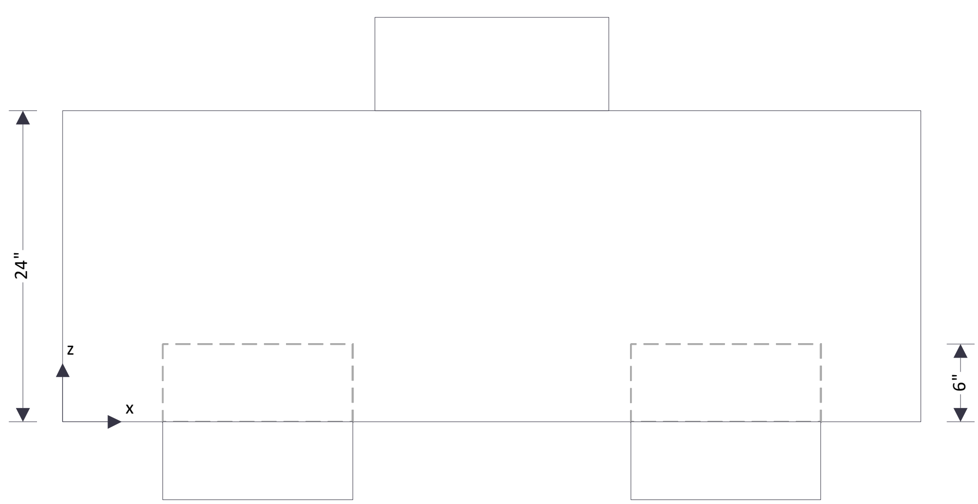
Pile analysis summary

	Unit	Applied	Allowable	Utilization	Result
Pile axial compression, pile 2	kips	12	300	0.040	PASS

Pile cap design summary

	Unit	Required	Provided	Utilization	Result
Flexural reinforcement	in^2	2.9 (min)	3.5	0.81	PASS
One way modified shear	kips	14.7	64.3	0.228	PASS
Two way col. mod. shear	psi	16.9	133.9	0.126	PASS
Two way pile shear	psi	20.5	164.3	0.125	PASS





Pile cap details

Pile cap width, along x axis	L_x = **5.5** ft
Pile cap width, along y axis	L_y = **2.5** ft
Total cap depth	D_{cap} = **24** in
Density of concrete	γ_{conc} = **150** lb/ft^3
Height of soil above pile cap	h_{soil} = **0** in
Density of soil above pile cap	γ_{soil} = **80** lb/ft^3

Column details

Column width, along x axis	$l_{x,col}$ = **18** in
Column width, along y axis	$l_{y,col}$ = **18** in
Column location, x axis	x_c = **2.75** ft
Column location, y axis	y_c = **1.25** ft

Pile details

Pile material	Steel
Steel pile section	Pipe STD x6
Allowable axial compression load	$P_{pC,allow}$ = **300** kips
Allowable axial tension load	$P_{pT,allow}$ = **0** kips
Allowable lateral load	$V_{p,allow}$ = **25** kips
Number of piles	N_p = **2**
Pile embedment	d_{embed} = **6** in
Pile spacing	s_p = **36** in
Edge distance	E = **15** in

Column axial loads

Axial dead load	P_D = **10** kips
Total area axial dead load	$P_{D,area} = \gamma_{conc} * L_x * L_y * D_{cap}$ = **4.125** kips
Axial live load	P_L = **10** kips

Pile group centroid

Centroid location, x direction	$x_{pg,c} = (x_{p1} + x_{p2}) / N_p$ = **2.75** ft
Centroid location, y direction	$y_{pg,c} = (y_{p1} + y_{p2}) / N_p$ = **1.25** ft

Pile distance from centroid

Pile 1 centroid distance, x direction	$x_{p1,c} = x_{p1} - x_{pg,c}$ = **-1.5** ft
Pile 1 centroid distance, y direction	$y_{p1,c} = y_{p1} - y_{pg,c}$ = **0** ft
Pile 2 centroid distance, x direction	$x_{p2,c} = x_{p2} - x_{pg,c}$ = **1.5** ft
Pile 2 centroid distance, y direction	$y_{p2,c} = y_{p2} - y_{pg,c}$ = **0** ft

Moment of inertia of pile group

Moment of inertia about x-x axis	$I_{xx} = y_{p1,c}^2 + y_{p2,c}^2$ = **0** ft^2
Moment of inertia about y-y axis	$I_{yy} = x_{p1,c}^2 + x_{p2,c}^2$ = **4.5** ft^2

Loading eccentricity

Eccentricity of column load, x direction	$e_{x,c} = x_c - x_{pg,c}$ = **0** ft
Eccentricity of column load, y direction	$e_{y,c} = y_c - y_{pg,c}$ = **0** ft

Dead load pile forces

Dead load moment about x-x axis	$M_{xD,Des}$ = 0 kip_ft = **0** kip_ft

Dead load moment about y-y axis	$M_{yD,Des}$ = 0 kip_ft = **0** kip_ft
Dead shear load on each pile, x direction	$V_{p,x,D} = V_{xD} / N_p$ = **0** kips
Dead shear load on each pile, y direction	$V_{p,y,D} = V_{yD} / N_p$ = **0** kips
Dead axial load on pile 1	$P_{p1,D} = (P_D + P_{D,area}) / N_p$ = **7.06** kips
Dead axial load on pile 2	$P_{p2,D} = (P_D + P_{D,area}) / N_p$ = **7.06** kips

Live load pile forces

Live load moment about x-x axis	$M_{xL,Des}$ = 0 kip_ft = **0** kip_ft
Live load moment about y-y axis	$M_{yL,Des}$ = 0 kip_ft = **0** kip_ft
Live shear load on each pile, x direction	$V_{p,x,L} = V_{xL} / N_p$ = **0** kips
Live shear load on each pile, y direction	$V_{p,y,L} = V_{yL} / N_p$ = **0** kips
Live axial load on pile 1	$P_{p1,L} = P_L / N_p$ = **5** kips
Live axial load on pile 2	$P_{p2,L} = P_L / N_p$ = **5** kips

ASCE 7-10 load combinations (ASD)

1.0D (0.024)

1.0D + 1.0L (0.040)

Combination 2 results: 1.0D + 1.0L

Pile 2 axial load	$P_{p2} = 1.0 * P_{p2,D} + 1.0 * P_{p2,L}$ = **12.06** kips
	max($P_{p2} / P_{pC,allow}$,0) = **0.040**

PASS - Pile allowable compression load exceeds axial force

Pile cap design

Material details

Compressive strength of concrete	f'_c = **3000** psi
Concrete type	Normal weight
Concrete modification factor	λ = **1**
Yield strength of reinforcement	f_y = **60000** psi
Nominal cover to top reinforcement	$c_{nom,top}$ = **3** in
Nominal cover to bottom reinforcement	$c_{nom,bot}$ = **3** in

ASCE 7-10 load combinations (LRFD)

1.4D (0.810)

1.2D + 1.6L + 0.5Lr (0.810)

Reinforcement in y direction

Reinforcement provided	8 No.6 bot bars (8 in c/c)
Area of reinforcement provided	$A_{s.prov}$ = **3.52** in^2
Minimum area of reinforcement (22.4.3.2)	$A_{s.min} = 0.0018 * L_x * D_{cap}$ = **2.851** in^2

PASS - Area of reinforcement provided exceeds minimum

Maximum spacing of reinforcement (24.4.3.3)	s_{max} = min(5 * D_{cap}, 18 in) = **18** in

PASS - Maximum permissible reinforcement spacing exceeds actual spacing

Combination 2 results: 1.2D + 1.6L + 0.5Lr

One-way shear design at column face, along x axis, right side

Ultimate shear force at face of column	V_u = **14.675** kips
Ultimate moment force at face of column	M_u = **14.675** kip_ft
Depth to reinforcement	$d_v = d_{x.bot}$ = **14.625** in
Distance to nearest pile	w_R = **9** in

Shear strength reduction factor — ϕ_v = **0.75**

Nominal shear capacity (CRSI Section 5.3) — V_n = min((d_v / (w_R + $e_{tolerance}$)) * (3.5 - 2.5 * min(1.0,M_u / (V_u * d_v))) * (1.9 * λ * $\sqrt{}$(f'_c * 1 psi) + 0.1 * λ * $\sqrt{}$(f'_c * 1 psi) * max(1.0,V_u * d_v / M_u)),10 * λ * $\sqrt{}$(f'_c * 1 psi)) * L_y * d_v = **85.789** kips

Design shear capacity — ϕV_n = ϕ_v * V_n = **64.342** kips

V_u / ϕV_n = **0.228**

PASS - Design shear capacity exceeds ultimate shear load

Column modified two way shear design

Depth to reinforcement — d_{v2} = **13.875** in

Distance to closest pile, x direction — w_x = 9 in

Distance to closest pile, y direction — N.A.

Shear perimeter length — $l_{x,perim}$ = **42** in

Shear perimeter width — $l_{y,perim}$ = **24** in

Shear perimeter, modified (CRSI 5.3) — b_s = $l_{x,perim}$ + $l_{y,perim}$ = **66.000** in

Area inside shear perimeter — $A_{InsidePerim}$ = $l_{x,perim}$ * $l_{y,perim}$ = **1008.000** in^2

Ultimate shear load — V_u = abs(Sum(0.089 * $P_{p1,LRFD2}$,$P_{p2,LRFD2}$) - 1.2 * (γ_{conc} * D_{cap}) * (A_{cap} - $A_{InsidePerim}$)) = **15.511** kips

Ultimate shear stress from vertical load — v_{umod} = max(V_u / (b_s * d_{v2}),0 psi) = **16.938** psi

Equivalent shear perimeter, traditional — b_o = b_s + d_{v2} = **79.875** in

Column geometry factor (11.11.2.1) — β = $l_{y,col}$ / $l_{x,col}$ = **1.00**

Column location factor (11.11.2.1) — α_s =**20**

Concrete shear strength, traditional (11.11.2.1) — v_{cpa} = (2 + 4 / β) * λ * $\sqrt{}$(f'_c * 1 psi) = **328.634** psi

v_{cpb} = (α_s * d_{v2} / b_o + 2) * λ * $\sqrt{}$(f'_c * 1 psi) = **299.833** psi

v_{cpc} = 4 * λ * $\sqrt{}$(f'_c * 1 psi) = **219.089** psi

v_{cp} = min(v_{cpa},v_{cpb},v_{cpc}) = **219.089** psi

Concrete shear strength, modified (CRSI 5.3) — $v_{cp.mod}$ = min((d_{v2} / (2 * ($e_{tolerance}$ + d_p / 2))) * (b_o / b_s) * v_{cp}, 32 * $\sqrt{}$(f'_c * 1 psi)) = **178.588** psi

Shear strength reduction factor — ϕ_v = **0.75**

Nominal shear stress capacity (Eq. 11-2) — v_n = $v_{cp.mod}$ = **178.588** psi

Design shear stress capacity (Eq. 11-1) — ϕv_n = ϕ_v * v_n = **133.941** psi

v_{umod} / ϕv_n = **0.126**

PASS - Design shear capacity exceeds ultimate shear load

Pile two way shear design, pile 2

Depth to reinforcement — d_{v2} = **13.875** in

Shear perimeter length — $l_{x,perim}$ = **29.238** in

Shear perimeter width — $l_{y,perim}$ = **28.738** in

Shear perimeter (11.11.1.2) — b_o = $l_{x,perim}$ + $l_{y,perim}$ = **57.975** in

Ultimate shear load — V_u = abs($P_{p2,LRFD2}$) = **16.475** kips

Ultimate shear stress from vertical load — v_{ug} = max(V_u / (b_o * d_{v2}),0 psi) = **20.481** psi

Pile geometry factor (11.11.2.1) — β = $l_{x,pile}$ / $l_{y,pile}$ = **1.07**

Pile location factor (11.11.2.1) — α_s =**20**

Pile shear strength (11.11.2.1) — v_{cpa} = (2 + 4 / β) * λ * $\sqrt{}$(f'_c * 1 psi) = **313.627** psi

v_{cpb} = (α_s * d_{v2} / b_o + 2) * λ * $\sqrt{}$(f'_c * 1 psi) = **371.714** psi

$v_{cpc} = 4 * \lambda * \sqrt{(f'_c * 1 \text{ psi})}$ = **219.089** psi

$v_{cp} = \min(v_{cpa}, v_{cpb}, v_{cpc})$ = **219.089** psi

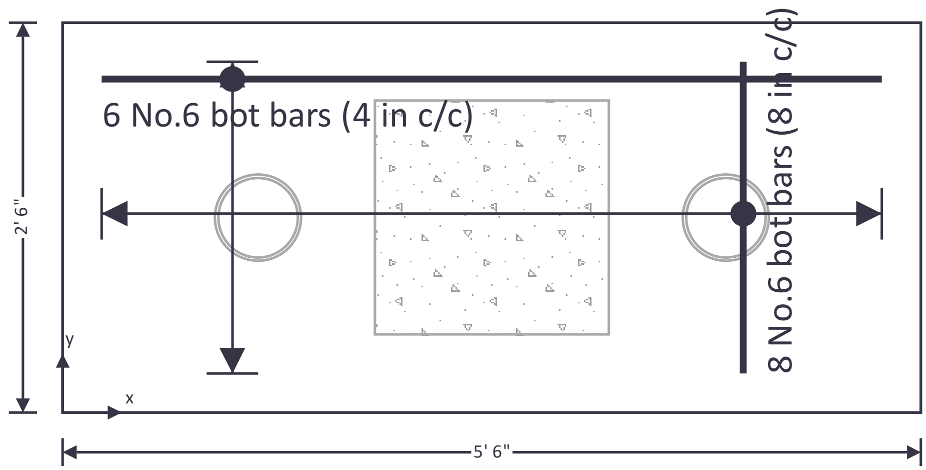
Shear strength reduction factor ϕ_v = **0.75**

Nominal shear stress capacity (Eq. 11-2) $v_n = \min(v_{cpa}, v_{cpb}, v_{cpc})$ = **219.089** psi

Design shear stress capacity (Eq. 11-1) $\phi v_n = \phi_v * v_n$ = **164.317** psi

$v_{ug} / \phi v_n$ = **0.125**

PASS - Design shear capacity exceeds ultimate shear load



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QUESTION@TREX.COM

EXHIBIT F

COMPOSITE DECKING – TREX TRANSCEND AND TREX ENHANCE

Part 1 General

1.1 Section Includes

A. Composite Decking (Trex Transcend and Trex Enhance)

1.2 Related Sections

A. Section 06-1100 – Wood Framing

1.3 References

A. ASTM D-7032-04: Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails), ASTM International.
B. ASTM D-7031-04: Standard Guide for Evaluating Mechanical and Physical Properties of Wood-Plastic Composite Products, ASTM International
C. ASTM E-84-01: Test Method for Surface Burning Characteristics of Building Materials, ASTM International.
D. ASTM D 570: Water Absorption of Plastics
E. ASTM D 1761: Mechanical Fasteners in Wood
F. ASTM D -1413-99: Test method for Wood Preservatives by Laboratory Soil-block Cultures
G. ASTM C177: Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

1.4 Design/Performance Requirements

A. Structural Performance:
   a. Deck: Uniform Load – 100lbf/sq.ft.
   b. Tread of Stairs: Concentrated Load: 750 lbf/sq.ft., and 1/8” max. deflection with a concentrated load of 300 lbf on area of 4 sq. in.
B. Fire-Test Response Characteristics per ASTM E-84.

1.5 Submittals

A. Product Data Indicate sizes, profiles, surface style, and performance characteristics
B. Samples: For each product specified, one sample representing actual product color, size, and finish.

1.6 Delivery, Storage, and Handling

A. Store Trex products on a flat and level surface. Adjust support blocks accordingly
B. Support Trex bundles on supplied dunnage
C. When stacking Trex bundles, supports should start approximately 8" from each end and be spaced approximately 2ft on center. Supports should line up vertically/perpendicular to the decking product.
D. Do not stack Trex Select decking more than 14 bundles.
E. Keep material covered using the provided bundle cover until time of installation.
F. See www. Trex.com for detailed storage recommendations;
    a. http://s7d4.scene7.com/is/content/Trex/Installation%20Guide%202013pdf

1.7 Warranty

A. Provide manufactures warranty against rot, decay, splitting, checking, splintering, fungal damage, and termite damage for a period of 25 years for a residential installation and 10 years for a commercial installation. In addition provide the Trex Transcend and Trex Enhance Fade and Stain Warranty against food staining and fading beyond 5 Delta E (CIE units) for a period of 25 years for a residential installation and 10 years for a commercial installation. Specific terms for warranties can be found at; www.Trex.com

Part 2 Products

2.1 Manufacturers

A. Contract Documents are based on products supplied by; Trex Company, Inc., 160 Exeter Dr., Winchester, VA 22603.
B. Substitutions: Not permitted under Division 01

2.2 Applications/Scope

A. Wood-Plastic Composite Lumber;
    a. Material Description: Composite Decking consisting of recycled Linear Low Density Polyethylene (LLDPE) and recycled wood. The product is extruded into shapes and sizes as follows:
        i. Trex Transcend and Trex Enhance Decking Boards; 1 x 5.5".
        ii. Lengths – 12, 16, and 20 feet
        iii. Color – To be specified by owner from Trex' standard list of colors.

b. Physical and Mechanical Properties as follows:

Test	Test Method	Value	
Flame spread	ASTM E 84	60(Transcend) / 85(Enhance)	
Thermal Expansion	ASTM D 1037	1.9 x 10-5 inch/inch/degreeF	
Moisture Absorption	ASTM D 1037	< 1%	
Screw Withdrawal	ASTM D1761	558 lbs/in	
Fungus Resistance	ASTM D1413	Rating - no decay	
Termite Resistance	AWPAE1-72	Rating = 9.6	
		Ultimate (Typical)Values *	Design Values
Compression Parallel	ASTM D198	1588 psi	540 psi
Compression Perpendicular	ASTM D143	1437 psi	540 psi
Bending Strength	ASTM D198	3280 psi	500 psi
Shear Strength	ASTM D143	1761 psi	360 psi
Modulus of Elasticity	ASTM D4761	412,000psi	200,000 psi
Modulus of Rupture	ASTM D4761	3280 psi	500 psi

* Ultimate strength values are not meant for design analysis. Design values are for temperatures up to 130F (54C)

2.2 Accessories

A. Fasteners:
   a. Trex Universal Hideaway Hidden Fasteners
   b. Screws; See - http://s7d4.scene7.com/is/content/Trex/Installation%20Guide%202013pdf for the updated recommendations on fasteners.

Part 3 Execution

3.1 Installation

A. Install according to Trex installation guidelines. http://s7d4.scene7.com/is/content/Trex/Installation%20Guide%202013pdf

B. Cut, drill, and rout using carbide tipped blades

C. Do not use composite wood material for structural applications

3.2 Cleaning

A. Following cleaning recommendations as found in Trex installation guide at; http://s7d4.scene7.com/is/content/Trex/Installation%20Guide%202013pdf

EXHIBIT G1

WAGNER™
ARCHITECTURAL SYSTEMS

ARCHITECTURAL SYSTEMS FOR LIFE SAFETY AND LIGHT

Welcome to Wagner™ Architectural Systems. We are a leading global provider of architectural railing systems dedicated to producing life safety and lighting products that meet the highest standards of quality, engineering and code compliance.

We work with architects, lighting designers, engineers and contractors to deliver complete product systems, or custom engineer and fabricate design-specific railing and panel solutions that provide safety, assist navigation, and elevate the architectural aesthetic of common space designs.

With expertise in manufacturing, code requirements and addressing LEED building standards, we are a partner who can meet your specifications and deliver installations with the fit, finish, beauty and performance you desire.

To learn more about working with Wagner Architectural Systems or to discuss your project, visit us at wagnerarchitectural.com, or call us at 888.243.6914.

ON THE COVER: MARRIOTT MARQUIS SAN DIEGO MARINA
SAN DIEGO, CA
ARCHITECT: tvsdesign
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KENNETH F. BURNS MEMORIAL BRIDGE
MASSACHUSETTS, DOT
WORCESTER-SHREWSBURY, MA
ARCHITECT: FST/STANTEC

LUMENRAIL® LIGHTS YOUR WAY

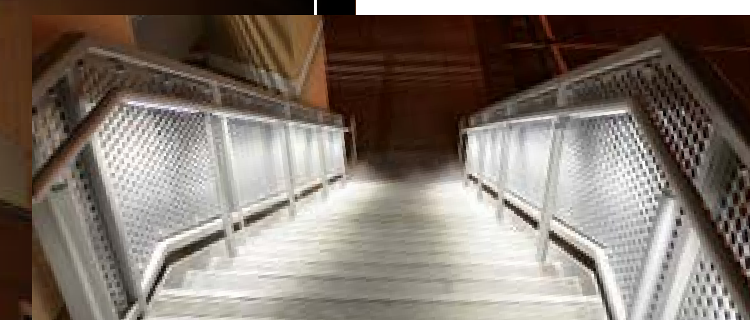
Common areas and pedestrian walkways have specific lighting requirements to ensure safe navigation and access in dark or lowlight conditions. These same walkways also require the use of handrails to protect, guide and assist pedestrians on ramps, landings, stairs and balconies. Lumenrail combines these lighting and safety requirements into one seamless, illuminated, protective assembly.

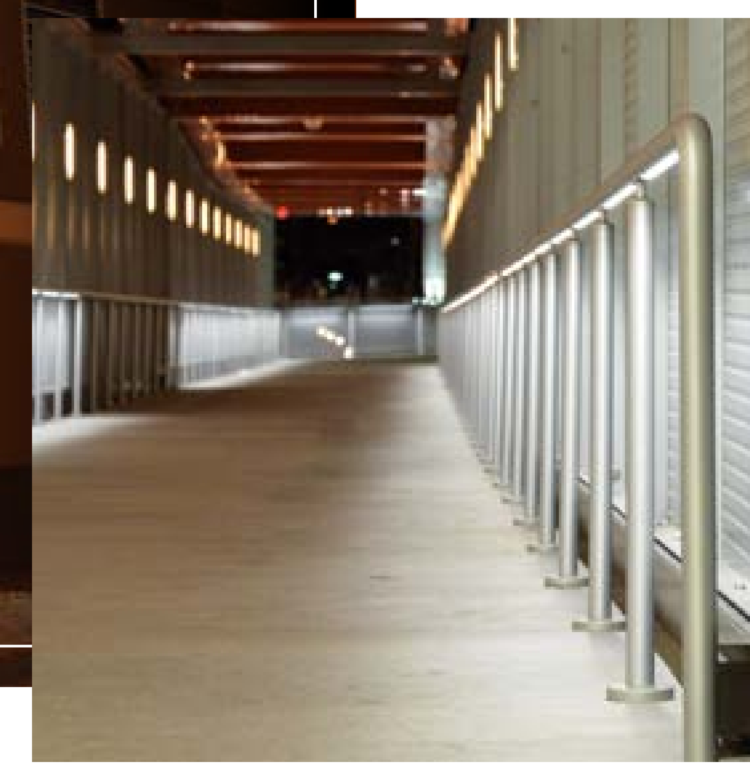
Lumenrail produces enough light to help pedestrians distinguish objects and obstacles clearly and without glare, often eliminating the need for additional lighting sources. Depending on the type of installation or your design specifications, Lumenrail can serve as the primary light source or as supplemental decorative lighting.

The Lumenrail illuminated handrail system utilizes linear or point-source luminaries with LED technology for exceptional flexibility, performance and longevity. The architectural grade finish and non-weld connections ensure beauty and durability under all conditions. With multiple mounting and infill options, Lumenrail is compatible with most handrail designs including wall and guardrail mounting, embedded posts, glass railing systems, cable railings, and stainless steel woven wire panels.

For information on Lumenrail illuminated handrail systems, scan this QR code.

SYMPHONY PARK
PEDESTRIAN BRIDGE
LAS VEGAS, NV
DESIGN: GCW ENGINEERS





LUMENPOD®

POINT-SOURCE ILLUMINATION

Create code-compliant lighting layouts for your most challenging designs. Lumenpod is a high performance family of compact, point-source LED luminaries designed specifically for handrail applications. They are ideal for pathway illumination and feature both symmetric and asymmetric output options to address variable widths, curves and elevation changes.

The flagship Lumenpod 28 is available in various optical packages with industry leading performance. Its innovative patent pending design features a simplified installation with fewer connections and components. Developed and produced domestically, Buy America projects can be specified without reservation.

Our 316 stainless steel Lumenpod 16 has a machined chamfered edge for a flush fit and integrated look in curved installations, as well as straight runs and flat material. Its mechanically threaded body and high-efficiency design make it a flexible point-source lighting solution.

LUMENPOST™ COMPATIBLE

See page 13 for integrated power supply details.

CENTER FOR SUSTAINABLE LANDSCAPES GREEN ROOF
PHIPPS CONSERVATORY AND BOTANICAL GARDENS
PITTSBURGH, PA
ARCHITECT: THE DESIGN ALLIANCE ARCHITECTS

LUMENPOD® 28

symmetric

asymmetric

The Lumenpod 28 offers the next evolution of point source architectural rail lighting. Designed for pathway illumination, it's available in symmetric and asymmetric output versions using the latest LED technology and production techniques.

- ETL wet location, IP68 ingress protection
- Solid cast 316 stainless steel face
- IK9 impact rating and secure installation
- Rectilinear distribution promotes uniformity
- Patent pending
- Designed, engineered and manufactured in the USA

For information on Lumenpod 28 point source luminaries, scan this QR code.

LUMENPOD® 16

The Lumenpod 16 is an ideal architectural lighting solution for any new or retrofit application. It provides distinctive projection aesthetics in straight or curved railing systems.

- Robust design withstands high impacts
- Weather resistant to IP67
- Machined 316 stainless steel resists corrosion
- Easy retrofit into existing applications
- Beam spreads from 16˚ to 94˚
- Recessed LED provides excellent visual comfort

For information on Lumenpod 16 point-source luminaries, scan this QR code.

BANTAM™

Designed for performance and ease of installation, our new Bantam surface-mount fixture combines point-source illumination with the flexibility for round or flat surface installations. Bantam is perfect for new or retrofit applications and meeting egress lighting compliance requirements. Its 316 stainless steel housing, IK10 rating and tamper resistant hardware provide durability and lasting appeal. Punctuate your application with defined pools of illumination from posts, columns or walls. A subtle 10˚ bias projects light from the mounting surface toward the path or feature.

For information on Bantam surface mount fixtures, scan this QR code.

WEDGE TERRACE, WPI QUAD
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MA
LANDSCAPE ARCHITECT: HALVORSON DESIGN, INC.
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LUMENLINEAR™

BEAUTY. SAFETY. PERFORMANCE.

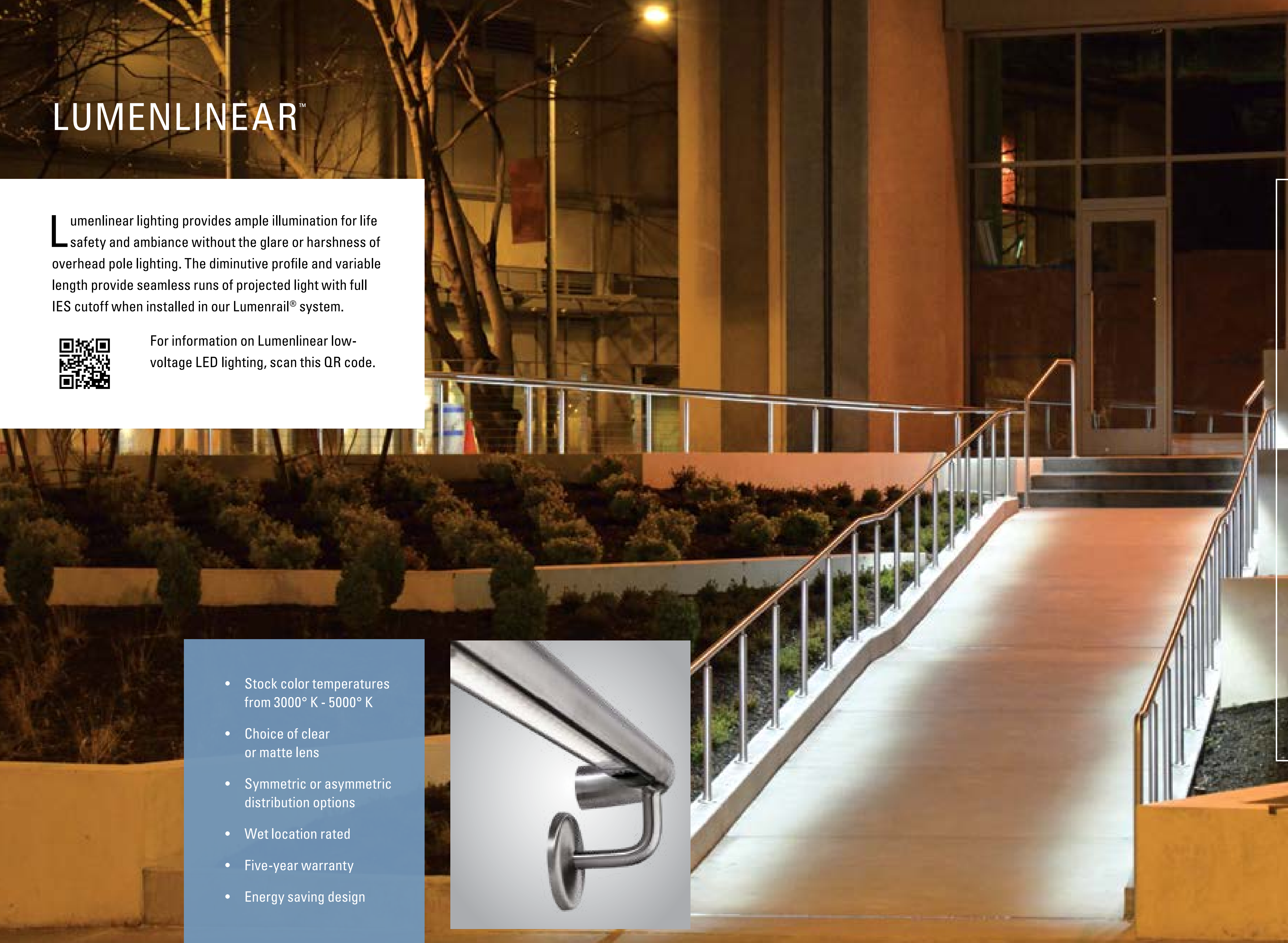
Lumenlinear is a state-of-the-art low-voltage LED light fixture that's an exceptional integrated linear source to enhance any stairway or walkway. Its unmatched fixture performance allows for truly spectacular installations and provides an effective Lumenrail® solution for any lighting design challenge.

Lumenlinear is a uniform and practical solution for adding beauty and light to your life safety installations. It's available in a range of warm, neutral or cool white color temperatures and with options for solid colors, and standard-, mid- and high-output offerings.

LUMENPOST™ COMPATIBLE

See page 13 for integrated power supply details.

BIG FOUR PEDESTRIAN BRIDGE
BIG FOUR STATION PARK
JEFFERSONVILLE, IN
ARCHITECT: TEG ARCHITECTS
PHOTO: STUART MAY, UNITED CONSULTING



LUMENLINEAR™

Lumenlinear lighting provides ample illumination for life safety and ambiance without the glare or harshness of overhead pole lighting. The diminutive profile and variable length provide seamless runs of projected light with full IES cutoff when installed in our Lumenrail® system.

For information on Lumenlinear low-voltage LED lighting, scan this QR code.

- Stock color temperatures from 3000° K - 5000° K
- Choice of clear or matte lens
- Symmetric or asymmetric distribution options
- Wet location rated
- Five-year warranty
- Energy saving design

1600 SEVENTH BUILDING
SEATTLE CENTRAL BUSINESS DISTRICT
SEATTLE, WA
DESIGN: HBB LANDSCAPE ARCHITECTURE

LUMENPOST™

INTEGRATED LED DRIVER ENCLOSURE

Lumenpost is a cast stainless steel enclosure designed to house an LED driver for any Lumenrail® post mounted application. It provides easy installation, service convenience and the durability to withstand harsh environments and vandal abuse. The enclosure integrates into a standard 1.90" diameter post for aesthetic uniformity throughout the handrail system.

- Use with Lumenpod®, Bantam™ or Lumenlinear™ luminaries
- Tamper proof 316 stainless steel hardware
- Industry leading 100W, 24VDC output
- Code-compliant structural integrity
- High-quality craftsmanship and appearance

For information on Lumenpost, scan this QR code.

CODE AND COMPLIANCE

YOUR LIFE SAFETY EXPERTS

PORT ANGELES WATERFRONT PARK
PORT ANGELES, WA
ARCHITECT: LMN ARCHITECTS, SEATTLE

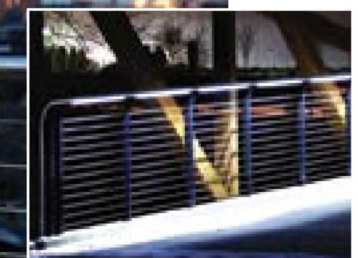
DECODING BUILDING CODES AND ADA STANDARDS

Prior to using any railing products, it's incumbent on designers, fabricators and installers to make themselves familiar with the local codes and standards that apply to their applications. To ease the process and avoid costly delays, Wagner can help specify and install the right products and systems. We have been active in the world of codes and standards for over 40 years, and have been providing railing products for over 60 years. Ask us – Wagner can help you meet the demands of your local authority having jurisdiction.

To learn more about our collaborative design approach and incorporating our safe, reliable and high-performing life safety products on your next project, visit wagnerarchitectural.com or call us at 888.243.6914.

MORE INNOVATIVE ARCHITECTURAL RAILING SYSTEMS

Beyond the Lumenrail® illuminated railing system, Wagner offers a full range of contemporary, high-quality railing systems and accessories that can be implemented independently or mixed to produce incredible, easy-to-install, interior and exterior applications.

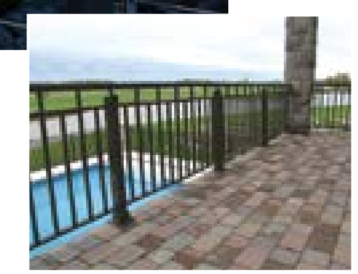


CABLE RAILING

- Swageless fittings for 1/8" and 3/16" diameter cable are easy to install
- Swaged fittings allow smaller holes in intermediate posts and require installation equipment
- Posts, cable, clamps, braces and hardware available

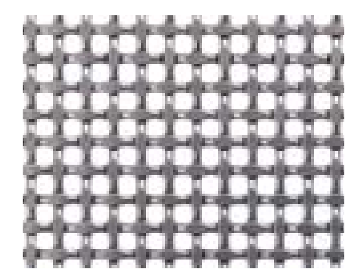
GLASS RAILING

- PanelGrip® 2, patented dry glaze, lightweight aluminum shoe molding and locking mechanisms, provide the fastest installation for ½" to ¾" (12-19 mm) thick glass
- Wet glaze aluminum shoe molding
- Legato™, round, square or flat post railing system
- Glass mounting hardware and top rail options



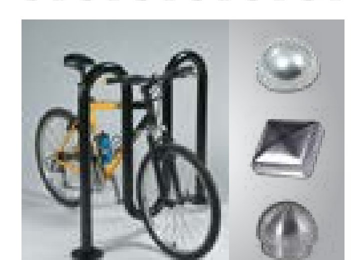
STAINLESS STEEL AND ALUMINUM RAILING

- Strength, durability and low maintenance
- Stainless steel railings highlight any project and come pre-fabricated and ready to install
- Aluminum railings are provided as components or pre-fabricated and ready-to-install systems. Multiple finishes are available.



ACCESSORIES

- Woven wire mesh infill: a wide range of 304 stainless steel panels fit within slotted rail sections
- Handrail brackets, elbows, connectors, flanges, caps and more



CUSTOM ARCHITECTURAL COMPONENTS

- Post caps: steel, aluminum, bronze and cast iron with galvanized, zinc plated, anodized or polished finishes
- Balls, hemispheres and rings for ornamental applications
- Industrial-strength bike racks: durable, stylish, easy-to-install stainless steel or galvanized steel racks – custom rack designs encouraged

WAGNER ARCHITECTURAL SYSTEMS IS PROUD TO PARTICIPATE IN YOUR PROJECTS AND PROMOTE THE RESULTS.

SUBMIT YOUR PHOTOS TO:
SYSTEMS@MAILWAGNER.COM

MARRIOTT MARQUIS
SAN DIEGO MARINA
SAN DIEGO, CA
ARCHITECT: tvsdesign
PHOTOGRAPHY: ©WAYNECABLE2018

WAGNER™
ARCHITECTURAL SYSTEMS

PROJECT NAME: ________________________ CATALOG NUMBER: ______________________

NOTES: __________________________ FIXTURE SCHEDULE: ______________________________

EXHIBIT G2

Full Cutoff Wall Pack

The Full Cutoff Wall Pack is designed to cast the light down and reduce light spread. It has a tempered glass lens that will resist yellowing over time. It is wet location rated for mounting outside along the sides of buildings, schools, garages and other structures.

Features:

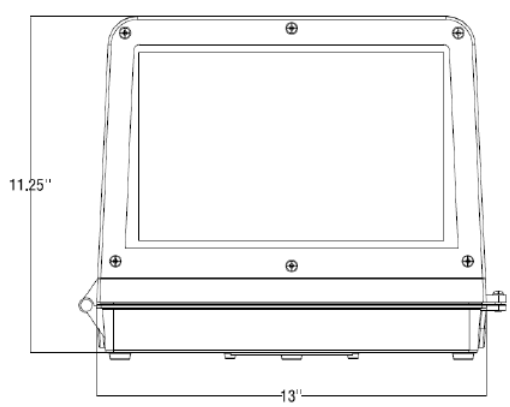
- Tempered glass lens, non-yellowing
- 0-10V dimming standard
- ETL, DLC Listed
- IP65 Rated
- 120-277V
- CRI: >70
- CCT: 4000K or 5000K
- Life: 50000 Hours
- Warranty: 5 Years
- Lumens:
  - 45W = 5500
  - 60W = 6900
  - 75W = 8800
  - 90W = 11000 (available Q4 2021)

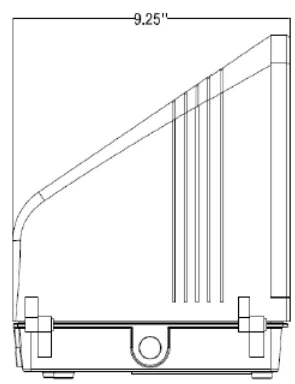
Applications

- Building façade
- Carports
- Loading areas
- Driveways
- Parking areas

WareLight Full Cutoff Wall Pack				
Model	Wattage	CCT	Voltage	Generation
WLFC	45W	4000K	MV (120-277V)	G2
	60W	5000K		
	75W			
	90W			

Dimensions
Length: 13” (330mm)
Width: 11.25” (280mm)
Height: 9.25” (230mm)





Trash Bins- Exhibit H1

The Cityview CV2-1000 waste receptacle is a top opening high volume trash receptacle designed for high traffic areas. CityView receptacles embody a simple vertical strap design.

MATERIALS

- Vertical straps – 5/16” x 1 1/2" steel flat bar
- Outside support strap - 1/4" x 2" steel flat bar
- Top ring - 5/8" dia. solid steel round bar
- Foot plates - 5/16" x 1 1/2" stainless steel
- Lid - 14 ga. spun steel lid
- Dome - 12 ga. spun steel dome
- Ash inlay - 13 ga. stainless steel ash pan
- Liner - High Density Polyethylene liner with handles

SUSTAINABILITY

CityView benches have a recycled material content of 96.91% of which 83.97% is post consumer content. This content may vary based on the product design, product material type, and interchangeable piece parts. Recycled content estimates are an average based on steel mill provided information for steel bar product. For project specific information contact SiteScapes. All styles are 100% recyclable. For more information about SiteScapes sustainable products and policies, please refer to our **Environmental Statement**.

Riverwalk Bench Exhibit H2

he CityView CV1-1000 is SiteScapes standard bench. This bench incorporates steel bar ends and vertical straps into its backed bench design. This bench is heavy duty and stands up to any environment.

MATERIALS

- Seat straps are 1 ½" x 5/16"
- End units are steel bar
- 1 5/16" support tubes at top and bottom
- Standard 6' and 8' lengths

SUSTAINABILITY

CityView benches have a recycled material content of 96.91% of which 83.97% is post consumer content. This content may vary based on the product design, product material type, and interchangeable piece parts. Recycled content estimates are an average based on steel mill provided information for steel bar product. For project specific information contact SiteScapes. All styles are 100% recyclable. For more information about SiteScapes sustainable products and policies, please refer to our **Environmental Statement**.